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Dental health behaviours among early adolescents in Hong Kong

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Abstract: *Objectives:* This study aimed to investigate the prevalence and socioeconomic differences in dental health behaviours among Hong Kong early adolescents. *Methods:* A cross-sectional survey was conducted among 4927 students (44.7% boys) aged 14–15 from 36 secondary schools in 2000–2001. Students reported their socioeconomic information and dental health behaviours using the Health Related Behaviour General Questionnaire (HRBGQ). Logistic regression models were used to determine the adjusted odds ratios of regular tooth brushing (at least twice daily), weekly use of dental floss (in the past 7 days) and annual dental visit (in the past 12 months) for different socioeconomic characteristics. *Results:* Of the subjects, 77.8% reported to have brushed regularly, but only 22.3% used dental floss weekly and 37.9% had annual dental visit. Male gender and Chinese ethnicity were significantly associated with lower odds of regular brushing, use of dental floss and annual dental visit. Two or more siblings and not living with both parents were also significantly associated with lower odds of regular brushing and annual dental visit. Furthermore, students living in non-private housing were significantly less likely to have annual dental visit than those in private housing. *Conclusions:* Regular brushing was common, but not use of dental floss and annual dental visits among Hong Kong early adolescents. In general, socioeconomic disparity in dental health behaviours was observed. Extending the existing government-run dental health programmes to secondary school students in Hong Kong is warranted.

Key words: adolescents; Chinese; dental health behaviours; socioeconomic characteristics

Introduction

Oral health is regarded as a major global public health problem in the 21st century by the World Health Organization (1). In adolescents, dental health is an useful indicator of general health (2). About 22.6% US adolescents had untreated dental caries in 1999–2000 (3). While dental health is improving in most places, increasing dental caries experiences among early adolescents in developing countries are forecasted (4). According to the national survey, number of decayed, missing or filled teeth (DMFT) among early adolescents (aged 15) in Mainland China was about 1.4 (5), which was similar to that among African adolescents (aged 11–14) with DMFT of 1.5 (6). In view of rapid economic growth and westernization of diets, dental health in Mainland China requires extra attention in future. As a leading city of China, Hong Kong is indeed a good miniature model for understanding dental health issues in the developing cities of Mainland China.

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To formulate better preventive measures, local epidemiological data on social and behavioural risk factors of dental health problems are valuable. Proper dental behaviours could effectively prevent dental problems. Regular tooth brushing prevents plaque formation (7, 8) and caries (9, 10), whereas flossing removes plaque (11, 12). These beneficial dental health behaviours, if developed in adolescence, may be tracked into adulthood (13). Prospective results also showed that regular dental visits could reduce caries experience, regardless of the pre-existing socioeconomic disparities (14).

Socioeconomic differences in dental health behaviours among adolescents have been reported in US (15). Such differences were also reported between adolescents in rural and urban areas of Mainland China (16). Nevertheless, the report in China was only limited to certain age groups (aged 12 and 18). In Hong Kong, primary school students (aged 6–11) are eligible for free annual dental checkups from the Department of Health. After being promoted to secondary schools, students are responsible for their own dental care needs. As a result, information on dental health behaviours was only available among young children (17), adults (18–20) and elderly (21, 22), but not adolescents in Hong Kong. This survey aimed to investigate the prevalence and socioeconomic differences in dental health behaviours among Hong Kong early adolescents.

Methods

Study design and sampling

In this study, stratified sampling was used to select schools by gender, district and academic banding to represent the Hong Kong school population. A total of 4927 adolescents (44.7% boys) aged 14–15 from 36 Hong Kong secondary schools (34 local and two international schools) participated in a cross-sectional survey in 2000–2001. Students were informed that participation was totally voluntary.

Measures

All students completed the Health Related Behaviour General Questionnaire (HRBGQ) in schools. Health Related Behaviour General Questionnaire was licensed from the Schools Health Education Unit (SHEU) of the University of Exeter and has been used in UK and other places (23). It was first used in Hong Kong in 1994 with modifications to suit the local situation. The pilot results from Hong Kong were analysed at the University of Exeter and cross-validated against UK results to ensure performance of the modified version.

Socioeconomic information including gender, age, ethnicity (Chinese, Caucasian, others including black and non-Chinese Asians), number of siblings (none, one sibling, two siblings or above), living arrangements (with both parents, others) and housing types (private, non-private) was reported in the anonymous questionnaire. Dental health behaviours, including teeth brushing habits (before breakfast, after breakfast, during the rest of the day, before sleep), use of dental floss (number of days in the past 7 days) and last dental visit (past 7 days, past month, past 3 months, past 6 months, past 12 months, more than 12 months) were also assessed.

Statistical analysis

The prevalence of tooth brushing, use of dental floss, dental visit in boys and girls are presented. Logistic regression models were performed to determine the adjusted odds ratios (ORs) for regular teeth brushing (twice or above daily), weekly use of dental floss (at least once in the past 7 days) and annual dental visit (at least once in the past 12 months) among subjects with different socioeconomic characteristics including gender (girls versus boys), age group (15 versus 14), ethnicity (Caucasian, others versus Chinese), number of siblings (one sibling, two siblings or above versus none), living arrangement (others versus with both parents) and housing type (non-private versus private). All results were mutually adjusted for socioeconomic characteristics.

Results

In Table 1, the sampled students were mainly Chinese (95.8%) with one (46.9%) or two (39.0%) sibling, living with both parents (87.0%) and in non-private housing (64.7%). In Table 2, most students brushed their teeth before breakfast (91.5%) and before sleep (78.5%). Although 77.8% of them managed to brush their teeth twice daily, only 22.3% used dental floss weekly and 37.9% had dental visit annually.

In Table 3, girls were significantly more likely to brush their teeth regularly (OR = 1.90, 95%CI = 1.66–2.18, $P < 0.001$) and use dental floss weekly (OR = 1.31, 95%CI = 1.14–1.50, $P < 0.001$) than boys. Students aged 15 were less likely to brush regularly (OR = 0.83, 95%CI = 0.72–0.95, $P = 0.006$) and

Table 1. **Basic characteristics**

	Boys (n = 2201) %	Girls (n = 2726) %	All %
Age			
14	48.5	52.8	50.8
15	51.5	47.2	49.2
Ethnic group			
Chinese	95.6	95.9	95.8
Caucasian	1.2	1.6	1.4
Others*	3.2	2.5	2.8
Number of siblings			
No (single child)	14.9	13.5	14.1
One	49.1	45.1	46.9
Two or above	36.0	41.4	39.0
Living arrangement			
With both parents	87.4	86.7	87.0
Others	12.6	13.3	13.0
Housing			
Private	32.4	37.7	35.3
Non-private	67.6	62.3	64.7

*Others including black or non-Chinese Asians.

Table 2. **Dental health behaviours**

	Boys %	Girls %	All %
Brushing habits			
Before breakfast	88.7	93.7	91.5
After breakfast	11.5	7.7	9.4
During the rest of the day	11.6	7.6	9.4
Before sleep	72.7	83.2	78.5
At least twice daily	71.6	82.7	77.8
Use of dental floss in the past 7 days			
None	80.2	75.6	77.7
1 day	6.1	7.3	6.8
2 days	4.7	6.8	5.9
3 days	3.4	3.7	3.5
4 days	1.5	1.9	1.7
5 days	1.3	1.2	1.2
6 days	0.3	0.4	0.3
7 days	2.4	3.2	2.8
Last dental visit			
Past 7 days	5.7	4.0	4.8
Past month	4.6	5.9	5.3
Past 3 months	5.4	6.4	6.0
Past 6 months	7.2	11.1	9.3
Past 12 months	10.1	14.4	12.5
More than 12 months	66.9	58.3	62.1

use dental floss weekly (OR = 0.88, 95%CI = 0.77–1.01, $P = 0.06$) than those aged 14. Moreover, Caucasian had higher odds of regular brushing (ORs = 1.91, 95%CI = 0.94–3.98, $P = 0.08$) than Chinese, although it was not statistically significant. Compared with Chinese, both Caucasian and other ethnic groups were significantly more likely to use dental floss weekly with respective ORs of 1.90 (95%CI = 1.15–3.15, $P = 0.01$) and 1.55 (95%CI = 1.07–2.25, $P = 0.02$). Having two siblings or above (OR = 0.67, 95%CI = 0.54–0.84, $P < 0.001$) and not living with both parents (OR = 0.79, 95%CI = 0.65–0.96, $P = 0.02$) were also significantly associated with lower odds of regular brushing.

Besides, girls were significantly more likely to have annual dental visit (OR = 1.45, 95%CI = 1.29–1.63, $P < 0.001$) than boys. Caucasian (OR = 2.69, 95%CI = 1.65–4.41, $P < 0.001$) and other ethnic groups (OR = 1.63, 95%CI = 1.16–2.29, $P = 0.005$) were both significantly more likely to have annual dental visit than Chinese. Furthermore, having one (OR = 0.76, 95%CI = 0.64–0.90, $P = 0.002$) or two siblings (OR = 0.65, 95%CI = 0.54–0.77, $P < 0.001$), not staying with both parents (OR = 0.81, 95%CI = 0.68–0.97, $P = 0.02$) and non-private housing (OR = 0.78, 95%CI = 0.69–0.88, $P < 0.001$) were all significantly associated with lower odds of annual dental visit.

Discussion

The prevalence of tooth brushing at least twice daily (77.8%) and having annual dental visit during previous 12 months (37.9%) in this study were both higher than that among urban Mainland Chinese adolescents in 1996 with corresponding prevalence of 59.1% and 28.6% (age: 12) (16); as well as in 2003 with corresponding prevalence of 67% and 26% (age: 11, 13 and 15) (24). Both well-established health care infrastructures and higher awareness of dental health in the community may promote better dental health behaviours among Hong Kong adolescents than those from other cities in Mainland China. Moreover, the prevalence of use of dental floss during

Table 3. **Adjusted odds ratios (OR)* of dental health behaviours for different socioeconomic characteristics**

	Regular brushing (at least twice daily)			Use of dental floss (past 7 days)			Dental visit (past 12 months)		
	%	OR (95% CI)	*P*	%	OR (95% CI)	*P*	%	OR (95% CI)	*P*
Gender									
Boys	71.6	1		19.8	1		33.1	1	
Girls	82.7	1.90 (1.66–2.18)	<0.001	24.4	1.31 (1.14–1.50)	<0.001	41.7	1.45 (1.29–1.63)	<0.001
Age									
14	79.6	1		23.5	1		39.0	1	
15	75.9	0.83 (0.72–0.95)	0.006	21.1	0.88 (0.77–1.01)	0.06	36.7	0.92 (0.82–1.03)	0.16
Ethnic group									
Chinese	77.8	1		21.9	1		37.2	1	
Caucasian	87.0	1.91 (0.94–3.89)	0.08	34.8	1.90 (1.15–3.15)	0.01	60.9	2.69 (1.65–4.41)	<0.001
Others†	72.7	0.81 (0.55–1.19)	0.28	29.7	1.55 (1.07–2.25)	0.02	47.5	1.63 (1.16–2.29)	0.005
Number of siblings									
No (single child)	81.0	1		23.6	1		44.7	1	
One	78.9	0.84 (0.68–1.05)	0.12	22.9	0.96 (0.78–1.17)	0.65	38.4	0.76 (0.64–0.90)	0.002
Two or above	75.3	0.67 (0.54–0.84)	<0.001	21.1	0.85 (0.69–1.05)	0.13	37.9	0.65 (0.54–0.77)	<0.001
Living arrangement									
With both parents	78.3	1		22.5	1		38.4	1	
Others	74.1	0.79 (0.65–0.96)	0.02	21.4	0.93 (0.76–1.14)	0.47	34.2	0.81 (0.68–0.97)	0.02
Housing									
Private	79.7	1		23.3	1		42.2	1	
Non-private	76.7	0.89 (0.77–1.03)	0.12	21.8	0.93 (0.81–1.07)	0.33	35.5	0.78 (0.69–0.88)	<0.001

*Mutually adjusted for gender, age, ethnic groups, number of siblings, living arrangement, housing.
†Others including black or non-Chinese Asians.

the past 7 days (19.8% in boys and 24.4% in girls) in this study was relatively lower when compared with the HRBGQ findings from the Exeter University (26.6% in boys and 30.5% in girls aged 12–16) (25). These may suggest that use of dental floss is less popular in the local community and needs to be further advocated in schools.

Similar to Western findings, girls were more likely to brush regularly (26) and to use dental floss (27) than boys. The odds of having dental visit in the past 12 months for both Caucasian and other ethnicities were significantly higher than that for Chinese subjects. In Hong Kong, most students attend local schools which teach subjects in Chinese. Only those who could afford the high school fees and mostly non-Chinese speaking groups would attend international schools. The present school dental health programmes provided by the Government are only available to primary school students and other dental services for the public are designated for emergency only. Almost all Caucasian and other ethnicity (black or non-Chinese Asians or others) groups in the present study were from private international schools and probably opted to attend private dental services for routine checkups.

Non-traditional living arrangements and more siblings (two or above) were associated with lower odds of regular brushing and annual dental visit. Findings in US children (28) and Canadian girls (29) also suggested that non-traditional family arrangements (not with both parents) were associated with limited access to dental care. It is reasonable to assume that students with more siblings and not living with both parents may have weaker bonding with their parents. Lower sense of family bonding was found to be associated with poorer dental health practices including brushing and regular dental visits (30). Furthermore, lower odds of annual dental visit among students with lower socioeconomic status (as indicated by housing type) were also consistent with the findings in US (15, 30, 31). Nevertheless, the present study did not reveal a significant association between socioeconomic status and regular brushing as reported in UK adolescents (32).

This study has recruited a relatively large and representative sample of early adolescents. Unlike most local studies, both local and international school students were included. It is assumed that the frequency of brushing and flossing of the students before survey well represented their usual practices. Moreover, dental health behaviours such as use of fluoride toothpaste, and consumption of sugary foods and drinks were not assessed in this study. Nonetheless, the information documented in this study would be useful for public health policy-making in Hong Kong and other Chinese cities.

Conclusions

Regular tooth brushing is common among early Hong Kong adolescents. However, use of dental floss and annual dental visit are not common. In general, poorer dental health behaviours may be related to socioeconomic disadvantages. Extending the existing government-run dental health programmes to secondary school students in Hong Kong is warranted.

Acknowledgements

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