# SECTION 4

## 12-year old students

### Introduction

The 12-year old children covered in this survey were all born in 1988. According to the Laws of Hong Kong, it is mandatory for children to receive formal education up to Form three (F3) in secondary school unless under exceptional circumstances. Hence, almost all the 12-year olds must be within the school system in Hong Kong, and they are referred to in this survey as 12-year old students. However, students of this age may be found in either primary schools or secondary schools. Available information indicated that majority of the 12-year old students were in F1 and F2 of secondary schools. Therefore, for administrative convenience, the survey on this age group was targeted only at F1 and F2 students in secondary schools.

### Survey objectives

The objectives of the survey of the 12-year old population were:
1. to assess the oral health status (mainly tooth decay and oral hygiene status);
2. to collect information on the oral health care behaviour;
3. to collect information on the students' and parents' knowledge on dental diseases; and
4. to collect information on parents' attitudes towards their children's oral health and regular dental checkup.

A brief description on the survey methods employed is presented in the following paragraphs. Details on data collection, methodology and statistical methods in sampling and computation of results, can be referred to in a separate Technical Report of the Oral Health Survey 2001.  Readers who wish to go direct to survey findings can proceed to quick reference sections found in green text boxes.

## Sample design

The sample size was determined by taking into consideration the precision level, prevalence of tooth decay, sample design effect, anticipated response rate, the proportion of 12-year old students in F1 and F2 and resources availability.

The sample of 12-year old students was drawn using secondary schools as the primary sampling unit. 26 schools were selected from a database of all local secondary schools provided by the Education Department. All F1 and F2 students of the selected schools born in 1988 were invited to participate in a second stage of selection. Due to constraints in resources and to avoid undue disruption of classes in the selected schools, the number of students selected from each school was limited to a maximum of 50.

## Data collection method

The oral health status was assessed by clinical examination according to the method and criteria recommended by the World Health Organization[1]. The clinical examination was carried out by two dental officers (examiners) all through the survey. Steps were taken to minimize the error arising from differences in clinical judgment, through repeated calibration exercises before the survey. During the survey, students were randomly assigned to the two examiners for clinical examination. A random sub-sample of one in every ten students (about 10%) were cross-examined, to monitor the examination reproducibility, and this was maintained at a very good level.

Information on the students and their parents were collected using two questionnaires, completed by students on site and by parents at home, respectively. The draft questionnaires were pre-tested on primary six students and their parents attending School Dental Clinics, and several revisions were made before being finalized.

## Enumeration results

Out of the 26 selected schools, 18 schools agreed to participate, and 820 students from these 18 schools were selected and invited to participate in this survey. Selected students were examined only if parental consent had been received, and the survey was successfully completed on 793 students. With statistical adjustment and weighting, the results of this survey could be inferred to some 67 100 students aged 12 in Hong Kong. According to the 2001 Population Census, there were 91 800 children aged 12 in Hong Kong at the time of survey. Hence, this survey had covered 73% of 12-year old children. Children not covered were mostly studying in school grades other than F1 and F2.

## Limitations

The findings were reported at the aggregate level. For Tables presented in the report, figures may not add up to the totals due to rounding.

Results of the Oral Health Survey may be subject to errors. The estimates contained in this report were based on information obtained from a particular sample, which was one of a large number of possible samples that could be selected using the same sample design. By chance, estimates derived from different samples would differ from each other. Due to this possible variation of results, a zero figure may mean a non-zero figure of small magnitude. These estimates should be interpreted with caution. Some results were derived from small sub-group of the sample and the limitation should be noted in its interpretations.

## What was the oral health status of the 12-year old students in Hong Kong?

### Teeth status - how many teeth were there ?

On average, each 12-year old student had 26.8 permanent teeth. The mean number of primary teeth still present was very small (0.5). Hence, the report on 12-year old students referred to their permanent dentition only.

### Teeth status - how clean were the teeth ?

The cleanliness of the students' teeth was measured by the Visible Plaque Index (VPI), which shows the percentage of teeth surfaces covered with dental plaque found on visual examination. The mean VPI among  12-year old students was 36.8%. The percentage distribution of students according to level of teeth cleanliness is shown in Figure 4.1. Only 1% (600) of students had no visible dental plaque on their teeth. 28.7% (19 200) were found to have visible dental plaque on more than half of their teeth surfaces (VPI>50%).

**Figure 4.1
Distribution of 12-year old students
according to level of teeth cleanliness**
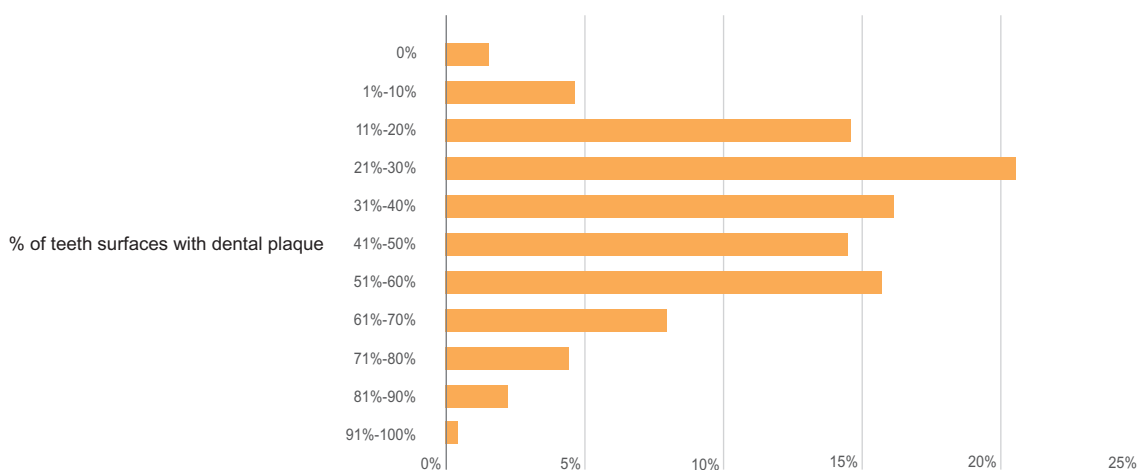
**Teeth status - what was the level of tooth decay ?**

The level of tooth decay as measured by the DMFT index is summarized in Table 4.1. The mean DMFT value among the 12-year old population was 0.8. Most of the decay experience (DMFT) were filled components (FT). The proportion of untreated decay (DT) was relatively low.

**Table 4.1**
**Level of tooth decay as measured by the DMFT index**
**among 12-year old students**

|  | DMFT | DT (decayed) | MT (missing) | FT (filled) |
|---|---|---|---|---|
| Mean value | 0.8 | 0.1 | 0.1 | 0.6 |
| % Among population | 37.8 | 6.9 | 3.1 | 33.8 |

The distribution of students according to their DMFT value is shown in Figure 4.2. 62.2% (41 800) students were free from tooth decay. It was found that most of the affected students had one or two teeth with decay experience. Only 4.2% of 12-year old students had four or more teeth with decay experience.

**Figure 4.2**
**Distribution of 12-year old students**
**according to DMFT value**
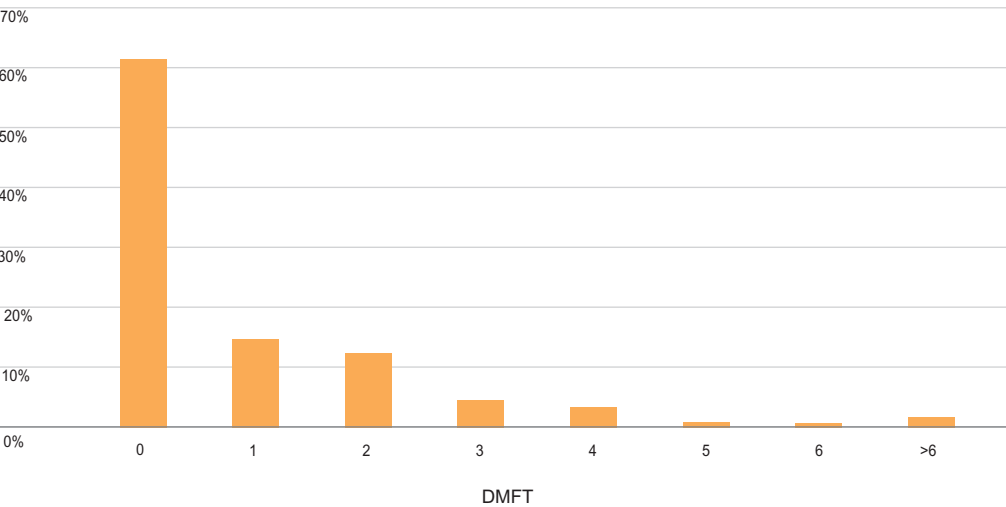
**Teeth status - how many teeth were protected by fissure sealants?**

Fissure sealant is a coat of resin applied to the teeth surfaces to prevent tooth decay. The mean number of sealed teeth per student was 2.3 indicating that many of these students had received some preventive care.

**What was the gum condition of the students ?**

The gum condition of the 12-year old students was measured by the Community Periodontal Index (CPI), and the results are shown in Table 4.2. On average, more than three sextants in the mouth of each 12-year old student had either bleeding gums or calculus deposit.

**Table 4.2**
**Gum condition as measured by CPI among 12-year old students**

|  | Healthy gums | Bleeding gums | Calculus deposits |
|---|---|---|---|
| Mean number of sextants affected | 2.6 | 1.8 | 1.6 |
| % Among population | 5.5 | 35.0 | 59.5 |

Only 5.5% (3 700) students had healthy gums in all the six sextants, while 59.5% (39 700) students had calculus deposits.

**Teeth cleanliness was not satisfactory.** Almost all of the 12-year old students had visible dental plaque on their teeth. More than a quarter (28.7%) of the students had dental plaque on more than half of the teeth surfaces examined.

**Tooth decay was not a problem among the 12-year old population.** The proportion of students affected by tooth decay was relatively low. Most of the students with decay experience had one or two teeth affected, and most of the decayed teeth were treated.

**The gum condition warranted attention.** Very few students (5.5%) had healthy gums. More than half of the population had calculus deposit. Along with the unsatisfactory level of teeth cleanliness, this population is at risk of developing gum disease.

## What was the pattern of usage of oral health care services among the 12-year old students?

**How many students had participated in the School Dental Care Service before entering secondary school ?**

The reported participation in the School Dental Care Service (SDCS) during their primary school years is presented in Figure 4.3. Almost four out of every five students had participated every year, and only 2.7% (1 800) had never participated in the SDCS.

**Figure 4.3
Distribution of 12-year old students
according to SDCS participation**

18.4%
(12 300)

78.9%
(53 000)

2.7%
(1 800)

■ Every year     ■ Intermittent years     ■ Never participated
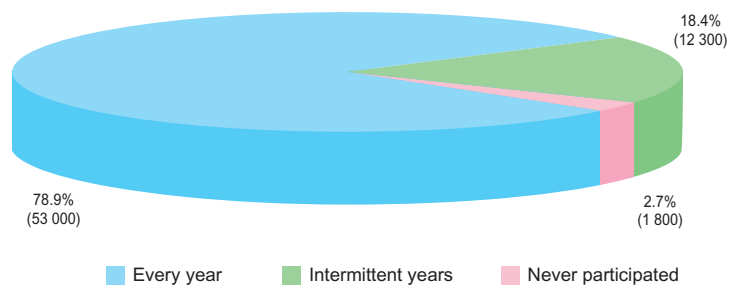
**How many students had visited the dentist after entering secondary school?**

Only 21% (14 100) of students had visited the dentist after entering secondary school. The treatment received during these dental visits are shown in Table 4.3. Majority of these students received professional teeth cleaning (scaling). A smaller proportion of students received curative treatment such as filling, orthodontic treatment and removal of teeth.

**Table 4.3**
**Number and percentage of 12-year old students**
**who had visited the dentist after entering secondary school**
**according to treatment received**

| Treatment received | Number | Percentage |
|---|---|---|
| Professional teeth cleaning | 10 200 | 72.2 |
| Filling | 4 200 | 29.5 |
| Orthodontic treatment | 2 600 | 18.5 |
| Removal of teeth | 2 600 | 18.4 |
| Pulp treatment | 400 | 3.0 |
| Prostheses | 200 | 1.3 |
| Others | 200 | 1.7 |

Respondents allowed to choose multiple answers

Among the 12-year old students, only 20.9% (14 000) claimed that they had visited the dentist for dental checkup after entering secondary school. There was no difference in this habit among students in F1 and F2.
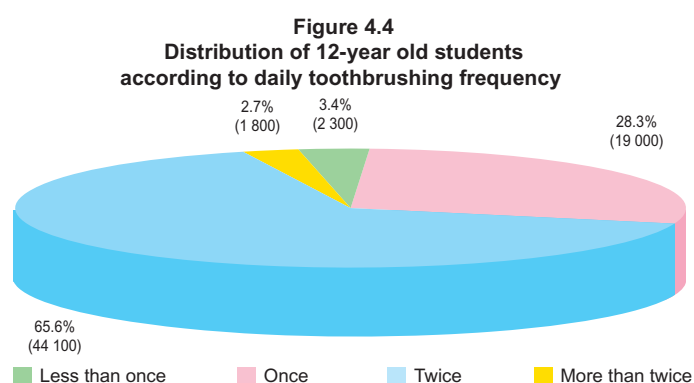
**Majority of the students received oral health care during their primary school years.** Most of the 12-year old students had received some form of oral health care during their primary school years. Only a very small proportion (2.7%) had never participated in the School Dental Care Service.

**A large proportion of students had stopped receiving regular oral health care after entering secondary school.** The use of oral health care services dropped dramatically after the students entered secondary school. Only 20.9% reported the seeking of dental checkup during secondary school years.

## How did the 12-year old students practise oral self-care ?

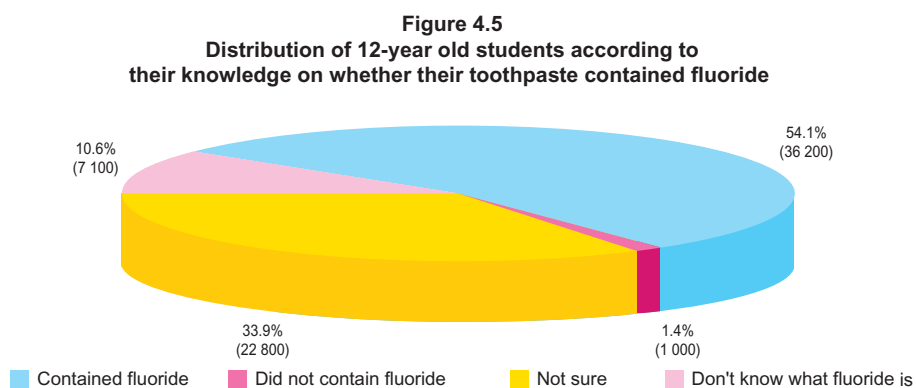### Toothbrushing - how often did the students brush ?

The reported toothbrushing habit among 12-year old students is shown in Figure 4.4. Most students reported the habit of daily toothbrushing. Only 3.4% (2 300) students reported that their toothbrushing habit had been irregular.

**Figure 4.4**
**Distribution of 12-year old students**
**according to daily toothbrushing frequency**

2.7%
(1 800)

3.4%
(2 300)

28.3%
(19 000)

65.6%
(44 100)

■ Less than once    ■ Once    ■ Twice    ■ More than twice

### Toothbrushing - was fluoride toothpaste used ?

As many as 94.7% (63 600) students reported the use of toothpaste every time they brushed their teeth.
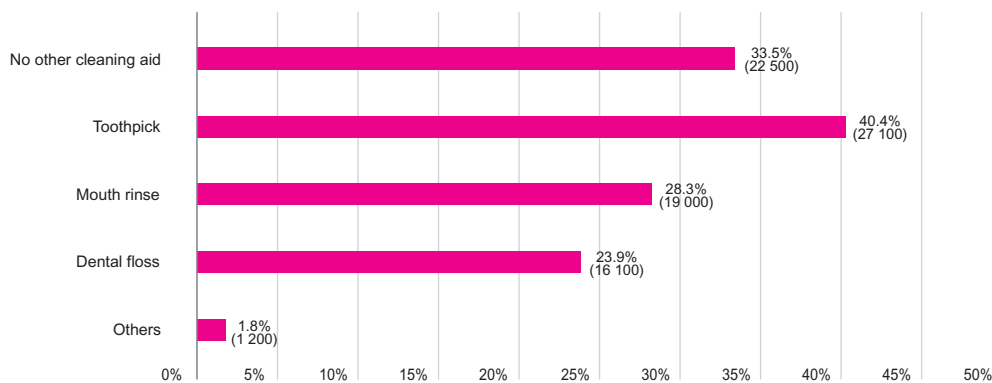
Students were asked whether the toothpaste they had been using contained fluoride, and the results are shown in Figure 4.5. Only 54.1% (36 200) reported that the toothpastes they used contained fluoride. A third of the students did not know whether fluoride was present in the toothpaste. One in every ten students did not know what fluoride was.

**Figure 4.5**
**Distribution of 12-year old students according to**
**their knowledge on whether their toothpaste contained fluoride**

10.6%
(7 100)

54.1%
(36 200)

33.9%
(22 800)

1.4%
(1 000)

■ Contained fluoride    ■ Did not contain fluoride    ■ Not sure    ■ Don't know what fluoride is

**Did the students use additional oral cleaning aids?**

The students were asked whether they used any additional oral cleaning aids to clean their teeth. The results are shown in Figure 4.6. Many students reported the use of toothpick or mouth rinse. Only 23.9% (16 100) of students claimed to have used dental floss.

**Figure 4.6**
**Number and percentage of 12-year old students**
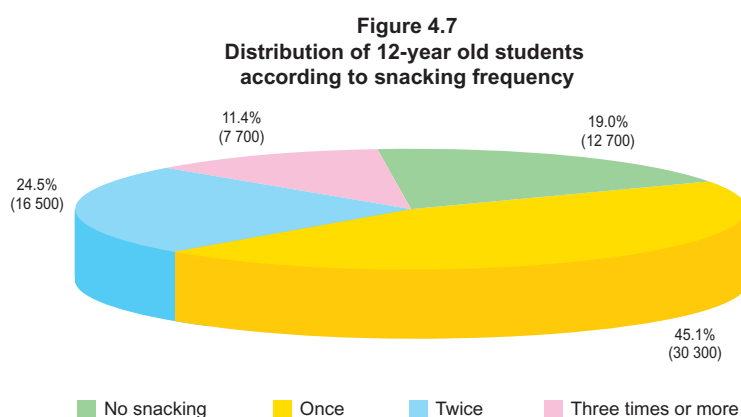**according to use of other oral cleaning aids**



Two-thirds of the students brushed their teeth twice daily. Only 3.4% brushed less than once a day. The use of toothpaste was common among those who brushed.

**More than one-third of the students did not know whether the toothpaste used contained fluoride or not.** As most toothpastes in Hong Kong contain fluoride, the chance of these students using non-fluoride toothpastes was small. However, a small number of students could be using non-fluoride toothpastes which may not be effective in the prevention of tooth decay.

**Two-thirds of the students used additional oral cleaning aids, but only less than a quarter of students reported the use of floss.** Different interdental cleaning aids are suited for different situations. For 12- year old students, the use of dental floss is more appropriate than toothpicks. Toothpicks, if used improperly, may cause trauma to the gums and even the loss of gum attachment.

**Snacking habit**

Snacking is referred to as any food, snack or drink (except water) intake in between normal meals. The reported snacking habit among 12-year old students is shown in Figure 4.7. Three out of every four students reported the habit of snacking. Only 11.4% (7 700) students reported snack intake of three or more times on the day prior to the survey. Students with this high snacking frequency could be at risk of developing tooth decay.
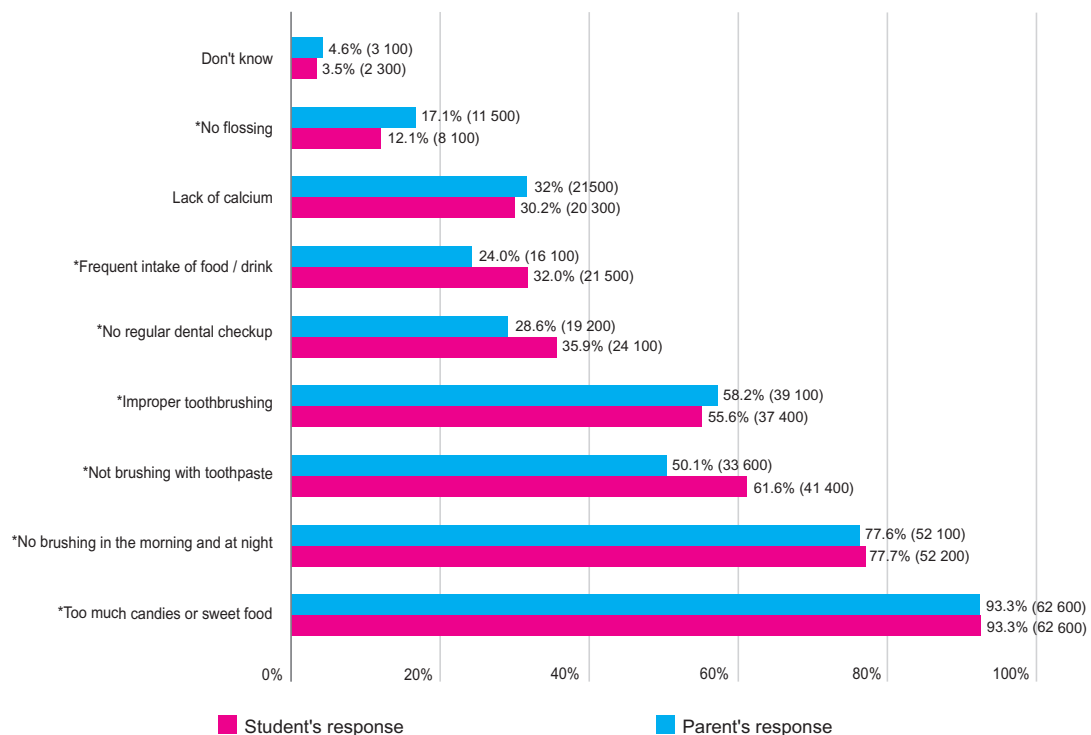
**Figure 4.7**
**Distribution of 12-year old students**
**according to snacking frequency**



11.4%
(7 700)

19.0%
(12 700)

24.5%
(16 500)

45.1%
(30 300)

■ No snacking     ■ Once     ■ Twice     ■ Three times or more

## What did the students and their parents know about dental diseases?

**What did the students and their parents know about the factors leading to tooth decay?**

The perceived factors leading to tooth decay by students and their parents are shown in Figure 4.8. The knowledge of students and parents on the factors leading to tooth decay was generally good. The mostly reported factor among both students and their parents was *eating too much candies or sweet food*, but relatively few could point out the importance of *frequent intake of food / drink*. The next mostly perceived factor was *no brushing in the morning and at night*.

**Figure 4.8**
**Number and percentage of 12-year old students and their parents
according to the perceived factors leading to tooth decay**

| Factor | Student's response | Parent's response |
|---|---|---|
| Don't know | 3.5% (2 300) | 4.6% (3 100) |
| *No flossing | 12.1% (8 100) | 17.1% (11 500) |
| Lack of calcium | 30.2% (20 300) | 32% (21 500) |
| *Frequent intake of food / drink | 32.0% (21 500) | 24.0% (16 100) |
| *No regular dental checkup | 35.9% (24 100) | 28.6% (19 200) |
| *Improper toothbrushing | 55.6% (37 400) | 58.2% (39 100) |
| *Not brushing with toothpaste | 61.6% (41 400) | 50.1% (33 600) |
| *No brushing in the morning and at night | 77.7% (52 200) | 77.6% (52 100) |
| *Too much candies or sweet food | 93.3% (62 600) | 93.3% (62 600) |

Respondents allowed to choose multiple answers
* Relevant factors

**What did the students and their parents know about the factors leading to gum disease?**

The perceived factors leading to gum disease provided by students and their parents are shown in Figure 4.9. The knowledge of students and parents on the factor leading to gum disease was not as good as compared with those of tooth decay. The mostly reported factor *of no brushing in the morning and at night* was shared by students and parents.  Otherwise, parents considered *improper toothbrushing* and *lack of vitamin* as important.  Students recognized *smoking* and *improper toothbrushing* as factors leading to gum disease.  *No flossing* and *no regular dental checkup* were reported by relatively fewer students and parents.

**Figure 4.9**
**Number and percentage of 12-year old students and their parents**
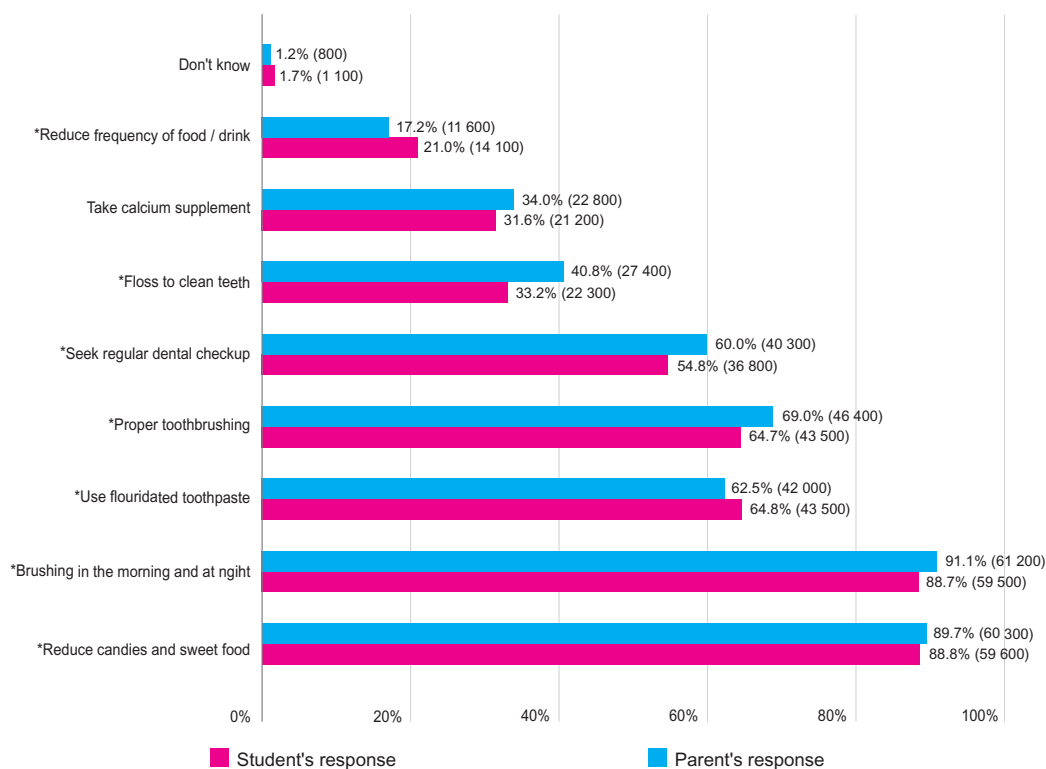**according to the perceived factors leading to gum disease**
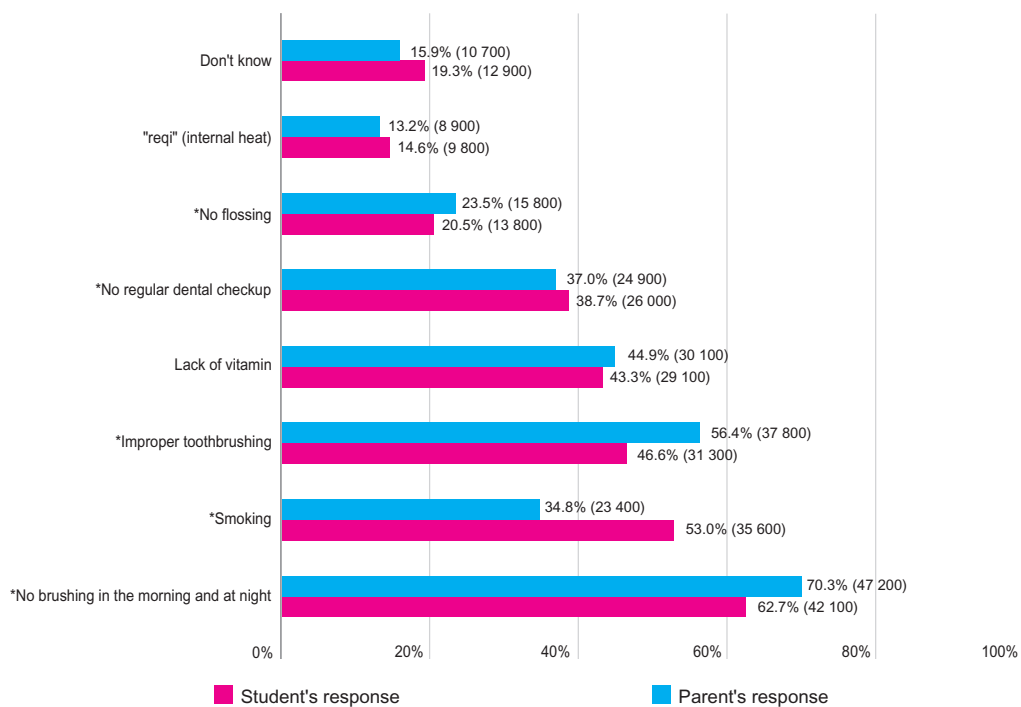


Respondents allowed to choose multiple answers
* Relevant factors

**What did the students and their parents know about the prevention of tooth decay?**

The methods as perceived by students and parents on the prevention of tooth decay are shown in Figure 4.10. *Reduce consumption of candies and sweet food* and *brushing in the morning and at night* were the mostly reported methods to prevent tooth decay, followed by use *fluoridated toothpaste* and *proper toothbrushing.* *Seek regular dental checkup* was mentioned by around 54.8% (36 800) students and 60% (40 300) parents. However, *reduce frequency of food or drink intake* was reported by relatively fewer students and parents. 31.6% (21 200) of students and 34% (22 800) parents indicated that taking calcium supplement could prevent dental decay. This general misconception needs to be clarified.

**Figure 4.10**
**Number and percentage of 12-year old students and their parents**
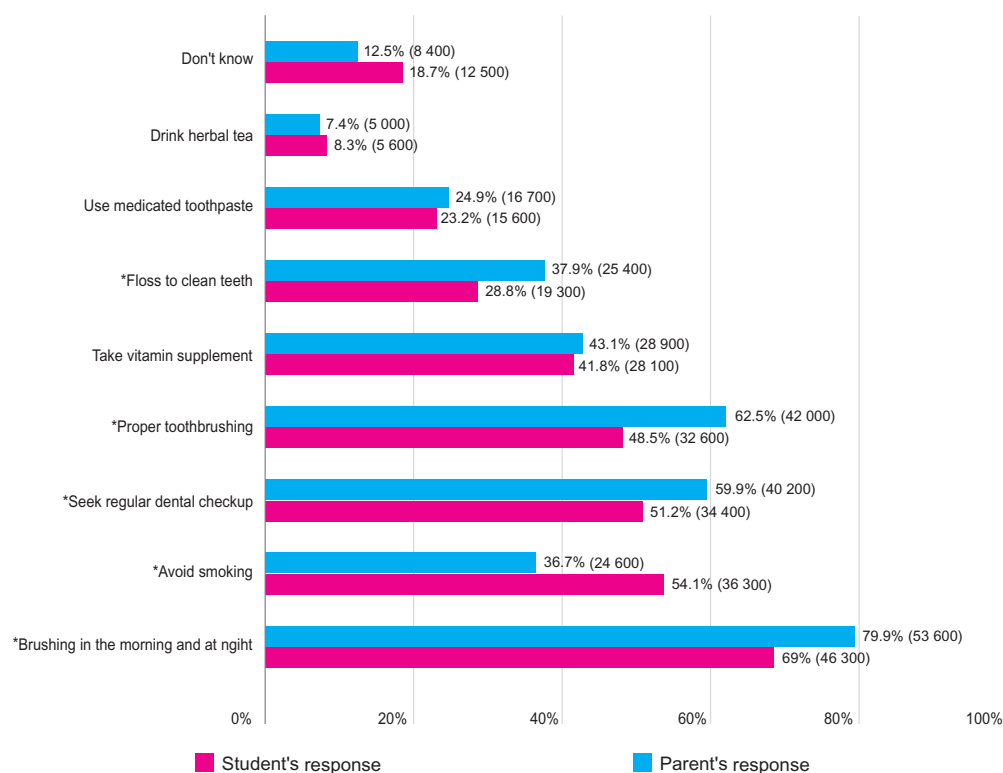**according to the perceived methods to prevent tooth decay**



Respondents allowed to choose multiple answers
* Relevant factors

**What did the students and their parents know about prevention of gum disease?**

The methods as perceived by students and parents on the prevention of gum disease are shown in Figure 4.11. The responses from students and their parents were again different in this area. Parents accorded more importance to *brushing in the morning and at night*, followed by *proper toothbrushing* and *seek regular dental checkup*. Students mentioned the three preventive methods to a similar degree, and more students pointed out the importance to *avoid smoking* in the prevention of gum disease than their parents. *Floss to clean teeth* was only reported by 28.8% (19 300) of students and 37.9% (25 400) parents.

**Figure 4.11**
**Number and percentage of 12-year old students and their parents**
**according to the perceived methods to prevent gum disease**



| | Student's response | Parent's response |
|---|---|---|
| Don't know | 18.7% (12 500) | 12.5% (8 400) |
| Drink herbal tea | 8.3% (5 600) | 7.4% (5 000) |
| Use medicated toothpaste | 23.2% (15 600) | 24.9% (16 700) |
| *Floss to clean teeth | 28.8% (19 300) | 37.9% (25 400) |
| Take vitamin supplement | 41.8% (28 100) | 43.1% (28 900) |
| *Proper toothbrushing | 48.5% (32 600) | 62.5% (42 000) |
| *Seek regular dental checkup | 51.2% (34 400) | 59.9% (40 200) |
| *Avoid smoking | 54.1% (36 300) | 36.7% (24 600) |
| *Brushing in the morning and at ngiht | 69% (46 300) | 79.9% (53 600) |

Respondents allowed to choose multiple answers
* Relevant factors

**Did the students and their parents know about the benefits of fluoride ?**

The perceived benefits of fluoride as reported by students and their parents are shown in Figure 4.12. 28.3% (19 000) students and 18.6% (12 500) parents replied *don't know*. Among those who could give an answer, most reported the benefit in the prevention of tooth decay. However, the *prevention of gum disease* and the *whitening of teeth* were also mentioned by more than one-third of students and parents.

**Figure 4.12**
**Number and percentage of 12-year old**
**students and their parents according**
**to their knowledge on the benefits of fluoride**
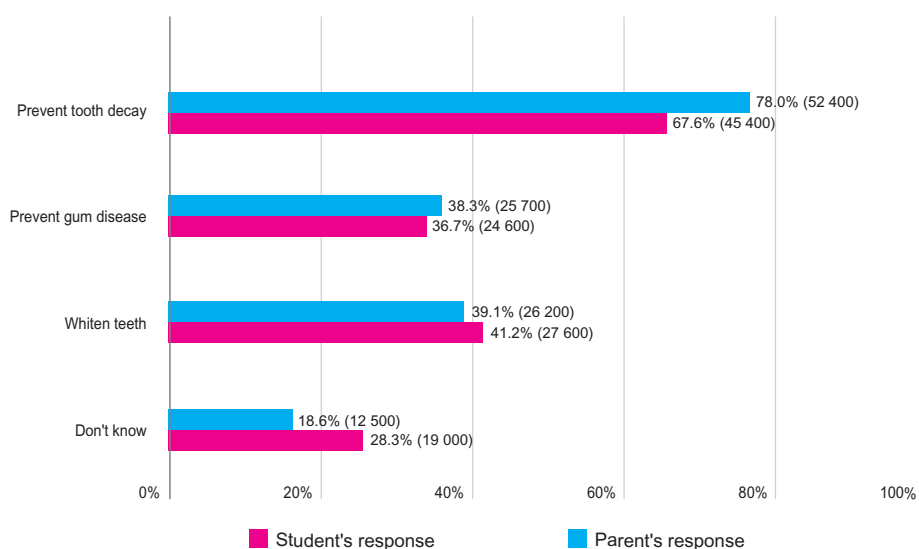
**Knowledge on gum disease prevention needs to be reinforced.** Among both the students and their parents, only six out of ten could point out the importance of use correct toothbrushing method (*proper toothbrushing*) in preventing gum disease, and even fewer (around three out of ten) could point out the importance of using *floss to clean teeth*. However, there were more students than their parents who pointed out the importance to *avoid smoking* in the prevention of gum disease.

**The function of fluoride was not fully understood.** About 70% of students and 80% of parents knew that fluoride is useful in preventing tooth decay. However, slightly more than one-third of the students and the parents thought that fluoride could also prevent gum disease or to whiten teeth.

**Most students and their parents knew candies and sweet food are bad for the teeth, but many of them did not know the risk of developing tooth decay from frequent snacking.** Less than one-third of the students and one-fourth of the parents knew of frequent snacking as a risk factor for developing tooth decay.

**Many students and their parents knew that regular dental checkup is important in preventing tooth decay and gum disease, but only a minority had actually done so.** More than 50% of the students and around 60% of the parents pointed out the importance of regular dental checkup in the prevention of tooth decay and gum disease. However, only around one in every five students had visited the dentist for checkup after entering secondary school.

**More students than their parents knew the harmful effect of smoking on gum health.** Only about one-third of the parents were able to cite smoking as a causative factor, and avoidance of smoking as a method to prevent gum disease, while more than half of the students were aware of this.

## What were the barriers to students seeking oral health care services after entering secondary school ?

**What were the reasons for not seeking regular dental checkup among 12-year old students ?**

Students who did not seek regular dental checkup after entering secondary schools were asked to state the reasons for not doing so. The reported reasons are listed in Figure 4.13.  Reasons such as *no need because of good teeth, no need because of absence of pain* and *no checkup habit* were grouped together as *no perceived need*, which were collectively reported by 53.9% (28 600) students. *No perceived need* was the single most commonly stated reason given for not seeking dental checkup. *Too busy* was a reason given by 40.7% (21 600) of students, and the concern of cost (*too expensive*) was given by 31.1% (16 500) of students.

**Figure 4.13**
**Number and percentage of 12-year old students**
**according to reported reasons for not having regular dental checkup**
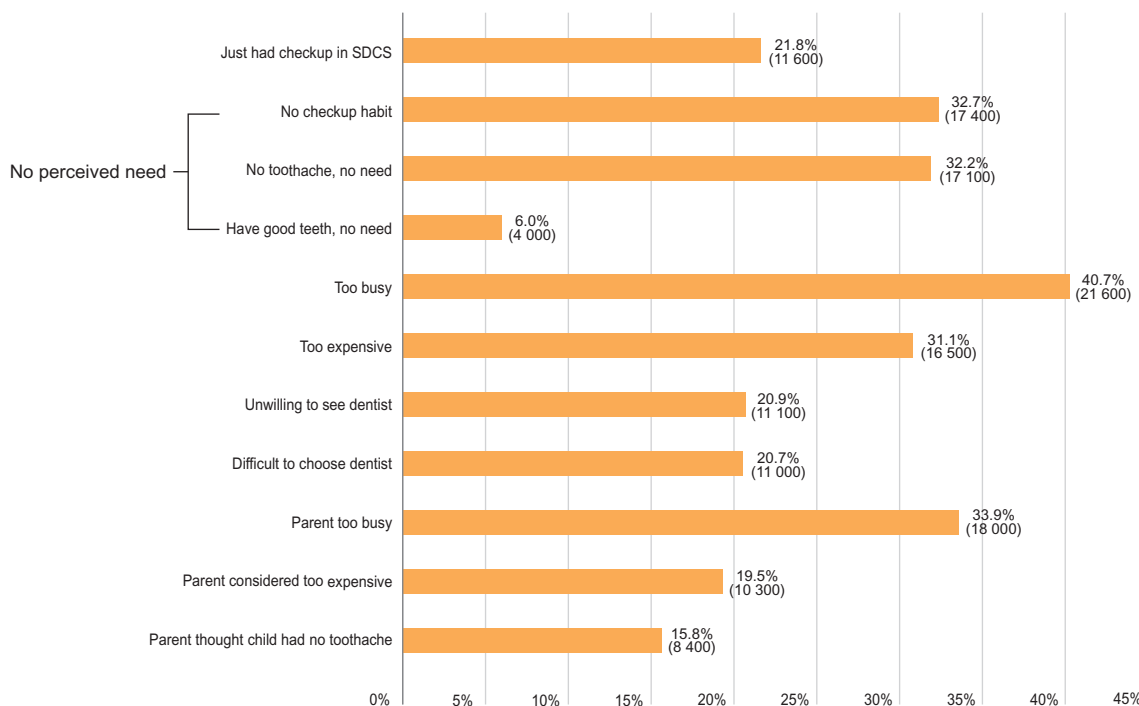
**Did the parents intend to bring their children to seek dental checkup?**

Only 41.7% of (28 000) parents claimed that they had intentions to bring their children for dental checkup and 58.3% (39 100) indicated that they had no such intentions.

**What were the reasons for parents not intending to bring their children to seek dental checkup ?**

The reported reasons are listed in Figure 4.14. The most commonly reported reason was *too expensive*, followed by *no perceived need due to the absence of pain, no checkup habit*, and parents *too busy*.

**Figure 4.14**
**Number and percentage of parents according to their reported reasons of not intending to bring the students for dental checkup**
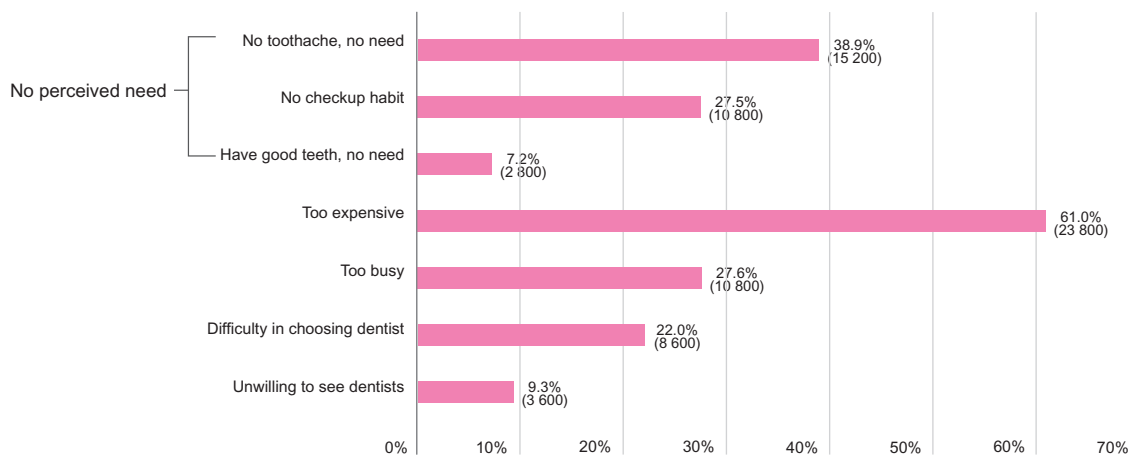


Low perceived need was the most common reason given by students and their parents for not seeking oral health care service. The absence of pain, the perceived good health, and the lack of regular checkup habit were related to the low perceived need.

Parents also considered dental checkup for their children too expensive. The survey information was not sufficient to conclude whether the affordability of checkup or the lack of perceived value was the real concern behind the response of *too expensive*.

## What was the dental treatment need as assessed by the survey method ?

The dental treatment need among 12-year old students as assessed by the survey method is shown in Table 4.4.

**Table 4.4**
**Dental treatment need of 12-year old students**
**as assessed by the survey method**

| Dental treatment need | Mean number of teeth | Percentage |
|---|---|---|
| Filling (1-surface) | 0.1 | 5.5 |
| Filling (2-surface) | 0.1 | 6.2 |
| Pulp treatment | <0.05 | 0.1 |
| Removal of teeth | <0.05 | 1.1 |
| Fissure sealant | 0.5 | 30.6 |
| Professional teeth cleaning | N/A | 59.5 |

N/A = not applicable

**The main type of dental treatment needed was for preventive care.** Many students brushed their teeth twice a day. However, the inefficient removal of plaque was reflected by 28.7% of students having visible plaque on more than half of the teeth surfaces and 35% of students having bleeding gums. Instruction on teeth cleaning skills, especially for those having inadequate oral hygiene is required. This can be carried out during regular dental checkup, alongside professional teeth cleaning to remove calculus.

Application of fissure sealant is a scientifically proven, safe, and effective preventive treatment for the prevention of tooth decay, especially for the permanent molar teeth. Such preventive treatment for 12-year olds is especially important as the remaining permanent molars erupt in place.

## What was the self-perceived oral health condition of the students?

The students were asked how they perceived their own oral health.  Their parents were also asked to indicate how they perceived their children's oral health.  The results are shown in Figure 4.15 and Figure 4.16. Only 17.4% (11 600) of children perceived their own oral health as *good* or *very good*.  More parents (25.2%, 16 600) perceived that their children as having *good* or *very good* oral health.   Relatively fewer students 13.5% (9 000) and parents 10.8% (7 100) thought that their oral health status was *bad* or *very bad*. 69.3% (46 400) students and parents 63.9% (41 900) had *no opinion*.

**Figure 4.15**
**Distribution of parents according to their**
**perception of their children's**
**oral health condition**
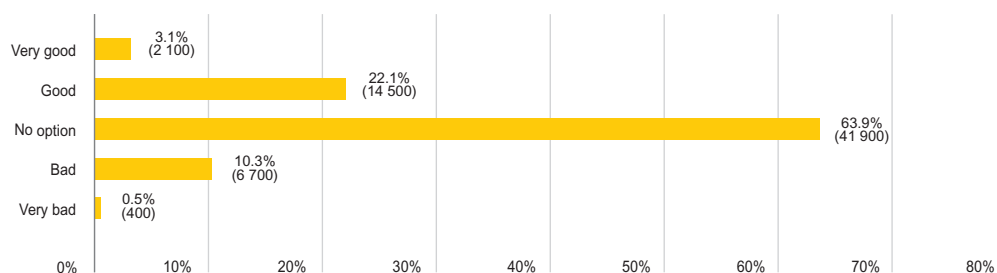


1 700 parents gave no answer

**Figure 4.16**
**Distribution of 12-year old students**
**according to their perception of their**
**own oral health condition**
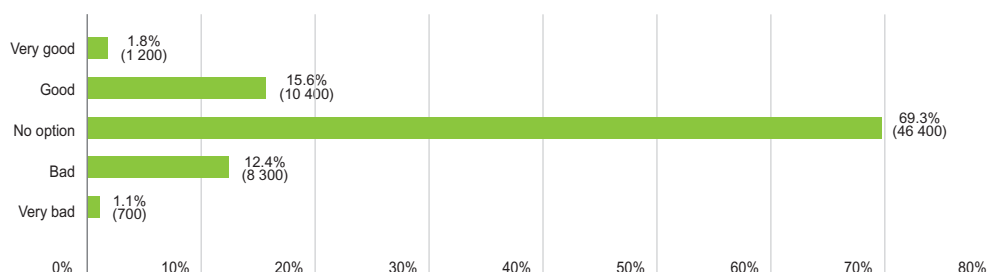


100 students gave no answer

57

**How was the perceived students' oral health status compared to the assessed need?**

The assessed need for curative treatment was very low among 12-year old students. However, the need for maintenance care and preventive treatment was high, as 35% of students had bleeding gums and 59.5% of students had calculus deposits. Since many students and their parents thought that they did not need to have regular checkup as their teeth had no problem, they would have missed the opportunity to get the much needed care.

## Coverage by parents' dental schemes and the parents' intention to bring the students to seek dental checkup

Only 16% (10 700) of the parents reported that they had dental scheme coverage. Of these dental schemes, 72.1% were dental benefits provided by parents' employers. Other schemes included dental insurance and other types of schemes. Only 14.3% (9 600) students were also covered by their parents' dental schemes.

More of the parents (67.9%) with dental scheme coverage reported the intention to bring their children to seek dental checkup than those (38.9%) whose children had no dental scheme coverage. However, such inference was drawn from a small sub-group of the original sample and must be interpreted with caution.

**Coverage by dental schemes was associated with higher intention reported by parents to bring their children to go for dental checkup.** It should be noted that expressed intention may not necessarily be put into action. Therefore, the results should be interpreted with caution.

# SECTION 4 - SUMMARY

## The oral health condition of 12-year old students, in terms of tooth decay level, can be regarded as very good.

No major inadequacy in oral health was found among the 12- year old students in this regard. A relatively small proportion of students were affected by tooth decay. Most of those with tooth decay had only one to two affected teeth, and most of the decayed teeth were filled.

## Inadequate teeth cleanliness and calculus deposits were indicators of risk to future disease development.

Very few students were free from visible dental plaque on examination. Gum inflammation as indicated by gum bleeding was found in one-third of the population. Calculus was also found in more than half of this population. The presence of plaque and calculus leads to greater risk of developing tooth decay and gum disease.

Toothbrushing was not effectively performed by most students. One-fourth of the students claimed to use dental floss to remove plaque between the teeth. Many students had calculus deposits and needed professional scaling. Promotion on maintaining teeth cleanliness and attending regular dental checkup need to be reinforced.

## Frequent snacking is a risk factor for tooth decay.

Most of the students reported a snacking habit. High frequency of food intake, which is a well-established cause of tooth decay, could be cited by only a few students and parents. Some of them snacked three times or more daily, which is an undesirable habit for maintaining good oral health.

## Not many students had regular dental checkup.

Regular dental checkup was mentioned by many students and parents as a method to help prevent tooth decay and gum disease. However, only one in every five students reported such habit.

It was commonly reported that there was no need to have a checkup since there was no toothache.  Many students thought that their oral health condition was average or good, but actually, only a small proportion had healthy gums. As early tooth decay and gum disease cannot be detected by the students and parents themselves, regular dental checkup should be promoted.

Survey results indicated that parents were concerned about the cost of dental checkup. This may be interpreted as either the cost of dental checkup was too high and unaffordable, or the cost of checkup had not been perceived as worthy of its value.

**Coverage by parents' dental schemes was associated with the relatively higher usage of oral health care services.**

More parents were willing to bring their children for regular dental checkup if the children were covered by dental schemes.  Similarly, more children who were covered by dental schemes did have regular dental checkup.