

A cross-cultural comparison of dental health attitudes and behaviour among freshman dental students in Japan, Hong Kong and West China

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Objective: To clarify the differences in dental health attitudes/behaviour among freshman dental students. **Design:** Cross-cultural differences. **Setting:** Japan, Hong Kong and West China. **Participants and methods:** The original version of the Hiroshima University-Dental Behavioural Inventory (HU-DBI) was written in Japanese. After testing the validity of both English and Chinese versions, the original version of the HU-DBI was administered to 58 freshman Japanese dental students, the English version to 43 Hong Kong Chinese peers and the Chinese version to 39 West Chinese peers. **Results:** Significant cultural differences were found for 16 items out of 20. The most striking result was that the Japanese students were more likely to have used a dye to see how clean their teeth were, compared to their Chinese peers ($P<0.001$). The Chinese students were less likely to have a belief that they could clean their teeth well without using toothpaste ($P<0.001$), whereas higher percentages of the Chinese students worried about having bad breath ($P<0.001$). A higher percentage of the Hong Kong students reported that they regularly checked their teeth in a mirror than did their West Chinese or Japanese peers ($P<0.05$). **Conclusions:** There were considerable differences in dental health attitudes/behaviour among freshman dental students in the three cultural groups.

Key words: Cross-cultural comparison, dental health attitudes, Japanese, Chinese, behavioural science

In countries with similar social systems the basis for health care is usually the same. Comparison of countries having different bases for health care and different languages is much more complicated and time-consuming. The language barrier between Japan and the rest of the world is relatively easy to define and therefore perhaps to deal with, but underlying it is a much more ambiguous and insidious problem. Chinese and English are structurally so alike that a person speaking in English words with a Chinese word order can produce perfectly understandable pidgin English. A similar combination of Japanese word order with either Chinese or English words would make only gibberish¹. The origins of Japan's sense of uniqueness are found in its long history of isolation, at first natural but later self-imposed, its distinctive culture, its unusual type of language, its unique and very difficult writing system, and its strong patterns of group organisation. Hence, attitude scales in Japanese have not been used suc-

cessfully in other linguistic-cultural groups.

In Japan, children aged 18- and 36-months, as well as pregnant women can receive dental health check-ups free of charge in municipal health centres. Dental providers in general practices are generally oriented toward curative care, in spite of their western-oriented education². In mainland China, there are no private dentists. The health care, including oral health care, is based on community responsibility. All dental services are available at polyclinics located either near the place of residence or at the work place. According to Peng *et al.*³, substantial changes in toothbrushing behaviour were found: the percentages of people brushing teeth twice or more a day increased to 70–80 per cent for all age groups in 1995. These percentages were reported to be similar to those of the Hong Kong Chinese. However, Hong Kong has special historical circumstances. British colonial sovereignty has ceased since Hong Kong reverted to Chinese rule as a Special Administrative Region in 1997. There are seven universities with only one dental school. The language of teaching of The University of Hong Kong is English with the use of Chinese for teachers of local contracts. The majority of students are Chinese, while about 10 per cent of the first year admission is open to overseas applicants who may be Chinese or of other ethnic origins. The School Dental Service is free for all elementary school children in Hong Kong, of which service most of the Hong Kong freshman dental students will have availed themselves. The social and economic systems in Hong Kong remain unchanged, as does the life-style of its citizens⁴.

Although much published research has been concerned with oral hygiene habits among young people^{5–9}, little attention has been given to the context of what they know and do regarding their oral self-care regimens in Asian coun-

tries. The aim of the present study was therefore to extend the experiences with the Hiroshima University-Dental Behavioural Inventory (HU-DBI)¹⁰ to a population of freshman dental students among three cultural areas in a linguistic context other than Japanese, as well as to clarify the differences in their dental health attitudes/behaviour using the Japanese, English and Chinese versions of the HU-DBI.

Material and methods

The original questionnaire of the HU-DBI was written in Japanese. The HU-DBI comprises 20 items dealing mainly with toothbrushing behaviour¹⁰. The adequacy of the language translation of the self-administered questionnaire (HU-DBI) has been examined in a comparative study of dental health behaviour between selected Japanese and Australian dental students¹¹. At the time of implementation, no Chinese translation of the HU-DBI was available. The translation into Chinese was conducted in two phases. A preliminary Chinese version of the HU-DBI was obtained from a translator living in Taiwan. During the second phase, the initial version was compared with the English version by one of the authors. Back-translation was not used during this process. Following several modifications, especially of old characters written in the traditional Chinese form, data for testing the validity of self-rating scales were collected from a convenience sample of 37 bilinguals (mean age; 29.3±9 yrs.) in Japan. They were capable of reading simplified characters in Chinese and fluent in both languages, although the ability of foreign language by their self-reporting was as follows: 15 of them answered 'no problem in daily life', 19 answered 'no problem in business', one answered 'the same as mother tongue', and the other two did not judge their language ability. Each bilingual was asked to answer each version of

the questionnaire separately at different times.

Reliability of the translated version was measured by % coincidences and lambda coefficients (Table 1). Statistical analyses were conducted using SPSS 10.0J (SPSS Inc., Chicago, IL, USA). Lambda coefficients ranged 0.82 to 1.00 except Item 8 (0.69). The number of coincidence in their answers to Item 8 was 33 out of 37.

In the main study, the original version of the HU-DBI was administered to 58 freshman Japanese dental students (mean age; 20.1±4.1 yrs.) at Hiroshima University in 1997, the Chinese version to 39 West Chinese peers (mean age; 19.7±1.3 yrs.) at West China University of Medical Sciences in 1997, and the English version to 43 Hong Kong Chinese peers (mean age; 18.9±0.8 yrs.) at the University of Hong Kong in 1998 (Table 2), all at the beginning of the academic year. Participation in the project was voluntary, an average of 82 per cent participating in all three schools (Hiroshima 88 per cent, West China 66 per cent, Hong Kong 93 per cent). No information about their academic records was gathered from students. The Chi-square test was used to examine differences in the distribution of selected characteristics of the HU-DBI by culture.

Results

Significant cultural differences were found for 16 items out of 20 (Table 3). The most striking result was that the Japanese students were more likely to have used a dye to see how clean their teeth were, (Item 16: Japan 59 per cent, Hong Kong 5 per cent, West China 10 per cent) and to have a belief that they could clean their teeth well without using toothpaste (Item 11: Japan 41 per cent, Hong Kong 12 per cent, West China 13 per cent), compared to their Chinese peers (both $P < 0.001$). The Japanese also tended to report more frequently to use a tooth-

Table 1 Reliability of the translated Chinese version measured by % coincidences and lambda coefficients in a sample of 37 bilinguals

No.	Item descriptions	% coincidence	Lambda
1.	I don't worry much about visiting the dentist	95	0.87
2.	My gums tend to bleed when I brush my teeth	97	0.94
3.	I worry about the colour of my teeth	97	0.92
4.	I have noticed some white sticky deposits on my teeth	94	0.88
5.	I use a child sized toothbrush	97	0.82
6.	I think that I cannot help having false teeth when I am old	97	0.94
7.	I am bothered by the colour of my gums	95	0.89
8.	I think my teeth are getting worse despite my daily brushing	89	0.69
9.	I brush each of my teeth carefully	97	0.91
10.	I have never been professionally taught how to brush	92	0.82
11.	I think I can clean my teeth well without using toothpaste	97	0.85
12.	I often check my teeth in a mirror after brushing	100	1.00
13.	I worry about having bad breath	100	1.00
14.	It is impossible to prevent gum disease with toothbrushing alone	95	0.90
15.	I put off going to the dentist until I have a toothache	97	0.85
16.	I have used a dye to see how clean my teeth are	97	0.91
17.	I use a toothbrush which has hard bristles	100	1.00
18.	I don't feel I've brushed well unless I brush with strong strokes	100	1.00
19.	I feel I sometimes take too much time to brush my teeth	100	1.00
20.	I have had my dentist tell me that I brush very well	100	1.00

Table 2 Distribution of respondents (freshman dental students) by sex and culture

Culture	Sex			Total	
	Male	Female	Unknown	n	Class total
Japan	36 (62%)	22 (38%)	0 (0%)	58	66
Hong Kong	17 (40%)	21 (49%)	5 (12%)	43	46
West China	19 (49%)	20 (51%)	0 (0%)	39	59
Total	72 (51%)	63 (45%)	5 (4%)	140	171

Mean age \pm S.D. (yrs): Japan: 20.1 \pm 4.1; Hong Kong: 18.9 \pm 0.8; West China: 19.7 \pm 1.3

Table 3 Percentage of agreement response by culture on the HU-DBI

No.	Item descriptions	Japan %	Hong Kong %	W. China %	χ^2
1	I don't worry much about visiting the dentist	64	79	85	6.04*
2	My gums tend to bleed when I brush my teeth	31	33	44	1.78
3	I worry about the colour of my teeth	67	74	90	6.48*
4	I have noticed some white, sticky deposits on my teeth	55	47	85	13.72**
5	I use a child sized toothbrush	7	12	10	0.72
6	I think that I cannot help having false teeth when I am old	28	49	21	8.46*
7	I am bothered by the colour of my gums	14	14	74	4.39***
8	I think my teeth are getting worse despite my daily brushing	26	28	62	14.76***
9	I brush each of my teeth carefully	40	53	49	2.01
10	I have never been professionally taught how to brush	43	58	8	23.28***
11	I think I can clean my teeth well without using toothpaste	41	12	13	15.75***
12	I often check my teeth in a mirror after brushing	45	63	33	7.33*
13	I worry about having bad breath	34	84	74	29.32***
14	It is impossible to prevent gum disease with toothbrushing alone	37	72	90	30.08***
15	I put off going to the dentist until I have a toothache	67	56	64	1.29
16	I have used a dye to see how clean my teeth are	59	5	10	44.13***
17	I use a toothbrush with hard bristles	50	16	23	14.91***
18	I don't feel I've brushed well unless I brush with strong strokes	48	16	21	14.52***
19	I feel I sometimes take too much time to brush my teeth	45	16	13	15.78***
20	I have had my dentist tell me that I brush very well	12	35	26	7.57*

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

brush which has hard bristles (Item 17: Japan 50 per cent, Hong Kong 16 per cent, West China 23 per cent), to brush with strong strokes (Item 18: Japan 48 per cent, Hong Kong 16 per cent, West China 21 per cent), and to take too much time to brush their teeth (Item 19: Japan 45 per cent, Hong Kong 16 per cent, West China 13 per cent) (all $P < 0.001$).

On the other hand, only 8 per cent of the West Chinese students reported that they had never been taught professionally how to brush their teeth (Item 10), in contrast to 43 per cent of the Japanese students and 58 per cent of the Hong Kong Chinese ($P < 0.001$). A higher percentage of West Chinese students (85 per cent) had noticed some white sticky deposits on their teeth (Item 4) than did the Hong Kong students (47 per cent) and the Japanese students (55 per cent) ($P < 0.01$). More than 60 per cent of the West Chinese students, however, thought that their teeth were getting worse despite their daily brushing (Item 8), while 28 per cent of the Hong Kong Chinese students and 26 per cent of the Japanese students did so ($P < 0.001$). Ninety per cent of the West Chinese students had a belief that it is impossible to prevent gum disease with toothbrushing alone (Item 14), whereas 72 per cent of the Hong Kong Chinese and 37 per cent of the Japanese students held this belief ($P < 0.001$). The majority of the West Chinese students were worried about the colour of their gums (Item 7), compared to both 14 per cent of Japanese and Hong Kong Chinese students ($P < 0.001$). Comparison with the data from the Japanese students indicated that higher percentages of the Chinese students worried about having bad breath (Item 13: Japan 34 per cent, Hong Kong 84 per cent, West China 74 per cent) ($P < 0.001$).

Despite the agreement from their dentists that they do brush well (Item 20, 35 per cent), Hong Kong students still worried about

having false teeth in old age (Item 6, 49 per cent) and 63 per cent were keen to check their teeth in a mirror after brushing (Item 12), all higher than the other groups.

Discussion

This study was a first step to prepare the way for using the general approach in attitudes/behaviour measurement across countries. Comparisons of individual items between the three population groups clearly demonstrated these differences and similarities. A higher percentage of the Chinese students thought it is impossible to prevent gum disease with mechanical tooth cleaning than did their Japanese peers as the Australian students reported before¹¹. One of the reasons might be that some of the Hong Kong students have a belief of the necessity of dental floss as recommended by most periodontists. Since the establishment of the People's Republic of China on the mainland in 1949, Hong Kong has been undergoing rapid demographic, social, and economic transformations. Although around 60 per cent of the present population have been born in Hong Kong, more than 98 per cent are Chinese. Most families trace their origins from Guangdong, China. According to traditional Chinese beliefs, the gums are related to the stomach via 'channels' through which the vital forces move¹². Although the subjects of the study are less likely to hold such views than their older counterparts, there has been no comparative study of the differences in attitudes and beliefs between the young and old Chinese and their influence on oral health: the understanding of Chinese Medicine has just started to be actively researched in Hong Kong. In spite of their Western-oriented education, some of the Hong Kong students may be influenced by such traditional beliefs, and then have disagreed with the statement of Item 14. On the other hand, the

Japanese generally have a belief that toothbrushing is the most important thing to prevent dental caries. Comparison with the 1986 results¹¹ indicates that the percentage of students brushing each of their teeth carefully and checking their teeth in a mirror after brushing increased during this time span.

However, there was a remarkable similarity in the direction of dental visiting patterns between the students across cultures regardless of whether they lived in Japan, Hong Kong, or West China. In all three cultures, more than half the students reported that they put off going to the dentist until they had a toothache. The finding was consistent with a racial study of Kiyak¹³: Asians in the USA knew little about dental disease, but were motivated to maintain their teeth by a concern for aesthetics, appearance, and pain. The Asian ways of dealing with health and disease are different from traditional western concepts in that most of the health beliefs and practices are learnt and practised in the home, and professional help is only sought when home remedies fail. 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'.

The degree to which cultural influences affect dental health behaviour has not been an extensively studied area because of the overlap between cultural influences and other factors such as dental health knowledge, social and economic status, and personal experience. As indicated by Lind *et al.*¹⁴, examining Chinese in Hong Kong, without a deeper understanding of the traditional Chinese cures and how they can be incorporated into the management of disease problems, western orientated health education will be in a weak position to change health and disease behaviour by culturally acceptable methods. The challenge would therefore be to develop culturally

sensitive programmes that have the potential to provide knowledge and to develop attitudes in the population concerning oral health and which present new developments as being natural extensions of traditional health beliefs. The dental health behaviour of the Japanese and Chinese freshman dental students was less than ideal, and included many misconceptions. Dental students, as future health professionals, should have a comprehensive programme including oral self-care regimens when passing through the undergraduate curriculum.

There are some limitations in this study. First, the response rate in West China was only 66 per cent. Students having a negative attitude towards dental health care would be unlikely to have responded to the questionnaire. Therefore, the real state of oral self-care of the West Chinese students may be worse than the results showed. Second, there may have been a difficulty in the interpretation of Item 16 by the Hong Kong students. Only 5 per cent of the students agreed with this statement. Since 'dye' was used in the questionnaire instead of 'disclosing solution', the percentage of agreement might have been underestimated. On the other hand, a higher percentage of Hong Kong students (58 per cent) stated that they have never been taught professionally how to brush their teeth. In Hong Kong, the School Dental Care Service is staffed by dental therapists. Hence, the responses to Item 10 may be the result of misunderstanding of the intention of the question if dental therapists

might not be regarded as professionals. Although problems such as the comparability of language, culture, and the structure of dental delivery system exist in cross-cultural attitudinal research¹⁵, there were considerable differences in dental health attitudes/behaviour among freshman dental students in the two countries/three cultural groups.

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References

1. Reischauer E O. *The Japanese today – Change and continuity*. Tokyo: Charles E Tuttle, 1994: 381–412.
2. Kawamura M, Sasaki T, Imai-Tanaka T, *et al.* Service-mix in general dental practice in Japan: A survey in a suburban area. *Aust Dent J* 1998 **43**: 410–416.
3. Peng B, Petersen P E, Tai B J, *et al.* Changes in oral health knowledge and behaviour 1987–95 among inhabitants of Wuhan City, PR China. *Int Dent J* 1997 **47**: 142–147.
4. Schwarz E, Lo E C M. Oral health and dental care in Hong Kong. *Int Dent J* 1995 **45**: 169–176.
5. Albino J E, Tedesco L A, Phipps G T. Social and psychological problems of adolescence and their relevance to dental care. *Int Dent J* 1982 **32**: 184–193.
6. Nagasaka N, Ogura I, Amano H, *et al.* Dental health knowledge, attitude, and behavior of junior high school students in China and Japan. *Pediatric Dent J* 1991 **1**: 143–6.
7. Honkala E. Oral health promotion with children and adolescents. In: Cohen L K, Gift H C, (eds). *Disease prevention and oral health promotion*. Copenhagen: Munksgaard, 1995: 169–187.
8. Kallio P, Murtomaa H. Determinants of self-assessed gingival health among adolescents. *Acta Odontol Scand* 1997 **55**: 106–110.
9. Åstrøm A N, Jakobsen R. Stability of dental health behavior: A 3-year prospective cohort study of 15-, 16- and 18-year-old Norwegian adolescents. *Community Dent Oral Epidemiol* 1998 **26**: 129–138.
10. Kawamura M. Dental behavioral science – The relationship between perceptions of oral health and oral status in adults. (In Japanese). *J Hiroshima Univ Dent Soc* 1988 **20**: 273–286.
11. Kawamura M, Iwamoto Y, Wright F A C. A comparison of self-reported dental health attitudes and behavior between selected Japanese and Australian students. *J Dent Educ* 1997 **61**: 354–360.
12. Lee K L, Schwarz E, Mak K Y K. Improving oral health through understanding the meaning of health and disease in a Chinese culture. *Int Dent J* 1993 **43**: 2–8.
13. Kiyak H A. Dental beliefs, behaviors and health status among Pacific Asians and Caucasians. *Community Dent Oral Epidemiol* 1981 **9**: 10–14.
14. Lind O P, Evans R W, Corbet E F, *et al.* Hong Kong survey of adult oral health. Part 2. Oral health related perceptions, knowledge and behaviour. *Community Dental Health* 1984 **4**: 367–381.
15. Kawamura M, Honkala E, Widström E, *et al.* Cross-cultural differences of self-reported oral health behaviour in Japanese and Finnish dental students. *Int Dent J* 2000 **50**: 46–50.