

Cross-cultural differences of self-reported oral health behaviour in Japanese and Finnish dental students

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Objective: To determine whether any differences existed in dental health behaviour between Japanese and Finnish dental students. **Setting:** Hiroshima University School of Dentistry and the University of Helsinki. **Design:** Comparison of cross-cultural differences of self-reported oral health behaviour. **Subjects:** Dental students, 337 in Japan and 113 in Finland. **Method:** Subjects were surveyed using the Japanese and Finnish versions of a 20-item questionnaire entitled Hiroshima University-Dental Behavioural Inventory (HU-DBI). **Results:** Only 2 per cent of Finnish students reported that they put off going to the dentist until they had toothache, compared to 56 per cent of Japanese students. Similarly, significantly more Japanese students thought that their teeth were getting worse despite their daily brushing, compared to their Finnish peers. The mean HU-DBI score of Year 1 Finnish students was higher than that of their Japanese peers, which suggested a higher level of dental health awareness in Finnish students upon entry into dental school. The mean scores of the Japanese students were lower than those of their Finnish peers until Year 3. The mean scores of Year 5 and Year 6 Japanese students were higher than that of Year 1 students, indicating raised self-care levels influenced by the course in preventive dentistry. The gender difference of the HU-DBI score was not a major feature in either country. **Conclusions:** Self-reported oral health behaviours seemed to be very different between the two countries, which reflected different culture and/or health education systems of the students.

Key words: Oral health behaviour, dental attendance patterns, dental students

In many countries, university students occupy a significant position in public life, and comprise the opinion leaders of the future¹. Patterns of health behaviour and beliefs in students may therefore be particularly significant. In passing through the undergraduate curriculum, the dental student should be able to be a personal model for oral health behaviour. In countries with similar social systems the basis for health care is usually the same. Comparison of countries having different structures of health care, different cultures and different languages is much more complicated.

A questionnaire, entitled the Hiroshima University-Dental Behavioural Inventory (HU-DBI), was developed by Kawamura². Based on his analytical research, 12 items out of 20 were identified for scoring. The HU-DBI had a good test-retest reliability (0.73) in a sample of 517 Japanese university students over a four-week period³. The English version of the HU-DBI also had a good test-retest reliability and translated validity in a sample of 26 bilinguals⁴. Using the two versions, Kawamura *et al.*⁵ reported that the mean score of the Japanese

Table 1 Distribution of respondents (Japanese and Finnish dental students)

Level	Japan (JPN)				Finnish (FIN)			
	Male	Female	Unknown	Total*	Male	Female	Unknown	Total
Year 1	36	22	0	58 (66)	9	17	0	26 (31)
Year 2	34	27	0	61 (66)	5	10	11	26 (31)
Year 3	35	22	1	58 (64)	6	13	4	23 (29)
Year 4	31	23	0	54 (56)	6	16	0	22 (24)
Year 5	37	18	0	55 (57)	4	10	2	16 (17)**
Year 6	36	16	0	52 (58)	—	—	—	—
Total	209	128	1	338 (367)	30	66	17	113 (132)

* Parentheses indicate the number of enrolment.

Half of the enrolled students were asked to participate in this study.

Sex-ratio of the two countries: Chi-square =28.6 ($P<0.001$)

students was lower than that of the Australian students until Year 4. Furthermore, wide variations in oral health behaviour of the two dental student groups have been reported. The HU-DBI might be an instrument capable of measuring differences in students' oral health behaviour across countries.

The rapid reduction in caries prevalence reported in many industrialised countries, including Finland, has not occurred in Japan^{6,7}. Although the role of dental behaviour has been emphasised very few comparable studies have been conducted across the different cultures⁸. From the behavioural point of view this kind of comparison between countries of declining and stable caries reduction should be interesting for oral health behaviour. Oral health behaviour of the dental students would reflect the adoption of the health behaviour in their society. How dental students undergo changes of oral health behaviour during their school life would reflect the effect of dental education⁹. Behaviour of dental students towards their own teeth would play an important role in determining the oral health conditions of their patients later on. The objective of this study was to determine, using the HU-DBI, whether any differences existed in dental health behaviour between Japanese and Finnish dental students and whether this varied according to their advancement in their studies.

Material and methods

A preliminary Finnish version of the HU-DBI was obtained by transla-

tion from the English version. The translation was discussed with three Finnish experts (bilingualists) who had experience with questionnaires and survey research. Back-translation was used during this translation process. Only minor corrections were made, and the resulting version was used in the present study. No separate validity testing was completed from the English to Finnish translation.

The Japanese version of the HU-DBI was administered to 338 undergraduate Japanese dental students in April, 1997, and the Finnish version to 113 Finnish dental students in February 1998. The Japanese students were drawn from Hiroshima University School of Dentistry, and the Finnish students from the University of Helsinki. Participation in the project was voluntary. Students were asked to remain after class if they were willing to complete a survey about their oral health behaviour. The questionnaire was delivered in their class and the respondents were asked to indicate their class level and gender.

Chi-square tests were used to examine the difference in the gender distribution and the differences of responses for each item on the HU-DBI between the two countries on the total sample and each gender separately. Descriptive statistics, including gender standardised group means and their standard deviations, are presented unless otherwise stated. Mann-Whitney's U tests for unpaired data were used to analyse differences between group means of the HU-DBI.

The number of subjects by country, gender and level of dental

education is listed in *Table 1*. There was a higher proportion of female students (71 per cent) than male students in Finland, whereas the male to female ratio was about 2:1 in Japan ($P<0.001$). The response rates of the Finnish and Japanese subjects were 86 per cent and 92 per cent respectively.

Results

Table 2 presents the percentage distribution of the students with 'agree' responses to the 20 items by country, gender, and level of dental education. The most important difference was that only 4 per cent of Finnish students reported that they had never been taught professionally how to brush (Item 10), in contrast with 41 per cent of Japanese students ($P<0.001$). Secondly, the percentage of Japanese students who thought that their teeth were getting worse despite their daily brushing (Item 8) was more than four times that of their Finnish peers (Japanese: Finnish/ 30:7 per cent, $P<0.001$).

Comparison with the data from the Finnish dental students, however, indicated that a lower percentage of the dental students in Japan had reported gum bleeding (Item 2) (Finnish; 45 per cent, Japanese; 25 per cent, $P<0.001$), and that a higher percentage of Japanese students thought they were able to clean their teeth well without toothpaste (Item 11) (Finnish; 5 per cent, Japanese; 47 per cent, $P<0.001$).

The percentage reporting brushing each of their teeth carefully (Item 9) among the Japanese students

Table 2 Questionnaire items of the HU-DBI and percentage of 'agree' response by country, gender and level of dental education. In the calculation of the HU-DBI: A = One point was given for each of these agree responses. D = One point was given for each of these disagree responses

No. Item descriptions	Country	Gender				Year						Total	P
		Male	P	Female	P	1	2	3	4	5	6		
1. I don't worry much about visiting the dentist.	JPN	65	NS	71	NS	64	57	55	69	85	77	67	NS
	FIN	53		64		62	62	65	45	69	-	60	
2. My gums tend to bleed when I brush my teeth. (D)	JPN	23	***	29	NS	31	33	31	17	24	15	25	***
	FIN	53		42		54	50	39	45	31	-	45	
3. I worry about the colour of my teeth.	JPN	55	**	57	***	67	52	53	50	58	56	56	***
	FIN	30		25		23	46	35	14	25	-	29	
4. I have noticed some white sticky deposits on my teeth.	JPN	76	***	70	***	55	62	78	80	89	94	76	***
	FIN	7		30		23	12	13	36	25	-	21	
5. I use a child sized toothbrush.	JPN	15	NS	30	***	7	18	19	17	27	40	21	***
	FIN	3		4		0	8	5	9	0	-	4	
6. I think that I cannot help having false teeth when I am old. (D)	JPN	26	*	16	NS	28	44	38	7	7	8	23	**
	FIN	7		14		4	15	9	18	6	-	11	
7. I am bothered by the colour of my gums.	JPN	32	***	29	***	14	26	33	35	35	44	31	***
	FIN	0		2		0	4	4	0	0	-	2	
8. I think my teeth are getting worse despite my daily brushing. (D)	JPN	33	***	26	**	26	43	43	30	22	14	30	***
	FIN	9		7		11	11	0	9	0	-	7	
9. I brush each of my teeth carefully. (A)	JPN	55	NS	57	**	40	39	42	54	75	88	55	***
	FIN	70		80		69	81	83	73	88	-	78	
10. I have never been taught professionally how to brush.(D)	JPN	45	***	33	***	43	49	45	61	36	6	41	***
	FIN	3		5		4	0	0	9	6	-	4	
11. I think I can clean my teeth well without using toothpaste.(A)	JPN	48	***	45	***	41	26	31	46	65	77	47	***
	FIN	10		5		8	0	0	14	6	-	5	
12. I often check my teeth in a mirror after brushing. (A)	JPN	45	NS	57	*	45	49	34	39	62	71	50	*
	FIN	43		73		62	50	77	59	63	-	62	
13. I worry about having bad breath.	JPN	34	NS	35	NS	34	41	40	39	27	25	35	NS
	FIN	33		41		42	27	22	41	50	-	35	
14. It is impossible to prevent gum disease with toothbrushing alone.(D)	JPN	39	**	37	NS	37	39	49	48	29	25	38	*
	FIN	10		27		15	32	35	32	13	-	26	
15. I put off going to the dentist until I have a toothache.(D)	JPN	55	***	56	***	67	64	74	56	44	27	56	***
	FIN	3		0		0	8	0	0	0	-	2	
16. I have used a dye to see how clean my teeth are. (A)	JPN	71	***	81	***	59	69	72	70	87	96	75	***
	FIN	40		58		42	42	61	59	63	-	52	
17. I use a toothbrush which has hard bristles.	JPN	43	**	35	***	50	46	50	30	36	27	40	***
	FIN	17		6		15	12	9	9	0	-	10	
18. I don't feel I've brushed well unless I brush with strong strokes.	JPN	39	***	30	*	48	56	47	35	13	12	36	***
	FIN	3		16		12	12	4	23	6	-	12	
19. I feel I sometimes take too much time to brush my teeth.(A)	JPN	51	***	49	***	45	41	36	43	67	73	50	***
	FIN	7		16		4	8	17	27	6	-	12	
20. I have had my dentist tell me that I brush very well.	JPN	11	***	19	***	12	13	9	9	24	19	14	***
	FIN	43		58		50	56	57	45	76	-	55	

Significant differences between Japanese and Finnish students: NS Not significant. *: $P < 0.05$ **: $P < 0.01$ ***: $P < 0.001$. Chi-square tests were not done in each level of dental education.

gradually increased in more advanced classes. Furthermore, the percentage of those putting off going to the dentist until they had a toothache (Item 15) decreased in students in the final year of the Japanese course whereas the percentage holding this behaviour among Finnish students was low even among students in the first year of the course. The percent-

age of Japanese students who had noticed some white sticky deposits on their teeth (Item 4) increased with advancement through the curriculum, whereas in the Finnish students the percentage was low even among students in the final year of the course.

Table 3 presents the mean HU-DBI scores for each group; the

summary estimate of oral health behaviour was calculated from the responses to the items (possible range 0-11) excluding Item 4 (because the question on 'white sticky deposits' caused problems of interpretation). The overall mean HU-DBI score of Finnish dental students was significantly higher than that of the Japanese students ($P < 0.01$). The

Table 3 Comparison of the HU-DBI scores between Japanese and Finnish dental students

Group	Japan (JPN)		Finland (FIN)		
Sex		<i>P</i> ^{a)}		<i>P</i> ^{a)}	<i>P</i> ^{c)}
Males	6.48±2.58 (209)	NS	6.83±1.34 (30)	NS	NS
Females	6.92±2.24 (128)		7.32±1.31 (66)		NS
Level of education		<i>P</i> ^{b)}		<i>P</i> ^{b)}	<i>P</i> ^{c)}
Year 1	5.93±2.25 (58)		6.96±0.92 (26)		*
Year 2	5.53±2.05 (61)	NS	6.58±1.47 (26)	NS	*
Year 3	5.36±2.51 (58)	NS	7.61±1.31 (23)	*	***
Year 4	6.33±1.86 (54)	NS	7.18±1.86 (22)	NS	NS
Year 5	7.95±2.14 (55)	***	7.69±1.01 (16)	*	NS
Year 6	9.08±1.52 (52)	***			
Total	6.64±2.47 (338)		7.15±1.13 (113)		**

Low scores denote poor self-reported oral health behaviour (possible range 0–11).

Mann-Whitney's U-tests (NS: Not significant, *: $P < 0.05$ **: $P < 0.01$ ***: $P < 0.001$).

a) Statistical differences between males and females

b) Statistical differences between Year 1 and the other levels

c) Statistical differences between Japanese and Finnish dental students

mean scores of Finnish students were significantly higher than those of the Japanese until Year 3 (Year 1, 2; $P < 0.05$, Year 3; $P < 0.001$). The mean scores of the Japanese Year 5 and Year 6 students were significantly higher than that of Year 1 students ($P < 0.001$). The mean scores of the Finnish Year 3 and Year 5 students were significantly higher than that of Year 1 students ($P < 0.05$). The mean HU-DBI scores between the genders were not significantly different in both countries.

Discussion

The main result was that the oral health care level measured by the HU-DBI was different between the Finnish and the Japanese dental students. The mean score of Year 1 Japanese students was lower than that of Year 1 Finnish peers, which suggested a lower dental health awareness of Japanese students on entry. The mean score of the Japanese students was almost constant until Year 4, and then increased rapidly, reaching more than 9 points: its increasing pattern was similar to the 1986 Japanese data⁵. This may be explained by the fact that they had improved their oral health awareness six months after the lecture programmes in preventive dentistry commenced in Year 4. There has been little effort aimed at students' self-care motivation by Year 3 in the curriculum. Early contact with patients has not been introduced

until quite recently at Hiroshima University, where clinical training with patients starts at the end of Year 5¹⁰.

In Finland, there was no remarkable change in mean scores according to level of education. The basic course in clinical periodontology starts in the third year with the aim of improving oral hygiene of the patient¹¹. There is, however, little intervention specifically aimed at students' own oral self-care. This may be explained by the fact that the improvement of oral health awareness among the Finnish dental students was lower than that of their Japanese counterparts.

The dental school environment of Hiroshima University aimed not to be representative of all dental schools in Japan due to differences in undergraduate training programmes, social norms, geographic origin and so forth. There are 11 governmental schools, one local public school and 17 private dental schools. In the entrance examination system there is a difference between governmental schools and private schools¹². The applicants to governmental schools have to take a nation-wide common examination of six subjects and some schools use this system as a screening test before the second school-based examination. The results obtained may not be directly applicable to other institutions in Japan.

In Finland, there are four dental schools. Only minor differences were

found between graduates from these schools in assessments of the importance of the subjects studied, probably due to minor differences in curricula¹³. The difference in the HU-DBI score between the first and final years students (3.15) was much higher than the gender difference (0.44) in Japan, whereas the difference (0.73) in Finland was similar to the gender difference (0.49). In previous research, the mean HU-DBI score including Item 4 of the mothers with infants was 4.75 in 1987 and increased only by 0.29 points in 1992¹⁴. The results suggest that student's self-care level may have been substantially influenced by the course content/experience in Japan.

Although indirect translation from Japanese to Finnish might influence the results, there were a lot of differences in individual health behaviours between the two countries. Finnish students more frequently attended the dentist and half of them received reinforcement from their dentists that they were brushing very well. In comparison, more than half of the Japanese students delayed going to the dentist until they had toothache and they therefore had little reinforcement. Most of the Finnish dental students reported to have been taught professionally how to brush, even though they were freshmen. The percentages of Japanese students who thought that their teeth were getting worse and reported a perception of inevitability having to wear false teeth when old were much higher than those of their Finnish peers. The improved self-reported behaviours in the Finnish students upon entry into dental school may to some extent be explained by their access to organised public dental activities. Since the Public Health Act of 1972, dental care has been provided free of charge at community-based dental health centres to Finns less than 19 years old.

Compared with the Australian dental students⁵, the Finnish peers in this study reported gingival bleeding after brushing much more frequently (Finnish; 45 per cent, Australian; 6 per cent), and less frequently reported that it is impos-

sible to prevent gum disease with toothbrushing alone (Finnish; 26 per cent, Australian; 42 per cent). The differences in other dental health behaviours were small between the two countries: there was a remarkable similarity in the direction of dental visiting patterns in spite of a seven-year difference in time between the collection of data. More than half of the Japanese dental students, however, reported that they put off going to the dentist until they had a toothache, both in the 1986 survey⁵ and in the present one. The finding was consistent with a study of Kiyak¹⁵: Asians in the USA knew little about dental disease, but were motivated to maintain their teeth because of their concern for aesthetics, appearance, and pain. The Asian way of dealing with health and disease is different from traditional Western concepts in that most of the health behaviour is learnt and practised at home, and professional help is only sought when home remedies fail¹⁶. The strong reliance on self-care may on the one hand undermine the effectiveness of organised oral health care by delaying dental visits or on the other hand make these 'unnecessary'. Comparisons of individual items of the HU-DBI clearly demonstrated these differences and similarities.

The present study aimed to prepare the way for using the general approach in health behaviour measurement across countries and for improving the validity of the item set. Nearly 80 per cent of the Finnish students stated that they brushed their teeth carefully. This does not imply that all students who agreed with this statement do in fact brush their teeth carefully: there may be a certain amount of measurement error connected with self-reported behaviours. Furthermore, an item such as, 'It is impossible to prevent gum disease with toothbrushing alone', could only be answered with a definite 'agree' or 'disagree' response by relatively few people. The majority would have difficulty in deciding how to answer this question. Most of the Finnish dental students would have lost one point if Item 4 was included in the scoring

system. The scoring system was based on previous research in Japan, in which a higher score indicated better dental behaviour related to periodontal health conditions². Although recent recommendations for periodontal maintenance emphasise toothbrushing, flossing and periodic dental check-ups¹⁷, 'flossing' behaviour was not included in the questionnaire. Further research is needed to examine its metric properties of cross-cultural reliability and validity.

Half of the final year Finnish students were out of school, to practice working on patients from the community in conjunction with taking their academic classes. The authors did not have any methods to force them to respond. Quite a high number of the Finnish students also did not fill the gender information. Around 40 per cent of the questionnaires were returned anonymously to the course representative. However, there was no gender difference in ratio between the total sample and respondents for this gender question. Although comparisons should be made with caution, the Japanese final year dental students appeared to have better oral health behaviour, as estimated by the HU-DBI, than that of their Finnish peers. Dental students as future health professionals, should have a comprehensive programme, including their own self-care regimens. Use of the HU-DBI may provide interesting comparative data regarding oral health behaviour of dental students in different school curricula and/or health care systems.

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