

## Are university students continuing their oral-dental health practices as performed in childhood?

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### Abstract

**Objectives:** This study aimed to evaluate the correlation between university students' oral-dental health behavior in their childhood and at present.

**Methods:** A self-administered anonymous questionnaire survey was performed with 3rd and 4th year university students in Nagasaki. The questionnaire included questions regarding oral-dental health practices related to toothbrushing, dental health check-ups, fluoride varnish, self-checking of oral and dental conditions, eating habits of sweets, mastication during eating, and frequency of toothbrush renewal, both currently and that of in childhood during primary school years.

**Results:** A total of 150 responses were analyzed. It was found that students brush their teeth  $2.9 \pm 0.9$  (mean  $\pm$  standard deviation) times per day, while they brushed  $2.7 \pm 0.7$  times per day in childhood ( $r = 0.339$ ). Seventy two of the students brushed their teeth 3 times or more per day at both the time of the survey and in childhood (48.0%).

**Conclusion:** It is necessary to establish oral-dental health behaviors as part of everyday lifestyle from childhood with continuous intervention of oral-dental health promotion.

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**Key Words** : university students, primary school age, life-course, oral-dental health practices

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### Introduction

The Ministry of Health, Labour and Welfare (MHLW) has implemented a campaign for oral health called "8020", which is intended to advocate "maintaining 20 of one's own teeth until age 80". The campaign focuses not only on oral health in adulthood, but rather takes a life-long approach by addressing oral health starting from childhood. It is said that having 20 or more of one's own teeth can allow one to maintain a satisfactory diet and eating functions such as swallowing and chewing throughout their lifetime. Thus, the act of eating with one's own teeth and being able to swallow for as long as possible is required to maintain a long, healthy life<sup>1,2</sup>. According to MHLW, life expectancy in Japan was 81.25 years for men and 87.32 years for women in 2018, ranking both in the world's three highest life expectancies<sup>3</sup>. With such long life expectancies, it is important that appropriate

daily oral-dental health care is practiced according to each life stage in order to maintain a longer health span, starting from childhood to adulthood.

An association between socio-economic status (SES) and oral-dental health conditions has also been reported. Not only adulthood SES, but also childhood SES was associated with oral-dental health in adulthood<sup>4</sup>, although adulthood SES mediated oral-dental health-related behavior such as tooth-brushing frequency and sugar intake frequency<sup>5</sup>. A previous study in Japan reported that community dwellers with healthy oral health practices such as brushing teeth for 2 minutes or more and paying attention to media information regarding oral-dental health had better oral-dental health conditions<sup>6</sup>. On the other hand, a study regarding mothers' preventive behaviors of their children's oral-dental health was associated with mothers' educational level and receiving guidance

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on oral-dental health during pregnancy<sup>7)</sup>. Regarding school-aged children's oral-dental health, school-based tooth-brushing program was associated with a reduction in number of caries<sup>8)</sup>. In general, pre-school and school-aged children received oral-dental health promoting and preventing programs due to mother and child health policies and school health policies. However, oral-dental health programs directed to people over the compulsory school age have not been given enough attention in Japan. Therefore, the authors considered that it is important to reveal oral-dental health behaviors among young adults including university students in order to promote long-life oral-health conditions.

Another study in Japan also found there to be an association between the parent(s)'s socio-economic status and their children's educational status<sup>9)</sup>. The percentage of people who get admitted into university in Japan is high, reaching 53.7% in 2019<sup>10)</sup>, but university students generally still tend to be from families with better SES. The authors therefore supposed that university students might have better SES than non-university-attending peers and be brought up in families with better SES<sup>11)</sup>. In addition, university students belonging to School of Health Sciences may have acquired adequate oral-dental health behavior from their studies on the importance of maintaining oral-dental health.

To promote life-course oral health is an essential strategy for healthy aging in the super-aged society as of Japan. This study aimed to evaluate the correlation between university students' oral-dental health behavior in childhood and in current age. Findings of this study will be used as an indicator of stability of oral-dental health behavior among young adults with better SES, and utilized for establishment of seamless oral-dental health program.

### Methods

A self-administered anonymous questionnaire survey was performed with 3<sup>rd</sup> and 4<sup>th</sup> year university students in the School of Health Sciences, including nursing, in 2018 in Nagasaki. The target students had learnt special subjects related to health sciences including oral-dental health. The authors assumed that their behavior can be a model of oral-dental health care practice in young adults.

The questionnaire was established in accordance to previous studies<sup>12,13)</sup>, and included questions regarding oral-dental health practices related to tooth-brushing, dental health check-ups, application of fluoride varnish (FV), self-checking of oral and dental conditions, eating habits of sweets, mastication during eating, and frequency of toothbrush renewal, both currently and that of in childhood during primary school years, but not specifying age (Box 1).

#### Box 1. Questionnaire: oral-dental health behaviors among university students and that of their childhood

1. Oral-dental health behavior in childhood and in current age
  1. Receive dental health check-up every 6 months or more
  2. Receive fluoride varnish application every 6 months or more
  3. Self-check oral-dental conditions every day
  4. Frequently eat sweets\*
  5. Masticate about 30 times when eating
  6. Change toothbrush every 3 month or more

\*: reversed item
2. Timing of daily tooth brushing and that of childhood
  1. Immediately after getting up
  2. After breakfast
  3. After lunch
  4. After supper
  5. Before going to bed
  6. After snack
  7. No practice of tooth brushing

Data collection was performed in the classroom at the end of lectures. After receiving oral and written explanations regarding the study objectives, procedures, management of data collected, confidentiality, and ethical considerations on participation or refusal to participate in the study, the study participants completed the questionnaire. Consent to participate in the study was determined to be given upon posting of the completed questionnaire into the collection box.

A simple calculation was shown regarding continuation of oral-dental health behaviors, and Pearson correlation coefficient was used to analyze the correlation between the daily number of tooth-brushing in childhood to the time of survey after stating mean and standard deviation. Statistical analyses were performed using Microsoft EXCEL

This study was approved by the Ethical Committees of Nagasaki University Graduate School of Biomedical Sciences (authorization number: 19101001).

**Results**

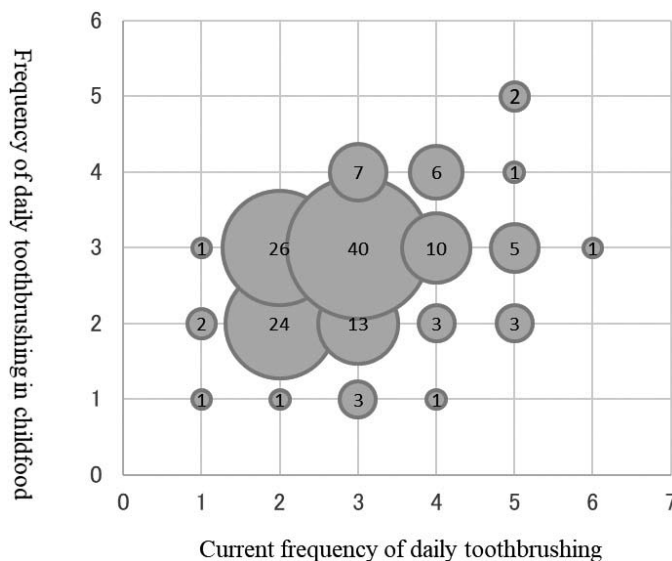
The questionnaire was distributed to 154 students, and 150 (97.4%) responses were obtained and analyzed. Table 1 shows demographic characteristics of study participants. All 150 students brushed their teeth after supper and/or before going to bed (100%). It was found that students brush their teeth  $2.9 \pm 0.9$  (mean  $\pm$  standard deviation) times per day, while they brushed  $2.7 \pm 0.7$  times per day in childhood ( $r = 0.339$ ). Seventy-two of the students brushed 3 times or more per day at both the time of the survey and in childhood (48.0%). Figure 1 illustrates the current frequency of daily tooth brushing and that of childhood.

Table 1 shows continuation of oral-dental health behaviors among university students from that of their childhood. Thirty (20.0%) respondents have practiced receiving dental health check-up every 6 months since childhood until today, but 63 (42.0%) respondents discontinued, and 46 (30.7%) respondents

**Table 1.** Continuation of oral-dental health behaviors among university students and that of their childhood (N=150)

	Performing currently and during childhood	Performed during childhood, but not currently	Performing currently, but not during childhood	Not performing currently nor during childhood
	n (%)	n (%)	n (%)	n (%)
Receive dental health check-up every 6 months or more	30 (20.0)	63 (42.0)	11 ( 7.3)	46 (30.7)
Receive fluoride varnish application every 6 months or more	4 ( 2.7)	31 (20.7)	9 ( 6.0)	106 (70.7)
Self-check oral-dental conditions every day	48 (32.0)	8 ( 5.3)	31 (20.7)	63 (42.0)
Frequently eat sweets*	94 (62.7)	15 (10.0)	24 (16.0)	17 (11.3)
Masticate about 30 times when eating	26 (17.3)	10 ( 6.7)	15 (10.0)	99 (66.0)
Change toothbrush every 3 month or more	101 (67.3)	8 ( 5.3)	21 (14.0)	20 (13.3)

\*: reversed item



**Figure 1.** The current frequency of daily tooth brushing and that of childhood

never received periodic dental health check-up. Dental fluoride every 6 months was not common among respondents, because 106 (70.7%) respondents did not practice at childhood and also currently. Regarding self-checking of oral-dental conditions every day, 48 (32.0%) respondents had continued since childhood until present time, 31 (20.7%) respondents currently performed self-checkups although not during childhood, and 63 (42.0%) respondents did not perform self-checkups neither at present nor during childhood. Ninety-four (62.7%) respondents frequently ate sweets, 15 (10.0%) respondents frequently ate sweets during childhood but not at present, and 17 (11.3%) had no custom of frequently eating sweets. Ninety-nine (66.0%) respondents did not have a custom of masticating about 30 times at eating. About two-thirds (67.3%) of respondents reported changing their toothbrush every 3 months or more.

### Discussion

The respondents of this study more frequently brushed their teeth compared to previous studies<sup>4)</sup>, including reports published by the MHLW. Dental health check-ups was not a common practice among university students, although some of them had received dental health check-ups in their childhood. Previous studies have reported that university students do not receive dental health check-ups for reasons such as their being bothersome/expensive, there being no time, and not considering them to be of importance<sup>13)</sup>. The same reasons could be applicable for the respondents of this survey. On the other hand, self-checking of oral-dental conditions every day and periodic replacement of toothbrushes was currently practiced if they had done so since childhood, possibly because these oral-dental health behaviors might have become habitual and part of their everyday lifestyle.

Several studies have demonstrated that adverse lifestyles and customs during childhood affect adulthood health conditions especially in low socio-economic conditions<sup>14-16)</sup>. For example, long hours of television watching and non-active lifestyle in childhood were associated with being overweight throughout life<sup>17)</sup>. In low socio-economic settings, adverse childhood conditions and behaviors can be easily fixated and become routine practice, because it is generally difficult to overturn adverse conditions when resources are limited throughout life. On the other hand, most of this study's participants, being university students, are expected to be from middle- or

upper-class families, suggesting their home disciplines including oral-dental health care and other self-care practices to be tidy and well turned out<sup>11)</sup>. However, even in their more affordable conditions, there were some students who had discontinued a good custom they once had in their childhood, and it was found to be difficult to start or change a daily basic custom such as oral-dental self-care anew. These findings suggest the importance of investing health promoting approaches at an early stage in life for a healthy life, not only childhood, but also in adulthood.

This study includes several limitations. First, recall bias should be considered, because frequency of daily tooth-brushing and other oral-dental health behaviors in childhood was reported as past experiences by the university students. This study was conducted as a cross-sectional study, and the authors did not verify the reported behaviors, for example with their parents. Therefore it is possible that their responses could have presented better oral-dental health conditions than actual conditions. Second, differences of daily tooth-brushing frequency and other oral-dental health behaviors depending on age in childhood were not considered in the data collection and interpretation of the results. For example, milk teeth are replaced by permanent teeth during the primary school age possibly affecting oral care methods, but the transition of teeth was not considered an influence by in this study. The responses would show variations of childhood stage depending on how each respondent interpreted the term "childhood during primary school years". Third, tooth-brushing time and brushing methods were not evaluated in this study. Therefore, appropriateness of tooth-brushing was not considered, and only frequency of tooth-brushing was addressed. The authors cannot determine the contribution of number of tooth-brushing on oral-dental health conditions. Fourth, the questionnaire was prepared according to previous studies in Japan, but the questions were not fully tested before conducting this study. For example, the practice of "changing toothbrush every 3 months or more" should be replaced with "changing toothbrush every month or more", which is the current recommended frequency of changing one's toothbrush. The respondents therefore might have misunderstood and/or have been confused in the interpretation of some of the questions and ways to answer them. Although there were several limitations, university students tended to continue oral-dental health behaviors that they practiced in their childhood.

This study reported life-course oral-dental health practices among Japanese university students who would assumedly have better SES and have opportunities of health related education compared with the same age population out of university. However, some good practice in childhood was found to be discontinued, for example receiving regular dental health check-ups. It is recommended that oral-dental health behaviors are practiced as everyday lifestyle starting from childhood, and continuous intervention regarding oral-dental health promotion is required depending on age and developmental stage.

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