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Department of Health

ORAL HEALTH SURVEY

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ORAL HEALTH SURVEY 2021

Department of Health
Government of the Hong Kong Special Administrative Region
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MESSAGE FROM THE DIRECTOR OF HEALTH

Being the Government's health advisor and agency to execute health policies and statutory functions, the Department of Health (DH) safeguards the health of the community through promotive, preventive, curative and rehabilitative services, as well as fostering community partnership and international collaboration.

Oral health is a key indicator of overall health, well-being and quality of life of the population. All along, the policy of the Government of the Hong Kong Special Administrative Region (HKSARG) has focused on increasing the awareness of the public on oral health and their proper use of oral health services. With emergence of aging population, new technologies, innovations and epidemiological shift of disease patterns, we are enhancing oral health strategies that are prevention-oriented, community-based and family-centric, with emphasis on early detection and intervention.

To continually monitor and understand the oral health status of our population, a territory-wide oral health survey is conducted by the DH every ten years. Following the surveys in 2001 and 2011, the Oral Health Survey 2021 was conducted to provide updated and comprehensive data on the oral health status and related behaviors of the citizens and facilitate the planning of dental care services. The data generated can also allow us to monitor the trend of population oral health status.

The results presented in this report should provide useful information to the public, dental profession and other health care professionals. They will also form the basis for the Working Group on Oral Health and Dental Care of the HKSAR in formulating its final recommendations which will be released by end of 2024. Let us work together to promote and enhance the oral health of population.

Dr. LAM Man Kin, Ronald, JP

Director of Health

Government of the Hong Kong Special Administrative Region

ACKNOWLEDGEMENTS

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Bureaux and Departments

Census and Statistics Department
Education Bureau
Official Languages Division, Civil Service Bureau
Social Welfare Department

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Caritas St Francis Kindergarten
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CUHK FAA Chan Chun Ha Kindergarten
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United Christian Medical Service Nursery School
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Kam Wah (North Point) Home For The Aged
Kato Home For The Aged
Kwong On Nursing Center Limited
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Sweet Home Caring Center for the Elderly Co., Limited
The Salvation Army Bradbury Home of Loving Kindness
Tung Kong Sanatorium
Yan Oi Elder Centre Limited
Yuk Wah Elderly Home Limited

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Christian Family Service Centre Choi Ying Day Care Centre for the Elderly
Chung Shak Hei (Cheung Chau) Home for the Aged Limited Day Care Centre for the Elderly
Fung Kai Public School — Fung Kai Care and Attention Home for the Elderly — Day Care Centre for the Elderly
Hong Kong Christian Service Chin Wah Day Care Centre for the Elderly
Hong Kong Sheng Kung Hui Welfare Council Limited — Yan Chun Day Care Centre for the Elderly
Hong Kong Young Women's Christian Association Lam Woo Memorial Day Care Centre for the Elderly
Jane's Home Limited — Pine Villa (Bought Place Scheme on Day Care Units for the Elderly)
Methodist Epworth Village Community Centre, Social Welfare Siu Sai Wan Day Care Centre for the Elderly
Pine Care Elite Limited — Pine Care Place (Bought Place Scheme on Day Care Units for the Elderly)
Po Leung Kuk Evergreen Day Care Centre for the Elderly (attached to Comfort Court for the Senior)
Po Leung Kuk Sunny Green Day Care Centre for the Senior (attached to Eco-Home for the Senior)
St. James' Settlement EverWise Day Care Centre for the Elderly
The Hong Kong Society for the Aged Kwai Shing West Day Care Centre for the Elderly
The Hong Kong Society for the Aged Yam Pak Charitable Foundation Day Care Centre for the Elderly
The Salvation Army Tai Po Integrated Services for Senior Citizens — Day Care Centre for Senior Citizens
Tsuen Wan Elderly Centre Limited (Bought Place Scheme on Day Care Units for the Elderly)
Tung Wah Group of Hospitals Chan Feng Men Ling Day Care Centre for the Elderly
Tung Wah Group of Hospitals Lo Wong Yuk Man Nursing Home cum Day Care Centre
Tung Wah Group of Hospitals Mr and Mrs Au Wai Lam Memorial Day Care Centre for the Elderly
Yan Chai Hospital Wong Wha San Wong Yee Jar Jat Day Care Centre for the Elderly
Yan Oi Tong Lung Siu Nga Day Care Centre for the Elderly

Enhanced Home and Community Care Services & Integrated Home Care Services

Aberdeen Kai-fong Welfare Association Social Service Centre — Integrated Home Care Services (Team I, II, III and IV)
Haven of Hope Christian Service — Sai Kung Enhanced Home and Community Care Services
Haven of Hope Christian Service — Wong Tai Sin Enhanced Home and Community Care Services
Hong Kong Family Welfare Society — Sham Shui Po Enhanced Home and Community Care Services
Methodist Centre — Wan Chai Methodist Centre for the Seniors (Integrated Home Care Services)
Po Leung Kuk — Kwai Tsing Enhanced Home and Community Care Services
The Salvation Army Kwun Tong Integrated Home Care Services Team
Tung Wah Group of Hospitals — Enhanced Home and Community Care Services (Kowloon City)
Tung Wah Group of Hospitals — Enhanced Home and Community Care Services (Sha Tin)

Other Organisations

Evergreen (Pratas Street) Nursing Home
Ma On Shan Mutual Aid Committee
Po Leung Kuk Merry Court For The Senior
Sik Sik Yuen Ho Chung Integrated Home Care Services
Sik Sik Yuen Ho Wing Neighbourhood Centre for Senior Citizens
Sik Sik Yuen Ho Wong Neighbourhood Centre for Senior Citizens
Yan Chai Hospital Lee Wai Siu Kee Elderly Home

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Last not but least, we must thank all the participants who consented to take part in this survey, which made this survey possible and completed smoothly.

The survey was planned and implemented by the following colleagues:

Oral Health Survey 2021 Planning Committee

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Dr. LAM Tak Chiu, Wiley (ex-Committee Chairperson)

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35 to 44-year old adult and 65 to 74-year old non-institutionalised older persons (NOP) teams

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Report preparation support team

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INTRODUCTION

Oral health is integral to general health and enables individuals to perform essential functions, such as eating, breathing and speaking, and encompasses psychosocial dimensions, such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment. In response to the recommendation of the World Health Organization (WHO), surveillance of oral health on community level thus has to be done at regular intervals. Since 2001, the Department of Health (DH) has committed to conduct a territory wide Oral Health Survey (OHS) in Hong Kong every 10 years, the purposes of which are to collect up-to-date information on the oral health status of citizens and provide a useful database for planning and development of public dental services that suit the needs of the population.

Objectives of Oral Health Survey 2021

The Oral Health Survey (OHS) 2021 was conducted 10 years after the second territory-wide survey in 2011. The objectives of the OHS 2021 were to obtain relevant information on i) the oral health condition of the people of Hong Kong; ii) the oral health related behaviours of the population; and iii) the factors that facilitate behaviours conducive to good oral health and barriers which prevent people from adopting positive behaviours. Where appropriate, the findings were also compared with the findings of OHS 2001 and OHS2011 to see the changes in these twenty years.

The sample size of each age group was determined by taking into consideration the precision level of selected key variables (such as prevalence of tooth decay), design effect of sample design, anticipated response rate and the resources available. The sample size was large enough to detect any significant associations in most cases when the relations of the clinical data with oral health behaviours and predisposing factors were examined.

Organization of Oral Health Survey 2021 report

Same as the two previous OHSs, the OHS 2021 report also focuses on two most common but preventable oral diseases, tooth decay (dental caries) and gum disease (periodontal disease), which affect many people. This report would give us a picture of the change of these two common oral diseases in the Hong Kong population over the past two decades. The various oral health indicators in relation to the two diseases are described again in **Chapter 1**.

Actually, tooth decay and gum disease are preventable simply by adoption of behaviours and lifestyle that are conducive to oral health. The measures are further described in **Chapter 2**.

The following index age and age groups were selected in OHS 2021 with reference to WHO's recommendation: (a) 5-year old children to evaluate the status of primary teeth; (b) 12-year old students, representing the complete change from primary dentition to permanent dentition stage, to monitor the diseases trends of permanent teeth; (c) 35 to 44-year old adults to evaluate the oral health condition of the adult population; (d) 65 to 74-year old non-institutionalized older persons (NOP) to obtain information on the oral health condition of this age group which is becoming more important as the Hong Kong population is aging; and (e) the aged 65 and above Social Welfare Department long term care services (LTC) users to assess the oral health condition and needs of functionally

dependent older persons receiving long term care services. These LTC users may have difficulties in daily oral hygiene and access to professional care, and they require our special attention. The detailed survey methodology is reported for each of these 5 age groups in **Appendix I**, **II**, **III**, **IV** and **V**..

The Oral Health Survey 2021 comprised of a series of fieldwork surveys which were conducted from December 2022 through January 2024 under the influence of the COVID-19 pandemic. The survey findings on oral health status and oral health related behaviours of the 5-year old children, 12-year old students, 35 to 44-year old adults, 65 to 74-year old NOP and the aged 65 and above LTC users are reported in **Chapters 3, 4, 5, 6 and 7**, respectively. The overview of the entire survey is shown in **Chapter 8**. Key findings of this survey are highlighted.

Presentation of estimates

The findings in the survey are reported at the aggregate level. For figures or tables presented in the report, figures may not add up to the totals due to rounding. It should be noted that all estimates in this report are subject to sampling error. These estimates are based on information obtained from a particular sample, which is one of a large number of possible samples that could be selected using the same sample design. By chance, estimates derived from different samples will differ from each other. Due to this possible variation of results, a zero figure may mean a non-zero figure of a small magnitude. Besides, some estimates are derived from small sub-groups of the sample or a small number of observations, and they might be subject to large sampling error. These estimates are marked by a symbol § and should be interpreted with caution.

Green Text Boxes

Readers who wish to have an overview of the report may focus on the **Green Text Boxes**, which shows the highlights of the survey findings. The **Green Text Boxes** at the end of each section from Section 3 to Section 7 contain the section summary of each index group.

Blue Text Boxes

Important reminders and points to note are shown in the Blue Text Boxes found throughout the report.

For more information

For more information related to oral health, please browse the website of the Department of Health Oral Health Promotion Division at:

https://www.toothclub.gov.hk/

CHAPTER 1

Tooth decay and gum disease

How to measure cleanliness of teeth?

Dental plaque and calculus

Dental plaque is a thin film of bacteria and their products adhering on the tooth surfaces. The immature dental plaque that keeps on re-forming after regular tooth cleaning is relatively harmless. However if tooth cleaning is not thoroughly performed, bacteria in dental plaque grow continuously and undisturbed dental plaque will mature into a status that may cause tooth decay and gum disease.

Calculus is hardened dental plaque as a result of mineral deposition from saliva. Although calculus may be unsightly, it is not a health threat. However, the roughness of the calculus surface cause accumulation and maturation of dental plaque, and then harmful effect results.

The cleanliness of the mouth, as reflected by the quantity of dental plaque and calculus, is an indication of the effectiveness of tooth cleaning. The oral cleanliness is also an indicator of the risk of an individual in having dental diseases.

Cleanliness of teeth- its presentation and interpretation

In this survey, cleanliness of teeth is assessed by measuring the proportion of tooth surfaces covered by dental plaque (or calculus) on visual examination. A low proportion indicates satisfactory level of cleanliness (and good tooth cleaning actions) and vice versa. In populations with relatively good cleanliness (e.g. 5- and 12-year old age groups), the overall cleanliness is presented as the distribution of individuals according to different proportion of teeth covered by visible plaque. In populations with less satisfactory cleanliness (e.g. adult and non-institutionalised older persons (NOP) age groups), the overall cleanliness is presented as the proportion of population with more than half of the tooth surfaces covered by dental plaque (or calculus).

How to measure tooth decay?

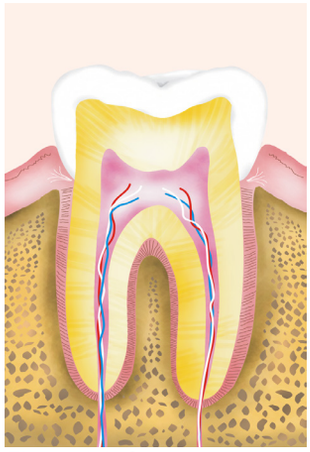


Figure 1.1 ***Cross-sectional view of a healthy tooth without tooth decay***

Figure 1.1 shows a cross-sectional view of a tooth without tooth decay.
Certain types of bacteria that may settle in undisturbed dental plaque are efficient in consuming sugars in food and drinks. These bacteria metabolise and turn the sugars into acid. Thus after each food or drink intake, the tooth is immersed in the acid produced, and the mineral in the tooth surface will dissolve.

Saliva may neutralize the acidic environment around the tooth and supplement the mineral loss in the tooth surface. However, it usually takes 20 to 30 minutes for the acidic environment to return to normal after each food or drink intake.

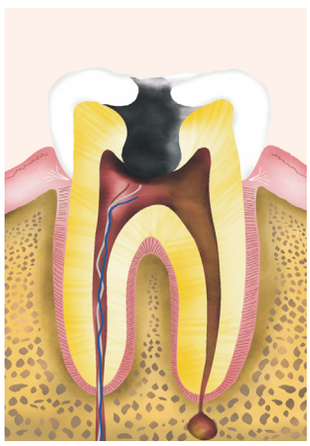


Figure 1.2 ***Diagrammatic illustration of an extensively decayed tooth with dental abscess***

If there is frequent intake of sugar-containing food or drinks, the mineral loss through dissolution will be larger than the repair. After a period of time, the tooth surface will be softened and the structure may break down to form of a cavity. If tooth decay is extensive (Figure 1.2) , it may cause intense pain, inflammation and subsequent death of the pulp tissues as well as abscess formation. When the crown of the tooth is completely broken down by decay, the residual root is called retained root.

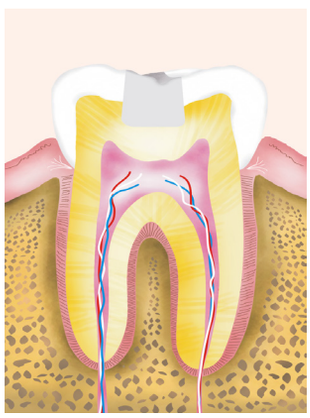


Figure 1.3 ***Diagrammatic illustration of a tooth with fillin***

A tooth with cavity can no longer repair by itself and it must be restored by a dental filling (Figure 1.3). More complex and costly restorative procedures will be required if the cavity becomes very extensive (e.g. root canal treatment, crown fabrication). When the crown of a tooth is destroyed to the extent beyond repair, the only option is to remove the tooth (dental extraction).

Measurement of tooth decay experience (DMFT/dmft index)

In this oral health survey (as well as in 2001 and 2011), tooth decay was defined as the occurrence of cavity extended into dentine. This is in accordance with the recommendation of the WHO in defining tooth decay as 'cavities with a softened dentine floor'. The number of permanent teeth with untreated decay (cavity) is referred to as DT (decayed teeth, and dt for decayed primary teeth). The number of permanent teeth with decay in the past but already been repaired by restorative procedures is referred to as FT (filled teeth, ft for filled primary teeth). The number of permanent teeth that were removed (extracted) due to decay is referred to as MT (missing teeth, mt for missing primary teeth). The sum of DT, MT and FT is referred to as the DMFT score, which reflects the total number of permanent teeth that has been affected by tooth decay in the past and at present. **DMFT** score is used for decay experience of permanent teeth, and **dmft** for decay experience of primary teeth.

The level of tooth decay experience in a population can be represented by the mean values of DT, MT, FT and DMFT, as well as by the proportion of population affected by each type of decay experience.

The DMFT value indicates the total number of teeth affected in the past and at present. The DT value reflects the number of teeth with untreated decay at present that needs attention. FT and MT values both show the number of teeth that have received treatment due to decay in the past. However, it is difficult to ascertain the cause of tooth extraction especially in older age groups as some teeth may be lost due to injuries, gum disease or reasons other than tooth decay.

What is gum disease, and how to measure?

Gum disease refers to the disorders affecting the tooth-supporting structures including the gum and bone caused by dental plaque.

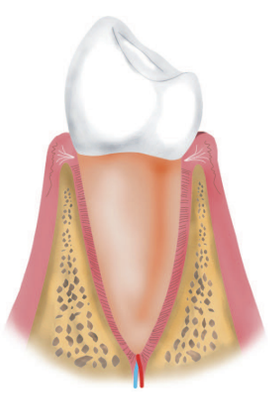


Figure 1.4 ***Section view of a tooth with healthy tooth-supporting structures***

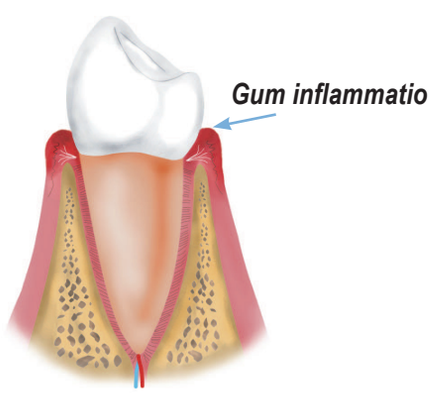


Figure 1.5 ***Diagrammatic illustration of gum inflammation***

The bacteria in undisturbed dental plaque can release toxins which irritate the gum tissue within the vicinity, leading to gum inflammation (Figure 1.4 &1.5). Gum bleeding is the sign of gum inflammation, and it can be reversed by thorough removal of dental plaque. However dental plaque may adhere to the rough surface of calculus which makes plaque removal less effective, and thus calculus should be removed by scaling performed by dental professionals.

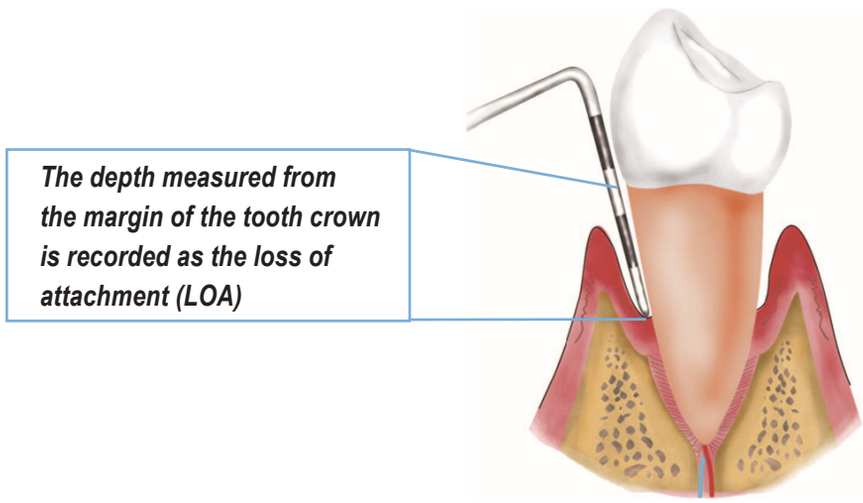


Figure 1.6 ***Diagrammatic illustration of how LOA is measured***

When the tooth-supporting structures break down, gum that originally tightly attached to the root surfaces will detach, leading either to the formation of gum (periodontal) pockets or recession of the gum margins or both. The sum of gum pocket and gum recession measurements is referred to as the loss of attachment (LOA) (Figure 1.6).

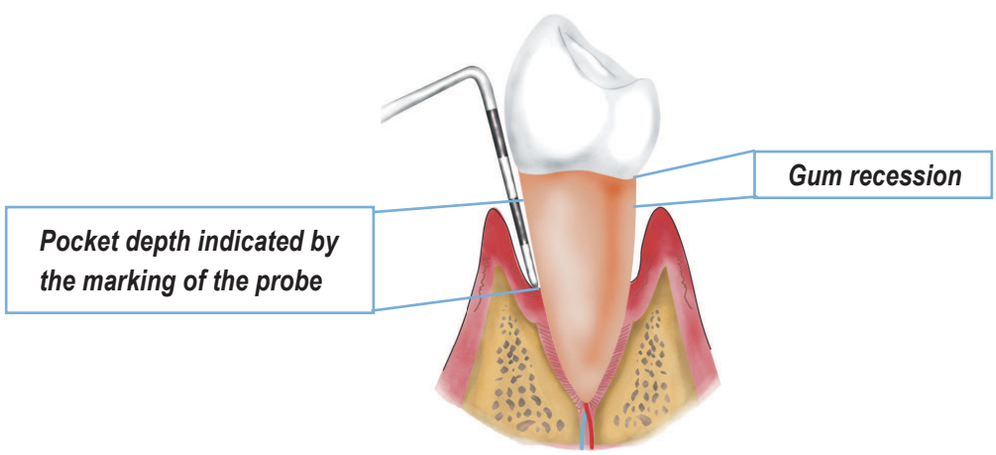


Figure 1.7 ***Diagrammatic illustration of a gum pocket and gum recession***

The loss of attachment in the form of gum recession leads to the exposure of root surface (Figure 1.7). The affected person may notice an 'elongation' of the tooth with more root surface exposed and possibly feel sensitivity to hot and cold. It is in fact a manifestation that the tooth support has been destroyed and exposing more root surfaces which will also be at risk to decay.

Measurement of gum disease–examination methods

In oral health surveys, gum disease is generally measured by gum bleeding (gum inflammation), pocket depths (degree of structural breakdown in the form of pocket) and LOA (the total amount of structural breakdown).

An internationally accepted standard probe for gum examination is used by dentists during examination of gum health status. The probe is inserted into the gingival/gum sulcus using a very light force and is moved gently with short upward and downward movements along the gum line. Any resulting gum bleeding is recorded as bleeding present.

The pocket depth (the depth of insertion of the probe) is recorded by the standard depth markings on the probe (Figure 1.7). In the clinical assessment of an individual, pocket depth 0 to 3 mm may be a gum pocket but within normal variations. The gum health in such case has to be assessed by dentist together with other criteria. In this population scale survey, gum pocket is defined as pocket depth of 4 mm or more, which is the same as the definition used in previous oral health surveys in Hong Kong.

Loss of attachment (LOA) is measured by recording the distance between the margins of the tooth crown (which should be covered by un-receded gum in healthy state) to the bottom of the gum pocket, using the standard depth markings on the probe (Figure 1.6).

Measurement of gum disease – index teeth, half mouth and full mouth

Traditionally, gum health is assessed by dividing all teeth in the mouth into six segments called sextants according to the WHO recommendation. Not all teeth in a sextant are examined, but only an index tooth or index teeth as specified by the WHO are examined. A sextant would be excluded from examination if less than two teeth are remaining, and a person would be excluded if all 6 sextants are excluded from examination.

Similar to tooth decay, gum disease may affect only some of the teeth present in a mouth. The measurement of the level of gum disease ideally should include all the teeth present. The current international trend is to examine at least all teeth on one side of the mouth (called half-mouth examination) or preferably to examine all teeth present (called full-mouth examination). The use of only index teeth in each of the six sextants may under-estimate the level of gum disease. However, the choice of examination method is dependent on the health status of the subjects in general as well as the environment in conducting the oral examination.

In this Oral Health Survey, there was time constraint in examining large groups of 5- and 12-year old students with minimal interruption of their daily routines, thus half-mouth examination was performed so as to get sufficient amount of information without causing too much disturbance to the students and schools

For the adults and NOP groups, full mouth examination was performed although it is more time-consuming and could be more stressful to the individuals being examined. The investigators carrying out oral examination were experienced in this kind of oral health survey. They could perform the examination orderly within a reasonable time. In this way, the information collected will be closer to the actual status of the individual.

For the long-term care service (LTC) users groups, they had difficulties in tolerating lengthy oral examination. Therefore, the examination of index teeth by sextants was adopted.

Sextant examination on index teeth– Community Periodontal Index

Community Periodontal Index (CPI) is a presentation of gum health information incorporating the presence of gum bleeding, calculus and pocket depths in one index. At present, this index is used mainly to facilitate comparison with previous survey results. It is now used in the LTC users group.

The CPI index is used with the examination by sextant and hence should result in six CPI scores in an individual without much tooth loss. The convention is to present only the maximal CPI score (i.e. the worst gum condition found) at the individual level. As only the maximal CPI score of each individual is reported, this presentation may exaggerate the extent of gum disease in the population. It just shows the maximal CPI attained by the individual but it gives no information of how many teeth have been affected by this score and how many have been affected by score with less severity. To get a better picture of the gum health at the population level, the mean number of sextant affected by each CPI score may give an approximation to the number of teeth affected when full-mouth or half-mouth examination methods were not applied.

Full-mouth / half-mouth examination

Similar to the measurement of cleanliness, gum health is measured by the percentages of teeth in the individual with bleeding, pocket depth and various levels of LOA. Gum health at the population level is presented by the distribution of population at different percentage categories of the respective gum condition.

When comparing the results of different oral health survey, it is necessary to note the number of teeth being examined in assessment of gum health. The chance of detecting gum disease will increase if more teeth are being examined, and the prevalence (the proportion of people affected) of gum disease may increase due to the change of examination method alone. In the adult and NOP groups, some degree of increase in proportion of people affected by gum disease may be observed solely because of the change from half-mouth examination to full-mouth examination. Readers must therefore exercise caution in comparing gum health information of this survey with previous Hong Kong surveys.

CHAPTER 2

Lifestyle conducive to good oral health

What kind of lifestyle is conducive to optimal oral health?

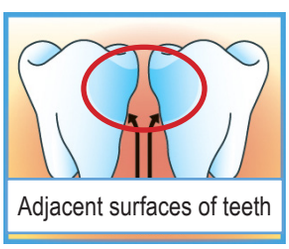
Lifestyle conducive to optimal oral health includes:

- Brush teeth twice daily with fluoride toothpaste using toothbrushing technique as instructed by a dental professional
- Perform interdental cleaning daily with dental floss or interdental brush, according to the instruction of a dental professional
- Seek regular dental check-up even if one believes that his/her oral health status is good
- Adopt good dietary habit by reducing the frequency of food or drinks intake, especially those with sugars
- Refrain from smoking

Dental plaque causes gum disease and tooth decay. Toothbrushing is an effective way to remove dental plaque from the tooth surfaces. For young children (below the age of 7) to clean their teeth effectively, parental assistance should be provided during toothbrushing. Fluoride toothpaste should also be used because fluoride has been proven to be effective in preventing tooth decay.

Although properly performed toothbrushing can remove dental plaque from most tooth surfaces, the adjacent surfaces of teeth in the interdental area (surfaces in-between adjacent teeth) cannot be cleaned and thus proper interdental cleaning by either flossing and/or interdental brushing is necessary.

Figure 2.1 ***Diagram showing the interdental area***



In general , if the gap (interdental space) between neighbouring teeth is narrow, using dental floss is good enough, however if the gap is wide, using interdental brush may be preferable as it requires less dexterity than dental floss to clean the adjacent surfaces. The basic steps are to choose an interdental brush that is recommended by dental professionals, insert it gently into the interdental space as close to the gum margin as possible, and then move the interdental brush back and forth.

Cleaning skill is the key to effective toothbrushing and interdental cleaning. During regular dental check-up, dentists can evaluate one's oral health conditions and provide personalised oral hygiene instruction to improve toothbrushing and interdental cleaning skill effectively.

Besides, regular dental check-up is important in early detection, early diagnosis and early management of oral diseases as well as early assessment of oral health risks. Dental professionals can give individualised advice on lifestyle and monitor the effectiveness of proper self-care behavior. Preventive treatment such as topical fluoride application and fissure sealant can also be provided during regular dental check-up.

Reduction in the frequency of food and drinks consumption can reduce the risk of tooth decay. Oral bacteria produce acids by metabolising the sugars present in food or drinks causing tooth decay. Sugars are almost ubiquitous in our diets. They can be naturally occurring sugars such as fruit sugars, milk sugars or starch are commonly added to food or drinks during the manufacturing process to enhance taste and texture. Therefore, whenever one eats or drinks, teeth are likely to be exposed to sugars and thereby acid attack. In order to reduce the risk of tooth decay, the frequency of food or drinks intake other than normal meals should be reduced. Whenever thirsty, it is recommended to drink water instead of other beverages.

Smoking can cause lung cancer and cardiovascular diseases. It is also a risk factor of gum disease and oral cancer. The avoidance of smoking is important in promoting both general health and oral health.

CHAPTER 3

5-year old children

What was the oral health status of 5-year old children in Hong Kong?

Tooth status – how many teeth were there ?

The teeth present in 5-year old children were mainly primary teeth (deciduous teeth). This report therefore, covers only the conditions of the primary teeth. Normally there were 20 primary teeth in a full set of primary dentition. Due to extraction or failure of eruption, the average number of primary teeth in the children in this survey was 19.3.

Tooth status – what was the level of tooth decay experience ?

The level of tooth decay experience in the 5-year old children as measured by the dmft index is shown in Table 3.1. The mean dmft value was 1.8. Most of the tooth decay experience (dmft) was the decay component (dt) with 88.9% (1.6/1.8) of the affected teeth untreated. Table 3.2 shows the percentage of children with tooth decay experience. It was found that 41.6% of the children had tooth decay experience and untreated decay (dt) was found to have affected 39.2% of the children.

Table 3.1 ***Level of tooth decay experience as measured by the dmft index among 5-year old children***

Tooth decay experience	dmft	dt (decayed)	mt (missing)	ft (filled
Mean value	1.8	1.6	< 0.05	0.2

Base: All 5-year old children
2021: (N = 39 700)

Table 3.2 ***Percentage of 5-year old children with tooth decay experience***

Tooth decay experience	dmft	dt (decayed)	mt (missing)	ft (filled
Percentage among population	41.6%	39.2%	1.2%	6.0%

Base: All 5-year old children
2021: (N = 39 700)

Table 3.3 and Table 3.4 compare the level of tooth decay experience in the 5-year old children and the proportion of children affected in 2001, 2011 and 2021. The level of tooth decay experience and the proportion of children affected decreased in last decade.

Table 3.3 ***Level of tooth decay experience as measured by the dmft index among 5-year old children in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 67 300)	2011 (N = 52 300)	2021 (N = 39 700)
Mean dmft	2.3	2.5	1.8
Mean dt (decayed)	2.1	2.3	1.6
Mean mt (missing)	< 0.05	< 0.05	< 0.05
Mean ft (filled	0.2	0.2	0.2

Base: All 5-year old children

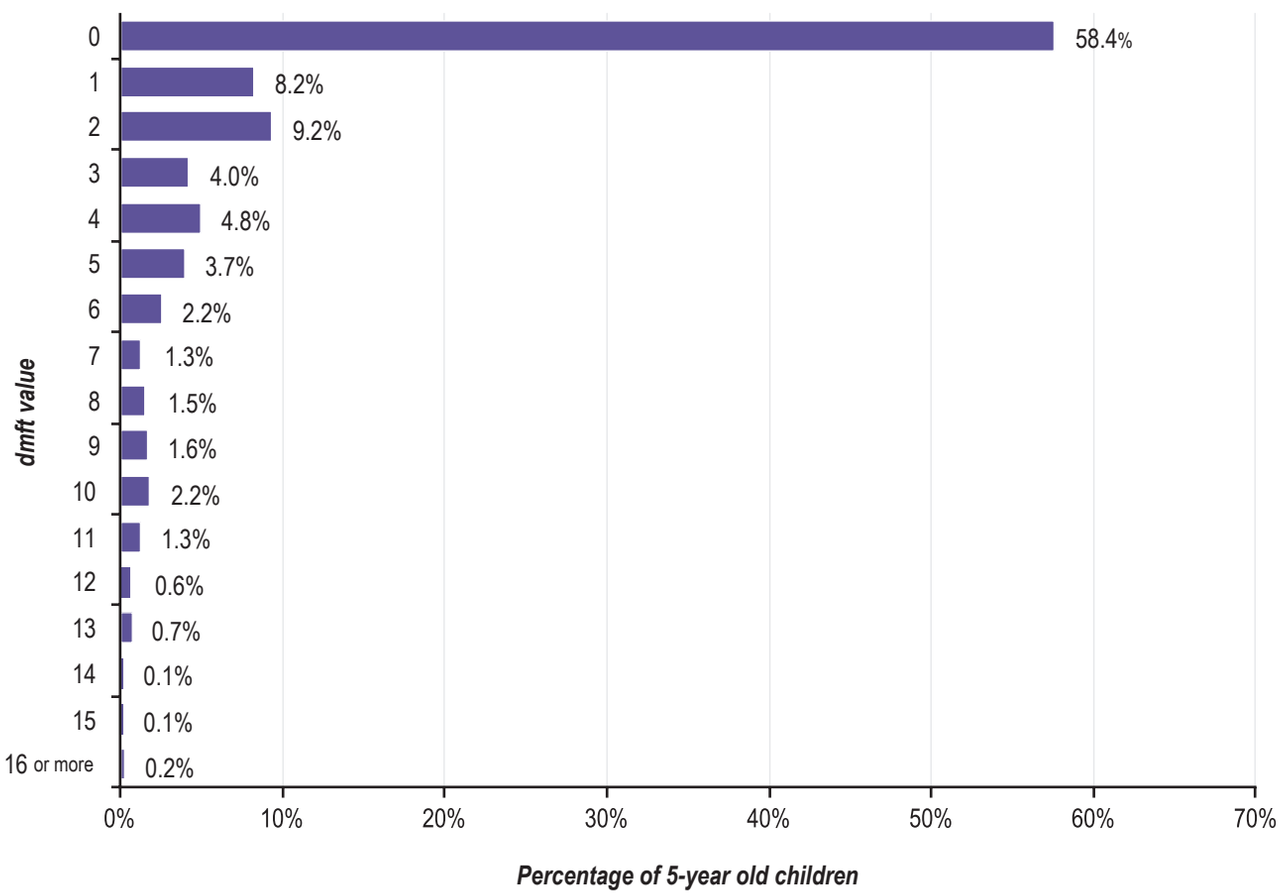
Table 3.4 ***Percentage of 5-year old children with tooth decay experience in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 67 300)	2011 (N = 52 300)	2021 (N = 39 700)
dmft	51.0%	50.7%	41.6%
dt (decayed)	49.4%	49.4%	39.2%
mt (missing)	1.3%	0.7%	1.2%
ft (filled	7.4%	7.3%	6.0%

Base: All 5-year old children

The distribution of 5-year old children according to their dmft value is shown in Figure 3.1. Up to 58.4% (23 200) of the 5-year old children had no experience of tooth decay. On the other hand, 20.2% (8 000) had four or more teeth with decay experience (dmft >3). The number of decayed teeth in these children accounted for around 78.8% of all the teeth with decay experience among the 5-year old children. The distribution of decayed teeth among 5-year old children was skewed.

Figure 3.1 ***Distribution of 5-year old children according to dmft value***



Base: All 5-year old children 2021: (N = 39 700)

Tooth status – presence of dental abscess

Dental abscess was present in 0.9% (3 00) of the 5-year old children. Most of these abscesses were probably associated with extensively decayed teeth. The percentage of children with abscess in the 2001 and 2011 survey was found to be at a higher level of around 6%.

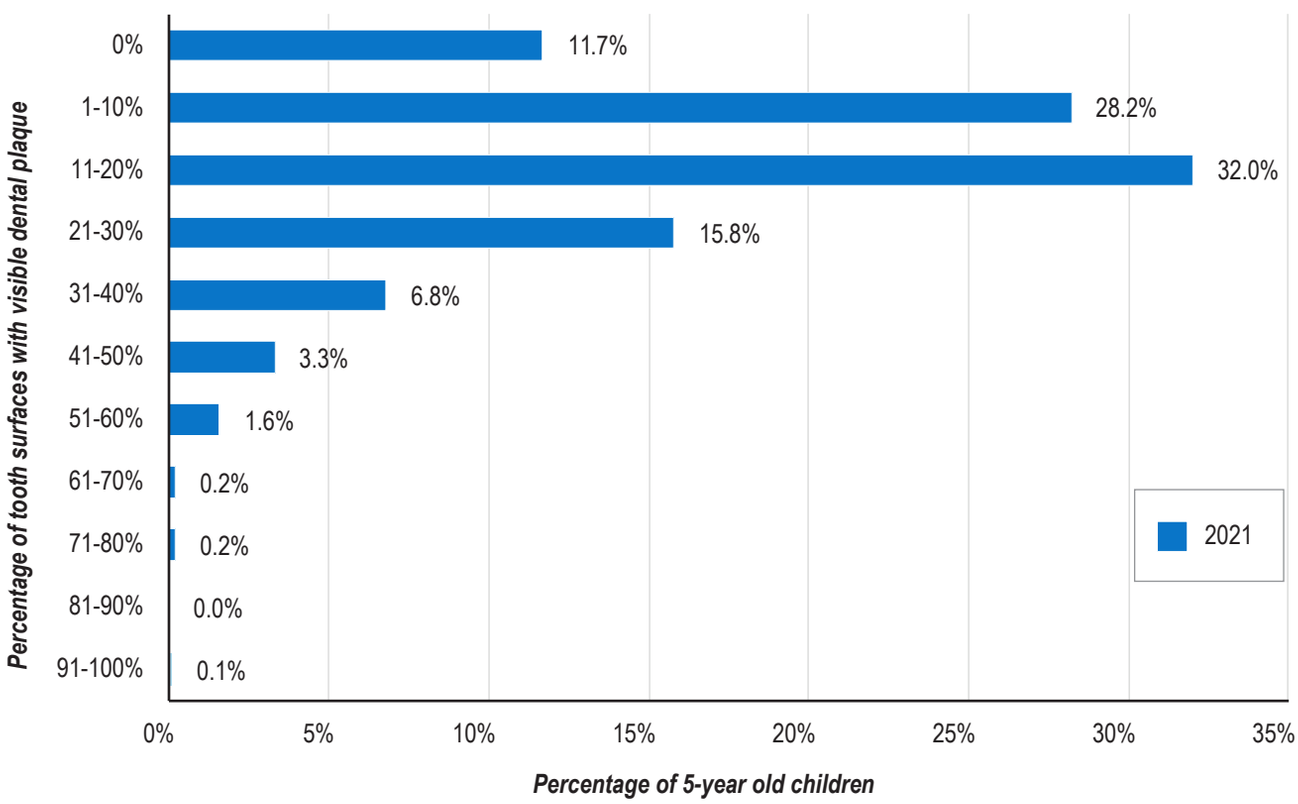
The distribution of decayed primary teeth in 5-year old children was uneven. Up to 58.4% of the children were not affected by tooth decay experience while 20.2% of children had around 78.8% of all the teeth with decay experience.

Up to 88.9% of the decayed primary teeth in the children were untreated. A very small proportion (0.9%) of the children was found to have dental abscess.

Tooth status – how clean were the teeth?

The cleanliness of the children's teeth was measured by the percentage of tooth surfaces with visible dental plaque. The mean percentage of tooth surfaces with visible dental plaque in the 5-year old children was 17.3% and the distribution in children according to the percentage is shown in Figure 3.2. Only 2.1% (800) had visible plaque on more than 50% of their tooth surfaces.

Figure 3.2 ***Distribution of 5-year old children according to level of teeth cleanliness as measured by the percentage of tooth surfaces with visible dental plaque in 2021***



Base: All 5-year old children
2021: (N = 39 700)

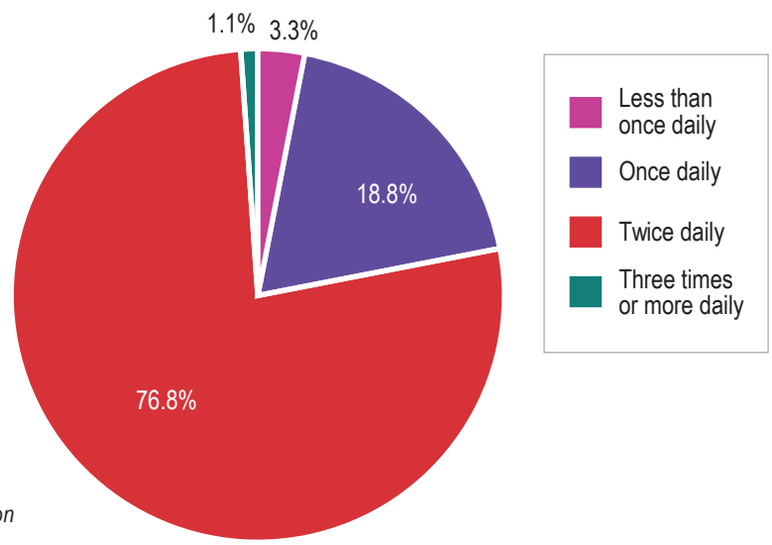
In the 2001 & 2011 surveys, the mean percentage of tooth surfaces with visible dental plaque in the children of this age group was 23.5% and 22.1%. Comparing the findings of the three surveys, there was a progressive improvement in the level of teeth cleanliness in children of this age group.

What was the oral health related behaviour of the 5-year old children ?

Toothbrushing – how often did the children brush?

The toothbrushing frequency of the children as reported by their parents is shown in Figure 3.3. Among the children, 77.9% (30 900) of them had toothbrushing twice or more daily while only 3.3% (1 300) of them had toothbrushing less than once a day.

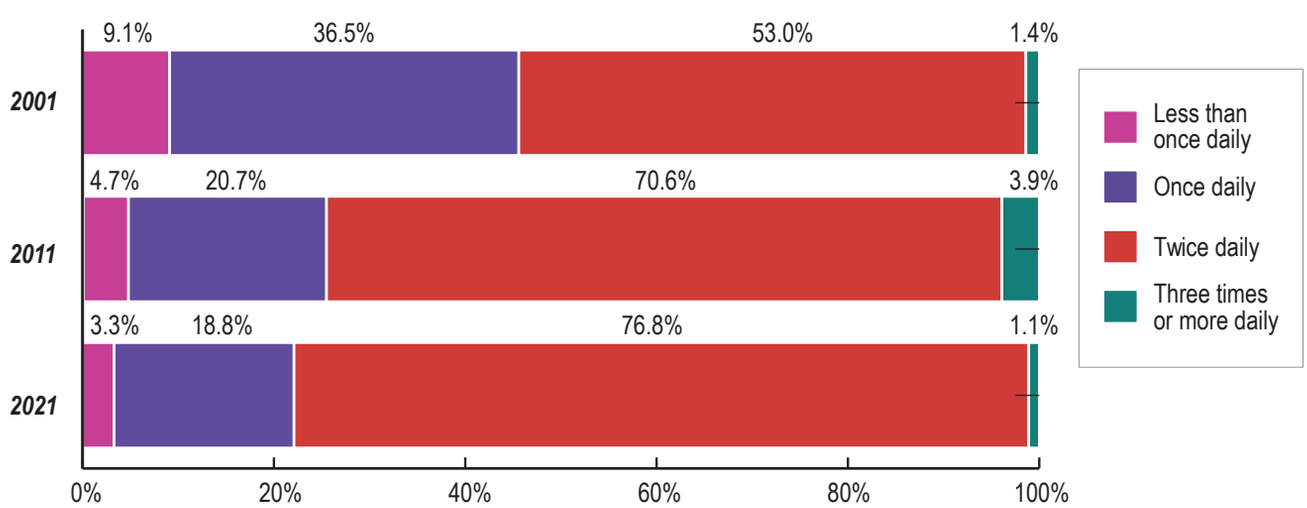
Figure 3.3 ***Distribution of 5-year old children according to the reported toothbrushing frequency***



Base:All 5-year old children whose parents responded to the question 2021: (N = 39 700)

When the results of this survey were compared with that of previous surveys, the 5-year old children in this survey were found to be brushing more frequently (Figure 3.4).

Figure 3.4 ***Distribution of 5-year old children according to the reported toothbrushing frequency in 2001, 2011 and 2021***

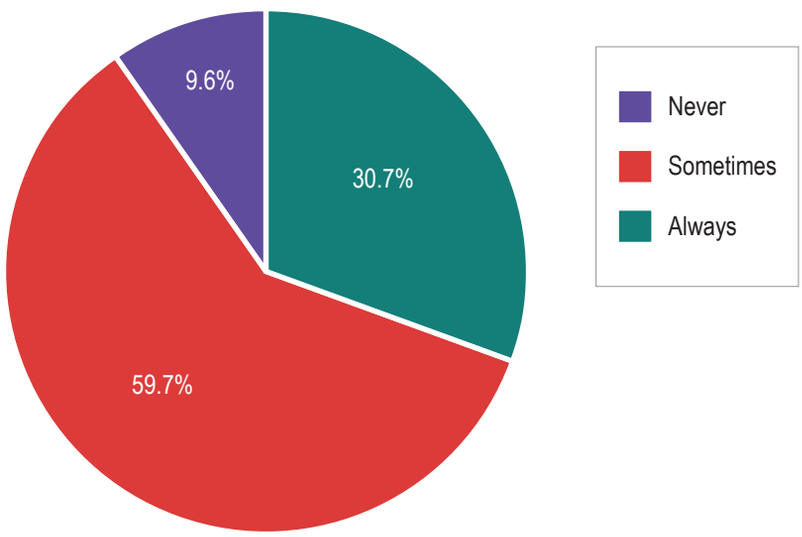


Base: All 5-year old children whose parents responded to the question
2001: (N=67 300)
2011: (N=52 100)
2021: (N=39 700)

Toothbrushing – did the children receive parental assistance while they brushed ?

Parents of the 5-year old children were asked if they had assisted their children in toothbrushing. Up to 59.7% (23 700) of parents reported that they sometimes assisted their children in toothbrushing while 30.7% (12 200) of parents always did so (Figure 3.5).

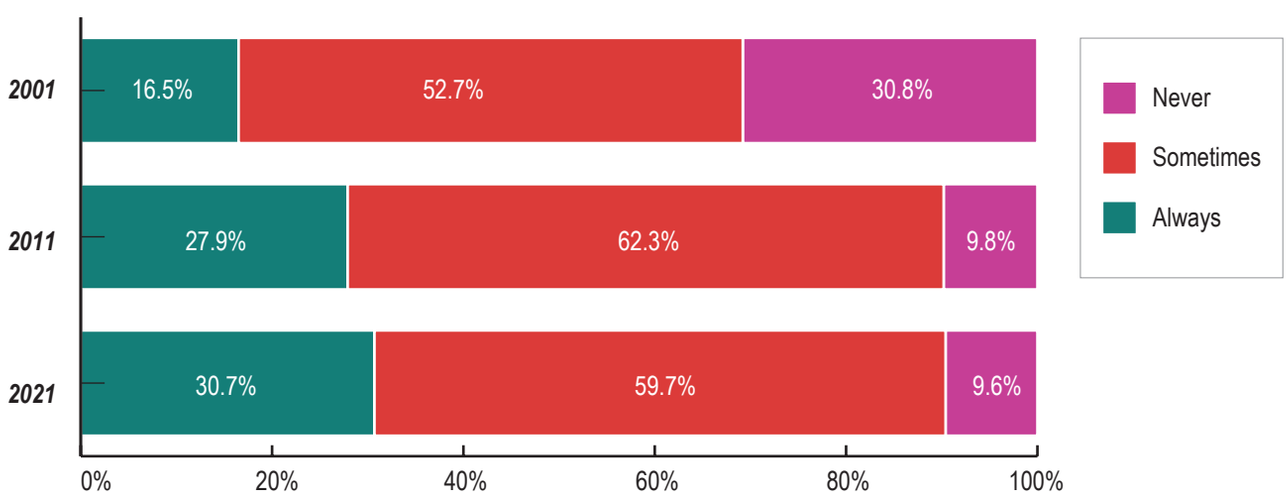
Figure 3.5 ***Distribution of 5-year old children according to the reported parental assistance in toothbrushing***



Base: All 5-year old children whose parents responded to the question
2021: (N = 39 700)

Comparing the findings of this survey to the 2001 and 2011 surveys, the percentage of parents who had been helping their 5-year old children with their toothbrushing increased about 20%, but the change eased up in the latest 10 years (Figure 3.6).

Figure 3.6 ***Distribution of 5-year old children according to the reported parental assistance in toothbrushing in 2001, 2011 and 2021***

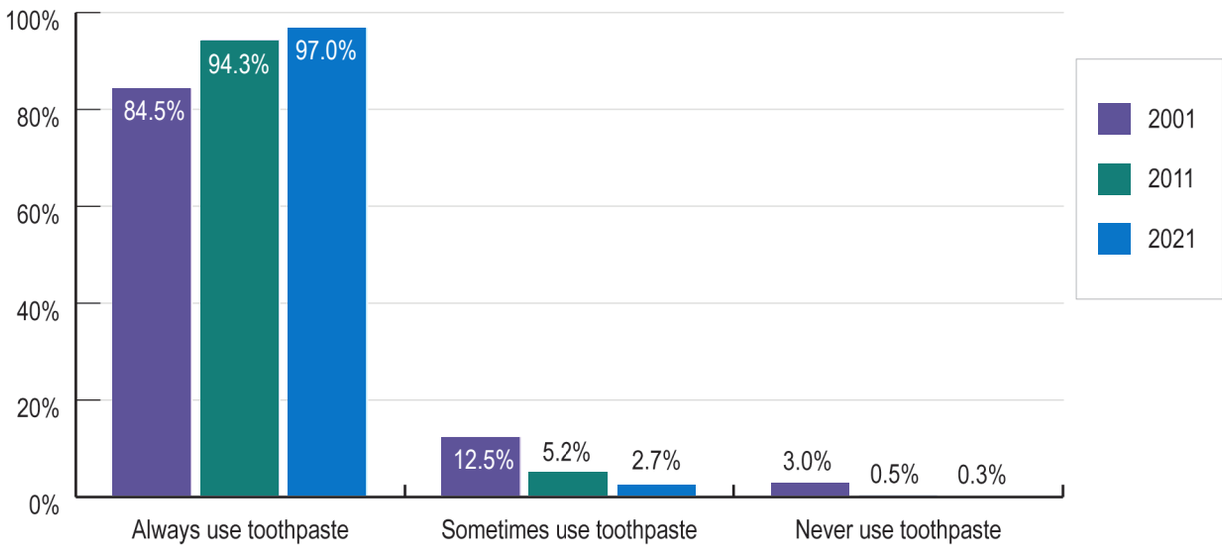


Base: All 5-year old children whose parents responded to the question
2001: (N=67 300)
2011: (N=52 100)
2021: (N=39 700)

Toothbrushing – was fluoride toothpaste used

Among the parents, 97.0% (38 500) of them reported that their children always used toothpaste when they brushed their teeth. Comparing the findings of this survey and the 2001 and 2011 surveys (Figure 3.7), more parents reported that their 5-year old children always used toothpaste.

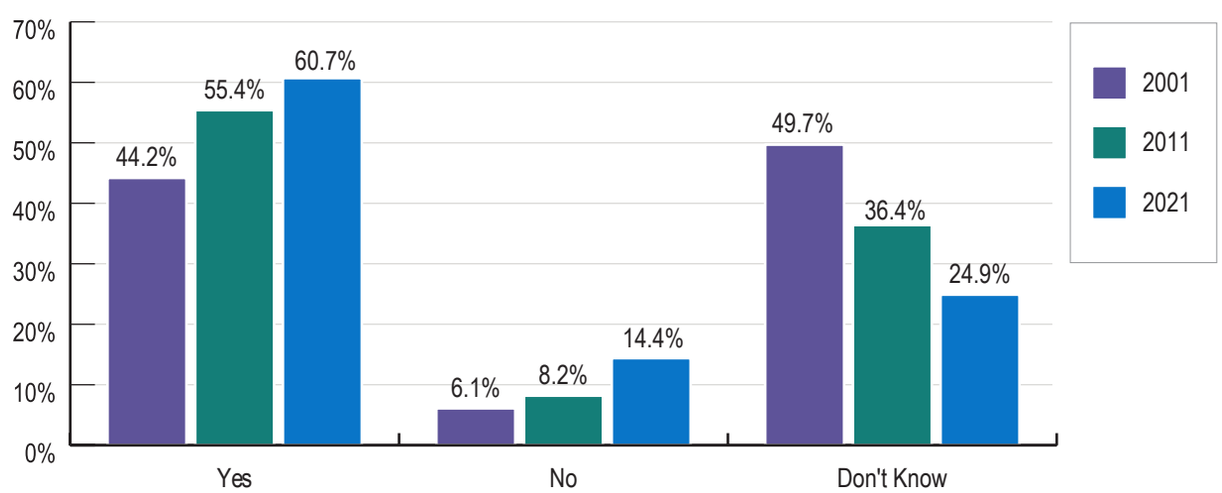
Figure 3.7 ***Distribution of 5-year old children according to reported use of toothpaste in 2001, 2011 and 2021***



Base: All parents of 5-year old children whose responded to the question
2001: (N=67 300)
2011: (N=52 100)
2021: (N=39 700)

Parents of children who used toothpaste were further asked if the toothpaste they had been using contained fluoride. Among this group of parents, 60.7% (24 000) of them reported that the toothpaste contained fluoride while 24.9% (9 900) of them did not know. Comparing the result of this survey to the 2001 and 2011 surveys, the percentage of parents who did not know whether there was fluoride in the toothpaste had dropped. The proportion reported to use non-fluoride toothpaste was increasing. (Figure 3.8).

Figure 3.8 ***Distribution of parents of 5-year old children according to their knowledge on whether the toothpaste their children used contained fluoride in 2001, 20 1 and 2021***



Base: All parents of 5-year old children whose responded to the question
2001: (N=65 400)
2011: (N=51 800)
2021: (N=39 600)

The majority of the 5-year old children had toothbrushing twice daily. Only 3.3% did not brush their teeth on a daily basis.

About 90% of the parents assisted their 5-year old children in toothbrushing. Around 59.7% of parents sometimes assisted their children in toothbrushing and 30.7% always did so.

The vast majority of 5-year old children used toothpaste to brush their teeth. About 60% of the parents reported that they were using fluorid toothpaste, while nearly 15% of parents reported that they were using non-fluoride toothpaste. The increasing proportion of 5-year olds children using non-fluoride toothpaste in the latest twenty years drew our attention. Besides, 24.9% of the parents did not know if there was fluoride in the toothpaste of their children, which reflected that this proportion of parents might not know the significance of choosing fluoride toothpaste.

Snacking habit

Parents were asked to report how frequently their 5-year old children snacked between normal meals. Around 67.4%(26 800) of the parents reported that their children snacked daily and 9.9% (3 900) would give snacks to their children three times or more per day (Table 3.5).

Table 3.5 ***Percentage of 5-year old children according to snacking frequency as reported by parents***

Snacking Habit	Percentage of children (N = 39 700)
No daily snacking habit	32.6%
Snack once per day	33.1%
Snack 2 times per day	24.4%
Snack 3 times or more per day	9.9%

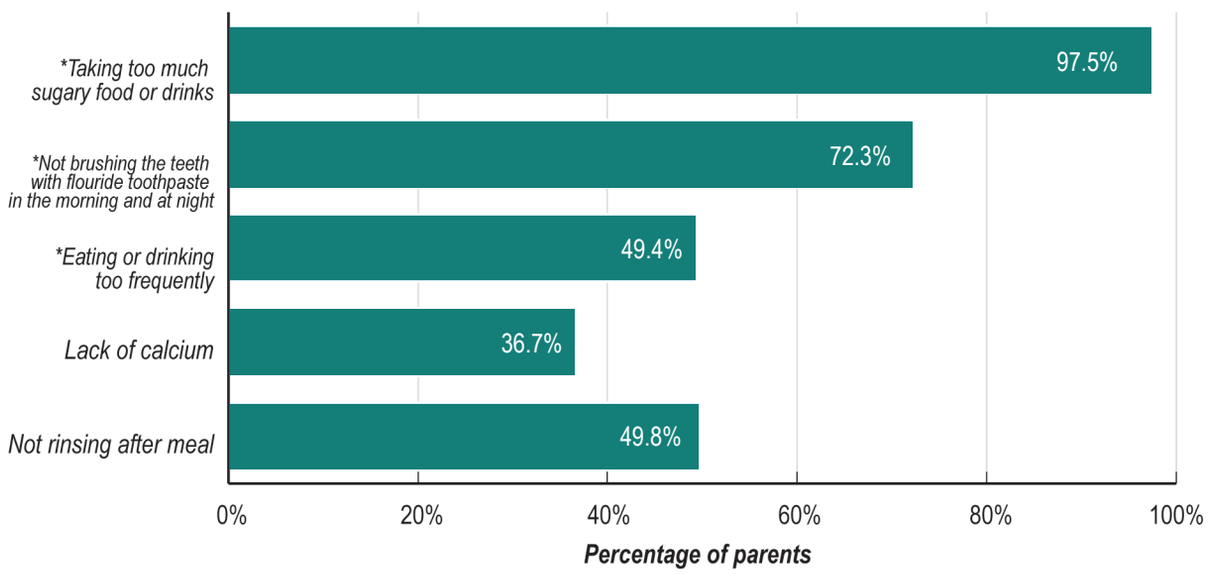
Base: All 5-year old children whose parents responded to the question

What did the parents know about dental diseases?

What did the parents know about the factors which might increase the risk of tooth decay?

Parents were asked what they considered were factors which might increase the risk of tooth decay and the results are shown in Figure 3.9. Up to 97.5% (38 700) of them considered *taking too much sugary food or drink* and 72.3% (28 700) considered *not brushing the teeth with fluoride toothpaste in the morning and at night* as a risk factor, but only 49.4% (19 600) could identify *eating or drinking too frequently* as a factor. There were some common misconceptions among parents with 49.8% (19 800) and 36.7% (14 600) of them respectively believing that *not rinsing after meal and lack of calcium* were relevant factors which might increase the risk of tooth decay.

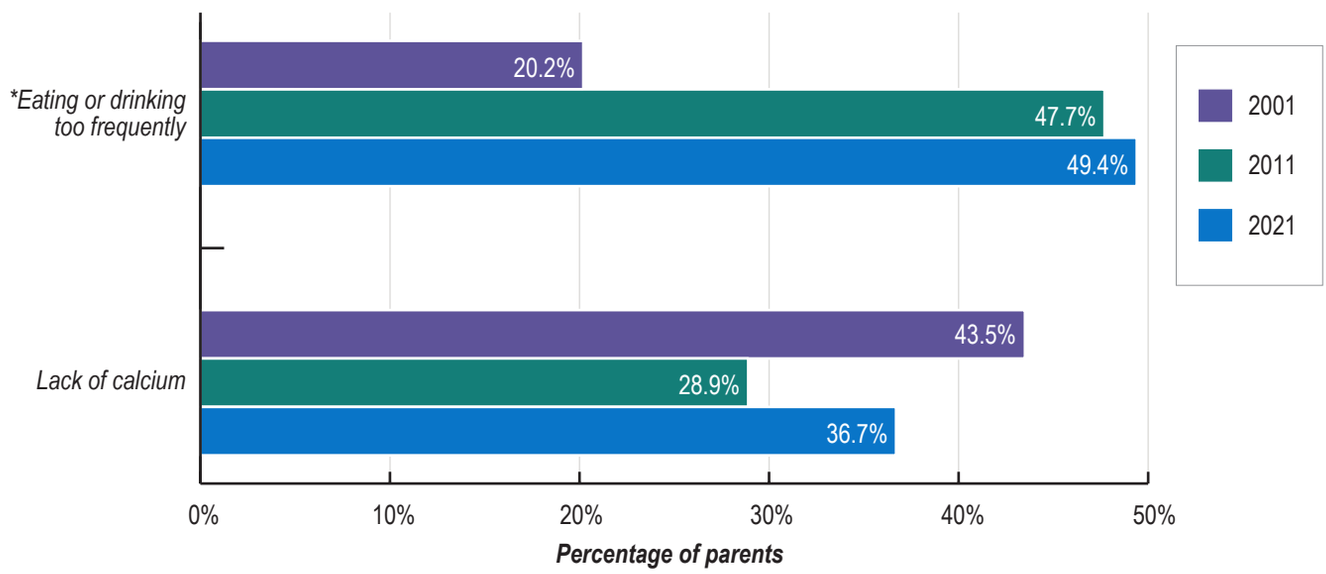
Figure 3.9 ***Percentage of parents of 5-year old children according to the perceived factors which might increase the risk of tooth decay (Multiple answers)***



**Relevant factors*
Base: All parents of 5-year old children who responded to the question
2021: (N = 39 700)

Comparing the findings of this survey with 2001 and 2011 surveys, changes are found in the parents' perception in frequency of eating and drinking and lack of calcium as factors which might increase the risk of tooth decay. Slightly more parents were aware of the fact that frequency of eating and drinking was a risk factor for tooth decay while more parents considered lack of calcium as a risk factor (Figure 3.10).

Figure 3.10 ***Percentage of parents of 5-year old children according to the perceived factors which might increase the risk of tooth decay in 2001, 2011 and 2021 (Multiple answers)***



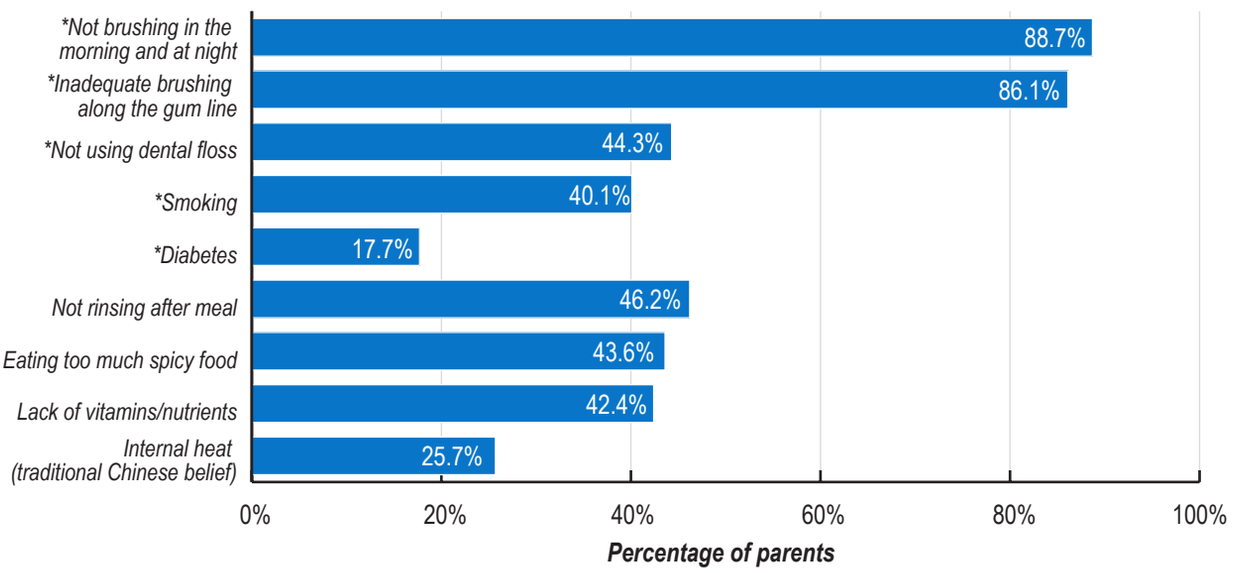
**Relevant factors*
Base: All parents of 5-year old children who responded to the question
2001: (N = 67 300)
2011: (N = 52 300)
2021: (N = 39 700)

What did the parents know about the factors which might increase the risk of gum disease?

Parents were asked what they considered were factors which might increase the risk of gum disease and the results are shown in Figure 3.11.

The majority of parents of the 5-year old children could identify *not brushing in the morning and at night and inadequate brushing along the gum line* as risk factors for gum disease. However, only 44.3% (17 600) and 40.1% (15 900) of them respectively knew that *not using dental floss* and *smoking* were also risk factors. It must be noted that vast majority of the parents did not know that *diabetes* could increase the risk of gum disease.

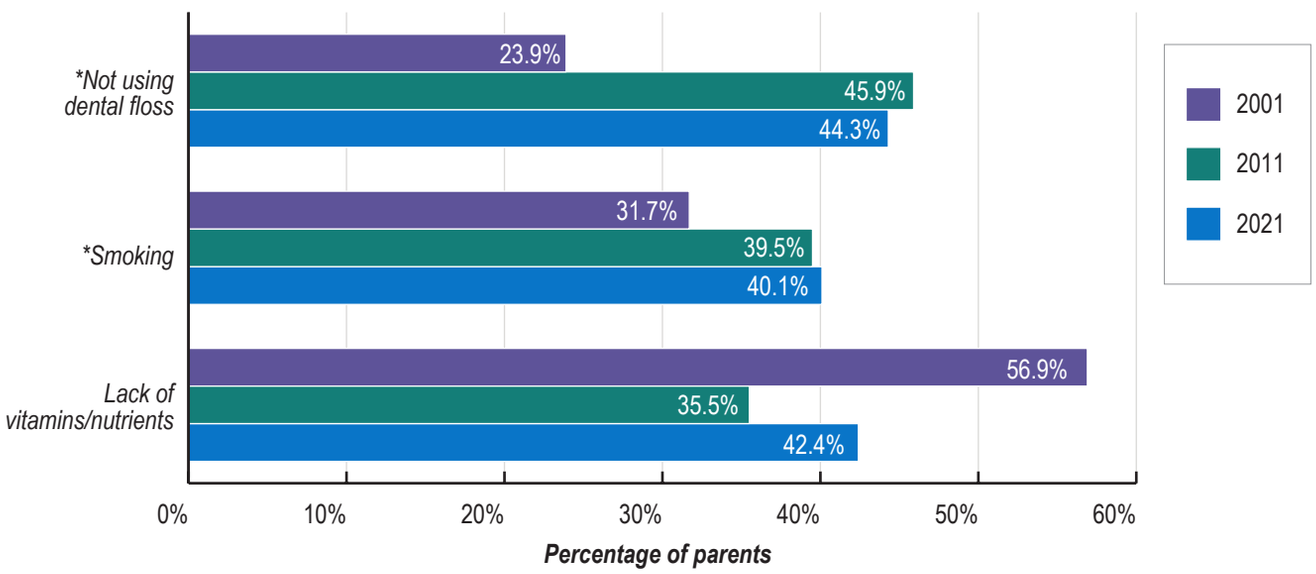
Figure 3.11 ***Percentage of parents of 5-year old children according to the perceived factors which might increase the risk of gum disease (Multiple answers)***



**Relevant factors*
Base: All parents of 5-year old children who responded to the question 2021: (N = 39 700)

Comparing the findings of this survey with previous surveys, similar percentage of parents in 2011 and 2021 surveys were aware that *not using dental floss and smoking* were risk factors for gum disease (Figure 3.12).

Figure 3.12 ***Percentage of parents of 5-years old children according to the perceived factors which might increase the risk of gum disease in 2001, 2011 and 2021 (Multiple answers)***

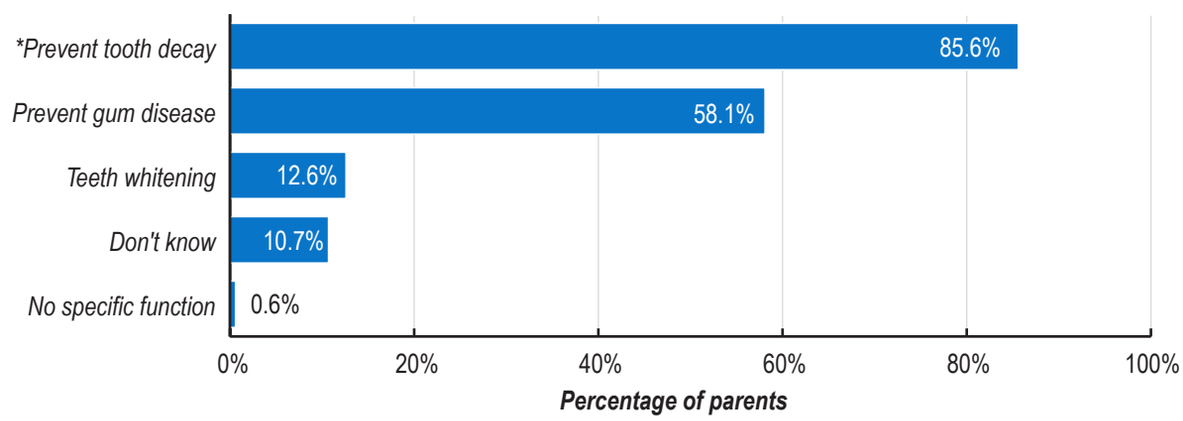


**Relevant factors*
Base: All parents of 5-year old children who responded to the question
2001: (N = 67 300)
2011: (N = 52 200)
2021: (N = 39 700)

Did the parents know about the benefits of fluorid

The perceived benefits of fluoride as reported by parents of 5-year old children are shown in Figure 3.13. Over 85% of the parents correctly knew the benefit of fluoride in the prevention of tooth decay. However, more than half of them (58.1%) had the misconception that fluoride could *prevent gum disease* and about 13% of them believed that fluoride was useful in *teeth whitening.* Oral health education concerning fluoride should be strengthened in order to clarify the oral health knowledge and to promote the use of fluoridated toothpaste.

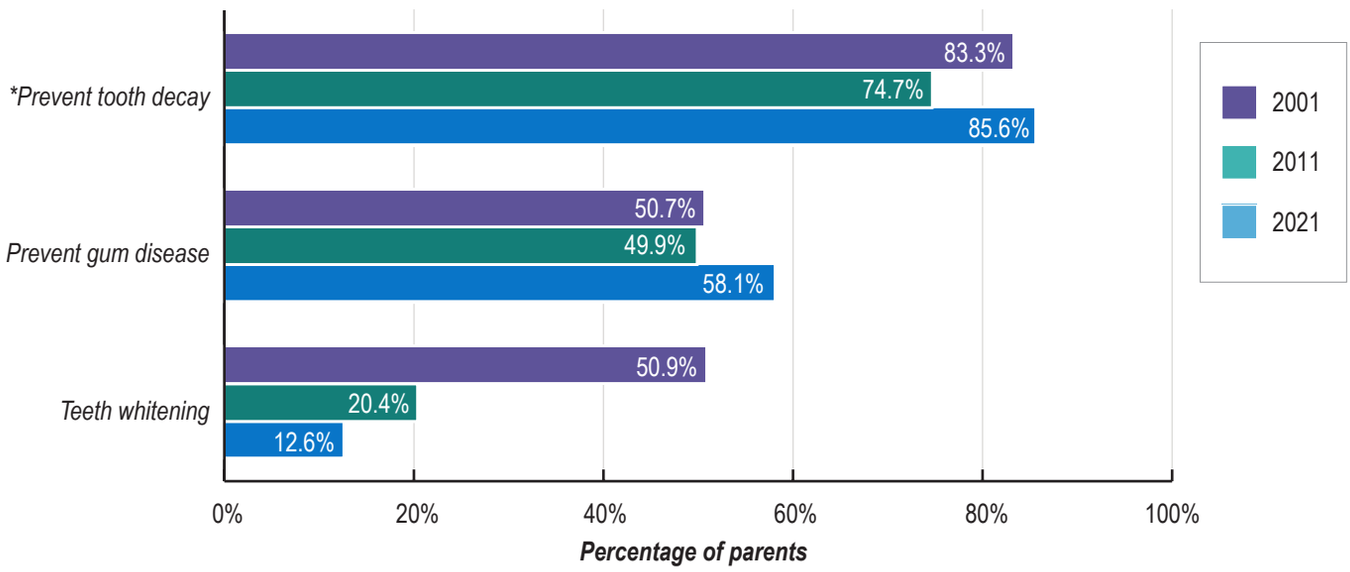
Figure 3.13 ***Percentage of parents of the 5-year old children according to their knowledge on the benefits of fluoride (Multiple answers)***



**Relevant factors*
Base: All parents of 5-year old children who responded to the question
2021: (N = 39 700)

Comparing the findings of this survey with 2001 and 2011 surveys, the proportion of parents of 5-year old children knew about the benefit of fluoride in tooth decay prevention remained the highest. However, the proportion of parents who mistook that fluoride was useful in prevention of gum disease also went up. On the other hand, the proportion of parents who misunderstood that fluoride was useful in teeth whitening had dropped (Figure 3.14).

***Figure 3.14** Percentage of parents of the 5-year old children according to their knowledge on the benefits of fluoride in 2001, 2011 and 2021 (Multiple answers)*



**Relevant benefit*
Base: All parents of 5-year old children who responded to the question
2001: (N = 67 300)
2011: (N = 52 300)
2021: (N = 39 700)

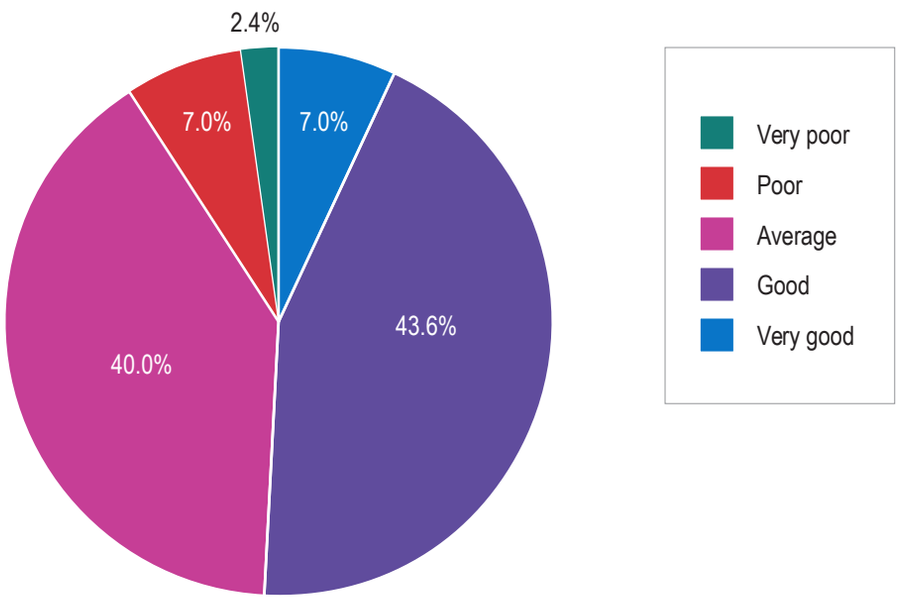
The parents of 5-year old children had improved knowledge on some risk factors for tooth decay and gum disease. However, more parents related tooth decay to the lack of calcium or gum disease to the lack of vitamins and nutrients in this survey.

The benefit of fluoride in the prevention of tooth decay was not fully recognized by parents. Although majority of them knew that fluoride could prevent tooth decay, more than half of the parents wrongly believed that fluoride could also prevent gum disease. Correct oral health messages should be continuously be promoted by the Government and the dental profession in order to rectify the fallacies.

What were the parents' perceptions of the oral health of their 5-year old children?

The parents were asked to rate the oral health condition of their children, and the results are shown in Figure 3.15. Around half of the parents rated their children's oral health as *good and very good* while around 10% rated their children's oral health as *poor and very poor.* The profile is similar to that in 2001 and 2011 survey.

Figure 3.15 Distribution of parents according to their perceptions of the oral health condition of their 5-year old children

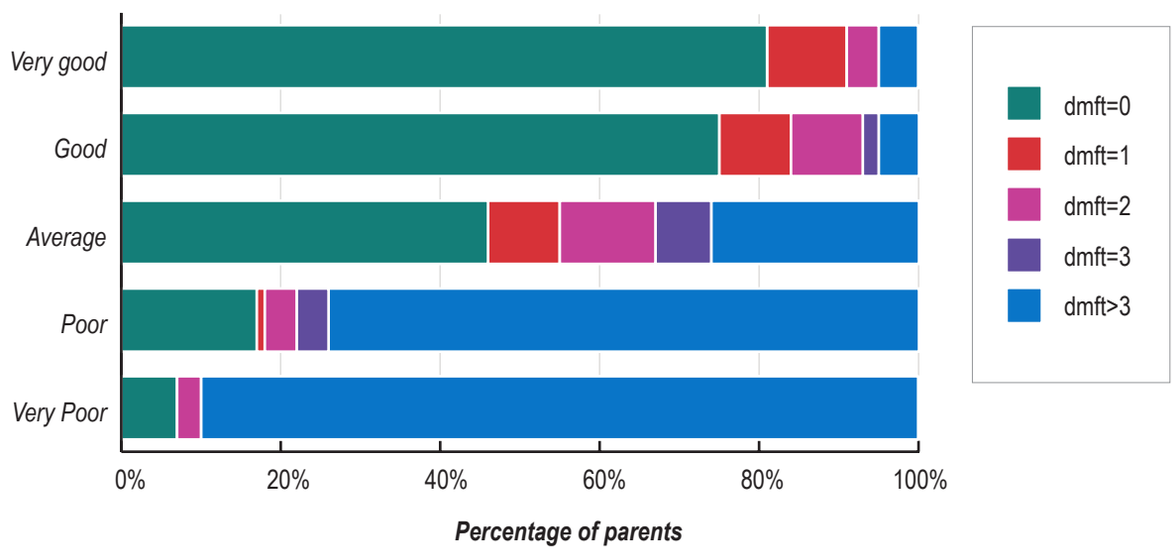


Base: All parents of 5-year old children 2021: (N = 39 700)

How did the parents' perceptions correspond with their children's oral health status?

The tooth decay experience of the 5-year old children, as measured by the dmft value, was matched with their parents' perception of their oral health. The results are shown in Figure 3.16.

***Figure 3.16** Oral health condition of 5-year old children as perceived by their parents and the children's decay experience*



Base: All parents of 5-year old children 2021: (N = 39 700)

The parents' perception of very poor oral health aligned with their children's actual oral health condition, as 93.7% (900) of the children whose parents rated them as having very poor oral health condition had more than three teeth with decay experience (dmft>3). However, the parents' perception of good or very good oral health were less precise. Up to 12.5% (300) and 15.3% (2 700) of the children whose parents rated them as having very good oral health and good oral health respectively actually had dmft value of 2 or above.

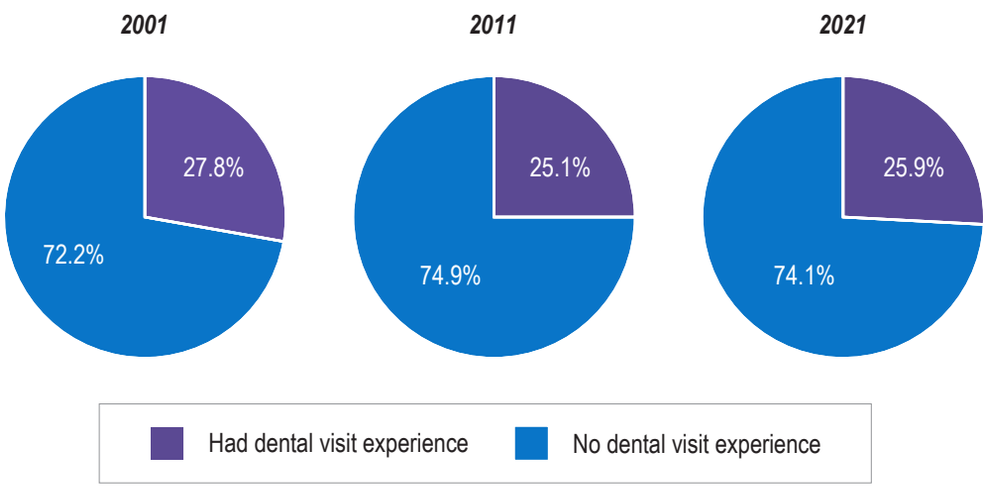
Parents' perception of their children's oral health was not always accurate. The perceptions were more accurate among parents who rated their children as having poor oral health than the parents who rated their children as having good oral health.

What was the pattern of utilization of oral health care services among the 5-year old children?

How many children had visited a dentist?

Only 25.9% (10 300) of the parents of 5-year old children had brought their children to visit dentist, a similar result was obtained in the 2001 and 2011 surveys (Figure 3.17).

Figure 3.17 ***Distribution of 5-year old children according to dental visit experience in 2001, 2011 and 2021***



Base: All parents of 5-year old children
2001: (N = 67 300)
2011: (N = 52 300)
2021: (N = 39 700)

Parents who had brought their 5-year old children to visit dentist were asked to indicate the major reason for the last visit and the results are shown in Table 3.6. Only 39.8% (4 100) of the parents reported that the major reason for the visit was checkup.

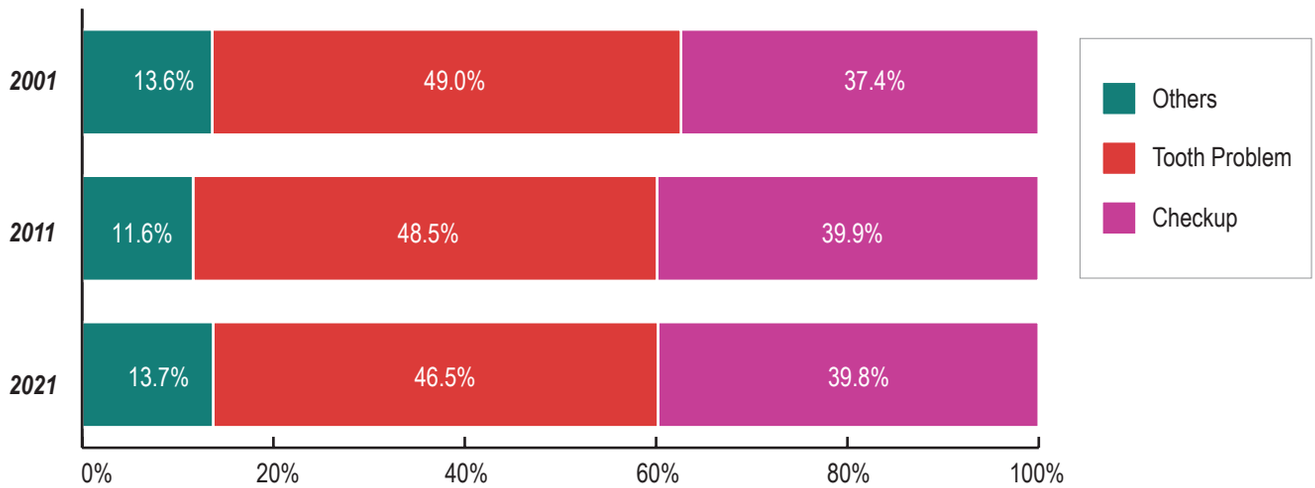
Table 3.6 ***Distribution of 5-year old children with dental visit experience according to the reported major reason for their latest dental visit***

Major reason for the children's latest dental visit	Percentage	Sub-categories of major reason for the children's latest dental visit	Percentage
Checkup	39.8%	Checkup	39.8%
Tooth problem	46.5%	Suspect tooth decay	29.1%
		Toothache	10.6%
		Trauma	6.8%
Other reasons	13.7%	Other reasons	13.7%

Base: All 5-year old children who had previous dental visit and whose parents responded to the question
2021: (N = 10 300)

The distribution of 5-year old children in the 2001, 2011 and 2021 surveys according to the reported major reason for their last dental visit are shown in Figure 3.18. The results appear to be very similar.

Figure 3.18 Distribution of 5-year old children who had dental visit experience according to the reported major reason for their last dental visit in 2001, 2011 and 2021

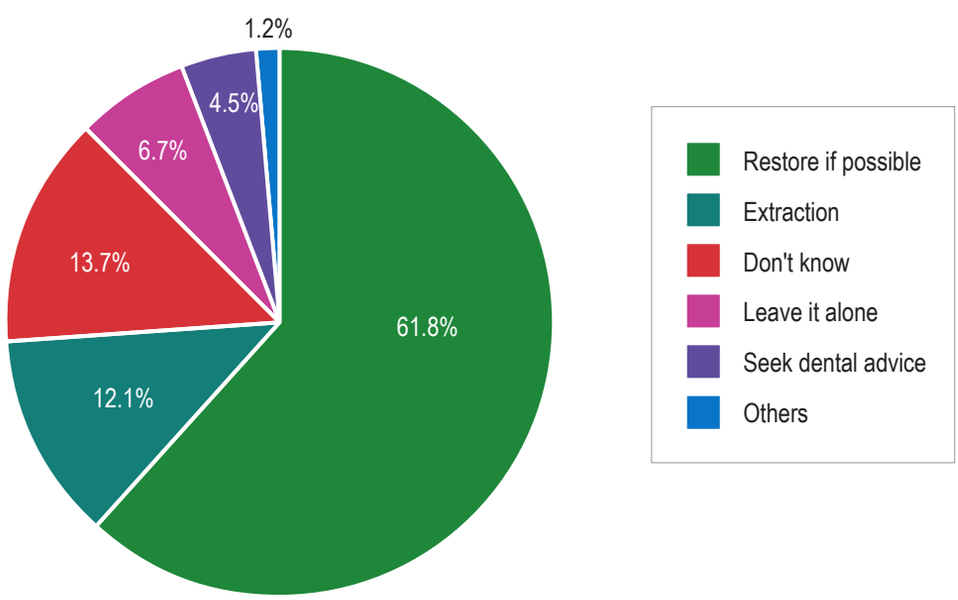


Base: All 5-year old children who had previous dental visit and whose parents responded to the question
2001: (N = 18 700)
2011: (N = 13 000)
2021: (N = 10 300)

What was the parents' preferred treatment for decayed primary teeth in their children?

Parents were asked about their choice of treatment for decayed primary teeth and 61.8% (23 500) of them preferred to have the teeth restored if possible (Figure 3.19)

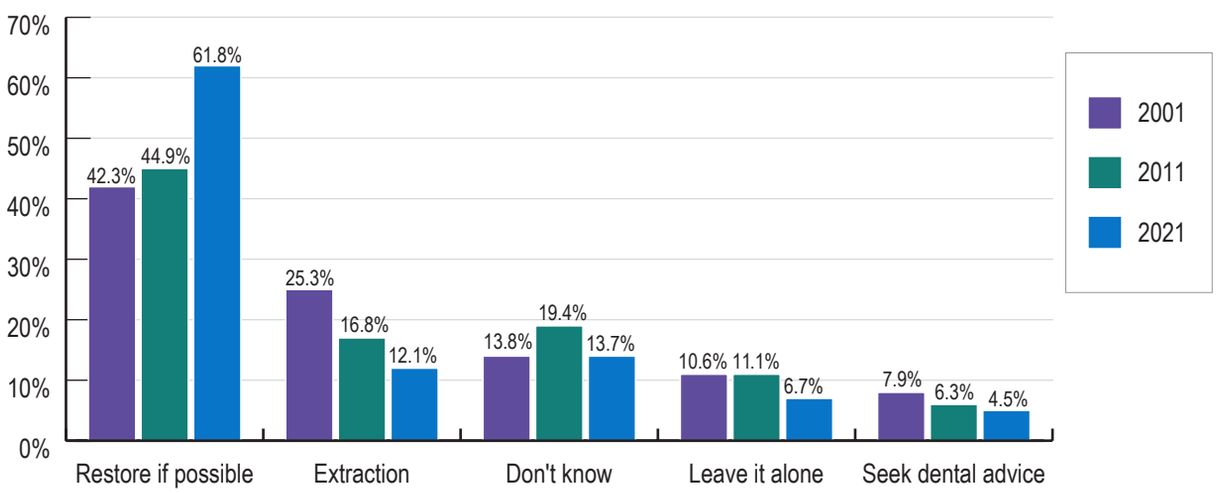
Figure 3.19 Distribution of parents according to their preferred treatment for decayed primary teeth



Base: Parents of 5-year old children who responded to the question
2021: (N = 39 700)

When compared to previous surveys, still a higher proportion of parents would like to have the decayed primary teeth of their children restored if possible, while fewer parents would like to have decayed primary teeth extracted or leave those decayed teeth alone. (Figure 3.20)

Figure 3.20 ***Percentage of parents according to their preferred treatment for decayed primary teeth in 2001, 2011 and 2021***



Base: All parents of 5-year old children who responded to the question
2001: (N = 67 300)
2011: (N = 52 300)
2021: (N = 39 700)

The utilization of oral health care services by 5-year old children was low. Only around 25% of the parents had brought their children to visit a dentist and one-half of them (46.5%) did so because of tooth problem. **Only about 40% of the 5-year old children visited a dentist for dental checkup.** The pattern did not change much in the latest 20 years.

More parents preferred restoration of the decayed primary teeth if possible.

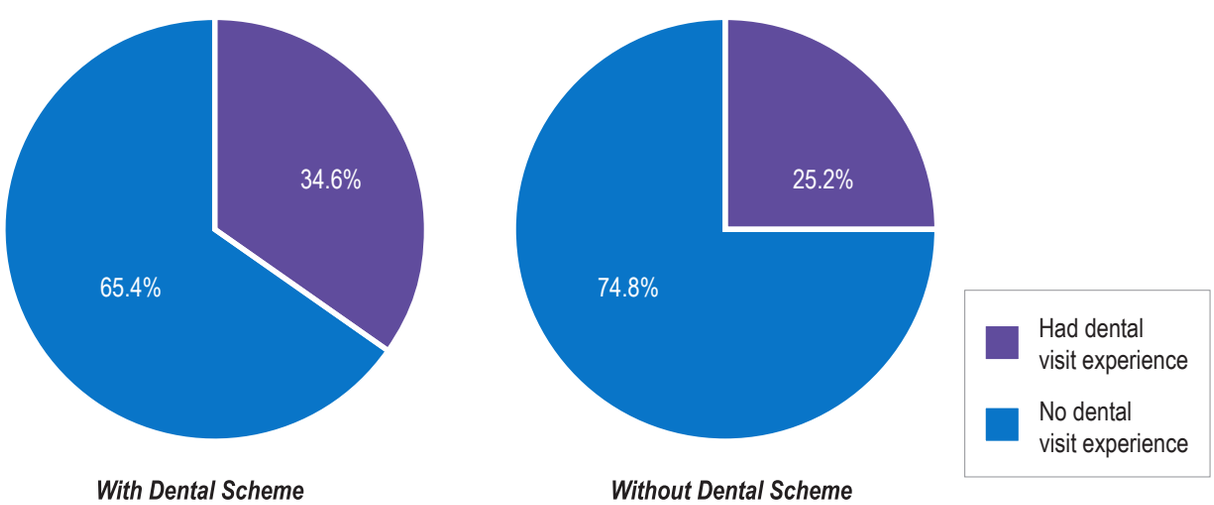
What was the proportion of 5-year old children covered by parents' dental third party payment scheme?

Only 19.7% (7 800) of the parents reported that they had dental scheme coverage and 93.1% (7 300) of such coverage were provided by employers. Among the parents with dental scheme coverage, 42.0% (3 300) of them indicated that their children were also covered. This was equivalent to 8.3% of all 5-year old children. Similar findings were obtained in the 2001 and 2011 surveys. At that time, 20.5% and 20.1% of the parents had dental scheme coverage with 77.6% and 83.8% of such coverage provided by the employers in the 2001 and 2011 surveys respectively. Among the 5-year old children, 10.5% and 9.9% of them were covered in the 2001 and 2011 surveys respectively.

Dental scheme and the utilization of oral health care services

Up to 34.6% (1 100) of the parents of those children who were covered by dental scheme reported that they had brought their 5-year old children to visit dentist while only 25.2% (9 200) of parents of those children who were not covered by dental scheme coverage had done so (Figure 3.21).

Figure 3.21 ***Distribution of children according to dental scheme coverage and their dental visit experience***

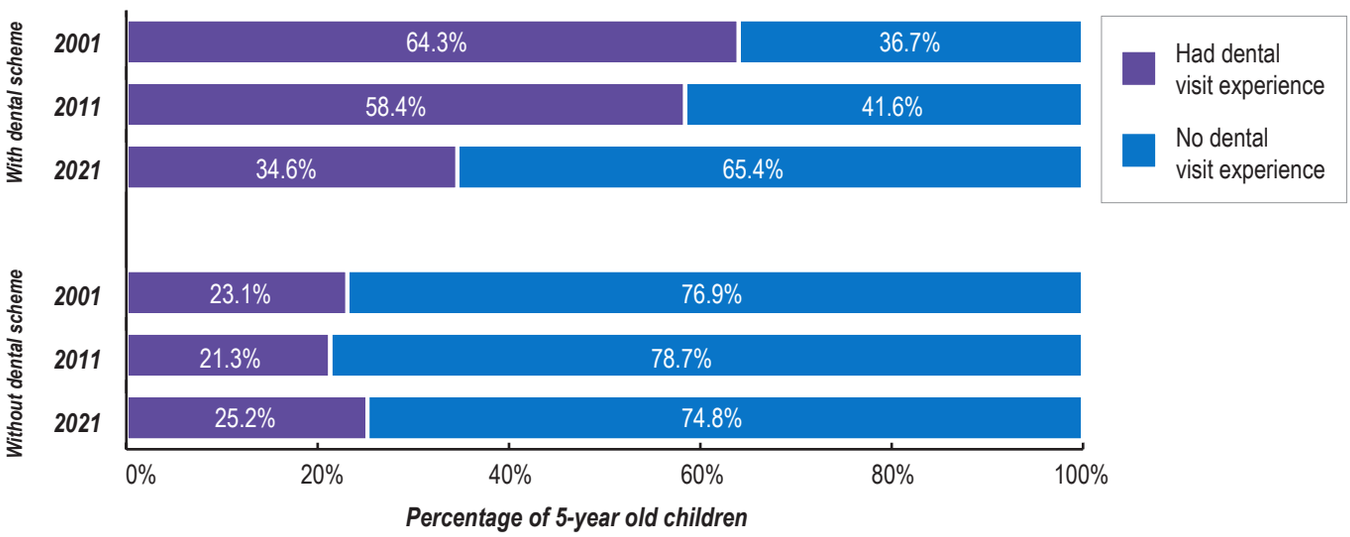


Base (with dental scheme):
All 5-year old children covered by dental scheme and whose parents answered the questions
2021: (N = 3 300)

Base (without dental scheme):
All 5-year old children not covered by dental scheme and whose parents answered the questions
2021: (N = 36 400)

Comparing the findings of the 2021 survey to the 2001 and 2011 surveys, there was very little change in the proportion of children who had visited dentist in the non-covered group, but a drastic reduction in the proportion of visiting dentist in the covered group in 2021 survey (Figure 3.22).

***Figure 3.22** Distribution of children according to dental scheme coverage and their dental visit experience in 2001, 2011 and 2021*



Base (with dental scheme):
All 5-year old children covered by dental scheme and whose parents answered the questions
2001: (N = 7 100) 2011: (N = 5 200) 2021: (N = 3 300)

Base (without dental scheme):
All 5-year old children not covered by dental scheme and whose parents answered the questions
2001: (N = 60 200) 2011: (N = 47 000) 2021: (N = 36 400)

Chapter 3 – Summary

The distribution of tooth decay among 5-year old children was uneven. The distribution of tooth decay experience was skewed with 20.2% of the children having four or more teeth with decay experience. This group of children had 78.8% of all the teeth affected by tooth decay. Up to 88.9 % of the decayed teeth were untreated.

Among the 5-year old children, about 80% of them had the habit of brushing their teeth twice or more daily. The vast majority (97%) of them used toothpaste. Up to 25% of the parents did not know whether there was fluoride in the toothpaste.

Making comparison with the past 20 years, the knowledge of 5-year old children's parents on the risk factors of tooth decay improved. However, more parents considered lack of calcium as a risk factor. The benefits of fluoride were still not fully recognized by parents.

Not many parents brought their 5-year old children to visit dentist. Only 25.9% of the parents had brought their 5-year old children to visit dentist and nearly half of them did so because of tooth problem. Even among parents with dental scheme coverage for their children, fewer of them brought their children for dental checkup in this survey.

Way forward

Compare with the past twenty years, there was further improvement in the oral health home care behaviour of the 5-year old children. They had been brushing their teeth more frequently. More of them always used toothpaste, and a higher proportion of them got parental assistance when they brushed. However, the improvement seems to slow down in the past 10 years. The knowledge of parents on the factors which might increase the risk of tooth decay and gum disease was polarized; the proportion of parents with or without correct knowledge related to caries and gum disease were both high.

There was a further improvement in the level of tooth decay experience. The average number of decayed teeth per child and the percentage of children being affected decreased when compared with that of 2011 survey. However, the population with decay experience was still high over the latest ten years, which means a large proportion of the 5-year old children was still under the threat of dental decay.

The slow improvement in the decay experience could partly be attributed to the fact that most of the children did not go for dental checkup where they could receive individualized oral health education and early preventive intervention. Especially during the pandemic of COVID-19, only about one-third of the parents of 5-year old children who were covered by dental scheme brought their children to visit dentist. In this survey, three-quarters of the 5-year old children had never visited a dentist which was similar to the results in 2001 and 2011. Even for those who had, around half of them did so mainly because of dental problems. The low checkup rate, together with the wrong perception of some parents that the oral health of their children was good while in fact they had tooth decay, could result in many decayed teeth remain undetected and untreated. Furthermore, the pandemic of COVID-19 might have deterred those who had dental scheme to seek for dental checkup and receive the appropriate treatment.

Looking at the way forward, the dental profession needs to further strengthen oral health education to parents of young children and encourage them to have regular dental checkup from as early as 6 months old after the eruption of the first tooth. Early screening programme of the infant could help early identification of the high risk group for dental decay. Parents should also be further motivated to help their children with toothbrushing and reduced snacking. This survey showed that the use of fluoride toothpaste of the parents was polarized. About 60% of the parent used fluoride toothpaste for their children. On the other hand, more than 10% of the parents used non-fluoridated toothpaste and it was increasing over the years. Continual promotion of using fluoridated toothpaste and establishing good dietary habit are required. The initiation of dental programmes that focus on pre-school children and risk assessment may help in early diagnosis, prevention and intervention of oral diseases.

CHAPTER 4

12-year old students

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

Tooth status – how many teeth were there ?

Students at age 12 usually have most of their permanent teeth (adult teeth) erupted and almost all of their primary teeth (milk teeth) shed. In this survey, each of them had 26.1 permanent teeth on average. This report covered only the conditions of permanent teeth of the students.

Tooth status – what was the level of tooth decay experience ?

The level of tooth decay experience in the 12-year old students as measured by the DMFT index is shown in Table 4.1. It was found to be very low with a mean DMFT value of 0.24. Most of the tooth decay experience was filled component (FT). Untreated decay (DT) affected only 4.2% (2 100) of the students (Table 4.2).

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

Tooth decay experience	DMFT	DT (decayed)	MT (missing)	FT (filled)
Mean value	0.24	0.05	0.00	0.19

Base: All 12-year old students 2021: (N = 50 000)

Table 4.2 ***Percentage of 12-year old students with tooth decay experience***

Tooth decay experience	DMFT	DT (decayed)	MT (missing)	FT (filled)
Percentage among population	16.3%	4.2%	0.0%	13.3%

Base: All 12-year old students 2021: (N = 50 000)

The level of tooth decay experience in 12-year old students and the percentage of students affected as found in the 2001, 2011 and 2021 surveys are compared in Table 4.3 and Table 4.4. The tooth decay experience level had decreased and the percentage of students affected was also getting smaller.

Table 4.3 ***Level of tooth decay experience as measured by the DMFT index among 12-year old students in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 67 100)	2011 (N = 56 900)	2021 (N = 50 000)
Mean DMFT	0.8	0.4	0.24
Mean DT (decayed)	0.1	0.1	0.05
Mean MT (missing)	0.1	< 0.05	0
Mean FT (filled	0.6	0.3	0.19

Base: All 12-year old students

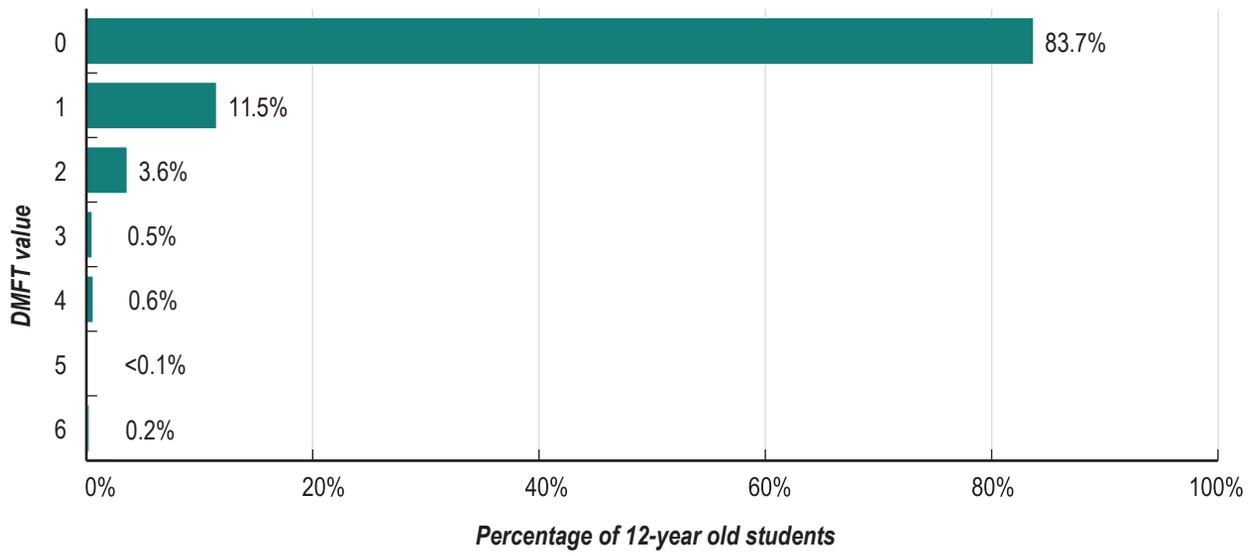
Table 4.4 ***Percentage of 12-year old children with tooth decay experience in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 67 100)	2011 (N = 56 900)	2021 (N = 50 000)
DMFT	37.8%	22.6%	16.3%
DT (decayed)	6.9%	5.4%	4.2%
MT (missing)	3.1%	0.5%	0.0%
FT (filled	33.8%	19.3%	13.3%

Base: All 12-year old students

The distribution of 12-year old students according to their DMFT value is shown in Figure 4.1. Over eighty percent (83.7%) of the students were free from tooth decay experience. It was found that most of the affected students had only one tooth with decay experience but around 0.8% of the affected students had four or more teeth with decay experience.

Figure 4.1 ***Distribution of 12-year old students according to DMFT value***



Base: All 12-year old students
2021: (N = 50 000)

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). During oral examination, only healthy gum, bleeding gum and calculus were detected. Those students who had medical conditions such as bleeding disorder or under oral treatment such as having fixed orthodontic appliance will be excluded from the examination. The findings are shown in Table 4.5 and Table 4.6.

Table 4.5 ***Gum condition as measured by CPI among 12-year old students***

Gum condition	No bleeding gum and calculus detected	Bleeding gum + no calculus	Calculus +/- bleeding gum
Percentage among population	16.0%	62.8%	21.2%

Base: All 12-year old students who received examination on gum condition
2021: (N = 49 100)

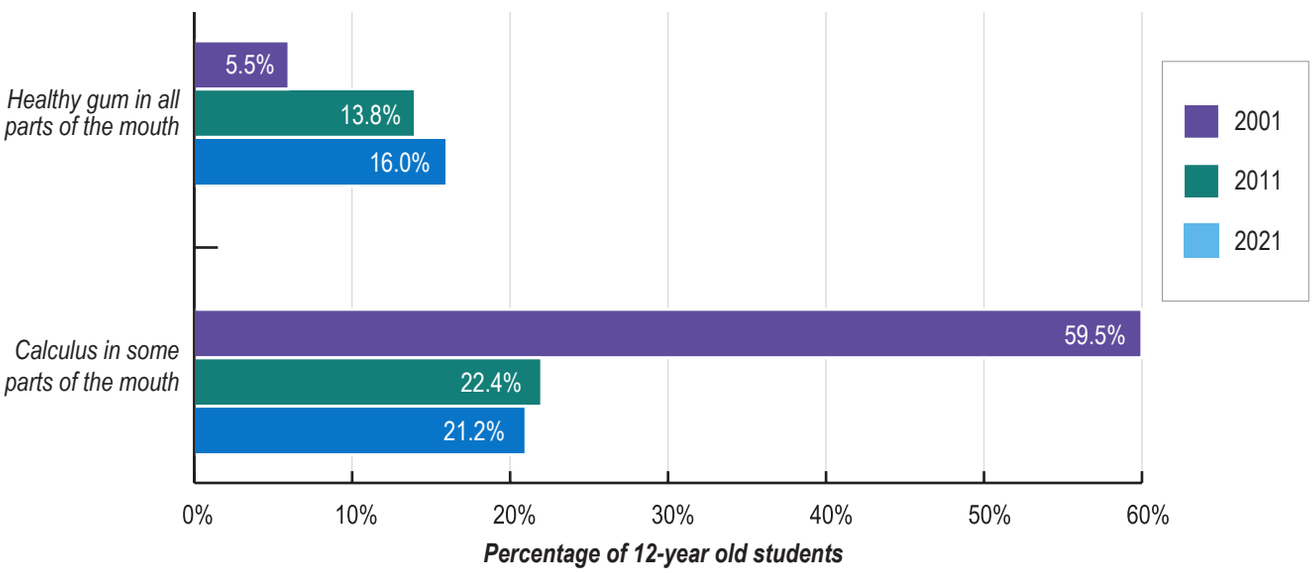
Table 4.6 ***Mean number of sextants with healthy gum, bleeding gum and calculus in 12-year old students***

Gum condition	No bleeding gum and calculus detected	Bleeding gum + no calculus	Calculus +/- bleeding gum
Mean number of sextants (6 sextants per person)	3.6	2.1	0.3

Base: All 12-year old students who received examination on gum condition
2021: (N = 49 100)

Comparing the results of this survey to that of 2001 and 2011, the gum condition of the 12-year old students had shown some improvement. In the present survey, an increased proportion of students (16.0% as compared with 5.5% and 13.8% in the 2001 and 2011 surveys respectively) had healthy gum in all parts of their mouth with no bleeding gum and calculus detected. There was also a decreased in proportion of students (21.2% as compared with 59.5% and 22.4% in the 2001 and 2011 survey respectively) having calculus in some parts of the mouth (Figure 4.2)

Figure 4.2 ***Percentage of 12-year old students according to gum condition in 2001, 2011 and 2021***



Base: All 12-year old students who received examination on gum condition
2001: (N = 66 600)
2011: (N = 55 900)
2021: (N = 49 100)

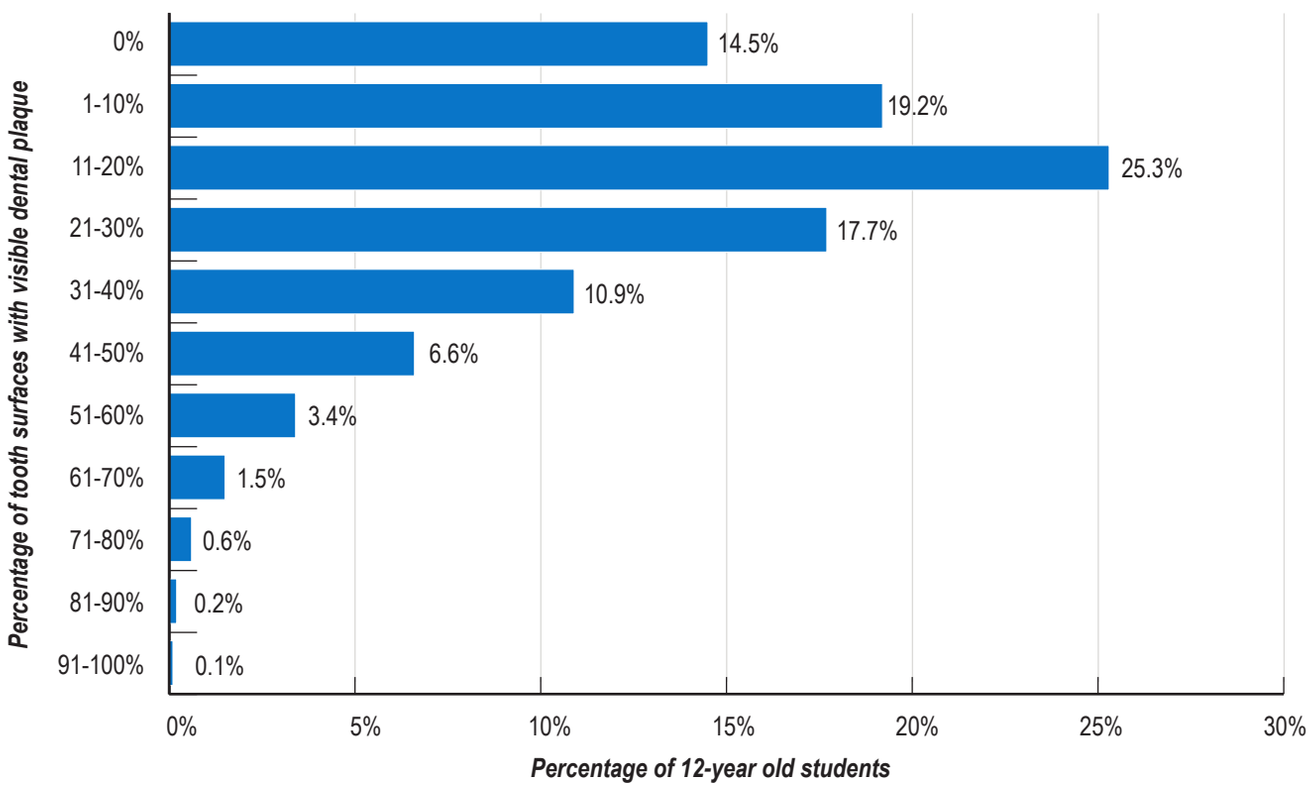
The level of tooth decay experience was very low among the 12-year old students. When compared with 2001 and 2011 surveys, both the level of tooth decay experience and the proportion of students affected by decay experience was on decreasing trend. Most of the students with decay experience had only one tooth affected and a large proportion of the decayed teeth were treated.

The gum health of 12-year old students had improved when compared with 2001 and 2011 surveys. More students had healthy gum and fewer students had calculus, but bleeding gum in some parts of the mouth remained to be found in most of the students.

Tooth status – how clean were the teeth?

The cleanliness of teeth of the 12-year old students was measured by the percentage of tooth surfaces with visible dental plaque. The mean percentage of tooth surfaces with visible dental plaque in this age group was 21.7%. The distribution of students by the percentage of tooth surfaces with visible dental plaque is shown in Figure 4.3. Only 5.8% (2 900) of the students were found to have visible plaque on more than 50% of their tooth surfaces.

***Figure 4.3** Distribution of 12-year old students according to level of teeth cleanliness as measured by the percentage of tooth surfaces with visible dental plaque*



Base: All 12-year old students 2021: (N=50 000)

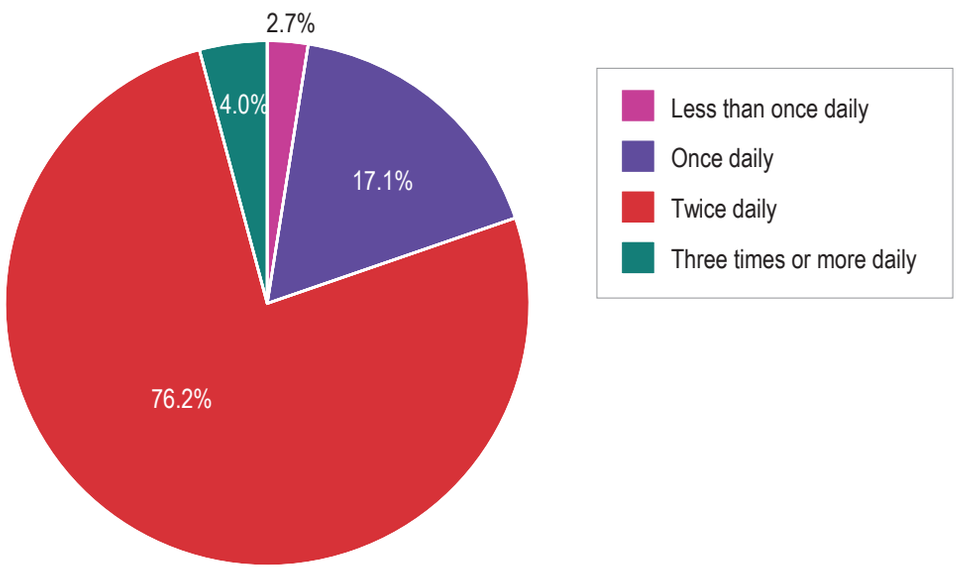
Comparing the findings of this survey with that of 2001 and 2011, there was improvement in the level of teeth cleanliness of the 12-year old students. The mean percentage of tooth surfaces with visible dental plaque had dropped from 36.8% (2001) to 27.0% (2011), and further to 21.7% (2021). The proportion of students with visible dental plaque on more than half of their tooth surfaces had also dropped from 28.7% (2001) to 8.4% (2011) and further reduced to 5.8% in 2021.

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

Toothbrushing – how often did the student brush?

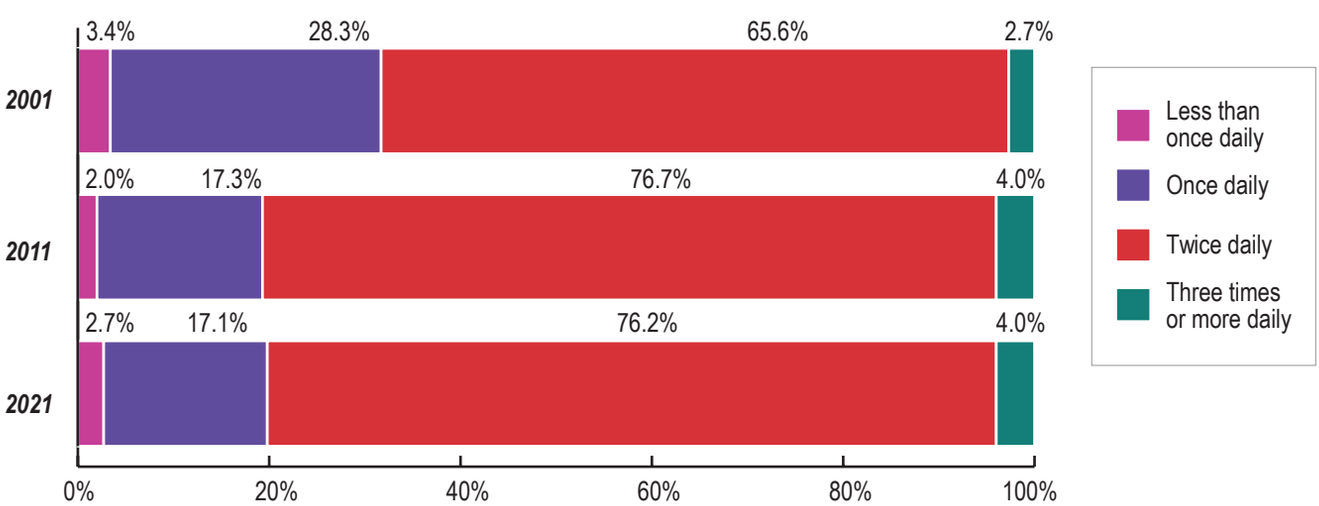
The toothbrushing habit among 12-year old students is shown in Figure 4.4. Only 2.7% (1 400) of the students reported that they brushed less than once a day. Up to 80.2% (40 100) of the students brushed twice or more a day and the proportion of such students was more or less the same when compared with 2001 and 2011 surveys (Figure 4.5).

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



Base: All 12-year old students
2021: (N=50 000)

Figure 4.5 ***Distribution of 12-year old students according to the toothbrushing frequency in 2001, 2011 and 2021***

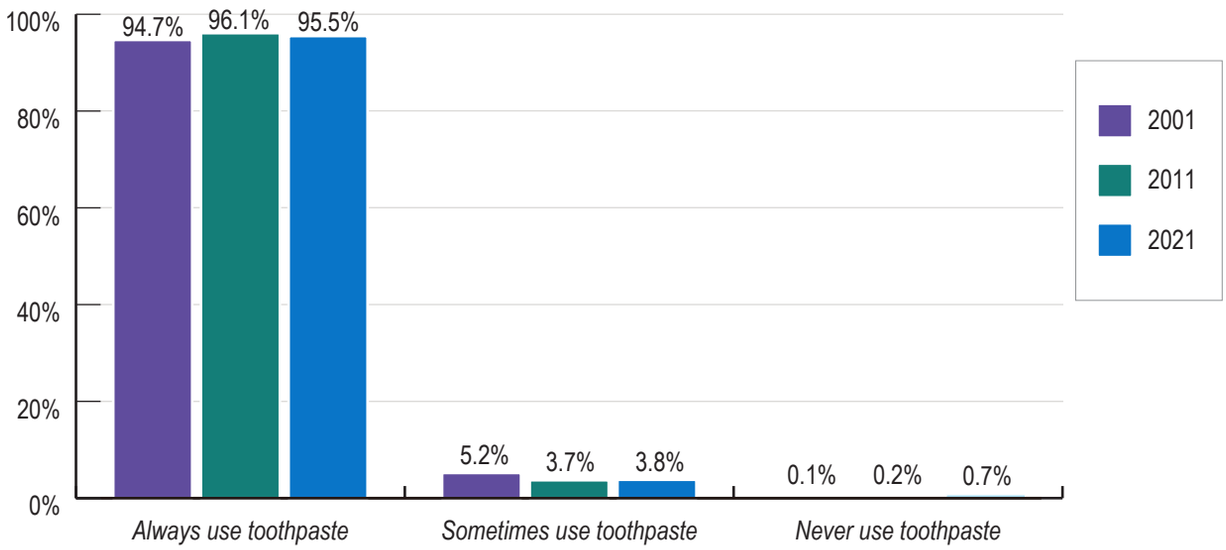


Base: All 12-year old students
2001: (N=67 100)
2011: (N=56 900)
2021: (N=50 000)

Toothbrushing – was fluoride toothpaste used

Among the 12-year old students, 95.5% (47 800) of them reported that they always used toothpaste when they brushed their teeth. Similar finding was observed in the 2001 and 2011 surveys (Figure 4.6).

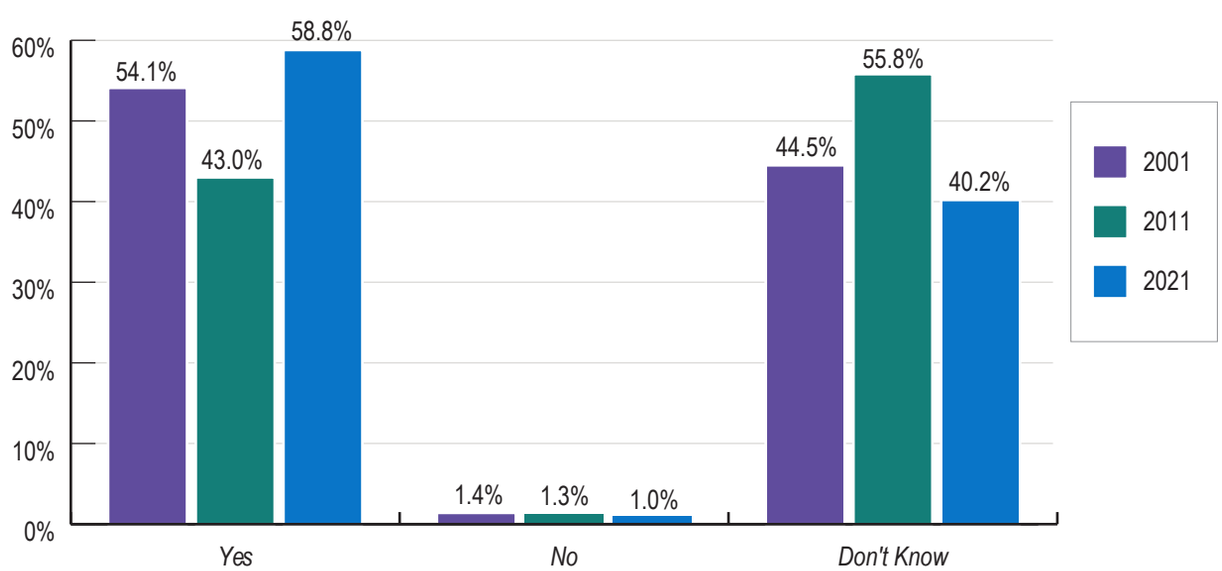
Figure 4.6 ***Distribution of 12-year old students according to use of toothpaste in 2001, 2011 and 2021***



Base: All 12-year old students responded to the question
2001: (N=67 100) 2011: (N=56 900) 2021: (N=50 000)

Students who used toothpaste were further asked if the toothpaste contained fluoride. Only 58.8% (29 200) of them reported that they were using toothpaste containing fluoride while 40.2% (20 000) of them did not know (Figure 4.7).

Figure 4.7 ***Distribution of 12-year old students according to their knowledge on whether their toothpaste contained fluoride in 2001, 2011 and 2021***

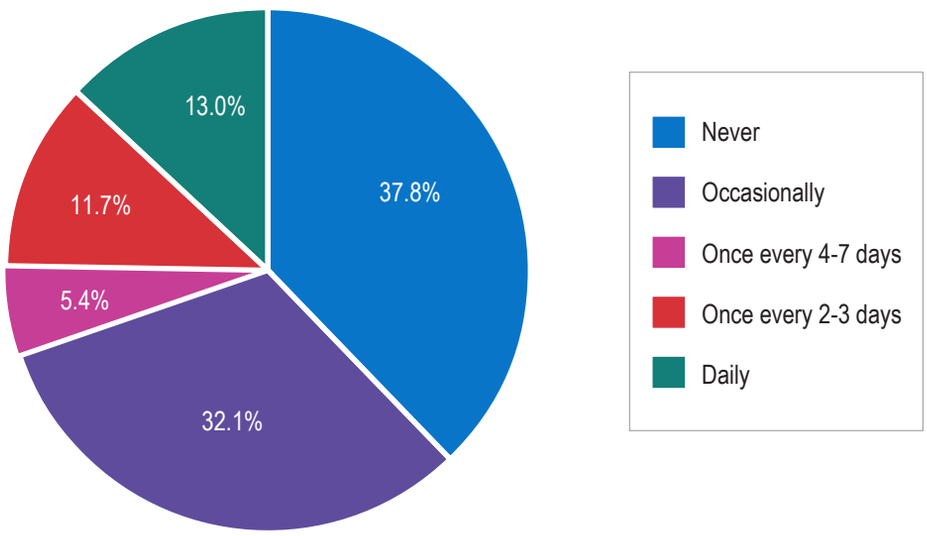


Base: All 12-year old students responded to the question
2001: (N=67 100) 2011: (N=56 700) 2021: (N=49 700)

Flossing – did the students use dental floss

Up to 62.2% (31 100) of the students reported that they used dental floss as compared with 60.6% in 2011. However, most of them only used dental floss occasionally (Figure 4.8).

Figure 4.8 ***Distribution of 12-year old students according to frequency of using dental floss***

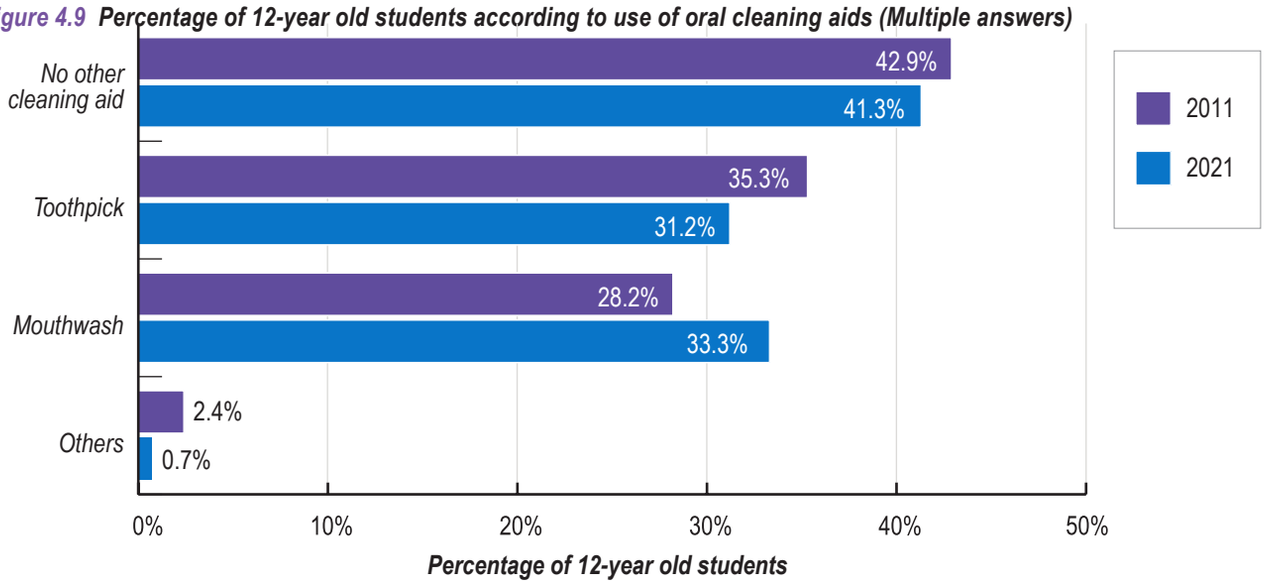


Base: All 12-year old students
2021: (N=50 000)

Did the students use additional oral cleaning aids?

Students were asked whether they had used any additional oral cleaning aids to clean their teeth and the results are shown in Figure 4.9. Comparing the results of this survey to the last one in 2011, slightly fewer students reported the use of toothpick (31.2% and 35.3% respectively) and slightly more students used mouthwash in this survey (33.3% and 28.2% respectively). Nonetheless, the use of proper oral cleaning method is utmost important.

Figure 4.9 ***Percentage of 12-year old students according to use of oral cleaning aids (Multiple answers)***



Base: All 12-year old students
2011: (N= 56 900) 2021: (N= 50 000)

The toothbrushing habit of the 12-year old students was good. Most of the students brushed their teeth twice a day and almost all of them used toothpaste. About 40% of the students, however, were not sure if their toothpaste contained fluoride but the percentage decreased as compared to the results of 2011 survey.

Up to 62.2% of the students used dental floss. More than half of them, however, were only occasional users. Only 13% of the students used dental floss daily.

Snacking habit

Students were asked to report how frequently they snacked between meals. About 30% of the students reported that they snacked at least once daily and 9.7% (4 900) snacked three times or more per day (Table 4.7). Compared to 2001 & 2011 surveys, more of the students had no daily snacking habits, but the percentage of students who snacked twice or more times per day was found higher than that of 2011.

Table 4.7 ***Distribution of 12-year old students according to snacking frequency***

Snacking habit	Percentage of students		
	2001 (N = 67 100)	**2011** (N = 56 900)	**2021** (N = 50 000)
No daily snacking habit	19.0%	67.5%	70.6%
Snack once per day	45.1%	19.0%	9.8%
Snack 2 times per day	24.5%	8.9%	10.0%
Snack 3 times or more per day	11.4%	4.7%	9.7%

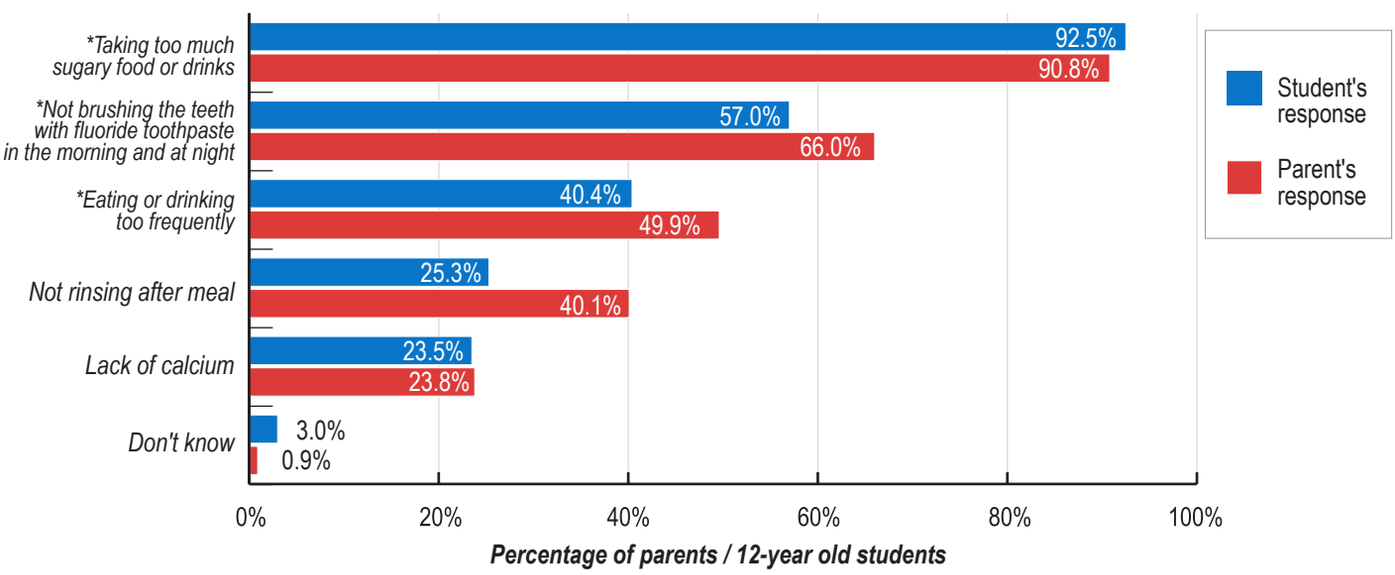
Base: All 12-year old students in 2001,2011 & 2021

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

What did the students and their parents know about the factors which might increase the risk of tooth decay?

Students and their parents were asked about the factors that might increase the risk of tooth decay and the results are shown in Figure 4.10. The students and parents basically shared similar beliefs. In both groups, the vast majority of them knew that *taking too much sugary food or drink* could increase the risk of tooth decay. About 60% of the students and parents could identify *not brushing the teeth with fluoride toothpaste in the morning and at night* was a factor and more than 40% of them could identify *eating or drinking too frequently* as a risk factor for tooth decay. Only a small proportion (about 24%) of both students and parents had the misconception that *lack of calcium* was a risk factor. There were, however, some areas in which the students and parents differed in their perceptions. About 25.3% (12 700) of students had the misconception that *not rinsing after meal* was a risk factor for tooth decay but up to 40.1% (20 000) of parents held that belief.

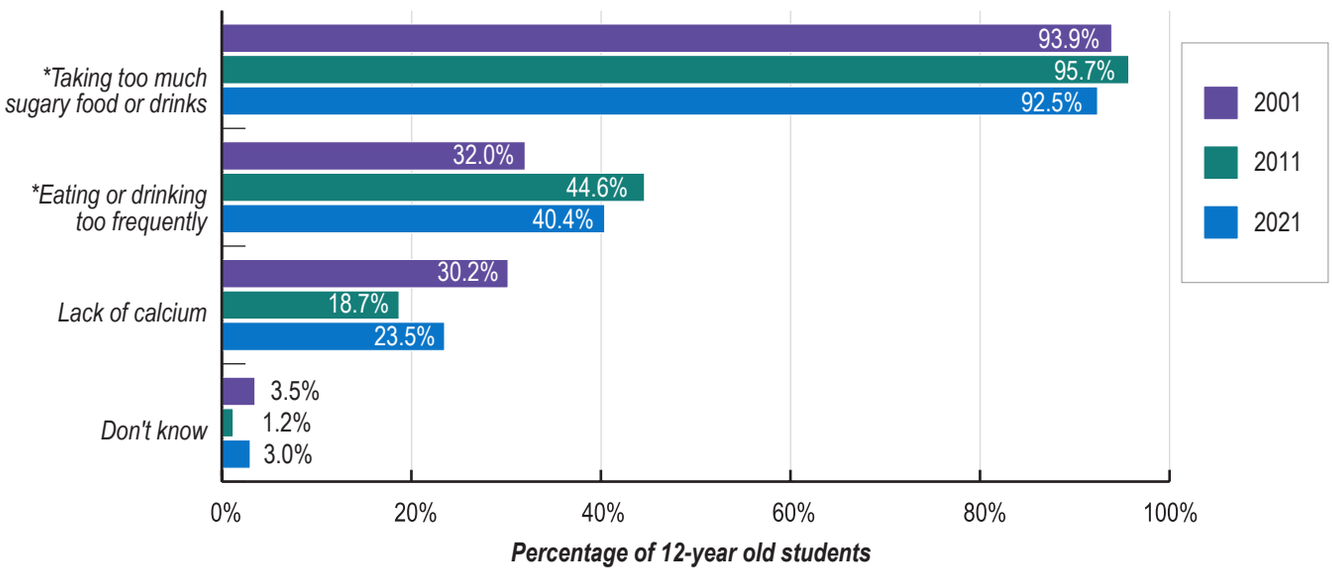
Figure 4.10 ***Percentage of 12-year old students and their parents according to the perceived factors which might increase the risk of tooth decay (Multiple answers)***



**Relevant factors*
Base: All parents / 12-year old students who responded to the question in 2021
Parents: (N = 50 000)
Students : (N =50 000)

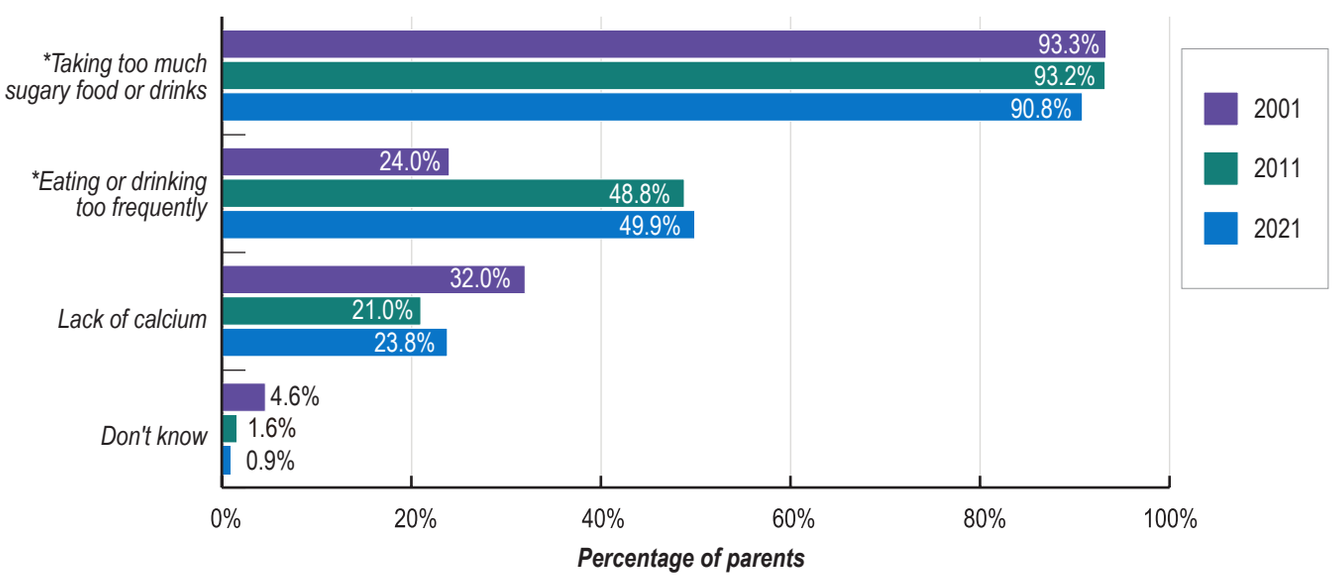
Comparing the findings of this survey to that of 2001 and 2011 (Figures 4.11 and 4.12), more than about 90% of the students and parents perceived that taking too much sugary food or drinks might cause tooth decay. The proportion of students and parents who were aware that eating or drinking too frequently was a risk factor had also increased over the past twenty years, from 32% to 40% in students and from 24% to 50% in parents.

Figure 4.11 ***Percentage of 12-year old students according to the perceived factors which might increase the risk of tooth decay in 2001, 2011 and 2021 (Multiple answers)***



**Relevant factors*
Base: All 12-year old students who responded to the question
2001: (N = 67 100) 2011: (N = 56 200) 2021: (N = 50 000)

Figure 4.12 ***Percentage of parents of 12-year old students according to the perceived factors which might increase the risk of tooth decay in 2001, 2011 and 2021 (Multiple answers)***

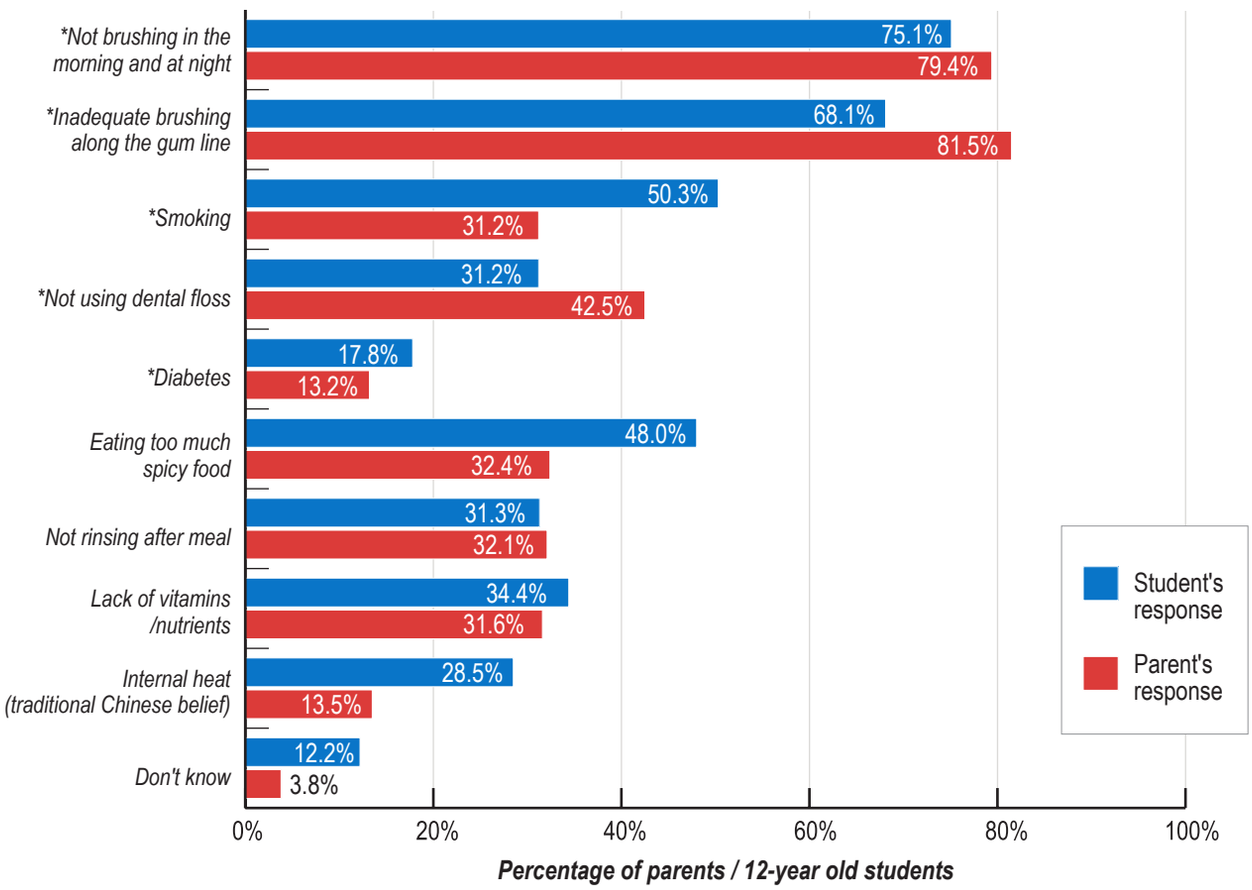


**Relevant factors*
Base: All 12-year old students who responded to the question
2001: (N = 67 100) 2011: (N = 56 200) 2021: (N = 50 000)

What did the students and their parents know about the factors which might increase the risk of gum disease?

Students and parents were asked what they considered were factors that might increase the risk of gum disease and the results are shown in Figure 4.13. Higher proportion of parents than students perceived *not brushing in the morning and at night, inadequate brushing along the gum line and not using dental fl ss* as risk factors for gum disease. Around 50% of the students and 30% of the parents were aware that *smoking* was a risk factor for gum disease.

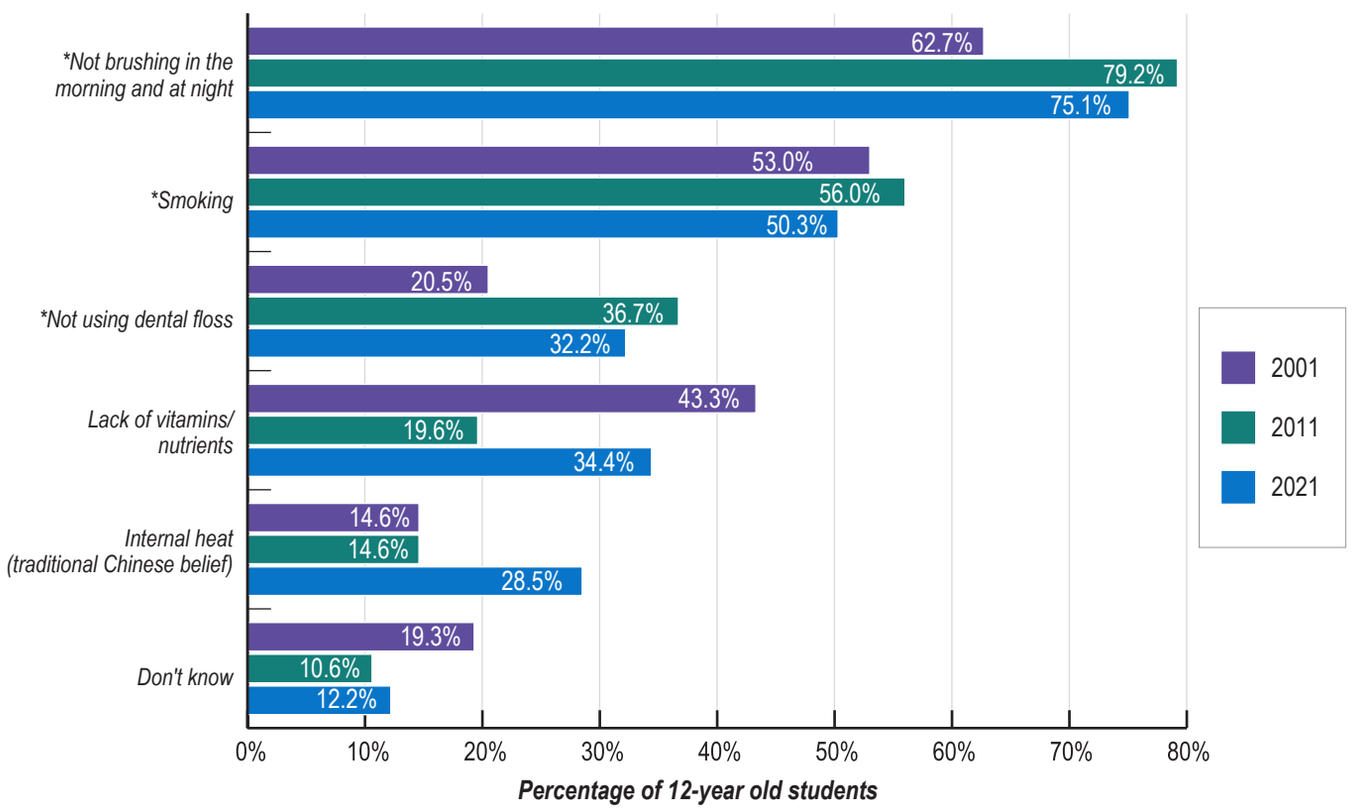
Figure 4.13 ***Percentage of 12-year old students and their parents according to the perceived factors which might increase the risk of gum disease (Multiple answers)***



**Relevant benefit*
Base: All parents / 12-year old students who responded to the question in 2021
Parents: (N = 50 000)
Student: (N = 50 000)

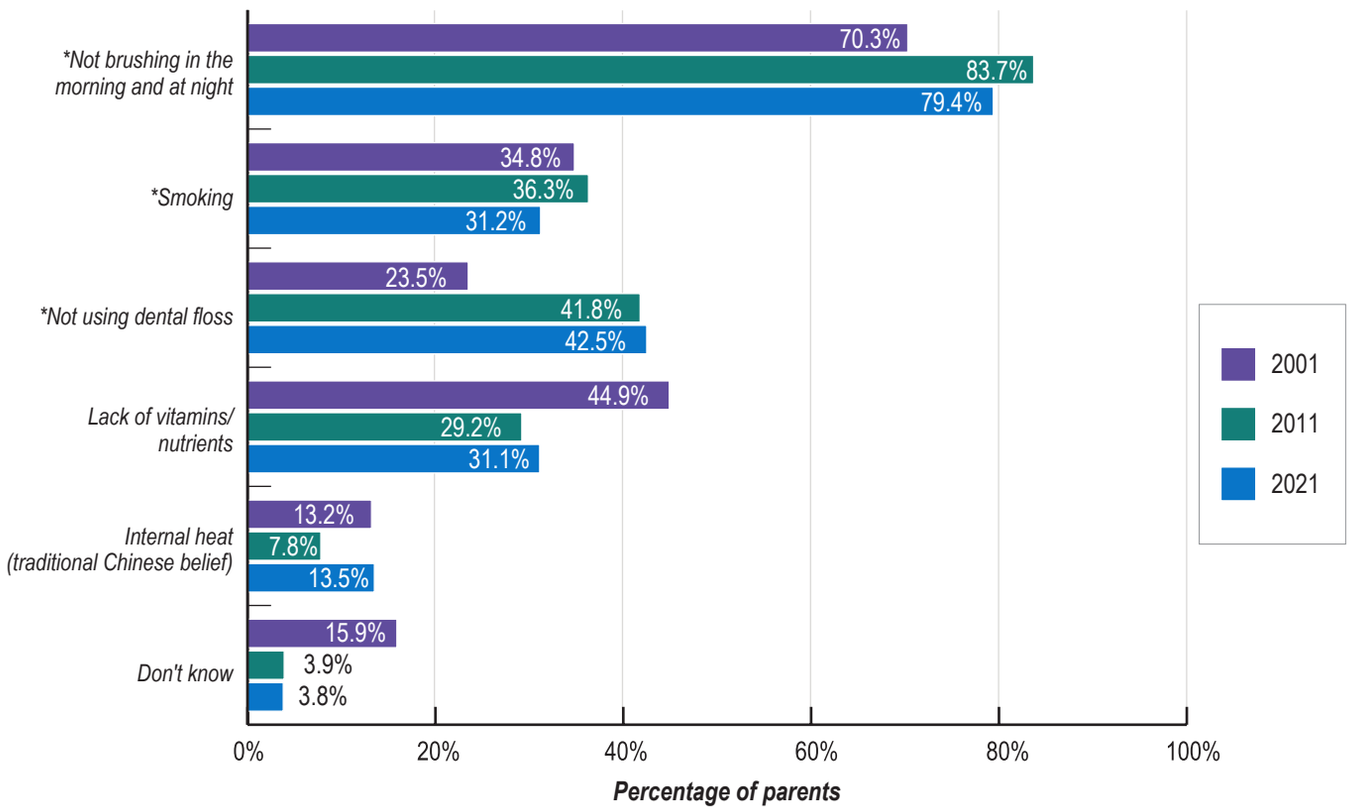
Comparing the findings of this survey to the 2001 and 2011 surveys, larger proportions of students and parents were aware that *not brushing in the morning and night* was a risk factor for gum disease. Also, in the present survey, there was an increasing proportion of both students and parents who believed that *lack of vitamins/ nutrients* and *internal heat (traditional Chinese belief)* were risk factors causing gum disease (Figures 4.14 and 4.15).

Figure 4.14 ***Percentage of 12-year old students according to the perceived factors which might increase the risk of gum disease in 2001, 2011 and 2021 (Multiple answers)***



**Relevant benefit*
Base: All 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 300)
2021: (N = 50 000)

Figure 4.15 ***Percentage of parents of 12-year old students according to the perceived factors which might increase the risk of gum disease in 2001, 2011 and 2021 (Multiple answers)***



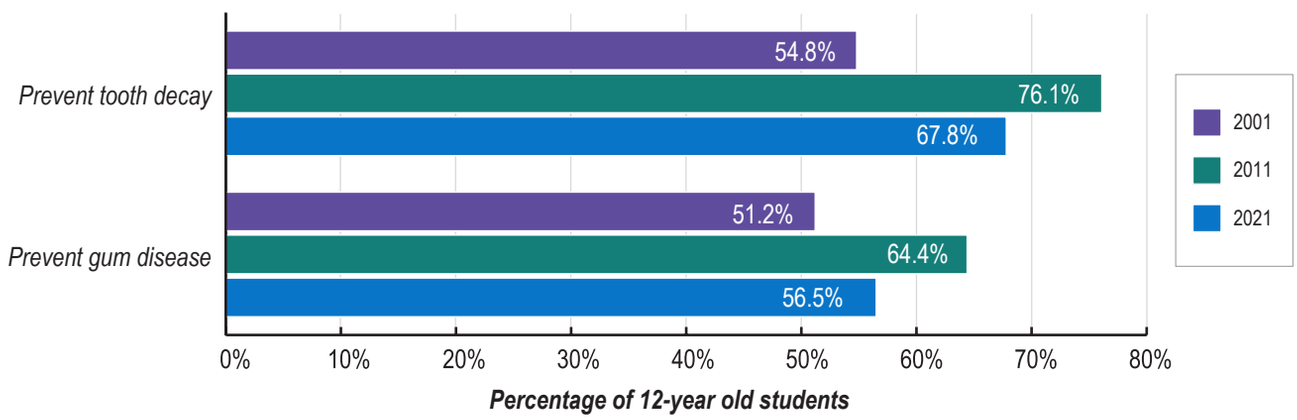
**Relevant benefit*
Base: All parents of 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 900)
2021: (N = 50 000)

Did the students and their parents consider regular checkup as a way to help prevent tooth decay and gum disease ?

In this survey, around two-thirds of 12-year old students as well as their parents considered regular dental checkup as a way to help preventing tooth decay. When the same question was asked on prevention of gum disease, more parents (two-thirds) than students (about a half) believed in the benefit of regular dental checkup.

However, comparing the results of this survey to the 2011 survey, both the proportion of students and their parents who believed in the value of dental checkup for the prevention of both tooth decay and gum disease had decreased (Figure 4.16 and 4.17).

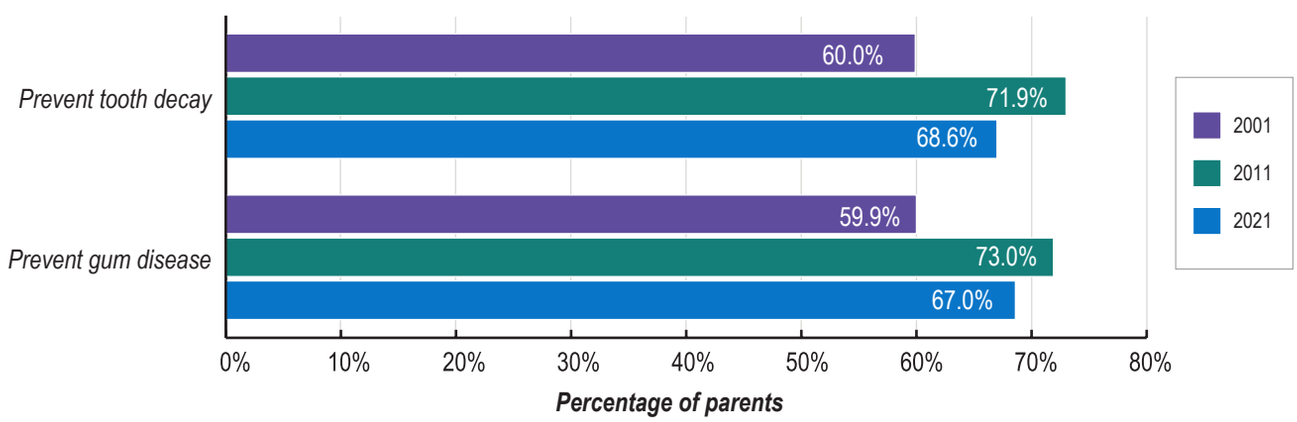
Figure 4.16 Percentage of 12-year old students according to the usefulness of dental checkup in the prevention of tooth decay and gum disease in 2001, 2011 and 2021



Base (prevention of tooth decay):
All 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 100)
2021: (N = 50 000)

Base (prevention of gum disease):
All 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 400)
2021: (N = 50 000)

Figure 4.17 Percentage of parents of 12-year old students according to the usefulness of dental checkup in the prevention of tooth decay and gum disease in 2001, 2011 and 2021

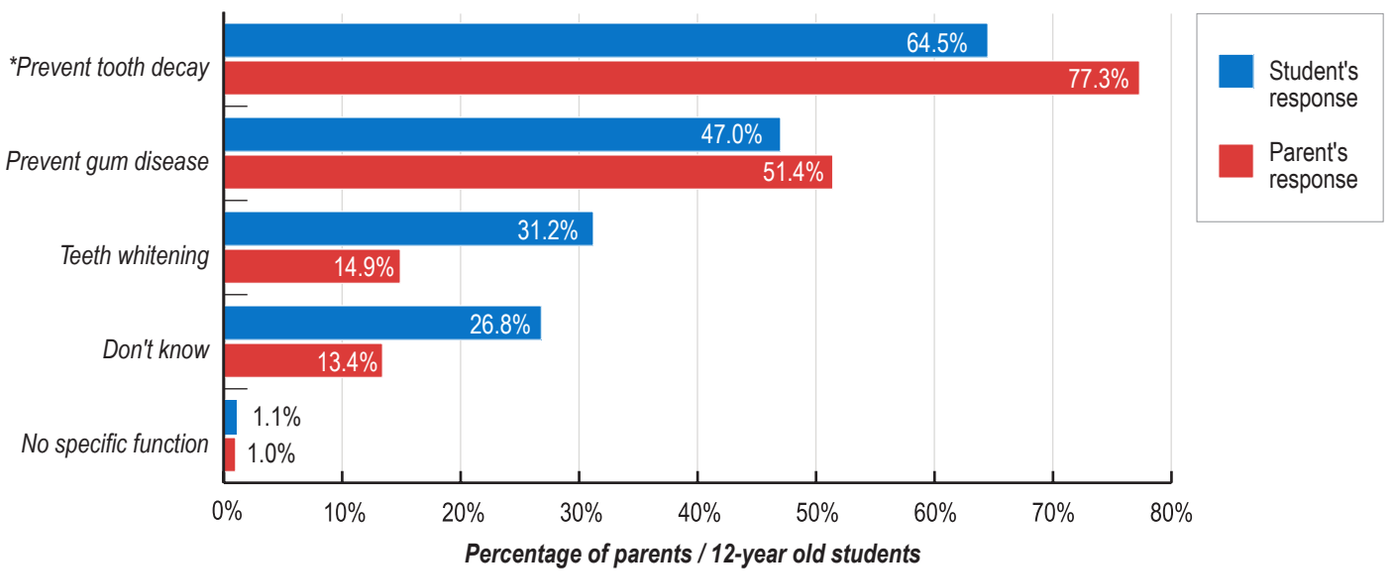


Base: All parents of 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 900)
2021: (N = 50 000)

Did the students and their parents know about the benefit of fluoride

The perceived benefit of fluoride as reported by 12-year old students and their parents are shown in Figure 4.18. About 64.5% (32 200) of the students and 77.3% (38 700) of parents knew the benefit of fluoride in prevention of tooth decay. On the other hand, around 50% of the students as well as their parents had the misconception that fluoride could prevent gum disease, while 31.2% (15 600) of students and 14.9% (7 400) of the parents thought that fluoride was useful in teeth whitening.

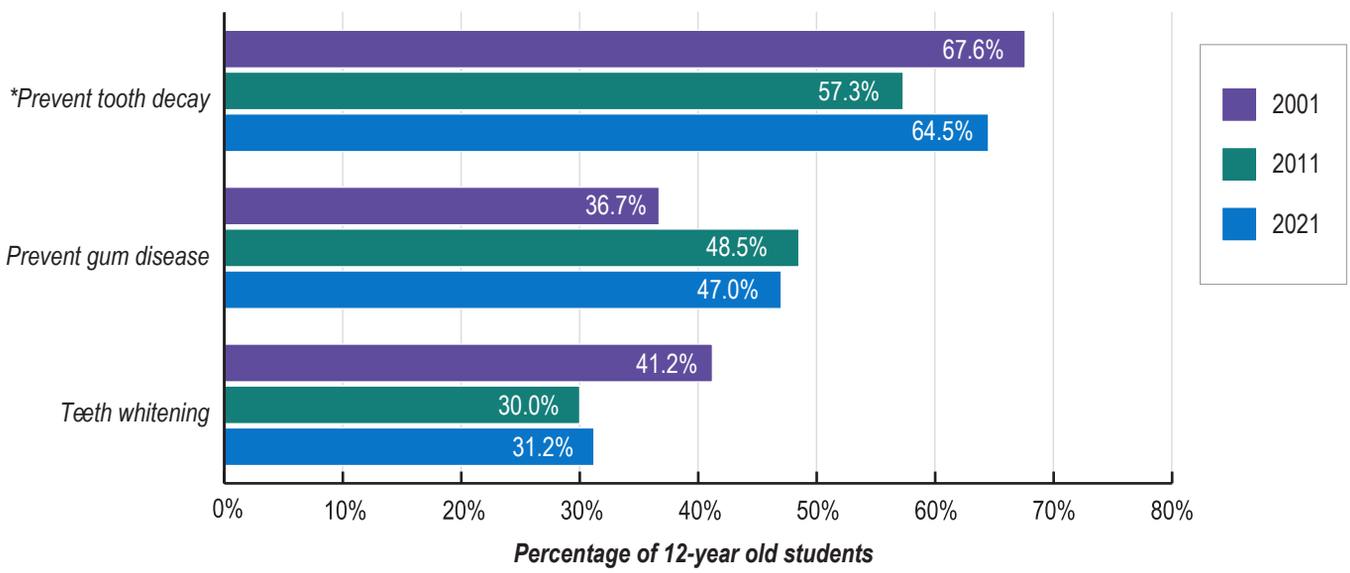
Figure 4.18 ***Percentage of 12-year old students and their parents according to their knowledge on the benefits of fluoride (Multiple answers)***



**Relevant benefit*
Base: All parents / 12-year old students who responded to the question in 2021
Parents: (N = 50 000)
Student: (N = 50 000)

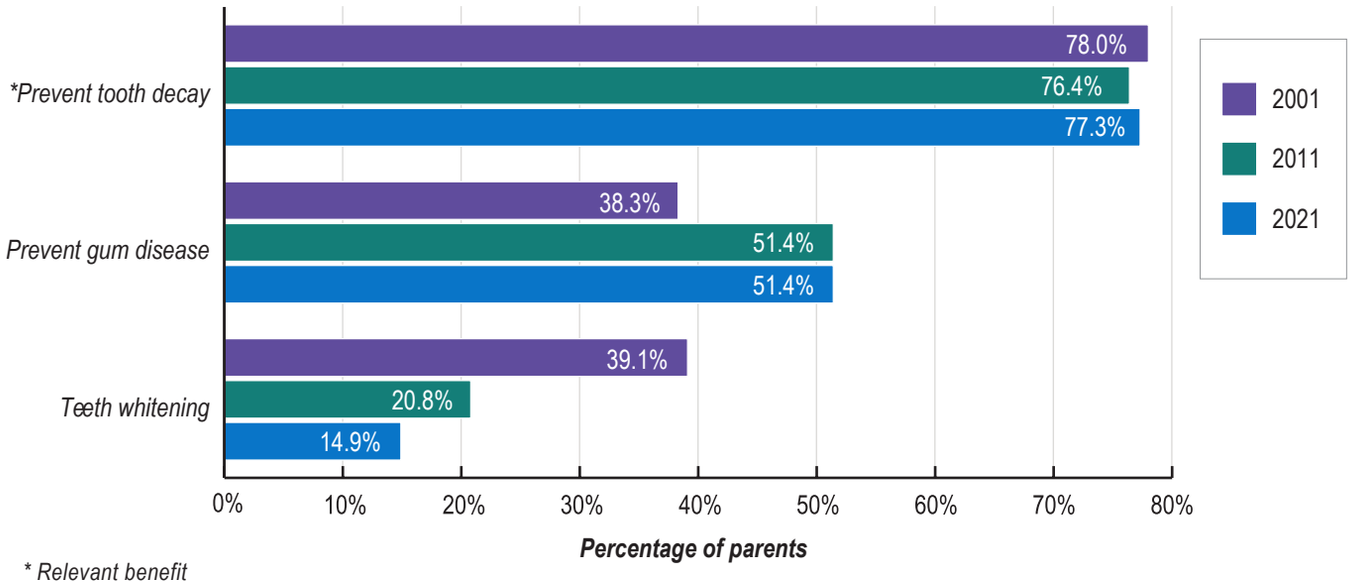
Comparing to the 2001 and 2011 surveys, the proportion of 12-year old students in this survey who knew the benefit of fluoride in prevention of tooth decay had increased to the level as at 2001. A high proportion of students and parents knew the functions of fluoride, but still there was a significant percentage of them believed that fluoride is useful in preventing gum disease and teeth whitening (Figures 4.19 and 4.20).

Figure 4.19 ***Percentage of 12-year old students according to their knowledge on the benefits of fluoride in 2001, 2011 and 2021 (Multiple answers)***



** Relevant benefit*
Base: All 12-year old students who responded to the question
2001: (N = 67 100)
2011: (N = 56 400)
2021: (N = 50 000)

Figure 4.20 ***Percentage of parents of 12-year old students according to their knowledge on the benefits of fluoride in 2001, 2011 and 2021 (Multiple answers)***



** Relevant benefit*
Base: All parents of 12-year old students
2001: (N = 67 100)
2011: (N = 56 900)
2021: (N = 50 000)

Compared with the 2011 survey, more students and parents had relevant knowledge on the risk factors for tooth decay and gum disease. Around two-thirds of them knew the benefits of fluoride in prevention of tooth decay. However, there were still misconception on the benefits of fluoride on gum disease and teeth whitening.

Around two-thirds of the students and parents considered regular checkup as a way to help prevent tooth decay. More of the parents believed in the benefits of regular checkup in prevention of gum disease than the students.

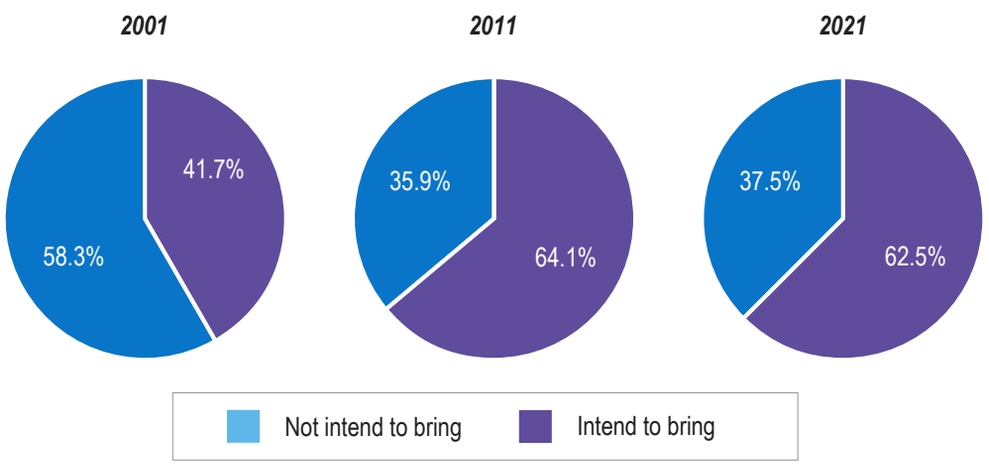
What was the pattern of utilization of oral health care services among the 12-year old students?

Did the parents intend to bring the 12-year old students to seek regular dental checkup?

Most primary school children in Hong Kong receive oral health care through the School Dental Care Service administered by the Department of Health and the participation rate was over 90%. The 12-year old students covered in this survey had just entered secondary schooling and a large proportion of them would have received some form of oral health care during their primary school years.

In this survey, parents were asked whether they intended to bring the 12-year old students to seek regular dental checkup. About 62.5% (31 300) of them indicated that they would do so. This was similar to the findings of the 2011 survey (Figure 4.21).

Figure 4.21 ***Distribution of parents according to whether they intended to bring their 12-year old students to seek regular dental checkup in 2001, 2011 and 2021***



Base: All parents of 12-year old student
2001: (N = 67 100)
2011: (N = 56 900)
2021: (N = 50 000)

How many students had visited the dentist after entering secondary school?

Up to 24.5% (12 300) of the 12-year old students had visited dentists after entering secondary schools. This decreased from the 31.8% found in the last survey in 2011.

The types of treatment received by the 12-year old students during those dental visits (12 300) are shown in Table 4.8. More than 80% of them received professional tooth cleaning (scaling). There was a smaller proportion of students requiring treatment such as filling.

Table 4.8 ***Type of treatment received in latest dental visit by of 12-year old students who visited dentist after entering secondary school***

Type of treatment received	Percentage of students (N = 12 300)
Professional tooth cleaning	82.6%
Filling	16.3%
Orthodontic treatment	14.2%
Removal of teeth (including removal of permanent teeth for orthodontic reason and removal of primary teeth)	8.2%
Root Canal treatment	1.1%
Others	8.0%

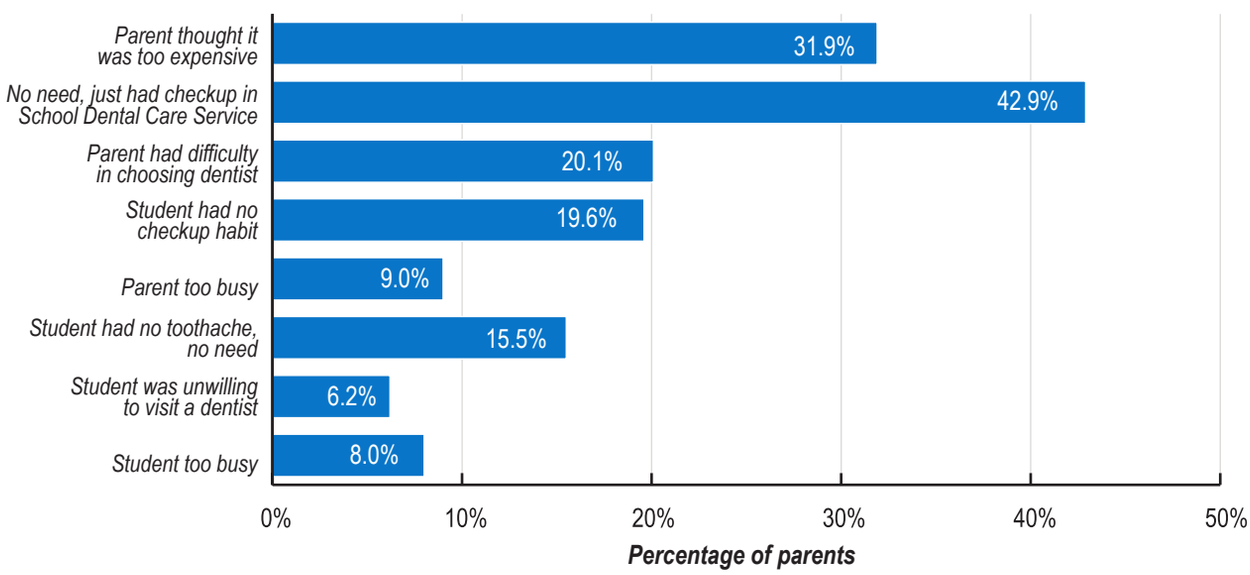
Base: 12-year old students who received dental treatment after entering secondary school and answered the question in 2021

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

What were the reasons for parents not intending to bring the 12-year old students to seek regular dental checkup ?

Parents who did not intend to bring the 12-year old students to seek regular dental checkup after entering secondary schools were asked for the reasons for not doing so. *No need as the student just had checkup in School Dental Care Service* and *Parent thought it was too expensive* were the two commonly reasons reported (Figure 4.22).

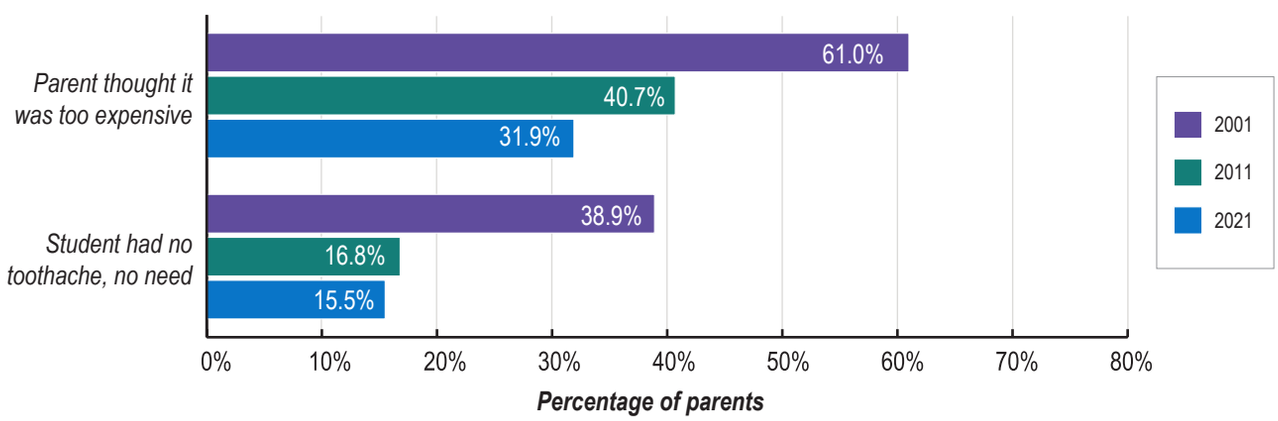
Figure 4.22 ***Percentage of parents of 12-year old students according to their reported reasons of not intending to bring the 12-year old students to seek regular dental checkup (Multiple answers)***



Base: All parents of 12-year old students who responded to the question in 2021 (N= 18 700)

Comparing the findings of this survey to the 2011 survey on parents (Figure 4.23), up to 40.7% of parents who did not intend to seek regular dental checkup for the students in 2011 indicated that dental checkup was too expensive, but in the present survey, only 31.9% of the parents had such thought. In addition, in the 2011 survey, about 16.8% of the parents who did not bring their children for dental checkup indicated that their children had no perceived need due to the absence of toothache. In the present survey, the percentage of parents reported such reason further reduced to 15.5%.

Figure 4.23 ***Percentage of parents of 12-year old students according to their reported reasons of not intending to bring the 12-year old students to seek regular dental checkup in 2001, 2011 & 2021***



Base: All parents of 12-year old students who responded to the question
2001: (N = 39 100)
2011: (N = 20 400)
2021: (N = 18 700)

What was the proportion of 12-year old students covered by the parents' dental third party payment schemes?

Around 23.6% (11 800) of the parents of the 12-year old students reported that they had dental scheme coverage and 85.9% (10 100) of such coverage were provided by employers. Among the parents with dental scheme coverage, 62.3% (7 400) of them indicated that their children were also covered. This was equivalent to 14.7% of all 12-year old students.

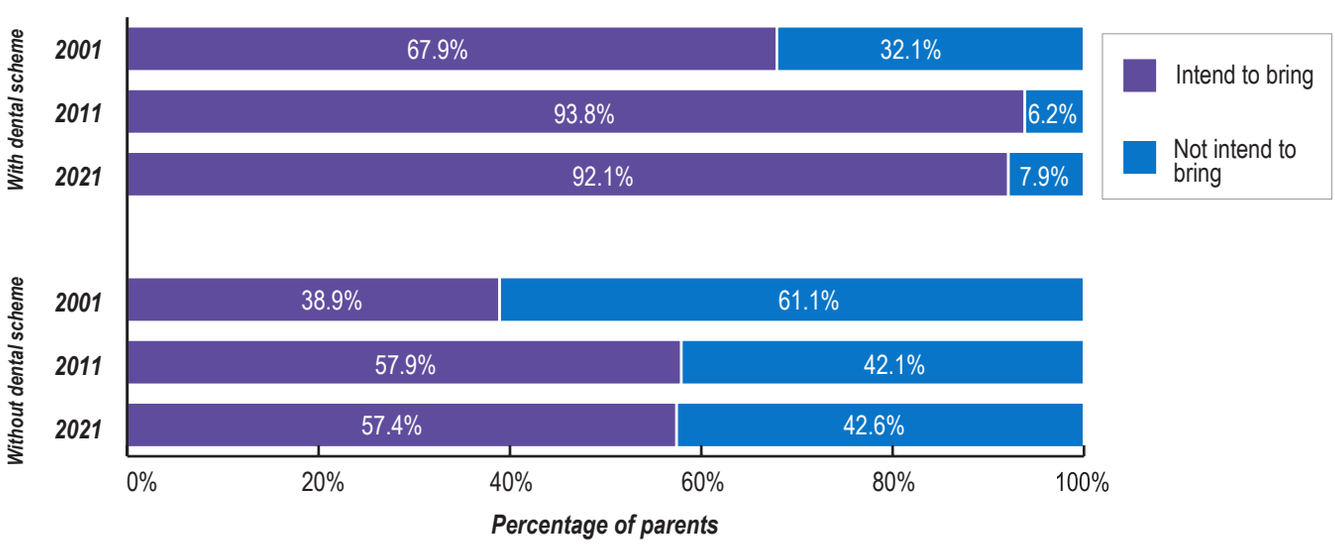
In the 2011 survey, only 26.8% of parents had dental scheme coverage and 17.2% of all students were covered.

Dental Scheme and parents' intention to bring the students to seek regular dental checkup

Up to 92.1% (6 800) of the parents with dental scheme coverage reported that they had the intention to bring the students to seek regular dental checkup, while only 57.4% (24 500) of parents of those students who did not have any dental scheme coverage would do so.

However, comparing to the 2011 survey, there were slightly fewer parents in this survey who intended to bring the students for regular dental checkup in the dental scheme covered group (Figure 4.24).

***Figure 4.24** Distribution of parents of 12-year old students according to whether they intended to bring the students to seek regular dental checkup in 2001, 2011 and 2021*



Base (with dental scheme): All parents of those 12-year old students covered by dental scheme who answered the questions
2001: (N = 9 600) 2011: (N = 9 800) 2021: (N = 7 400)

Base (without dental scheme): All parents of those 12-year old students not covered by dental scheme who answered the questions
2001: (N = 57 500) 2011: (N = 47 100) 2021: (N = 42 700)

Around 60% of the parents intended to bring the 12-year old students to seek regular dental checkup. Up to 24.5% of the students had already visited dentists after entering secondary schools and the treatment they received was mostly professional dental cleaning (scaling). For those parents who did not intend to bring the 12-year old students to seek regular dental checkup, ***no need because just finished School Dental Care Servic*** (42.9%) was one of the major reasons.

Parents had a greater tendency to bring the 12-year old students to regular dental checkup if the students were covered by dental scheme. Among those parents who did not intend to bring the students to seek regular dental checkup, 31.9% of them considered **cost** as one of the reasons.

Compared with 2001 and 2011 surveys, more parents in the group covered by dental scheme intended to bring the 12-year old students to seek regular dental checkup when compared to the group not covered by dental scheme. However, the increase was attenuated in 2021.

Chapter 4 – Summary

The dental condition of 12-year old students was still very good and also kept on improving when compared with 2001 and 2011. The tooth decay experience of the 12-year old students was minimal with a DMFT value of 0.24. Most of the decay had already been treated.

The gum condition of the 12-year old students was stable when compared with 2011. More students had healthy gums and fewer had calculus in some parts of their mouth. However, it should be noted that gum bleeding still prevailed in more than 60% of the students.

The oral health habits of the 12-year old students were maintained at a satisfactory level. The knowledge on risk factors for tooth decay and gum was maintained from 2001 through 2021. The toothbrushing habits of the students was kept at a very good level and the cleanliness of the teeth as measured by the percentage of tooth surfaces covered by visible dental plaque was further reduced. Slightly higher proportion of the students reported using dental floss, however most of them used occasionally which was similar to 10 years ago.

About two-thirds of the parents intended to bring the 12-year old students to seek regular dental checkup. The proportion of parents who had tendency to bring the students to seek regular dental checkup was similar to that of the 2011 survey. The proportion was higher for those students who were covered by the dental scheme from their parents.

Way forward

The findings of the 2001, 2011 and 2021 surveys indicated that the level of tooth decay experience of the 12-year old students was on a downward trend continuously, and had dropped to a very low level. Also, further improvement was found in their gum health, whereas the oral health knowledge and oral care habit were maintained. Over 60% of parents responded that they intended to bring the students to checkup.

Although further improvement has been observed in both level of tooth decay and gum condition in the last 10 years, most students still had bleeding gum and calculus in parts of their mouth. Many of them used floss occasionally and daily flossing habit had not yet established among the students. The survey also showed there was room for improvement in some aspects of their oral health knowledge and perception over the years. As before, a sizeable proportion of students and parents were still unaware that frequent eating or drinking was a risk factor for tooth decay. Only half of the students could relate smoking to gum disease. The risk and harmful effect of frequent eating or drinking on teeth and smoking on the gum should be reinforced. In addition, although tooth decay is not a great concern for this age group, their knowledge on oral health should be enhanced. There was still a significant proportion of students who were not aware of the benefits of fluoride and regular dental check-up. As this group of students had left the School Dental Care Service, some form of dental checkup scheme could be considered by the Government for secondary school students as a follow up of their oral health condition. In fact, the Hong Kong government is going to launch a primary dental care scheme for adolescents to encourage regular dental checkup among the age groups. We hope that through the scheme, their oral health knowledge and habits could be strengthened, and they can take care of their oral health themselves and maintain good oral health until old age without losing any of their teeth.

CHAPTER 5

35 to 44-year old adults

What was the oral health status of 35 to 44-year old adults in Hong Kong?

Tooth status - how many teeth were there?

It was recognized by the World Health Organization that a functional and aesthetic dentition required no less than 20 well distributed teeth. The proportion of adults who had 20 or more teeth was assessed in this survey. In this survey, each adult had an average of 28.9 teeth and 99.9% (983 800) of them had at least 20 teeth (Table 5.1). In addition, no subject was found to have total tooth loss.

Table 5.1 ***Percentage of adults with at least 20 teeth left in 2001, 2011 and 2021***

Number of teeth left	2001	2011	2021
	(N = 1 354 700)	(N = 1 062 900)	(N = 985 200)
≥ 20 teeth left	99.2%	99.8%	99.9%

Base: All Adults

Table 5.2 ***Percentage of adults with number of occluding pairs in 2021***

No. of occluding pairs*	Percentage
0 – 9 pairs	0.9%
≥ 10 pairs	99.1%

Base: All Adults
2021: N = 985 200
**Occluding pairs formed by natural tooth with natural tooth/fixed prosthesis are counted.*

Teeth have to be in functional contact in order to perform the chewing function. The number of occluding pairs (number of pair of opposing teeth in functional contact) is a way to evaluate the number of teeth available for chewing. In this survey, an occluding pair was defined as natural tooth/ natural tooth or natural tooth/fixed false tooth. Almost all adults had at least 10 occluding pairs (99.1%) (Table 5.2).

Only 6.1% of adults were found with dental prostheses, irrespective of the type. 6.0% of adults had dental bridges and 3.2% had dental implants (Table 5.3).

Table 5.3 ***Percentage of adults with different types of dental prostheses in 2021***

Type of dental prostheses	2021 (N = 985 200)
With any prostheses	6.1%
With dental bridges	6.0%
With removable partial dentures	0.3%§
With full dentures	0.0%§
With dental implants	3.2%

Base: All adults

§ *This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.*

Tooth loss did not appear to be a problem among adults. On average, adults had 28.9 teeth and no adult was found to suffer total tooth loss in the present survey. Almost all adults had 10 or more pairs of occluding teeth in their mouth.

Tooth status - what was the level of tooth decay experience?

The level of tooth decay experience as measured by the Decayed, Missing and Filled Teeth (DMFT) index is summarised in Table 5.4. The mean DMFT value among the adult population was 6.6. The mean number of teeth with untreated decay (DT) remained small (0.7). When compared with 2001 and 2011, adults had slightly more teeth remaining (28.1 in 2001, 28.6 in 2011 and 28.9 in 2021) while the mean number of filled teeth (FT) (2.8) and decayed teeth (DT) (0.7) remained unchanged as a decade ago. Readers should interpret the result of missing teeth (MT) in Table 5.4 with caution as whether the teeth were missing due to tooth decay could not be ascertained.

Table 5.4 ***Level of tooth decay experience as measured by the DMFT index among adults in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021 (N = 985 200)
Mean DMFT	7.4	6.9	6.6
Mean DT (Decayed)	0.7	0.7	0.7
Mean MT (Missing)	3.9	3.4	3.1
Mean FT (Filled)	2.8	2.8	2.8

Base: All Adults

The proportion of adults having untreated tooth decay and filled teeth were more or less the same over the years (Table 5.5).

Table 5.5 ***Percentage of adults with tooth decay experience in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021 (N = 985 200)
DMFT	97.5%	96.1%	95.9%
DT (Decayed)	32.0%	31.2%	31.7%
MT (Missing)	91.4%	89.7%	86.2%
FT (Filled)	66.6%	67.4%	67.0%

Base: All Adults

Table 5.6 ***Level of root surface decay experience among adults in 2001, 2011 and 2021***

Root surface decay experience	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021 (N = 985 200)
Mean DF-root	0.1	0.1	0.1
Mean D-root (Decayed)	< 0.05	< 0.05	0.09
Mean F-root (Filled)	< 0.05	< 0.05	<0.05

Base: All Adults

Table 5.7 ***Percentage of adults with root surface decay experience in 2001, 2011 and 2021***

Root surface decay experience	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021 (N = 985 200)
DF-root	4.2%	4.0%	7.2%
D-root (Decayed)	3.4%	3.0%	5.9%
F-root (Filled)	1.0%	0.9% §	1.4%

Base: All Adults

§ This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.

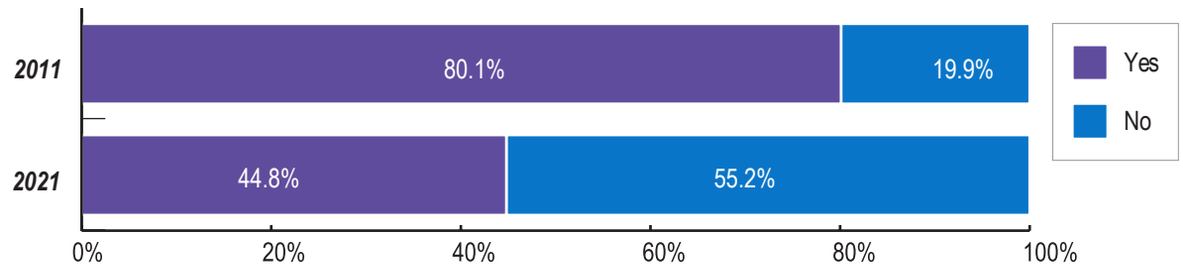
It can be seen from Tables 5.6 and 5.7 that the mean number of decayed and untreated root surface (mean D-root) has increased, which might be due to the higher proportion of adults affected. While the proportion was still small numerically, the magnitude of increment compared with 2011 worth attention.

The number of remaining teeth among adults had slightly increased compared with 2011. The mean DMFT value among the adult population was 6.6. The mean number of filled teeth (FT) (2.8) and decayed teeth (DT) (0.7) remained unchanged as a decade ago. Although the level of coronal caries remained stable, there was an increase observed in the proportion of adults with decayed and untreated root surface (5.9% in 2021, 3.0% in 2011).

Gum condition - what was the level of gum bleeding?

There were 44.8% (441 200) of adults having half or more of their teeth with bleeding gums, which was significantly lower than adults in 2011 (80.1%) (Figure 5.1).

Figure 5.1 ***Percentage of adults having half or more of the teeth with bleeding gums***



Base: All adults
2011: N = 1 062 900
2021: N = 985 200
(The same data was not available in 2001 for comparison)

Gum condition - what was the level of gum pocket?

Please refer to Chapter 1 for detailed definition of gum pocket.

In 2021, 57.4% of the adult population had shallow or deep pockets. Proportion of adults considered as having no pocket, i.e. highest pocket depth being 0-3 mm, had reduced from 60.4% in 2011 to 42.6% in 2021. The increase in presence of deeper gingival pockets of 4 mm or above was worth attention. (Table 5.8)

Table 5.8 ***Percentage of adults according to the highest pocket depth in 2001. 2011 and 2021***

Highest pocket depth	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021# (N = 985 200)
0-3 mm (Not considered as pocket)	54.0%	60.4%	42.6%
4-5 mm (Shallow pocket)	38.9%	29.8%	42.6%
≥ 6 mm (Deep pocket)	7.1%	9.8%	14.8%
Total	100.0%	100.0%	100.0%

Base: All Adults
 # The diagnostic methodology was extended to include all teeth in the mouth in 2021 instead of half mouth in 2011 and index teeth in 2001

The distribution of gum pockets was not even among different tooth type. From Table 5.9, it was noted that higher proportion of back teeth (molars) had shallow or deep pockets than other tooth types. Similarly, higher percentage of upper teeth were founded to have shallow or deep pockets when compared with their lower counterparts. It was also noted that in more than 80% of upper and lower molars with shallow pockets, bleeding on probing was also detected. The proportion of bleeding on probing was raised to more than 90% for lower back teeth with deep pockets. In gist, there was a high tendency for gum pockets to co-exist with gum bleeding, mostly in back teeth.

Table 5.9 ***Mean percentage of teeth according to the pocket depth of adults in 2021***

	Molars (back teeth)	Premolars	Incisors and canine
Shallow pockets (pocket depth 4-5 mm)			
Upper teeth	24.0%*	13.7%	8.4%
Lower teeth	15.2%*	8.1%*	6.2%
Deep pockets (pocket depth 6 mm+)			
Upper teeth	3.4%	1.1%**	1.0%
Lower teeth	3.3%**	0.4%**	0.4%
Missing			
Upper teeth	3.2%	5.1%	1.1%
Lower teeth	6.2%	3.7%	1.3%

Base: All adults
** bleeding on probing was detected in >80% of this teeth group*
***bleeding on probing was detected in >90% of this teeth group*

Gum condition - what was the loss of attachment level?

Please refer to Chapter 1 for detailed definition of loss of attachment.

Comparing the results of this survey with 2001 and 2011, a high proportion of adults in 2021 had loss of attachment (LOA) of 4 mm or more (58.2% in 2021, 51.8% in 2011 and 67.0% in 2001) (Table 5.10). For adults with LOA of 4 mm or more, majority of them had attachment loss between 4 to 5 mm.

Table 5.10 ***Percentage of adults according to the level of loss of attachment (LOA) in 2001, 2011 and 2021***

Level of LOA	2001 (N = 1 354 700)	2011 (N = 1 062 900)	2021# (N = 985 200)
0-3 mm	33.0%	48.2%	41.8%
4-5 mm	50.2%	40.5%	43.0%
6-8 mm	12.3%	8.4%	12.5%
9-11 mm	3.1%	1.7%	1.5%
≥12 mm	1.4%	1.2%	1.2%
Total	100.0%	100.0%	100.0%

Base: All Adults
 # The diagnostic methodology was extended to include all teeth in the mouth in 2021 instead of half mouth in 2011 and including only index teeth in 2001

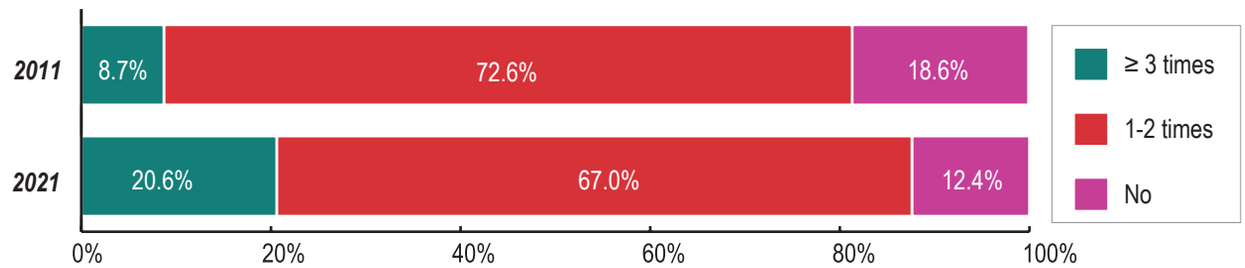
There were fewer adults with half or more of their teeth having bleeding gum (from 80.1% in 2011 to 44.8% in 2021). However, there were more adults with gum pocket (i.e. probing depth 4 mm or above) (from 39.6% in 2011 to 57.4% in 2021), whereas the proportion with maximum loss of attachment being 4 mm or above also increased though to a lesser extent (from 51.8% in 2011 to 58.2% in 2021). The teeth with gum pockets were mainly posterior teeth and mostly co-exist with bleeding on probing. While the adult population might have improved their oral hygiene that led to less gum bleeding, the improvement seemed to be localised in the front teeth region. Daily cleaning apparently was ineffective in the back teeth region leading to more gum bleeding and more gum tissue destruction in the form of gum pockets. The cleaning of back teeth is more difficult due to its location and also because of the special root shape of the back teeth. Effective cleaning requires the professional instructions as well as facilitation by proper professional management of the gum pockets.

What were the oral health related behaviours among adults?

Dietary habit - how often did adults snack or consume food?

20.6% (202 700) of adults reported having snack or food consumption at least three times daily other than normal meals, a surge from 8.7% of adults in 2011 (Figure 5.2). Frequent snacking or intake of sugar-containing food and drink is a significant risk factor for tooth decay.

Figure 5.2 ***Percentage of adults according to daily frequency of snacking or food consumption other than normal meals***

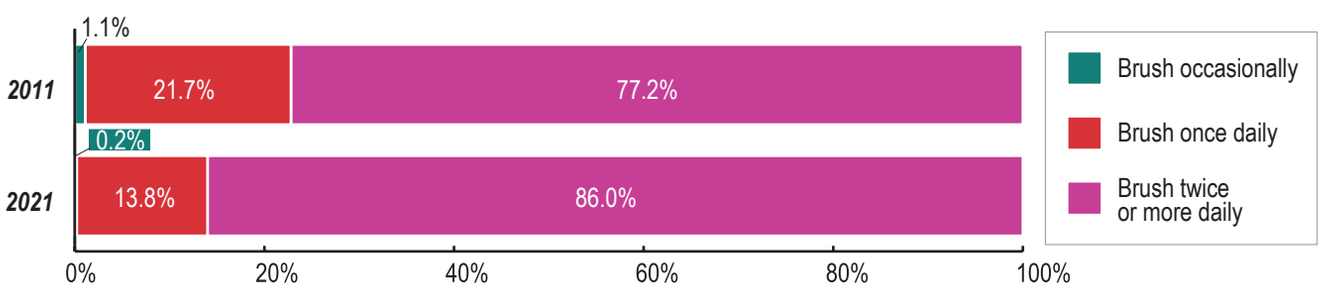


Base: All adults
2011: N = 1 062 900
2021: N = 985 200

Oral hygiene habit - how often did adults brush their teeth?

Compare with 2011, the proportion of adults who brushed teeth twice or more daily had increased by 9 percentage points (86.0% in 2021, 77.2% in 2011) while 13.8% of them brushed only once a day which was reduced by around 8 percentage points compared with 2011 (Figure 5.3).

Figure 5.3 ***Percentage of adults according to toothbrushing habit***



Base: All adults
2011: N = 1 062 900
2021: N = 985 200

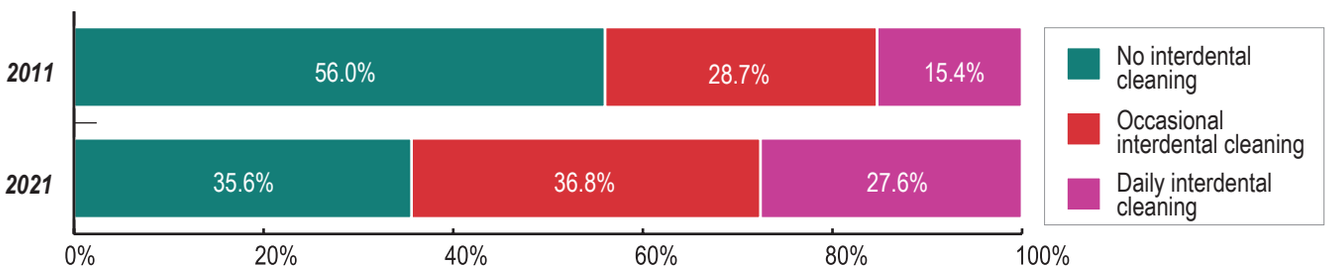
Among those who brushed their teeth, 99.4% (979 300) of them always brushed with toothpaste, similar to adults in 2011.

Oral hygiene habit - did adults have interdental cleaning habit?

64.4% (634 600) of adults reported that they had the habit of cleaning interdental surfaces of their teeth with either dental floss or interdental brush (Figure 5.4).

In 2011, only 15.4% of adults reported having the habit of daily interdental cleaning. Despite a nearly two-fold increase in 2021 (27.6%, 272 100), majority of adults still did not perform daily interdental cleaning.

Figure 5.4 ***Percentage of adults according to the intercleaning habit***

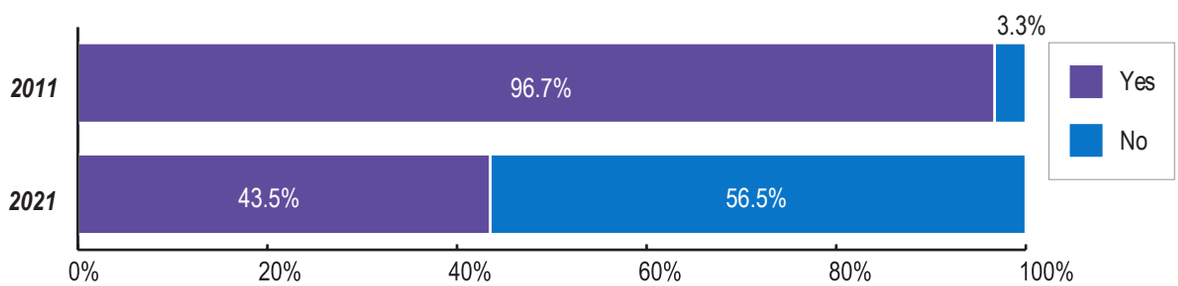


Base: All adults
2011: N = 1 062 900
2021: N = 985 200

Oral hygiene condition - how clean were adults' teeth?

The level of accumulation of visible dental plaque and calculus deposition were assessed to measure the cleanliness of the teeth. Proportion of adults having half of their teeth covered with visible dental plaque underwent a significant reduction from 96.7% in 2011 to 43.5% in 2021. (Figure 5.5)

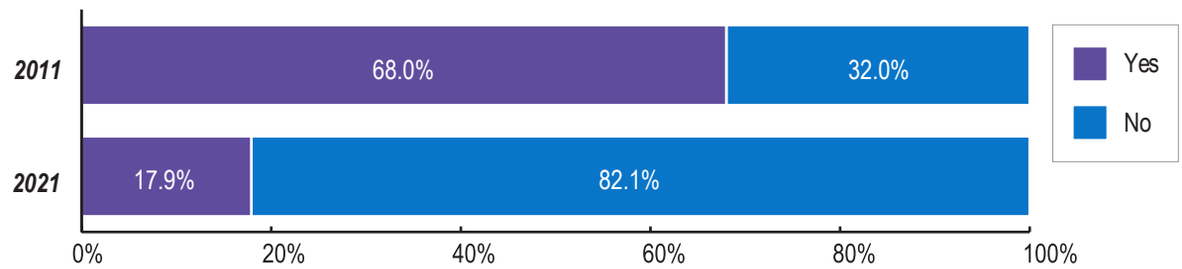
Figure 5.5 ***Percentage of adults having visible dental plaque on half or more of their teeth***



Base: All adults
2011: N = 1 062 900
2021: N = 985 200

Regarding the level of calculus deposition, only 17.9% of adults had calculus on half or more of their teeth, also significantly fewer than that of 2011 (68.0%) (Figure 5.6).

Figure 5.6 ***Percentage of adults having calculus on half or more of their teeth***



Base: All adults
2011: N = 1 062 900
2021: N = 985 200

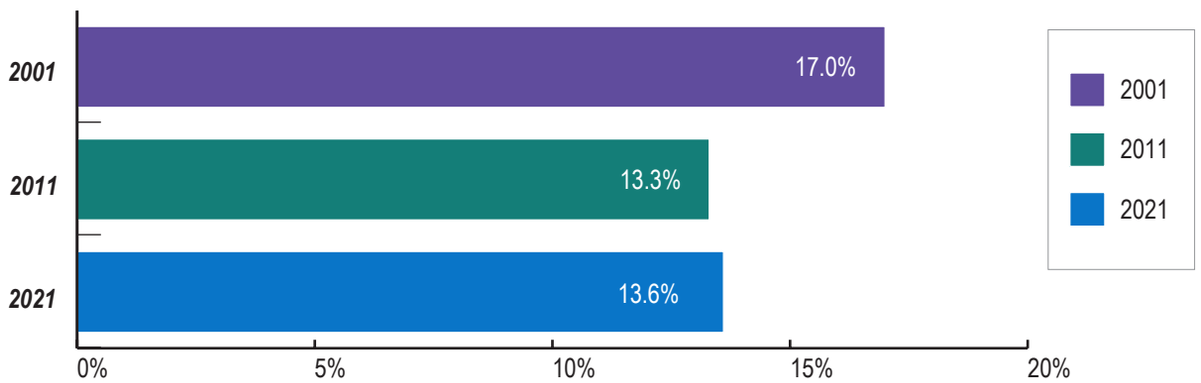
Toothbrushing twice daily had become a well-established oral hygiene habit. At the same time, the proportion of adults who practised daily interdental cleaning has nearly doubled. Improvement in the level of plaque control was supported by a noticeable decline in the number of adult's teeth being covered by visible dental plaque and calculus. All these seem to point to a promising direction. However, an increased proportion of adults with gum pockets was also observed. On further analysis, it was found that most of the gum bleeding and gum pockets were at the back teeth. Why the improved daily oral hygiene practices could not lead to better gum health at the back teeth?

Since brushing alone cannot adequately remove interdental plaque, thorough interdental cleaning must also be practised. Only 27.6% of the adults performed regular interdental cleaning was not favorable for prevention of oral diseases. Daily flossing or interdental brushing should continue to be encouraged among adults. However, the selection of cleaning aid and the proper technique in using them require professional and individualized instructions. By attending regular dental checkup, dentists or dental care professionals can make individualised recommendations to adults on the choices of interdental cleaning tools. Also, adults can acquire and master their skills of handling these interdental cleaning tools, particularly over the back teeth which is more technically demanding, through professional instructions given by dental professionals.

Smoking habit - what was the smoking prevalence among adults?

Among all adults, 13.6% (137 800) reported they had smoking habit, which was similar to the level in 2011 (13.3%, 141 800).

Figure 5.7 ***Percentage of adults with smoking habit***



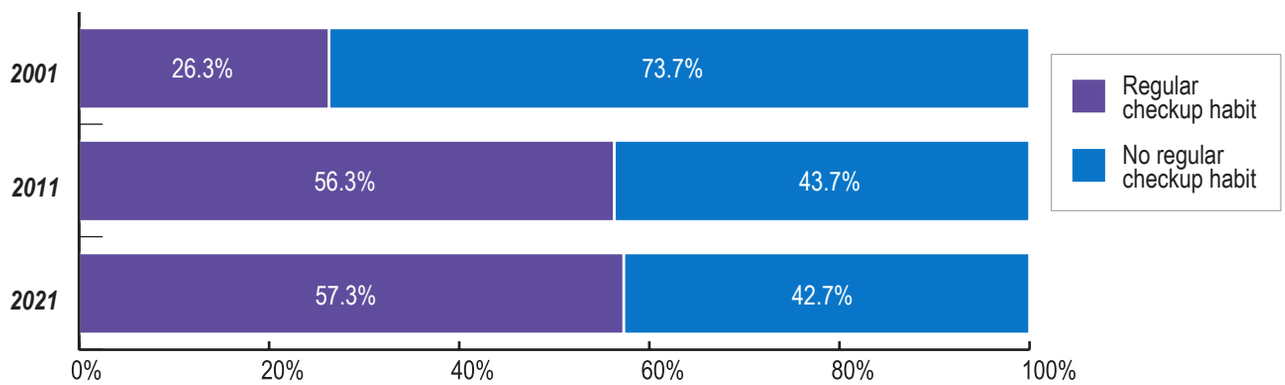
Base: All adults
2001: N = 1 354 700
2011: N = 1 062 900
2021: N = 1 010 700 (Population Health Survey 2020-2022 Data)*

Proportion of adults with smoking habit remained stable over the past 10 years at around 13%. With smoking being a risk factor for gum disease, oral cancer and other health problems, anti-smoking advice against all types of tobacco products such as e-cigarette and heated tobacco products should be conveyed by healthcare personnel at every possible health encounter.

Utilisation of oral health care services - how many adults had the habit of seeking regular dental checkup?

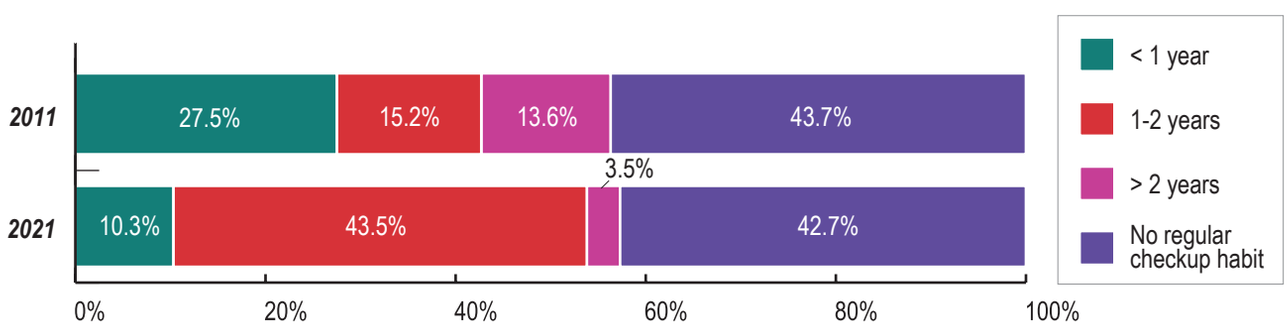
In 2021 survey, the proportion of adults with habit of seeking dental checkup for scaling or checkup remained similar with a decade ago (57.3% (564 400) in 2021, 56.3% (598 400) in 2011) (Figure 5.8). When looking into the dental checkup intervals, more adults in 2021 had their dental checkup done between one to two years (from 15.2% in 2011 to 43.5% in 2021) and fewer had checkup within a year (from 27.5% in 2011 to 10.3% in 2021), signifying an extended interval between dental checkup (less frequent checkup) when compared with 2011 (Figure 5.9).

Figure 5.8 ***Percentage of adults according to the dental checkup habit (2001, 2011 and 2021)***



Base: All Adults
2001: N = 1 345 700
2011: N = 1 062 900
2021: N = 985 200

Figure 5.9 ***Percentage of adults according to the dental checkup habit***

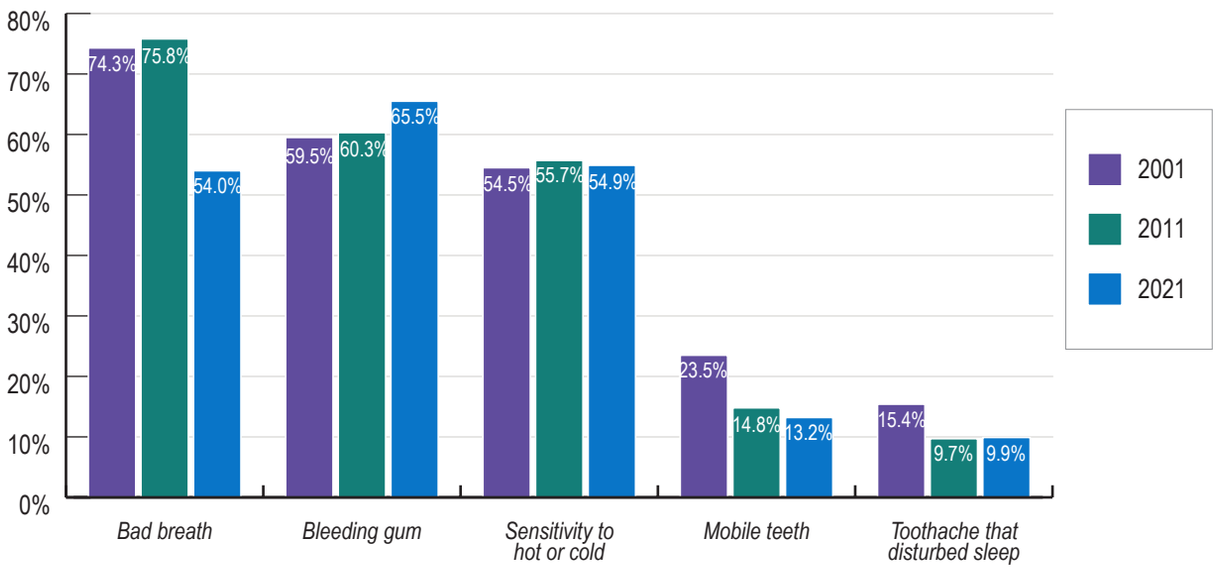


Base: All adults
2011: N = 1 062 900
2021: N = 985 200

Utilization of oral health care services - how many adults had experienced oral symptoms and did they consult a dentist?

The adults were asked whether they had oral symptoms in the past 12 months and the ways they managed their symptoms (Figure 5.10). Bleeding gum had topped the list as the most common oral symptom in 2021 (65.5%, 644 900) followed by sensitivity to hot or cold (54.9%, 541 300) whereas the prevalence of bad breath showed a marked decline (54.0% (531 900) in 2021, 75.8% (805 300) in 2011). Mobile teeth (13.2%, 129 900) and toothache that disturbed sleep (9.9%, 97 500) remained as the least common oral symptoms.

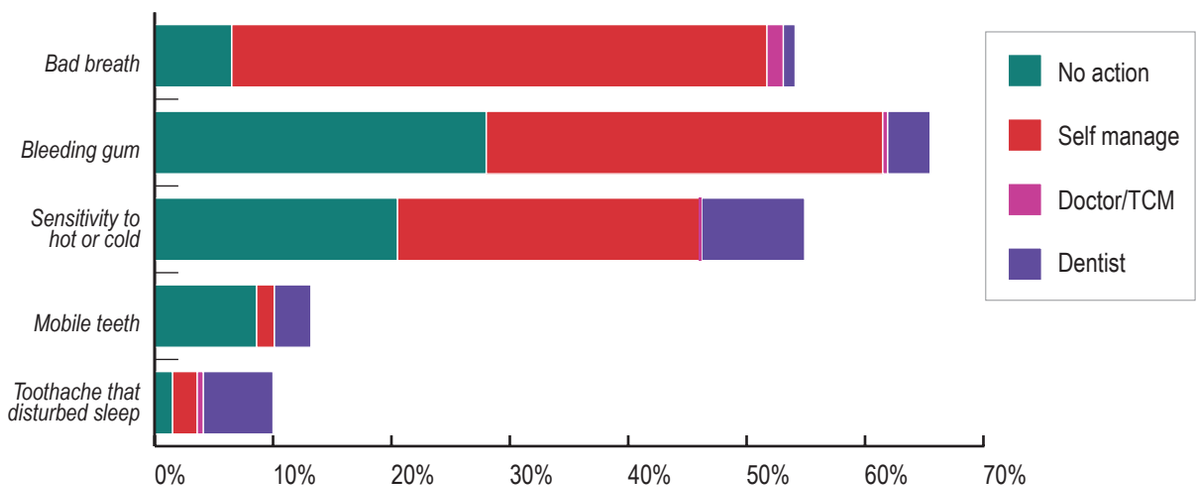
Figure 5.10 ***Percentage of adults according to the oral symptoms experienced in the 12 months before the survey (2001, 2011 and 2021)***



Base: All adults
2001: N = 1 354 700
2011: N = 1 062 900
2021: N = 985 200

When experiencing oral symptoms, majority of the affected adults either did not take any action or manage the oral symptoms by themselves rather than attending dental consultation. Even for toothache that disturbed sleep, not all the affected adults attended dental consultation. (Figure 5.11).

***Figure 5.11** Proportion of adults according to the oral symptom experienced in the 12 months before the survey and the action taken in 2021*



Base: All adults
2021: N = 985 200
The bases for specified oral symptoms refer to adults who had the corresponding specified oral symptoms in the 12 months before the survey.
** TCM – Traditional Chinese medical practitioners*

Utilization of oral health care services - what were the treatment needs among adults and did they intend to seek dental care?

The two highest treatment needs according to a standardised assessment criteria were scaling (79.6%, 784 700) and filling and/or root canal treatment (RCT) (25.3%, 249 000). The lowest assessed need was replacement of missing teeth (4.2%, 41 400). Similar to the previous surveys in 2001 and 2011, discrepancies were noted between the dental treatment need perceived by the subjects and the need assessed by the examining dentists across all treatment items (Table 5.11).

Table 5.11 ***Percentage of adults according to the perceived and assessed dental treatment needs in 2001, 2011 and 2021***

Dental treatment need	2001 (N = 1 354 700)		2011 (N = 1 062 900)		2021 (N = 985 200)	
	Perceived	Assessed	Perceived	Assessed	Perceived	Assessed
Scaling*	18.4%	95.9%	31.0%	97.5%	22.2%	79.6%
Filling and/or root canal treatment (RCT)**	25.0%	29.0%	12.3%	26.3%	10.2%	25.3%
Extraction	5.5%	11.9%	2.2%	12.6%	4.2%	10.1%
Replacement of missing teeth***	7.8%	8.2%	2.1%	3.4%	1.3%	4.2%

**The subject would be assessed to have need of scaling if calculus is detected*

***Filling and root canal treatment figures in 2001 and 2011 were combined into a single category Filling/ root canal treatment (RCT) for direct comparison with 2021*

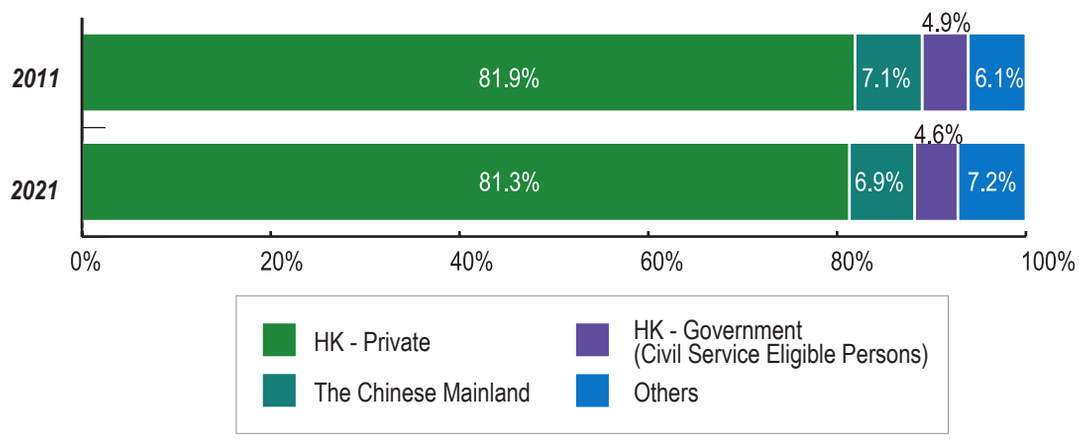
****The subject would be assessed to have need to replace missing teeth if one or more of the following reasons were met:*

- *an existing bridge or a denture is fractured or has been otherwise rendered functionless*
- *need for extraction of any abutment teeth of existing bridge or denture*
- *a tooth space anterior to the first premolars*
- *there are less than 10 functional tooth pairs (including opposing natural and/or prosthetic teeth in contact)*

Utilization of oral health care services - where did they usually go for dental visit?

Among the adults who had seen a dentist before, 81.3% (783 500) of them usually visited private dental clinics in Hong Kong and 6.9% (66 300) of adults visited dental clinics in the Chinese Mainland (Figure 5.12), both remained similar over the past decade.

Figure 5.12 ***Percentage of adults who had visited a denitst according to the type of dental clinic visited***



Base: Adults who had ever visited a dentist
2011: N = 1 004 100
2021: N = 963 100

Seeking dental checkup in the absence of symptoms is a conducive behaviour to oral health if it can be done at a regular interval ranging from every 6 months to every 2 years, depending on the individual risk level as assessed by dentist. In this survey, the proportion of adults with dental checkup routine within a 2-year interval had increased from 42.7% in 2011 to 53.8% in 2021. While efforts have to be made to facilitate the remaining 46% of adults to establish this beneficial behaviour, the less frequent (longer intervals between checkup) checkup habit may need attention if this is not recommended by dentists due to an assessed low oral health risk.

Experiencing oral symptoms should be seen as an alert for the presence of certain oral health diseases, such as gum bleeding as an indication of gum diseases. It was concerning to note that majority of adults did not seek for professional dental care when encountering most of the common oral symptoms. Even if it came to toothache that would interfere with sleep which may affect their daily function, there were still a considerable proportion of adults chose not to take any actions or tried to manage the symptoms by themselves. As a result, these adults could have missed the chance to manage the emerging oral conditions that are mostly reversible if being treated by dental professional at an early stage.

The obvious discrepancy between the adult's perceived need for dental treatment and actual treatment needs determined by dentists had not improved over the past decades. In sum, this inaccurate self-assessment of treatment needs coupled with the procrastination tendency might lead to a delay of the adult population in receiving timely treatment causing deterioration of oral health that may end up with unnecessary tooth loss.

What were the facilitators and barriers affecting adults to adopt the desirable oral health related behaviours?

In this survey, the facilitators and barriers to the use of interdental cleaning devices, utilization of oral health care services including regular dental checkup and dental visit for managing oral symptoms were investigated.

These identified possible facilitators and barriers could provide information for the planning of individual oral health education and community-based oral health promotion.

What were the facilitators and barriers to interdental cleaning habit?

'Removing food trapped between teeth' was the most common reason for adults to maintain their interdental cleaning habit, followed by 'teeth became cleaner after use'. Less than 6% of adults could relate their flossing or use of interdental brush habits with prevention of either tooth decay or gum disease. (Table 5.12).

Table 5.12 ***Percentage of adults according to the reasons for having interdental cleaning habit***

Reasons for having interdental cleaning habit	2021	
	Floss (N=548 600)	IDB (N=203 500)
Could remove food trapped between teeth	71.6%	45.6%
Teeth became cleaner after use	37.3%	35.6%
Recommended by dentist	12.1%	23.6%
Could prevent tooth decay	1.5%	3.6%
Could prevent gum disease	1.0%	5.6%

Base (Dental Floss): Adults who had the habit of using dental floss
Base (Interdental brush): Adults who had the habit of using interdental brush

'Lazy/trouble to use/ did not want to use' (34.8%) and 'Did not know how to use' (18.4%) were the two common reasons for adults not using dental floss while 'No such need' (24.3%) was the most common reason for adults not using interdental brush (Table 5.13).

Table 5.13 ***Percentage of adults according to the reasons for not having interdental cleaning habit***

Reasons for not having interdental cleaning habit	2021	
	Floss (N=436 600)	IDB (N=781 700)
Lazy/troublesome to use/did not want to use	34.8%	15.1%
Did not know how to use	18.4%	11.9%
No such need	16.3%	24.3%
Had never thought of using it	7.5%	9.1%
Did not know what it was	1.2%	15.8%

Base (Dental Floss): Adults who did not have the habit of using dental floss
Base (Interdental brush): Adults who did not have the habit of using interdental brush

While dental floss was known by most adults, there were 15.8% (123 300) of adults who actually did not know what interdental brush was. Around one-fifth of adults reported lack of skill as the reason for not using dental floss (18.4%, 80 300) and more than one-tenth cited the same reason as a hurdle for using interdental brush (11.9%, 93 200) (Table 5.13).

Among those who reported the practice of interdental cleaning, a substantial proportion of them did that for social and cosmetic reasons. More importantly, only a small proportion reported the recommendation by their dentists. There are reasons to believe that most of the adults performed interdental cleaning without professional instructions. Such DIY approach of interdental cleaning may give the concerned adults a false sense of security when in fact the practice could not help to prevent gum diseases.

While regular dental checkup is a good opportunity for dentists to provide personalised advice on daily oral care, such oral hygiene instructions can also be provided by appropriately trained dental care professionals (dental hygienists and dental therapists) in non-clinical settings. A community–based primary dental care system may help to promote proper daily oral hygiene care to a greater proportion of the population.

When facing adults who did not acquire the skill to perform interdental cleaning, dental professionals could take a proactive approach to practise proper oral hygiene skills at each dental encounter, to empower their adult patients to master interdental cleaning habits and enhance their own oral health through effective oral hygiene habits.

What were the facilitators and barriers to regular dental checkup habit?

In the following section, adults with regular dental checkup habits were defined as individuals who made dental visits within two years' interval in the absence of any oral problem. Comparisons were made between groups of adults classified as regular and irregular attenders.

For adults with the habit of seeking regular dental checkup, two-third (68.1%, 360 700) stated that they had this habit because they wanted to go for scaling or dental checkup, while 25.9% (137 400) of regular attenders went for prevention of dental problems based on the belief that prevention was better than cure. About 15% of adults attended regularly because they took full benefit from their entitlement to insurance plan / employment benefit (Table 5.14).

Table 5.14 ***Percentage of adults according to the reasons for seeking regular dental checkup at least once every two years (Multiple answers)***

Reasons for seeking regular dental checkup	2021 Percentage
Want to have scaling or want to have dental check up	68.1%
For prevention of dental problems or prevention was better than cure	25.9%
Took full benefit of the dental service which was included in in urance plan / employment benefi	15.1%
For keeping teeth healthy	9.5%
Dentist reminded to have regular checkup	8.8%
Help keeping teeth white and clean	4.2%

Base: Adults who had regular dental checkup at least once every two years
2021: N = 529 800

When asked about the reasons why they did not seek dental checkup regularly, majority (56.9% (259 200) in 2021) of the irregular attenders felt that their teeth were good / had no pain or they had no need to have regular dental checkup, similar to their counterparts a decade ago (60.0% (365 200) in 2011) (Table 5.15).

A proportion of the irregular attenders claimed that they did think of going for regular checkup but had encountered problems. Among the barriers mentioned, there was no particular one outstanding. No time (13.5%, 61 700) and charge was unaffordable / didn't want to spend money on checkup (7.3%, 33 300) were the two comparatively more frequently mentioned. The percentages of these named reasons had slightly reduced comparing with adults in 2011 but they remained as important barriers for adults to have dental checkup regularly.

Table 5.15 ***Percentage of adults according to the reasons for not seeking regular dental checkup at least once every two years (Multiple answers)***

Reasons for not seeking regular dental checkup		2021 Percentage
Teeth were good / no pain /no need		56.9%
Did think of going for regular checkup, however:	**No time**	13.5%
	Charge was unaffordable / did not want to spend money on checkup	7.3%
	Problem with appointment booking	3.9%

Base: Adults without regular dental checkup at least once every two years
2021: N = 455 400

All adults, irrespective of their checkup habit, were asked whether they had a certain thought or belief towards regular dental checkup. These thoughts or beliefs were potential facilitators or barriers related to dental checkup identified from a preceding qualitative study on adults of 35-44 years old. Percentages of regular and irregular attenders with the respective thoughts or beliefs are shown in Table 5.16.

Table 5.16 ***Percentage of adults according to the thoughts and beliefs towards regular dental checkup***

Thoughts and beliefs towards regular dental checkup	Regular attenders		Irregular attenders	
	2011	2021	2011	2021
	(N = 454 100)	(N = 529 800)	(N = 608 800)	(N = 455 400)
Will go for regular checkup in order to have early detection of tooth problems (為咗及早發現牙齒嘅問題，而定期去牙醫度檢查牙齒)	80.4%	75.2%	40.3%	41.3%
Will go for scaling regularly because of aesthetic reason (為咗整靚棚牙，而定期去牙醫度洗牙)	45.0%	52.0%	20.0%	25.7%
Practising good oral hygiene at home can replace regular scaling (只要勤力啲刷牙同埋打理棚牙，就唔駛定期去洗牙啦)	15.1%	12.7%	61.1%	51.8%
Dare not visit a dentist because the total cost of dental treatments at the end is often unpredictable (睇親牙醫都唔知要俾幾錢先至出得返嚟，令到你唔敢隨便去睇牙)	34.0%	32.4%	60.1%	60.6%

Base (Regular attenders): Adults with regular dental checkup at least once every two years
Base (Irregular attenders): Adults without regular dental checkup at least once every two years

When comparing to adults without regular checkup, a significantly larger proportion of regular attenders held the thoughts or beliefs that they:

- Will go for regular checkup in order to have early detection of tooth problems
- Will go for scaling regularly because of aesthetic reason

On the other hand, significantly larger proportion of irregular attenders had the thoughts or beliefs that they:

- Practising good oral hygiene at home can replace regular scaling.
- Dare not visit a dentist because the total cost of dental treatments at the end is often unpredictable

Regular scaling and prophylaxis were the predominant factors driving adults to have routine dental checkup. Whereas, the strongest impediment to not doing so was the subjective feeling of having good oral health (as there was no pain) and the belief that practising good oral hygiene at home could replace regular scaling. However, as dental diseases might progress silently without perceiving any discomfort by an individual, regular checkup even when there is no perceived discomfort are essential for preventive care and early identification of oral health problems. That remains true even if good oral hygiene is being practiced every day. Furthermore, time constraints and the concern about unpredictable treatment cost had also discouraged adults from seeking regular dental checkups. Dental professionals should address these system factors perceived by adults to promote dental utilisation.

Education and communication could leverage on the desirability of having annual scaling and prophylaxis as motivators, cultivating the habits of visiting dentists for checkup even when oral health condition was perceived by adults as good. Practising good oral hygiene at home requires good self-care skills which professional advice is essential for addressing individual needs. In addition, risk assessment by dental professionals can identify any hidden risk factors in developing dental diseases on an individual. Healthcare personnel could make use of every health encounter to instill and reinforce these important messages.

What were the barriers to seeking professional dental care when adults experienced oral symptoms?

Even when adults were aware of their oral symptoms, not all of them would seek professional dental care. To understand the barriers of seeking professional dental care, both adults who did or did not seek professional dental care for their oral symptoms were asked for the reasons behind their decision.

Table 5.17 ***Percentage of adults visiting and not visiting a dentist when having oral symptom in the 12 months before the survey***

Oral symptom		Visiting a dentist when having oral symptom in the 12 months before the survey	Not Visiting a dentist when having oral symptom in the 12 months before the survey
Bad breath	2021 (N = 531 900)	1.8%§	98.2%
Bleeding gums	2021 (N = 644 900)	5.5%	94.5%
Sensitivity to hot or cold	2021 (N = 541 300)	15.8%	84.2%
Mobile teeth	2021 (N = 129 900)	23.7%	76.3%
Toothache that disturbed sleep	2021 (N = 97 500)	59.2%	40.8%

Base: Adults who had the specific oral symptom in the 12 months before the survey
§ This estimate for the oral symptom, 'Bad breath' was complied based on a very small sample. Readers are advised to interpret this estimate with caution.

It was noted that even when experienced severe toothache that disturbed sleep, there was still 40.8% of adults did not attend dental consultation (Table 5.17).

However, a number of adults with oral symptoms knew that they needed to seek professional dental care but were hindered from doing so because of certain barriers (Table 5.18). The most frequently reported barrier was 'No time' for all symptoms including mobile teeth and toothache that disturbed sleep which would likely affect their daily functions. The two other common barriers for milder symptoms were 'Difficulty in booking dental appointments' and 'Unaffordable charges'. Whereas for adults who suffered from mobile teeth or toothache, 'Afraid of visiting a dentist' or 'Not sure of which dentist was good' were important deterrents to their dental care seeking intention (Table 5.18).

Table 5.18 ***Percentage of adults with oral symptom in the 12 months before the survey who knew that they needed dental care according to the barriers they encountered (Multiple answers)***

Oral symptom		No time	Problem with appointment booking	Charge was unaffordable	Afraid of visiting a dentist	Not sure which dentist was good
Bad breath	2021 (N = 84 000)	35.1%	32.3%	30.2%	2.9%§	5.9%§
Bleeding gums	2021 (N = 86 700)	43.9%	30.7%	27.3%	8.1%§	4.6%§
Sensitivity to hot or cold	2021 (N = 107 600)	24.3%	33.8%	22.6%	13.6%	4.1%§
Mobile teeth	2021 (N = 33 500)	43.2%	19.0%§	9.2%§	28.4%§	4.7%§
Toothache that disturbed sleep	2021 (N = 20 600)	51.2%§	0.0%§	9.3%§	7.3%§	9.8%§

Base: Adults who knew that they needed to visit dentist when they had the specific oral symptom in the 12 months before the survey but did not consult a dentist
§ This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.

In general, a low rate of seeking professional dental care when facing with oral symptoms was detected among adults in this survey.

The lack of time was a strong barrier for the adult population to seek dental care for the named oral symptoms. This was compounded by difficulties in booking dental appointments. For symptoms with milder intensity like gum bleeding and sensitivity to hot & cold, the charge of dental care was considered by more adults as unaffordable when compared with more severe symptoms, namely mobile teeth and toothache that disturbed sleep.

What was the impact of oral health on the quality of life of adults?

In this survey, the impact of oral health to the quality of life of the adults was investigated. (Table 5.19).

16.6% of the adults experienced dryness in their mouth either fairly often or very often (Table 5.20).

When compared with the findings in 2001, it was observed that negative impact of oral health on the daily life of adults remained in a low level. Similar questions were not included in 2011 and thus data was not available for comparison.

Table 5.19 ***Percentage of adults expressing negative impact on aspects of daily life in OHIP-14 in 2001 and 2021***

Impact of oral health on daily life	Percentage of adults reported 'Very often/Fairly often'	
	2001	2021
Have you ever had difficulty chewing any foods because of problems with your teeth, mouth or denture?	2.4%	3.0%
Have you ever had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	2.3%	1.1%
Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	6.0%	2.9%
Have you had sore spots in your mouth?	1.7%	3.9%
Have you been worried by dental problems?	1.4%	3.9%
Have dental problems made you miserable?	1.5%	1.1%
Have you felt that there has been less flavour in your food because of problems with your teeth, mouth or dentures?	1.4%	0.5%
Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	6.0%	3.8%
Have you been upset because of problems with your teeth, mouth or dentures?	0.9%	1.0%
Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	2.9%	1.1%
Have you avoided going out because of problems with your teeth, mouth or dentures?	0.2%	0.4%
Have you had trouble getting on with other people because of problems with your teeth, mouth or dentures?	0.2%	0.1%
Have you been totally unable to function because of problems of your teeth, mouth or dentures?	0.2%	0.1%
Have you been unable to work to your full capacity because of problems with your teeth, mouth, dentures?	0.4%	0.1%

Table 5.20 ***Percentage of adults according to their frequency of experiencing dry mouth in 2021***

	Percentage of adults reported 'Very often/Fairly often'
How often did your mouth feel dry?	16.6%

Base: All adults
2001: N = 1 354 700
2021: N = 985 200

The impact of problems of adults' teeth, mouth or denture to their quality of life was gauged through a set of questions from the Oral Health Impact Profile-14. It was noted that oral condition did not have high impact on the daily life of adults in general.

16.6% of adults reported to encountered dry mouth either very often or fairly often.

Chapter 5 – Summary

When compared with 10 years ago, the oral health of the Hong Kong adult population appeared to have maintained at a good level. Tooth loss was not a problem as no adult was found to have total tooth loss and vast majority had more than 10 occluding pairs of teeth. There were positive findings like fewer adults had visible dental plaque, bleeding gums and calculus in more than half of their teeth. Reported oral hygiene practices also had improved.

The survey team would like to point out areas that require attention and behavioural modifications that are necessary among the adult population. Tooth decay seemed not serious as only an average of 0.7 out of the 28.9 remaining teeth had untreated tooth decay. However, the distribution of untreated tooth decay was not even and was present in 31.7% of adults. The proportion of adults with untreated decay on root surfaces was still low, but in fact has doubled that in 2011. The proportion of adults with gum pockets had increased despite less visible dental plaque and less gum bleeding. There were dental problems among a substantial proportion of the adult population while the affected persons were very likely not aware.

Some adults considered that they had good daily oral hygiene and therefore dental checkup is not necessary. However, the presence of untreated tooth decay and gum pockets has proved that this belief is inappropriate. Gum pockets and gum bleeding were found mostly in the back teeth, indicating that the current daily oral hygiene practices might not be effective in the back teeth region. One very likely reason was the lack of professional instruction in the selection of cleaning aids and in the technique in using the cleaning aids. Behaviour with high oral health risk was also common, such as frequent snacking or food/drink consumption and smoking. Even adults without existing dental diseases may still have risk in developing diseases in future.

On the other hand, the use of professional dental care was still low. Regular dental checkup was reported by more adults, but in fact the checkups were mostly less frequent and it was not certain whether the increased checkup intervals was recommended by dentists due to low assessed oral health risk. The unawareness of existing dental diseases and low tendency to regular dental checkup did not favour early identification of dental diseases.

Most of the adults still tended to ignore or self manage their perceived oral discomforts, and this is unfavourable to timely management of dental diseases.

While there may be attitudinal barriers among the adult population in using dental care services, there may be factors of the oral health care system that hinder utilisation by the adults. The dental profession should consider how to address the time constraints and perceived high cost of care that were reported as reasons for not seeking dental care.

Way forward

All adults should be made to aware that despite of the common practice of daily toothbrushing, oral hygiene over the back teeth was still not satisfactory. Proper daily oral hygiene requires professional instruction, in both the selection of cleaning aids (e.g. whether to use floss or interdental brush) and the technique in using the cleaning aids. This is important especially in cleaning the back teeth region where cleaning is difficult due to the teeth location and the shape of the roots. Currently, most of the gum bleeding and gums pockets were found in the back teeth region.

Dental checkup is a good opportunity to receive professional instructions in daily oral hygiene. Oral hygiene instructions, risk assessment and preventive dental treatment can also be provided by appropriately trained dental care professionals (dental hygienists and dental therapists).

Regular dental checkup by dentists is still irreplaceable even with the presence of a large scale primary dental care system. More detailed oral examination and special investigations (such as using radiographs) can be performed by dentists for early identification, and hence timely management of dental diseases. This should be able to reduce the occurrence of oral discomforts and the need for emergency dental treatment.

The citizens have the responsibilities to manage their own health, including their oral health, and the dental profession should assist and facilitate the citizens in improving their health. More information needs to be provided to the citizens by promotion and education, and barriers from dental clinics such as service opening time and price information should also be addressed to enhance the utilization of professional dental services.

CHAPTER 6

65 to 74-year old non-institutionalised older persons (NOP)

What was the oral health status of 65 to 74-year old non-institutionalised older persons (NOP) in Hong Kong?

Tooth status - how many teeth were there?

The proportion of NOP who had lost all their teeth reduced markedly from 5.6% in 2011 to 0.9% in 2021 (Table 6.1). The mean number of teeth among NOP in 2021 (22.8) has further increased when compared with 2011 (19.3) and 2001 (17.0).

It was recognised by the World Health Organization that a functional and aesthetic dentition requires no less than 20 well distributed teeth. The proportion of NOP who had 20 teeth was assessed in this survey. In this survey, 77.4% of NOP had 20 or more teeth which were about 18 percentage points higher when compared with 2011 (59.5%).

Table 6.1 ***Percentage of NOP according to the number of teeth in 2001, 2011 and 2021***

Tooth number	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
Total tooth loss	8.6%	5.6%	0.9%
≥ 20 teeth left	49.7%	59.5%	77.4%

Base: All NOP

Table 6.2 ***Percentage of NOP with number of occluding pairs in 2021***

No. of occluding pairs*	Percentage
0 – 9 pairs	33.3%
≥ 10 pairs	66.7%

Base: All surveyed NOP
2021: N = 883 200
**Occluding pairs formed by natural tooth with natural tooth/fixed prosthesis are counted.*

Teeth have to be in functional contact in order to perform the chewing function. The number of occluding pairs (number of pair of opposing teeth in functional contact) is a way to evaluate the number of teeth available for chewing. In this survey, an occluding pair was defined as natural tooth to natural tooth/ natural tooth to fixed false tooth, and 66.7% of NOP had at least 10 occluding pairs (Table 6.2).

Tooth status - how many NOP had their missing teeth replaced?

The proportion of NOP using dental prostheses (false teeth) was on a decreasing trend (50.7% (447 700) in 2021, 63.2% (284 900) in 2011, 68.1% (303 400) in 2001). This observation could be partially attributed to more teeth retained as reflected by decrease in missing teeth in NOP.

For those who had dental prostheses made, there was a change in the types of prosthesis used. There was a 4-fold increase in the proportion of them having dental implants (10.0% (88 100) in 2021, 2.5% (11 300) in 2011) accompanied with a major drop of NOP using removable and/ or full dentures to replace their missing teeth in 2021 (26.6% (234 900) in 2021, 46.7% (210 500) in 2011) (Table 6.3).

Table 6.3 ***Percentage of NOP with different types of dental prostheses in 2001, 2011 and 2021***

Type of dental prostheses	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
With any prostheses	68.1%	63.2%	50.7%
With dental bridges	30.2%	31.4%	32.1%
With removable partial dentures	33.6%	35.5%	22.8%
With full dentures	19.8%	11.2%	3.8%
With dental implants	*	2.5%	10.0%

Base: All NOP
** this parameter was not measured in 2001*

Tooth status - what was the level of tooth decay experience?

The tooth decay experience of NOP as measured by the DMFT index is tabulated in Table 6.4. The mean DMFT of NOP in this survey was 13.5 which had further declined when compared with 2011 (16.2) and 2001 (17.6). Contributed predominantly to more teeth remained in NOP (Missing Teeth (MT): 9.2 in 2021, 12.7 in 2011 and 15.1 in 2001). At the same time, more filled teeth (FT) (3.1 in 2021, 2.3 in 2011 and 1.2 in 2001) were observed. The mean number of untreated decay (DT) was low (1.2) and it was relatively stable as 2011 and 2001. Similar to 10 years ago, about one-half of NOP had untreated tooth decay (Table 6.5). Readers should interpret the result of MT with caution as whether the teeth were missing due to tooth decay could not be ascertained.

Table 6.4 ***Level of tooth decay experience as measured by the DMFT index among NOP in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
Mean DMFT	17.6	16.2	13.5
Mean DT (Decayed)	1.3	1.3	1.2
Mean MT (Missing)	15.1	12.7	9.2
Mean FT (Filled)	1.2	2.3	3.1

Base: All NOP

Table 6.5 ***Percentage of NOP with tooth decay experience in 2001, 2011 and 2021***

Tooth decay experience	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
DMFT	99.4%	99.3%	99.6%
DT (Decayed)	52.9%	47.8%	47.1%
MT (Missing)	98.1%	98.1%	97.8%
FT (Filled)	40.3%	59.5%	69.9%

Base: All NOP

Table 6.6 ***Level of root surface decay experience among NOP in 2001, 2011 and 2021***

Root surface decay experience	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
Mean DF-root	0.4	0.5	0.7
Mean D-root (Decayed)	0.3	0.4	0.5
Mean F-root (Filled)	< 0.05	0.06	0.2

Base: All NOP

The average number of teeth with decayed or filled root surface (DF-root) was 0.7 (Table 6.6). The proportion of NOP with root surface decay experience was on an increasing trend (28.8% (253 900) in 2021, 24.6 (110 900) in 2011, 22.6% (110 700) in 2001). In 2021, 28.8% of NOP had root surface decay experience (DF-root) and about 80% of root decay (23.3%/28.8%*100%) were left untreated. (Table 6.7)

Table 6.7 ***Percentage of NOP with root surface decay experience in 2001, 2011 and 2021***

Root surface decay experience	2001 (N = 445 500)	2011 (N = 450 800)	2021 (N = 883 200)
DF-root	22.6%	24.6%	28.8%
D-root (Decayed)	21.5%	21.8%	23.3%
F-root (Filled)	3.1%	4.1%	8.4%

Base: All NOP

The degree of tooth loss in NOP had decreased continuously over the past two surveys. The proportion of NOP who had lost all their teeth dropped from 5.6% in 2011 to 0.9% in 2021 while the mean number of teeth present in NOP population increased from 19.3 to 22.8. When counting the pairs of occluding natural to natural and/or fixed prosthetic teeth, about two-third of NOP (66.7%) had at least 10 pairs in their mouth.

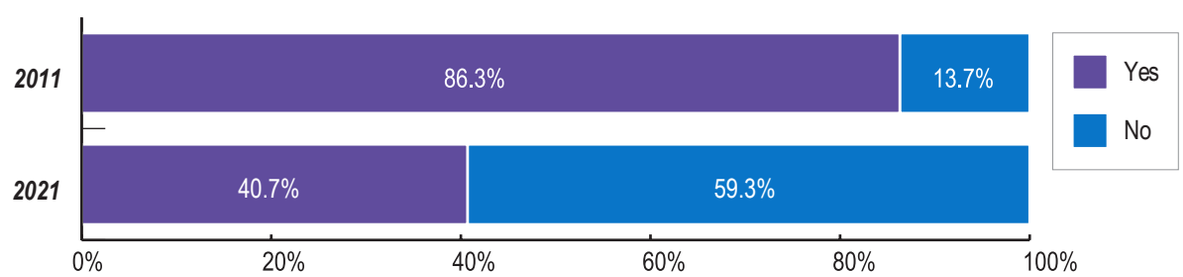
The level of mean number of Decayed, Missing and Filled teeth (DMFT) dropped from 16.2 in 2011 to 13.5 in 2021. Although the level of coronal caries remained stable, there was an increase in the proportion of NOP who had root surface decay with the majority of decay being untreated even though more NOP had experience of filling their decayed root surface in 2021.

Gum condition - what was the level of gum bleeding?

NOP who had no teeth or who had some specific medical conditions, e.g. bleeding disorder, were excluded from the gum examination. In this report, gum condition was only inferred to 874 900 dentate NOP (NOP who had teeth) represented by the NOP with gum examination performed in 2021.

About 40.7% (355 800) of them were found to have half or more of their teeth with bleeding gums, amounting to over 50% reduction from the percentage observed in 2011 (86.3%, 333 400 in 2011) (Figure 6.1).

Figure 6.1 ***Percentage of dentate NOP having half or more of the teeth with bleeding gums***



Base: Dentate NOP
2011: N = 386 200
2021: N = 874 900
(The same data was not available in 2001 for comparison)

Gum condition - what was the level of gum pocket?

Please refer to Chapter 1 for detailed definition of gum pocket.

Around 70% (612 200) of dentate NOP in this survey had shallow or deep pockets, increased by about 10% points compared with 10 years ago (Table 6.8). The observed increase could be due to a deterioration of the gum condition. It could also be related to a change in the examination method and possible retention with more teeth with gum pockets among NOP in 2021.

Table 6.8 ***Percentage of dentate NOP according to the highest pocket depth in 2001, 2011 and 2021***

Highest pocket depth	2001 (N = 358 700)	2011 (N = 386 200)	2021# (N = 874 909)
0-3 mm (Not considered as pocket)	44.7%	40.8%	30.0%
4-5 mm (Shallow pocket)	44.3%	38.8%	44.1%
≥ 6 mm (Deep pocket)	11.0%	20.4%	25.8%
Total	100.0%	100.0%	100.0%

Base: All dentate NOP

 # The diagnostic methodology was extended to include all teeth in the mouth in 2021 instead of half mouth in 2011 and including only index teeth in 2001

Table 6.9 ***Mean percentage of teeth according to the pocket depth of NOP in 2021***

	Molars (back teeth)	Premolars	Incisors and canine
Shallow pockets (pocket depth 4-5 mm)			
Upper teeth	17.1%*	15.6%*	10.9%
Lower teeth	11.2%*	10.2%*	8.5%*
Deep pockets (pocket depth 6 mm+)			
Upper teeth	4.7%*	2.1%	2.2%**
Lower teeth	2.6%	2.1%	1.6%*
Missing			
Upper teeth	33.8%	23.8%	14.3%
Lower teeth	42.3%	17.6%	11.5%

Base: All dentate NOP
**bleeding on probing was detected in >70% of this teeth group*
***bleeding on probing was detected in >80% of this teeth group*

The proportion of different teeth with shallow or deep pockets was quite similar. Bleeding on probing was commonly observed with shallow pockets. It was also noted that 33.8% of upper molars and 42.3% of lower molars were already extracted in the NOP. (Table 6.9)

Gum condition - what was the loss of attachment level?

Please refer to Chapter 1 for detailed definition of loss of attachment.

It was noted that there was a decrease in the proportion of dentate NOP with 4 mm or above loss of attachment (LOA) across the three oral health surveys (87.0% (761 200) in 2021, 90.5% (349 600) in 2011, 91.7% (328 900) in 2001). However, the proportion with LOA 9 mm or above had slightly increased (21.3% (186 300) in 2021, 16.8% (64 900) in 2011, 15.5% (55 600) in 2001). Similar to the condition of gum bleeding, the observed increase could be due to a deterioration of the gum condition. It could also be related to a change in the examination method and possible retention with more teeth with gum pockets among NOP in 2021 (Table 6.10).

Table 6.10 ***Percentage of dentate NOP according to the level of loss of attachment (LOA) in 2001, 2011 and 2021***

Level of LOA	2001 (N = 358 700)	2011 (N = 386 200)	2021# (N = 874 909)
0-3 mm	8.3%	9.5%	13.0%
4-5 mm	39.9%	43.2%	37.4%
6-8 mm	36.3%	30.6%	28.3%
9-11 mm	10.7%	11.4%	14.8%
≥12 mm	4.8%	5.4%	6.5%
Total	100.0%	100.0%	100.0%

Base: All dentate NOP

 # The diagnostic methodology was extended to include all teeth in the mouth in 2021 instead of half mouth in 2011 and including only index teeth in 2001

Gum bleeding condition showed improvement, as shown by an obvious reduction in percentage of NOP with half or more of their teeth having bleeding gum.

However, gum pockets were still prevalent in dentate NOP. Compared with a decade ago, there was about 10% points increase of dentate NOP with gum pockets of 4 mm or more. Besides, there was increase in the proportion of NOP with severe attachment loss of 9 mm or more which reflected needs to improve periodontal care for NOP in 2021.

The proportion of missing molars in the NOP group was obviously higher than the adult group. This high proportion of missing molars might compromise their chewing efficiency, nutrition intake and jeopardize their general health. Preventive dental care should be commenced early when one was young to avoid tooth loss when reached elderly.

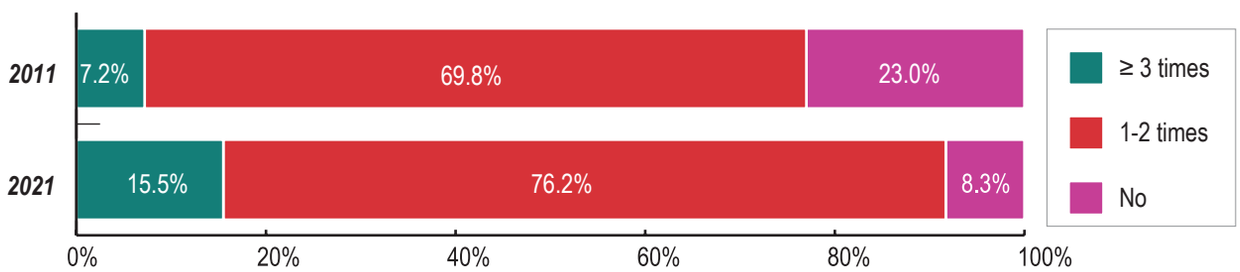
In sum, NOP had improved their gum condition with less bleeding but at the same time, increased proportion of them had more attachment loss in form of deep periodontal pockets.

What were the oral health related behaviours among NOP?

Dietary habit - how often did NOP snack or consume food?

In 2021, fewer than 9.0% (73 100) of NOP reported they did not snack at all which was significantly lower than that a decade ago (23.0%, (136 300) in 2011). In contrary, the proportion of NOP who snacked three times or more a day other than normal meals had doubled (15.5% (137 300) in 2021, 7.2% (32 500) in 2011) (Figure 6.2). Frequent snacking or intake of sugar-containing food and drink is a significant risk factor for tooth decay.

***Figure 6.2** Percentage of NOP according to daily frequency of snacking or food consumption other than normal meals*

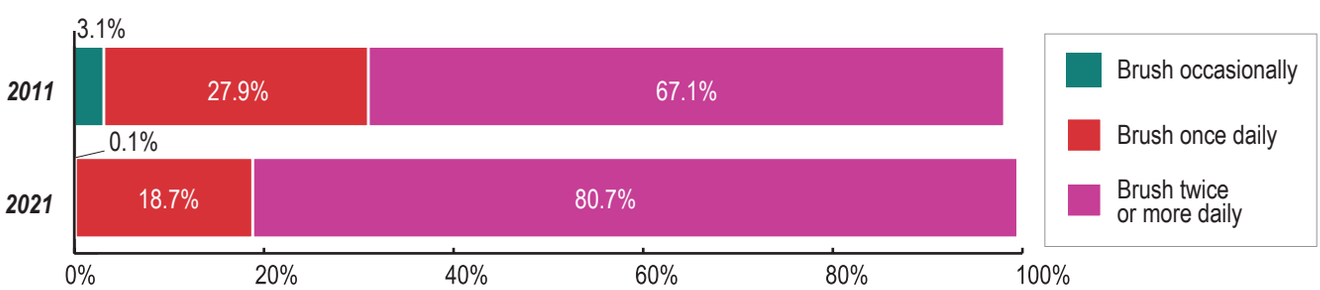


Base: All NOP
2011: N = 450 800
2021: N = 883 200

Oral hygiene habit - how often did the dentate NOP brush their teeth?

Almost all (99.4%, 869 000) of dentate NOP brushed their teeth every day. There is a significant increase of dentate NOP who brushed twice or more daily in 2021 (80.7%, 705 800) when compared with 2011 (67.1%, 285 400). (Figure 6.3). For those who brushed their teeth (870 300), nearly all of them (99.8%, 868 400) used toothpaste.

***Figure 6.3** Percentage of dentate NOP according to toothbrushing habit*

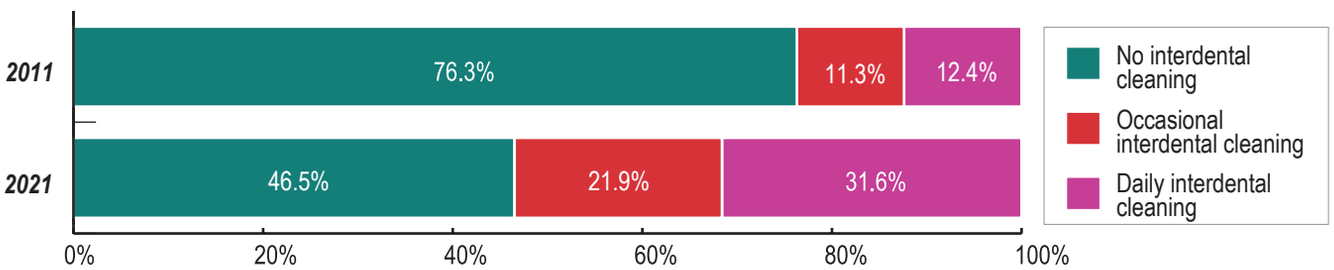


Base: Dentate NOP
2011: N = 425 500
2021: N = 874 900

Oral hygiene habit - did the dentate NOP have interdental cleaning habit?

Among dentate NOP, 31.6% of NOP (276 700) reported that they had the habit of daily cleaning interdental surfaces of their teeth (Figure 6.4) which was nearly a doubling increase compared with 2011 (12.4%, 52 800). Despite of this increase, majority of NOP still did not perform interdental cleaning daily.

***Figure 6.4** Percentage of dentate NOP according to the interdental cleaning habit*



Base: Dentate NOP
2011: N = 425 500
2021: N = 874 900

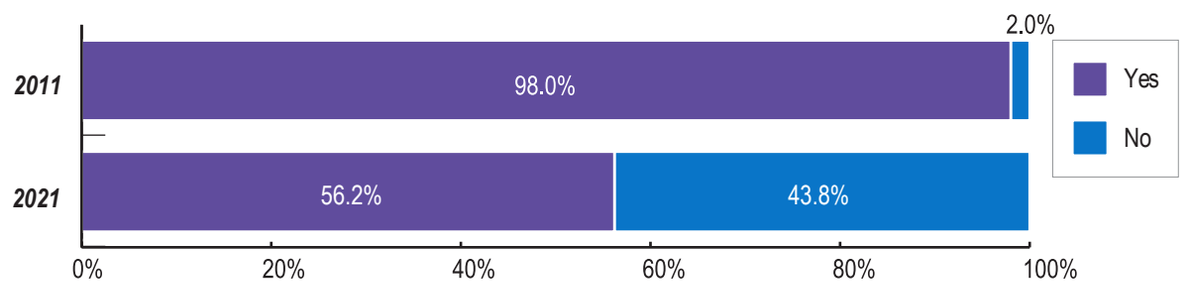
Oral hygiene condition - how clean were NOP's teeth?

Oral cleanliness and the effectiveness of oral hygiene practices were measured by the level of visible dental plaque and calculus. The measurement was taken in NOP who had gum examination performed. As those NOP who had no teeth or who had some specific medical conditions were excluded from the gum examination, cleanliness of teeth in this report was only inferred to 874 900 dentate NOP represented by the NOP with gum examination performed in 2021.

Amongst these dentate NOP, 56.2% (491 900) had visible dental plaque found on at least half of their teeth (Figure 6.5). A marked reduction when compared with 2011 when nearly all NOP (98.0%, 378 400) had plaque on at least half of their teeth.

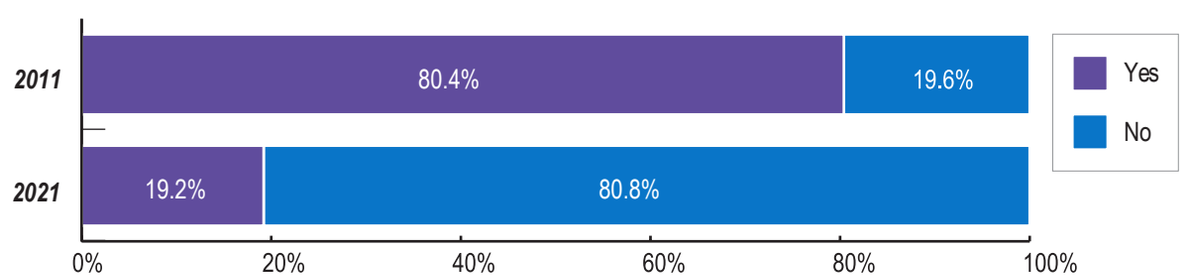
Regarding the level of calculus deposition, 19.2% (168 100) of dentate NOP had calculus present on at least half of their teeth which was one fourth of the proportion of NOP with this observation in 2011 (80.4%, 310 600) (Figure 6.6)

Figure 6.5 ***Percentage of dentate NOP having visible dental plaque on half or more of their teeth***



Based: Dentate NOP (represented by the NOP with gum examination performed)
2011: N = 386 200
2021: N = 874 900

Figure 6.6 ***Percentage of dentate NOP having calculus on half or more of their teeth***



Based: Dentate NOP (represented by the NOP with gum examination performed)
2011: N = 386 200
2021: N = 874 900

The oral hygiene practices among NOP in 2021 improved with nearly all of the dentate NOP brushing their teeth daily. Their gum health showed improvement through a marked reduction in the proportion of NOP with plaque or calculus on half or more of their teeth when compared with that in 2011.

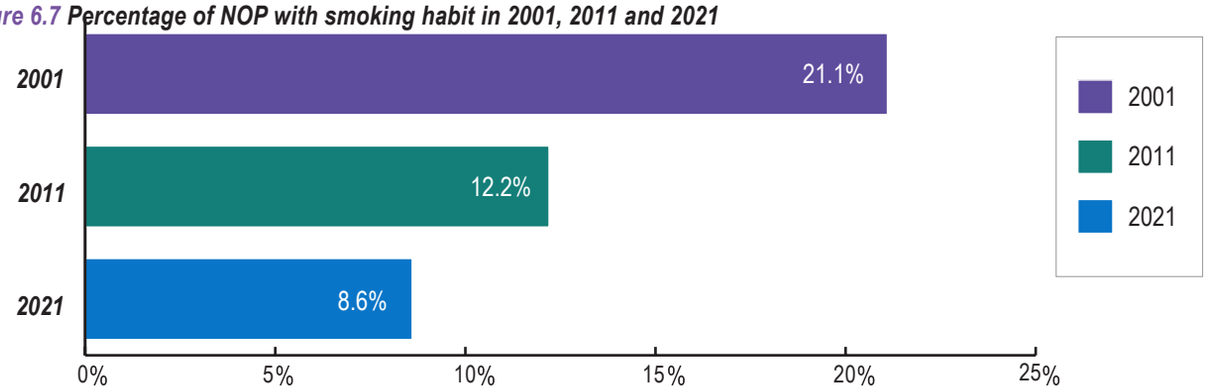
More than half of dentate individuals reported having the habit of interdental cleaning, with about one-third of them doing it on a daily basis. Among NOP with daily interdental brushing habit, interdental brush was more commonly used than dental floss. Despite a nearly doubling increase in the habit of daily interdental cleaning, majority of NOP failed to establish the habit of daily interdental cleaning. While this shows a positive trend, there is still room for improvement. Therefore, it is crucial to continue promoting daily interdental cleaning.

Professional input is highly important in selecting appropriate cleaning aids and refining the technical skills of toothbrushing and interdental cleaning, especially over the posterior teeth which is more technically demanding for the elders.

Smoking habit - what was the smoking prevalence among NOP?

Among the whole NOP group, 8.6% (72 100) of NOP reported that they had smoking habit, either daily or weekly which was around four percentage points reduction when compared with 2011 (from 12.2% to 8.6%). (Figure 6.7).

Figure 6.7 ***Percentage of NOP with smoking habit in 2001, 2011 and 2021***



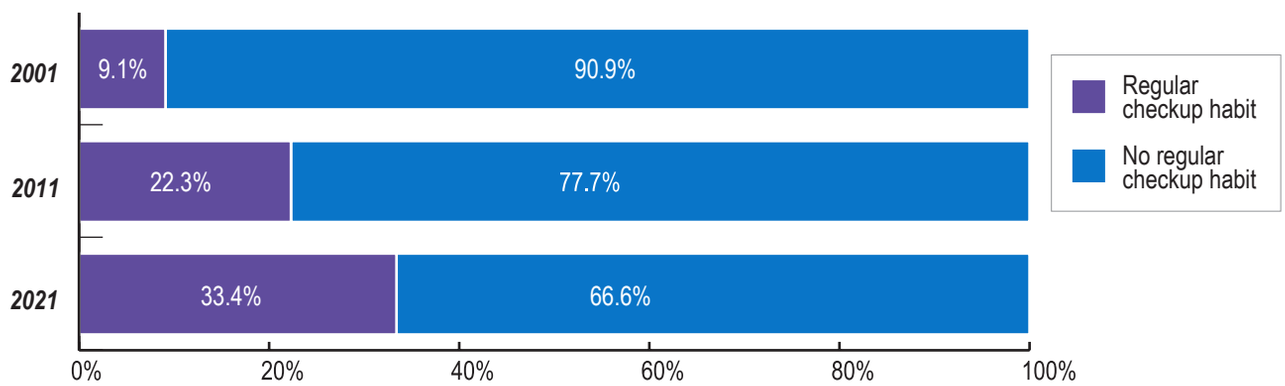
Base: All NOP
2001: N = 445 500
2011: N = 450 800
2021: N = 837 900 (Population Health Survey 2020-2022 Data)

The prevalence of smoking among NOP was found to be reducing continuously across the three consecutive health surveys. Individuals who continue to smoke are at a higher risk of developing gum disease, oral cancer, and other health problems. Dentists have a unique role in providing smoking cessation advice during dental visits, which can greatly contribute to helping patients quit smoking and improve their oral and overall health.

Utilisation of oral health care services - how many NOP had the habit of seeking regular dental checkup?

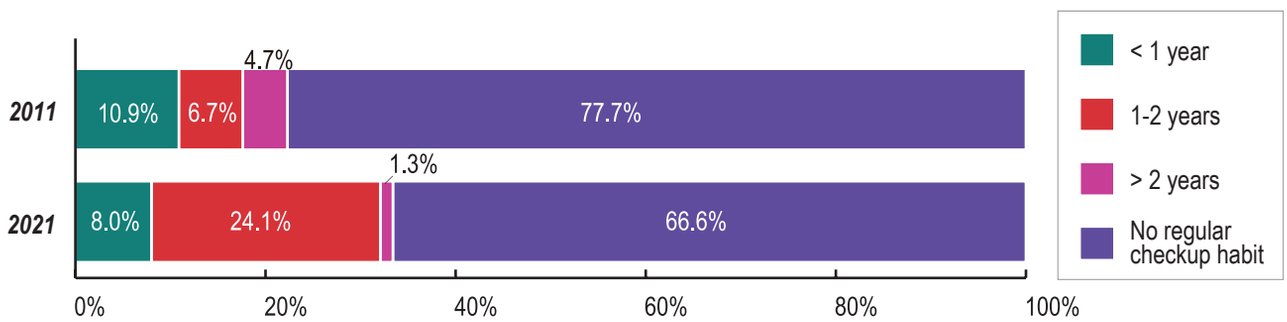
In this survey, NOP with regular dental checkup habit were defined as those who attended a dental clinic regularly for checkup and cleaning of teeth in the absence of any oral pain or problems. It was found that 33.4% (294 800) of the NOP population had dental checkup habit and the percentage was on an increasing trend across the figures in 2011 (22.3%) and 2001 (9.1%) (Figure 6.8). When broken down into specific intervals, more NOP had their dental checkup done between one to two years (from 6.7% in 2011 to 24.1% in 2021) and fewer had checkup within one year interval (from 10.9% in 2011 to 8.0% in 2021), indicating an extension in dental checkup interval when compared with 2011. (Figure 6.9).

Figure 6.8 ***Percentage of NOP according to the dental checkup habit (2001, 2011 and 2021)***



Base: All NOP
2001: N = 445 500
2011: N = 450 800
2021: N = 883 200

Figure 6.9 ***Percentage of NOP according to the dental checkup habit***

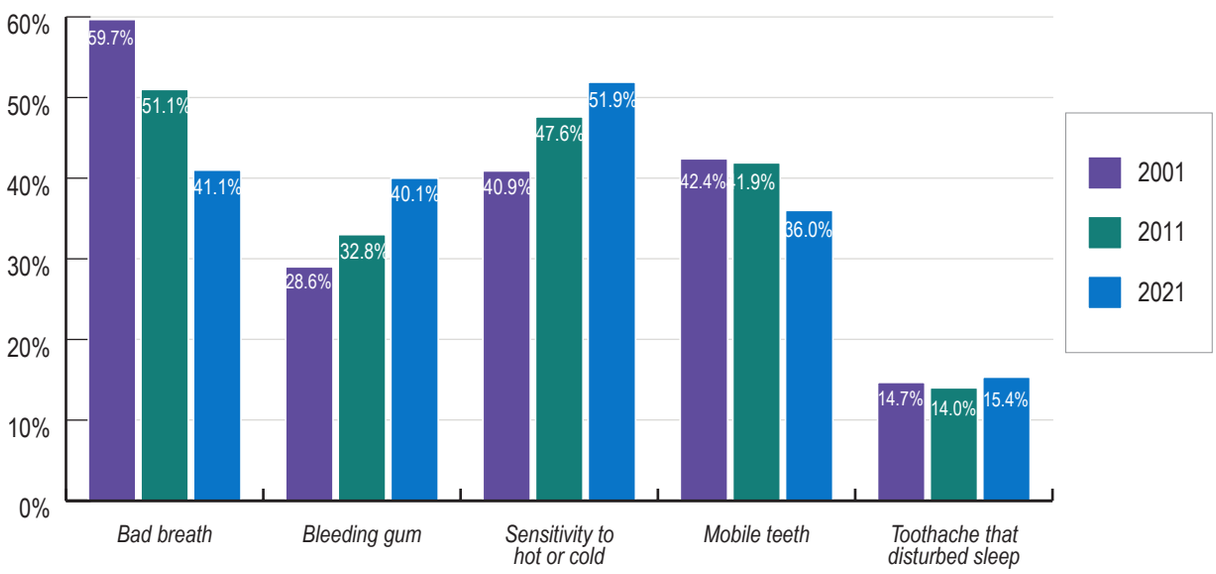


Base: All NOP
2011: N = 450 800
2021: N = 883 200

Utilisation of oral health care services - how many NOP had experienced oral symptoms and did they consult a dentist?

NOP were asked whether they had oral symptoms in the past 12 months and the ways they managed them. The oral symptoms ranged from mild discomfort such as bad breath to severe toothache that disturbed sleep. Among the NOP population, around half of them reported having sensitivity to hot/cold (51.9%, 458 500) (Figure 6.10). Unlike NOP in 2011, sensitive to hot or cold had replaced bad breath to be the most common oral symptom in 2021 where the latter became second on the list (Bad breath in 2021: 41.1%, 363 200). Toothache that disturbed sleep (15.4%, 136 100) remained as the least common oral symptoms in 2021.

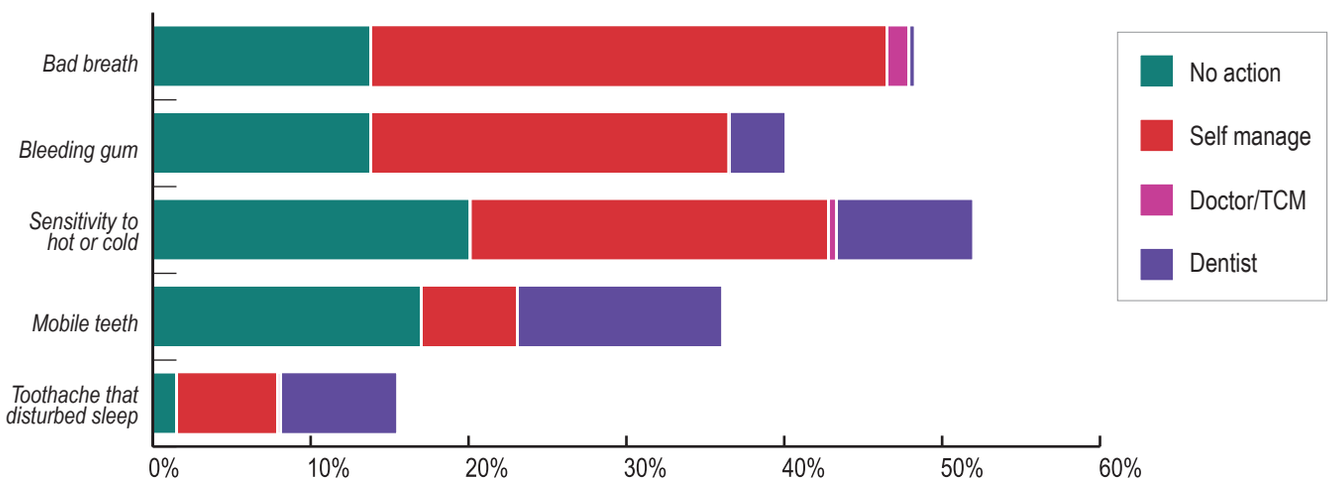
Figure 6.10 ***Percentage of NOPs according to the oral symptoms experienced in the 12 months before the survey (2001, 2011 and 2021)***



Base: All NOP
2001: N = 445 500
2011: N = 450 800
2021: N = 883 200

When NOP experienced oral symptom, it was noted that majority of NOP did not take actions or manage the oral symptoms by themselves rather than attending dental consultation. Even for toothache that disturbed sleep, there was still a considerable proportion of NOP did not consult dentist (Figure 6.11).

***Figure 6.11** Percentage of NOP according to the oral symptom experienced in the 12 months before the survey and the action taken in 2021*



Base: All NOP
2021: N = 883 200
The bases for specified oral symptoms refer to NOP who had the corresponding specified oral symptoms in the 12 months before the survey.
**TCM – Traditional Chinese medical practitioners*

Utilisation of oral health care services - what were the treatment needs among NOP and did they intend to seek dental care?

Similar to gum condition and oral hygiene condition, the assessed treatment need for scaling in this report was only inferred to 874 900 dentate NOP represented by the NOP with gum examination performed in 2021. For the other treatment needs, they were inferred to all NOP.

According to standardized assessment criteria, majority of dentate NOP (77.5%) were assessed to have a need of scaling. Based on clinical examination of all NOP, the assessed treatment need of filling/root canal treatment (32.4%, 286 600) was lowered, and the lowest assessed need was extraction. An increase proportion of NOP perceived their needs in replacement of missing teeth (11.9%) when compared with those in 2011 (7.2%). This perception was echoed by an increase in the assessed treatment need in replacing missing teeth in this survey (25.4% in 2011 to 31.3 in 2021). The treatment need perceived by NOP was found to be much lower than the need assessed by the examining dentist across most treatment items (Table 6.11).

***Table 6.11** Percentage of NOP according to the perceived and assessed dental treatment needs in 2001, 2011 and 2021 (Multiple answers)*

Dental treatment need	2001 (N = 445 500)		2011 (N = 450 800)		2021 (N = 883 200)	
	Perceived	Assessed	Perceived	Assessed	Perceived	Assessed
Scaling*	3.9%	98.3%	15.2%	95.5%	11.7%	77.5%
Filling and/or root canal treatment**	9.8%	36.0%	8.6%	39.8%	14.5%	32.4%
Extraction	8.6%	36.1%	6.1%	28.2%	15.5%	18.9%
Replacement of missing teeth***	22.2%	36.6%	7.2%	25.4%	11.9%	31.3%

**Base: (Assessed need for scaling): Dentate NOP represented by the NOP with gum examination performed*
2001: (N = 358 700)
2011: (N = 386 200)
2021: (N = 874 900)
Base (Other treatment needs): All NOP

*The subject would be assessed to have need of scaling if calculus is detected

**Filling and root canal treatment figures in 2001 and 2011 were combined into a single category Filling/ root canal treatment (RCT) for direct comparison with 2021

***The subject would be assessed to have need to replace missing teeth if one or more of the following reasons were met:

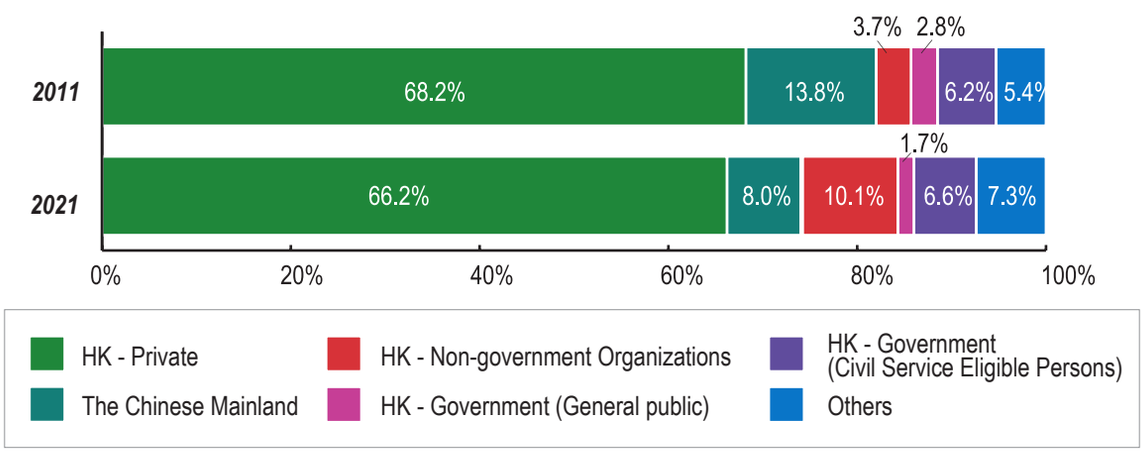
- an existing bridge or a denture is fractured or has been otherwise rendered functionless
- need for extraction of any abutment teeth of existing bridge or denture
- a tooth space anterior to the first premolars
- there are less than 10 functional tooth pairs (including opposing natural and/or prosthetic teeth in contact)

Utilisation of oral health care services - where did they usually go for dental visit?

In both 2011 and 2021, around three fourth of NOP sought dental treatment in the private sector (76.3%, 664 800 in 2021, 71.9%, 302 200 in 2011), namely at private dental clinics and dental clinics run by non-government organizations (NGO), followed by dental clinics in the Chinese Mainland (8.0%, 70 100) (Figure 6.12). This consistent trend demonstrates that private dental clinics continued to serve as the predominant service providers for NOP in Hong Kong.

It was worth noting that the proportion of NOP who visited dental clinics operated by NGO had nearly tripled over the past ten years (10.1% 87 800 in 2021, 3.7%, 15 700 in 2011) while there was around six percentage points reduction of NOP who went to Chinese Mainland for dental during the survey period of OHS 2021.

Figure 6.12 ***Percentage of NOP who had visited a dentist according to the type of dental clinic visited***



Base: NOP who had ever visited a dentist
2011: N = 425 500
2021: N = 871 500

The proportion of NOP with regular dental checkup habit had continued to increase over the past two decades, from under 10% in 2001 to more than 30% in 2021. Despite of this increase, around seven out of ten NOP had not established a regular dental checkup habit yet. The interval for dental checkup depends on the individual risk level as assessed by dentist, the interval ranges from every 6 months to every 2 years in general. From this survey, it was seen that most NOP who had a checkup habit did it regularly between 1 to 2 years period and fewer NOP did it within one year period which may need attention if this extension in checkup interval was not recommended by dentist after individual risk assessment.

Experiencing oral symptoms was not always an effective cue for NOP to seek professional care or treatment. In fact, majority of the affected NOP did not take any actions or tried to manage oral symptoms by themselves. Even with severe toothache that disturbed sleep, this proportion was still considerable. It must be emphasized that the proper way to manage the oral symptoms must be based on a proper diagnosis made by dentist after consultation. In addition, professional instructions on the appropriate methods of self-care is essential for effective management of oral symptoms.

The discrepancy between NOP's perceived need for dental treatment and assessed treatment need determined by dentists was still large with perceived treatment needs of all the treatments being found lower than the assessed treatment needs. The tendency of delaying seeking professional dental care might result in tooth loss which is highly undesirable.

Majority of dentate NOP were assessed to have a need of scaling. An increase proportion of NOP acknowledged the need for replacement of missing teeth compared to the previous studies in 2011. The treatment need perceived by NOP was found to be much lower than the assessed need across most treatment areas.

It was not surprising to see that private sector continued to be the main source of dental services for NOP with non-government organisations getting a greater share in the service provision in 2021.

What were the facilitators and barriers affecting NOP to adopt the desirable oral health related behaviours?

In this survey, the facilitators and barriers to interdental cleaning habit, regular dental checkup habit and dental visit for managing oral symptom were investigated. These identified possible facilitators and barriers could provide some information for the planning of individual and community-based oral health promotion.

What were the facilitators and barriers to interdental cleaning habit?

For dentate NOP who had a habit of using dental floss or interdental brush, most of them reported that they used floss (77.5%) and interdental brush (56.7%) for removing food trapped between teeth. The other common reason was teeth became cleaner after use (Table 6.12). Recommended by dentists was reported more by NOP using interdental brush (28.1%) than dental floss (13.1%).

Table 6.12 ***Percentage of dentate NOP according to the reasons for having interdental cleaning habit (Multiple answers)***

Reasons for having interdental cleaning habit	Floss (N=301 600)	IDB (N=301 000)
Could remove food trapped between teeth	77.5%	56.7%
Teeth became cleaner after use	31.4%	42.0%
Recommended by dentist	13.1%	28.1%
Could prevent gum disease	3.2%	2.1%
Could prevent tooth decay	1.2%	2.1%

Base (Dental Floss): NOP who had the habit of using dental floss
Base (Interdental brush): NOP who had the habit of using interdental brush

'Did not know how to use' (30.8%) and 'Lazy/trouble to use/ did not want to use' (22.7%) were two most common reasons for NOP not using dental floss while 'Did not know what it is' (25.8%) and 'No such need' (25.0%) were the common reasons for NOP not using interdental brush (Table 6.13).

Table 6.13 ***Percentage of dentate NOP according to the reasons for not having interdental cleaning habit (Multiple answers)***

Reasons for not having interdental cleaning habit	Floss (N=573 300)	IDB (N=573 900)
Did not know how to use	30.8%	15.4%
Lazy/troublesome to use/did not want to use	22.7%	12.2%
No such need	20.7%	25.0%
Had never thought of using it	5.8%	5.0%
Did not know what it was	4.8%	25.8%
Dental floss/ Interdental brush is useles	3.5%	5.6%

Base (Dental Floss): NOP who did not have the habit of using dental floss
Base (Interdental brush): NOP who did not have the habit of using interdental brush

The strongest facilitator for dentate NOP to adopt a habit of using dental floss and interdental brush seemed to be because these tools could remove food trapped between teeth, which made them felt their teeth being cleaner after use. Fewer NOP adopted this practice as recommended by their dentists. It was reasonable to believe that although more NOP practice interdental cleaning, they did it without professional instructions.

While the perception of no such need appeared to be a prominent barrier for both interdental cleaning with dental floss or interdental brush, three out of ten NOP who did not have interdental cleaning habit reported that they did not know how to use dental floss but much fewer for interdental brush. On the contrary, few NOP did not know what dental floss was but around one fourth of them was unsure what an interdental brush was. This lack of knowledge could deter the willingness of NOP to incorporate these tools into their oral hygiene routine.

The acquisition of knowledge and skills of interdental cleaning can be obtained by attending regular dental checkup. Furthermore, the selection of suitable tools can be recommended on individual circumstances. These professional advices or instructions can also be provided by appropriately trained dental care professionals (dental hygienists and dental therapists). This may be provided in a community-level primary dental care setting to promote proper oral self-care in NOP population.

What were the facilitators and barriers to regular dental checkup habit?

For analysis purpose, NOP with regular checkup habit were defined as those who made dental visits within two years' interval in the absence of any oral problem. Comparisons were made between groups of NOP classified as regular and irregular attenders according to this definition.

When these NOP were asked about the reasons why they sought regular dental checkup, the main reasons given were 'want to have scaling' and 'want to have dental checkup' (61.5%). The next two more commonly reported reasons were for prevention of dental problems or prevention was better than cure (21.1%, 59 900) and reminder from dentist (19.0%, 53 700) (Table 6.14).

***Table 6.14** Percentage of NOP according to the reasons for seeking regular dental checkup at least once every two years (Multiple answers)*

Reasons for seeking regular dental checkup	2021 Percentage
Want to have scaling or want to have dental check up	61.5%
For prevention of dental problems or prevention was better than cure	21.1%
Dentist reminded to have regular checkup	19.0%
Took full benefit of the dental service which was included in in urance plan / employment benefi	13.9%
For keeping teeth healthy	12.3%
Had a good and trustworthy dentist	1.2%§

Base: NOP who had regular dental checkup at least once every two years 2021: (N = 283 400)

§ This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.

Among those NOP without regular checkup habit (599 800), the most common reason was that they felt their teeth were good, had no pain or need for dental checkup (61.0%, 365 800) which was similar to their counterparts in 2011. There was a decrease in the proportion of NOP in 2021 (12.7%) than in 2011 (25.9%) who mentioned that the charge of dental visit was unaffordable or they did not want to spend money on checkup. Afraid of seeing dentist (6.4%, 38 400) and no time (4.2%, 24 900) were the two other reasons for NOP not to seek regular dental checkup (Table 6.15).

Table 6.15 ***Percentage of NOP according to the reasons for not seeking regular dental checkup at least once every two years (Multiple answers)***

Reasons for not seeking regular dental checkup		2021 Percentage
Teeth were good / no pain /no need		61.0%
Did think of going for regular checkup, however:	**Charge was unaffordable / did not want to spend money on checkup**	12.7%
	No time	4.2%
	Afraid of seeing dentist	6.4%
	Did not know which dentist was good	2.2%
	Problem with appointment booking	2.6%
	Compromised mobility / poor accessibility / need companion to go together	0.7%§
	Finding dental treatments painful	1.9%

Base: NOP without regular dental checkup at least once every two years

2021: (N = 599 800)

§ This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.

All NOP irrespective of their checkup habit were asked whether they had certain thoughts or beliefs towards regular dental checkup. These thoughts or beliefs were potential barriers or facilitators to dental checkup identified from a preceding qualitative study on NOP. Percentages of regular and irregular attenders with the respective thoughts or beliefs are shown in Table 6.16.

Table 6.16 ***Percentage of NOP according to the thoughts and beliefs towards regular dental checkup***

Thoughts and beliefs towards regular dental checkup	Regular attenders		Irregular attenders	
	2011 (N = 79 600)	2021 (N = 283 400)	2011 (N =371 200)	2021 (N = 599 800)
Having regular dental checkup every one to two years will help to keep teeth in good condition (每一兩年去檢查下啲牙齒，洗下牙，棚牙就可以keep得好啲同健康啲)	96.3%	93.7%	40.1%	53.6%
Will go for regular checkup in order to have early detection of tooth problems (為咗及早發現牙齒嘅問題，而定期去牙醫度檢查牙齒)	74.1%	72.7%	21.0%	32.9%
Will go for scaling regularly because of aesthetic reason (為咗整靚棚牙，而定期去牙醫度洗牙)	35.0%	32.3%	7.9%	16.8%
Practising good oral hygiene at home can replace regular scaling (只要勤力啲刷牙同埋打理棚牙，就唔駛定期去洗牙啦)	25.5%	21.7%	78.7%	64.0%
Will visit a dentist only when in pain or with serious dental problems (棚牙有痛先要去睇牙，無事無痛就梗係唔去睇牙啦)	44.3%	49.0%	92.7%	91.5%
Dare not visit a dentist because the total cost of dental treatments at the end is often unpredictable (睇親牙醫都唔知要俾幾錢先至出得返嚟，令到你唔敢隨便去睇牙)	33.1%	31.0%	65.8%	58.3%

Base (Regular attenders): NOP with regular dental checkup at least once every two years

Base (Irregular attenders): NOP without regular dental checkup at least once every two years

When comparing to NOP without regular dental checkup habit, a significantly larger proportion of regular NOP attenders held the thoughts or beliefs that:

- 'Having regular dental checkup every one to two years will help to keep teeth in good condition'
- 'Will go for regular checkup in order to have early detection of tooth problems'
- 'Will go for scaling regularly because of aesthetic reason'

On the other hand, a significantly larger proportion of irregular NOP attenders held the thoughts or beliefs that:

- 'Practising good oral hygiene at home can replace regular scaling'
- 'Will visit a dentist only when in pain or with serious dental problems'
- 'Dare not visit a dentist because the total cost of dental treatments at the end is often unpredictable'

The beliefs in the effectiveness of dental checkups for preventing oral diseases and receiving reminders from the dentist were identified as possible facilitators for NOP individuals to have regular dental checkups. Thoughts and beliefs such as 'having regular dental checkups every one to two years will help to keep teeth in good condition,' 'going for regular checkups for early detection of tooth problems,' and 'going for scaling regularly for aesthetic reasons' might also contribute in the adoption of this habit.

Regarding barriers identified for NOP to attend regular dental checkup in 2021, subjective feeling of having good oral health remained to be the most dominant one for NOP, same as that 10 years ago. And for NOP who did think of going for dental checkup, they did not go finally because they perceived some barriers. Around one out of eight of them were deterred by cost concern, followed by their fear of seeing a dentist and lack of time which were mentioned only by around 5% of them. Dental professionals should address these system factors perceived by NOP to promote dental utilisation.

For NOP who did not attend regular dental checkup, they held the beliefs that practising good oral home care could replace regular dental checkup. Two key messages should be delivered to the NOP. Firstly, practising good oral hygiene effectively at home requires input from dental professionals. Secondly, attending regular dental checkup is essential even if not perceiving any discomfort.

What were the barriers to seeking professional dental care when NOP experienced oral symptom?

To understand the barriers to seeking professional dental care, both NOP who did or did not seek professional dental care for their oral symptom were asked about their care seeking patterns and reasons behind.

Comparatively more NOP visited a dentist if they had mobile teeth (36.0%, 114 500) or toothache that disturbed sleep (48.3%, 65 700) while few of them did so for milder symptoms such as bad breath (0.9%, 3 300) and bleeding gum (8.9%, 31 600) (Table 6.17).

Table 6.17 ***Percentage of NOP visiting and not visiting a dentist when having oral symptom in the 12 months before the survey***

Oral symptom	Visiting a dentist when having oral symptom in the 12 months before the survey	Not Visiting a dentist when having oral symptom in the 12 months before the survey
Bad breath (N = 363 200)	0.9%	99.1%
Bleeding gums (N = 353 700)	8.9%	91.2%
Sensitivity to hot or cold (N = 458 500)	16.7%	83.3%
Mobile teeth (N = 318 000)	36.0%	64.0%
Toothache that disturbed sleep (N = 136 100)	48.3%	51.7%

Base: NOP who had the specific oral symptom in the 12 months before the survey

A number of NOP with oral symptoms knew that they needed to seek professional dental care but were hindered from doing so because of certain barriers. The barriers that precluded NOP from seeing a dentist are tabulated in Table 6.18.

Among this group of NOP, the commonly reported reasons were that the charge was unaffordable (29.9% to 38.7%), did not want to spend money on dental care (11.4% to 32.7%) and problems with appointment booking (15.2% to 31.4%) as observed in 2021.

***Table 6.18** Percentage of NOP with oral symptom in the 12 months before the survey who knew that they needed dental care according to the barriers they encountered (Multiple answers)*

Oral symptom		Charge was unaffordable	Did not want to spend money on dental care	Problem with appointment booking	Afraid of visiting a dentist	No time
Bad breath	2021 (N =82 900)	37.1%	32.7%	31.4%	15.0%	10.3%§
Bleeding gum	2021 (N = 85 900)	29.9%	20.8%	29.3%	20.0%	6.5%§
Sensitivity to hot or cold	2021 (N = 124 200)	37.7%	28.9%	28.3%	21.3%	6.3%§
Mobile teeth	2021 (N = 82 000)	38.7%	24.2%	15.3%	25.1%	10.8%
Toothache that disturbed sleep	2021 (N = 43 700)	35.1%	11.4%§	15.2%§	16.9%§	14.7%§

Base: NOP who knew that they needed to visit dentist when they had the specific oral symptom in the 12 months before the survey but did not consult a dentist

§ This estimate was compiled based on a very small sample. Readers are advised to interpret this estimate with caution.

In general, the proportion of NOP who visited dentist when having oral symptoms was low. Even with severe pain that disturbed sleep, the proportion was still less than half.

A certain proportion of NOP mentioned that they knew they needed to visit a dentist but encountered some barriers. The main reported barriers were unaffordable charge and reluctance to spend money on dental care.

What was the impact of oral health on the quality of life of NOP?

In this survey, the impact of oral health on the quality of life of the NOP was investigated (Table 6.19).

Another prevalent issue among the NOP population was dry month, 19.5% of NOP reporting experiences of mouth dryness either very often or fairly often (Table 6.20).

When compared with the findings in 2001, it was observed that negative impact of oral health on the daily life of NOP remained in a similar level except more obvious increase in NOP reported their meals were interrupted and also feeling upset because of problems with teeth, mouth or dentures. Similar questions were not included in 2011 and thus data was not available for comparison.

Table 6.19 ***Percentage of NOP expressing negative impact on aspects of daily life in OHIP-14 in 2001 and 2021***

Impact of oral health on daily life	Percentage of NOP reported 'Very often/Fairly often'	
	2001	2021
Have you ever had difficulty chewing any foods because of problems with your teeth, mouth or denture?	18.1%	16.9%
Have you ever had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	8.4%	6.7%
Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	18.2%	16.6%
Have you had sore spots in your mouth?	3.8%	6.8%
Have you been worried by dental problems?	4.2%	7.7%
Have dental problems made you miserable?	5.3%	5.3%
Have you felt that there has been less flavour in your food because of problems with your teeth, mouth or dentures?	11.7%	9.9%
Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	5.9%	12.5%
Have you been upset because of problems with your teeth, mouth or dentures?	3.3%	6.1%
Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	5.3%	6.6%
Have you avoided going out because of problems with your teeth, mouth or dentures?	1.6 %	1.5%
Have you had trouble getting on with other people because of problems with your teeth, mouth or dentures?	1.7%	1.7%
Have you been totally unable to function because of problems of your teeth, mouth or dentures?	0.8%	1.0%
Have you been unable to work to your full capacity because of problems with your teeth, mouth, dentures?	1.6%	1.1%

Table 6.20 ***Percentage of NOP according to their frequency of experiencing dry mouth in 2021***

	Percentage of NOP reported 'Very often/Fairly often'
How often did your mouth feel dry?	19.5%

Base: All NOP
2001: N= 445 500
2021: N = 883 200

The impact of problems of NOP's teeth, mouth or denture to their quality of life was gauged through a set of questions from the Oral Health Impact Profile-14. Compared with 2001, more NOP reported they had to interrupt meals because of problems with their teeth, mouth or dentures. Psychologically, more NOP worried, a bit embarrassed by dental problems and upset because of problems with their teeth, mouth or dentures.

Dry mouth was experienced by 19.5% of NOP either very often or fairly often.

Chapter 6 – Summary

When compared with 10 years ago, NOP were found to have more teeth remained and two-third of them had at least 10 occluding pairs of teeth. In general, teeth of NOPs were cleaner with less plaque and calculus. There were fewer NOP with gum bleeding over half of their teeth. Reported oral hygiene practices also had improved.

With reference to the findings in this survey, several areas were identified which required attention in the NOP group. Tooth decay seemed slightly improving as each NOP had an average 3.5 more teeth compared with 2011 but the average number of decay teeth had decreased by 0.1. However, the distribution of untreated tooth decay was not even and was present in 47.1% of NOP. The proportion of NOP with untreated decay on root surfaces was on an increasing trend. Regarding gum condition, same as adults, the proportion of NOP with gum pockets had increased despite less visible dental plaque and less gum bleeding. One of the possible reasons was increased retention of teeth with advanced gum disease.

One third of the NOP were found to have fewer than 10 occluding pairs of teeth. When looking at tooth level, the missing teeth were mainly molars (back teeth) which is important for chewing food. A higher proportion of NOP was assessed to have a need of having false teeth. Replacing missing back teeth might be required for improving the chewing function for a proportion of NOP.

Some NOP did not attend regular dental checkup because they believed that practising good home care can serve the same purpose. However, this belief is inaccurate as reflected by the presence of untreated tooth decay and presence of gum pockets, indicating that their current daily oral hygiene practices without professional instructions might not be effective. There might also be underlying risk factors such as frequent snacking and smoking which the NOP might not be aware of. Professional risk assessment and instruction in the selection of cleaning tools and self-care skill, based on individual circumstances, might be very likely insufficient in NOP group as it has to be obtained from dental consultation.

On the other hand, the use of professional dental care was still not satisfactory. More NOP reported to have regular dental checkup, but the interval might be extended and it was not certain whether this extension was recommended after individualized risk assessment by dentists. This finding, in combination of the self-perceived good oral health by some NOP who did not attend regular dental checkup, lead to delayed identification of dental problems.

It is still common for the NOP to ignore or self-manage their perceived oral symptoms, and this is also unfavourable to early identification and timely management of dental diseases. It has to be emphasised that professional instructions is essential on the proper method of self-care of dental conditions.

There may be factors of the oral health care system that hinder utilisation by the NOP. Cost was reported as one of the concerns. While some NOP still perceive they could not afford dental treatment despite of the financial subsidization available (e.g. Elderly Healthcare Voucher Scheme (EHVS)), the dental profession should consider how to address the perceived high cost of care that was reported as reasons for not seeking dental care.

Way forward

It is well-established that maintaining good oral health contributes to better general health. Preserving natural teeth in older persons is essential as it enables elders to have a wider range of food choices, empowering them to develop healthy eating habit and maintaining a good nutrition status and contributing to good physical health. This in turn has positive implications for the mental and social well-being of the elders.

Although the number of missing teeth was found to be reducing continuously in this age group since 2001, observation across different age groups in this survey was alarming. In this survey, it was noted that many molars were founded with gum pockets in adults while around 30-40% of molars were already missing when a person reached the stage of NOP. Although the reason of extraction of those back teeth could not be ascertained, this highlighted the importance of primary dental care which emphasized on prevention and must be commenced early and regularly throughout the life course of an individual to maintain oral health, avoid future tooth loss and minimize the need of curative dental treatment which might be more expensive. Even when a person reached the stage of NOP, he or she can still enjoy a diverse diet, and ultimately enhance their physical, mental and social well-being.

Oral health promotion and education should be emphasized the need of attending regular dental checkup even if one does not perceive any discomfort. NOP should be aware of need to master their toothbrushing skills from the dental professionals. Apart from dentists, dental hygienists and dental therapists should be involved in providing professional self-care instructions, risk assessments, lifestyle advice and any preventive dental treatment indicated.

While NOP should be aware of their own responsibility to take care of their oral health, the dental profession should also consider measures to assist this population group to attend dental consultation by overcoming their perceived barriers, e.g. price information, enrolling in the EHVS, offering flexible working hours of clinics or utilizing information technology to provide dental consultation and home-care advice.

For the better overall health management of elders, NOP and private dental professionals may consider joining the Electronic Health Record Sharing System for a more comprehensive and coordinated care and facilitate referrals across different healthcare providers if necessary.

By emphasizing on primary dental care and fostering collaboration with other healthcare professionals in the oral health care process, dental professionals can promote better oral health outcomes but also contributes to overall well-being and quality of life for this population group.

CHAPTER 7

Aged 65 and above users of Social Welfare Department Long-term Care Services

The three categories of Long-term Care (LTC) services users that had been covered in this survey were listed as following:

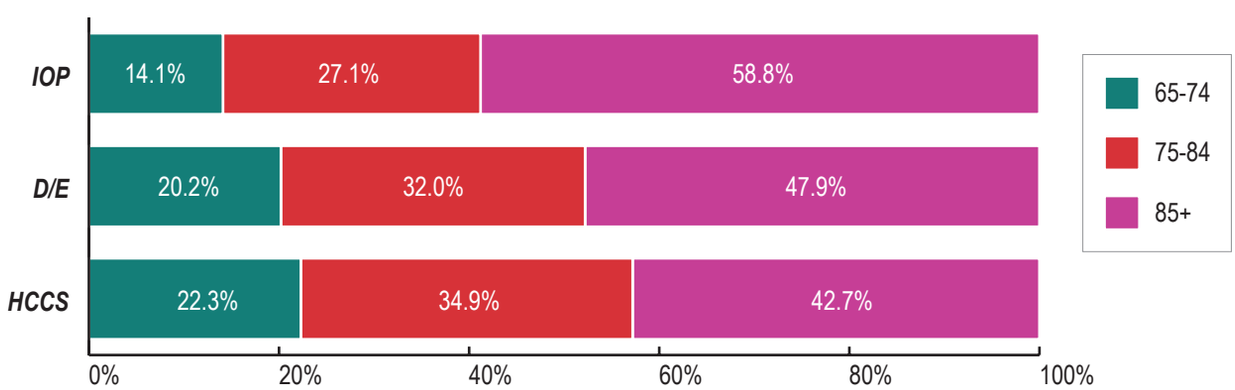
1. Users of Residential Care Services (IOP)
2. Users of Day Care Centres or Units for the Elderly (DE)
3. Users of Enhanced Home & Community Care Services and Integrated Home Care Services (Covered Frail Cases only) (HCCS).

Age profile of the target populations

After grossing up, the results could be inferred to 60 000 IOP, 7 300 DE users and 17 700 HCCS users.

The age distribution of the three categories of LTC users was shown in Figure 7.1. For all three categories of LTC users, the youngest age group (65-74) constituted the minority and the majority was aged 85 and above. The IOP had the highest proportion of users aged 85 and above (58.8%, 35 300) compared to DE users (47.9%, 3 500) and HCCS users (42.7%, 7 560).

***Figure 7.1** Distribution of LTC users according to age*

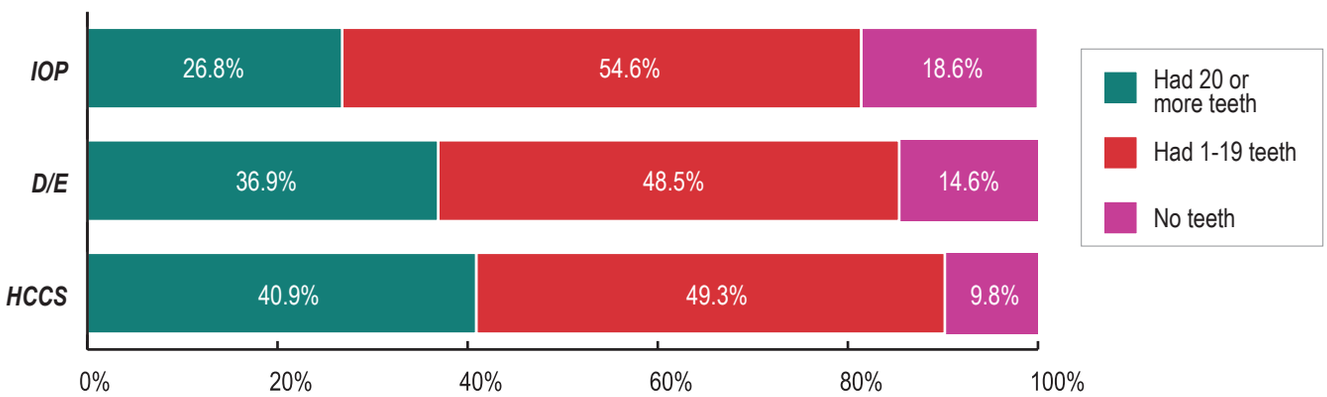


Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Oral status – number of remaining teeth

The degree of tooth loss among LTC users was summarised in Figure 7.2. IOP had the highest degree of tooth loss with 12.1 remaining teeth on average, and had the highest proportion with no remaining teeth (18.6%, 11 200). HCCS users had 14.9 remaining teeth on average and 9.8% (1 750) had no remaining teeth. DE users were in between with 14.0 remaining teeth on average and had 14.6% (1 070) had no remaining teeth.

***Figure 7.2** Distribution of LTC users according to the number of remaining teeth*



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

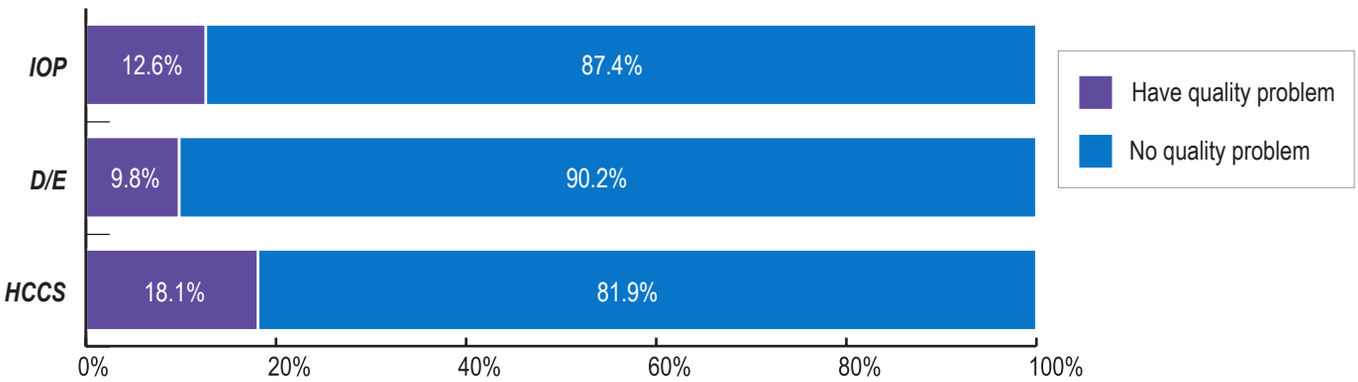
Oral status – replacement of missing teeth

***Table 7.1** Percentage and number of LTC users with dental prostheses (Multiple answers)*

		IOP (N=60 000)	DE (N=7 300)	HCCS (N=17 700)
65-74	Any	24.2%	32.5%	38.1%
	Bridge	1.6%	8.8%	15.2%
	Partial Denture	16.6%	18.8%	17.6%
	Full Denture	4.1%	8.7%	8.2%
	Dental Implant	2.8%	2.3%	5.8%
75-84	Any	42.3%	45.5%	55.6%
	Bridge	17.5%	13.5%	17.6%
	Partial Denture	22.1%	21.2%	31.7%
	Full Denture	11.0%	19.2%	23.9%
	Dental Implant	0.8%	2.0%	4.7%
85+	Any	53.9%	59.5%	58.5%
	Bridge	9.8%	8.6%	11.3%
	Partial Denture	26.4%	30.5%	33.3%
	Full Denture	29.0%	35.3%	31.7%
	Dental Implant	1.1%	2.4%	2.8%
All	Any	46.5%	49.6%	52.9%
	Bridge	10.7%	10.2%	14.4%
	Partial Denture	23.8%	25.2%	29.2%
	Full Denture	20.6%	24.8%	23.7%
	Dental Implant	1.3%	2.3%	4.1%

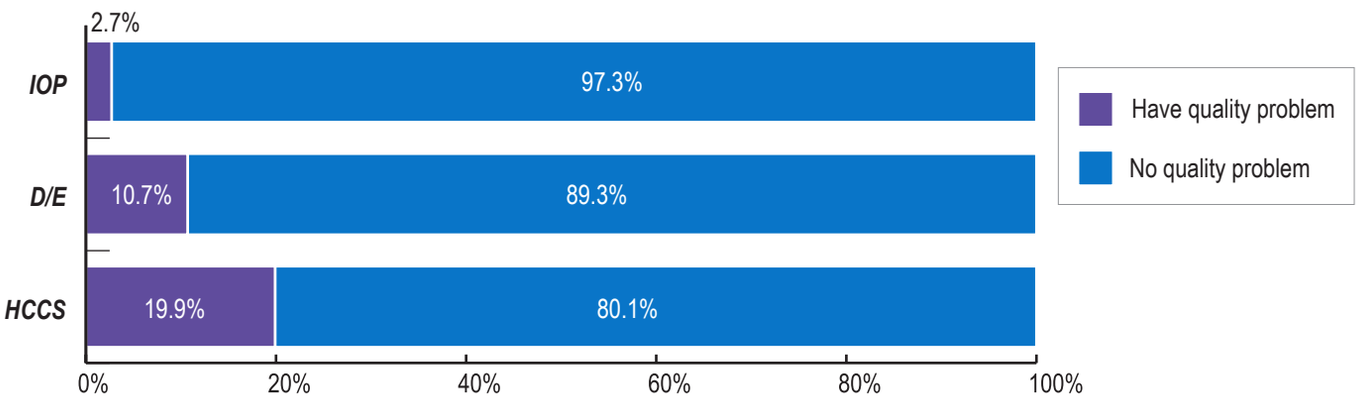
Table 7.1 showed the distribution on using different types of dental prostheses according to their age and types of LTC. For those LTC users who had removable full denture and/or partial denture, their denture(s) were assessed by the examining dentists for quality and cleanliness problems, and the results were summarised in Figures 7.3 to 7.6. Quality problems referred to problems including poor fitting and structural defects to the degree that require repair or replacement of the denture. Cleanliness problems referred to the low cleanliness level of the denture which needs improvement in daily hygiene care of the denture.

Figure 7.3 ***Quality problems of full dentures being worn by LTC users***



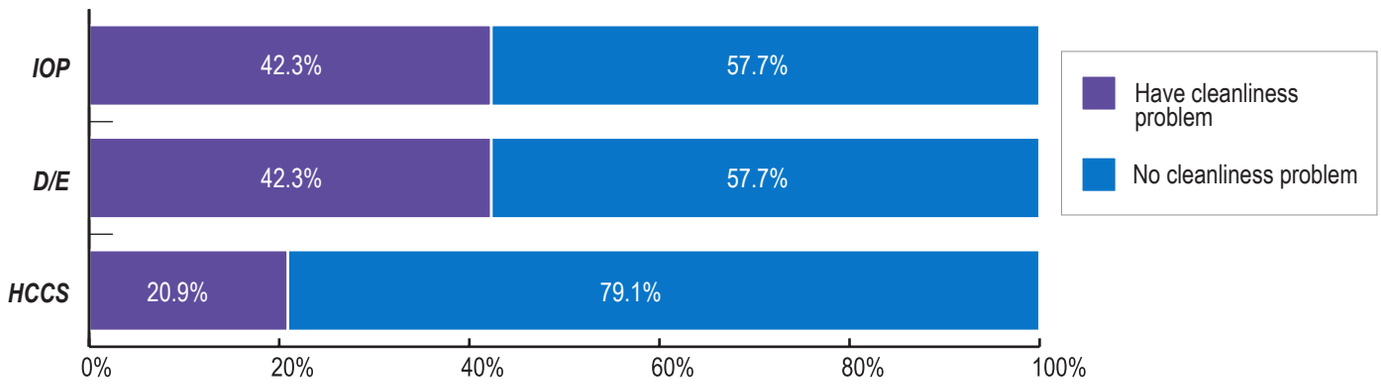
Base: All LTC users and wearers of full denture
IOP: (N = 12 360)
DE users:(N = 1 810)
HCCS users: (N = 4 200)

Figure 7.4 ***Quality problems of partial dentures being worn by LTC users***



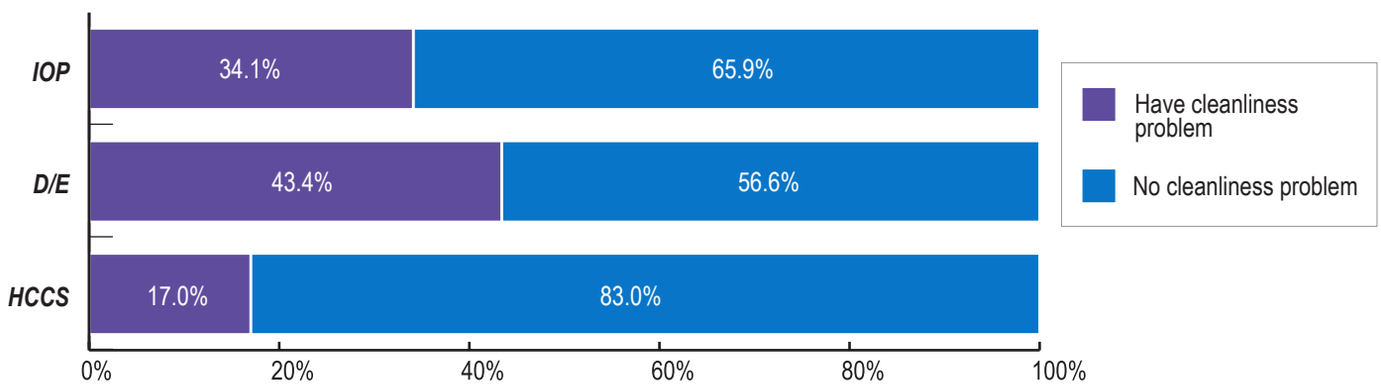
Base: All LTC users and wearers of partial denture
IOP: (N = 14 300)
DE users:(N = 1 840)
HCCS users: (N = 5 180)

Figure 7.5 ***Cleanliness problems of full dentures being worn by LTC users***



Base: All LTC users and wearers of full denture
IOP: (N = 12 360)
DE users:(N = 1 810)
HCCS users: (N = 4 200)

Figure 7.6 ***Cleanliness problems of partial dentures being worn by LTC users***



Base: All LTC users and wearers of partial denture
IOP: (N = 14 300)
DE users:(N = 1 840)
HCCS users: (N = 5 180)

More HCCS users had quality problems in their partial and complete dentures compared with the other two categories of LTC users, while more IOP and DE users had cleanliness problems with their dentures than the HCCS users.

Oral status – oral mucosal condition

Oral mucosa was examined by visual examination only and no diagnosis was given as no laboratory investigation was performed. Mucosal conditions were found in around 5.7 – 10.7% of LTC users (3 420 IOP, 650 DE users, 1 890 HCCS users). The most commonly occurred mucosal condition was abscess, most likely related to tooth decay. Table 7.2 summarised the conditions observed.

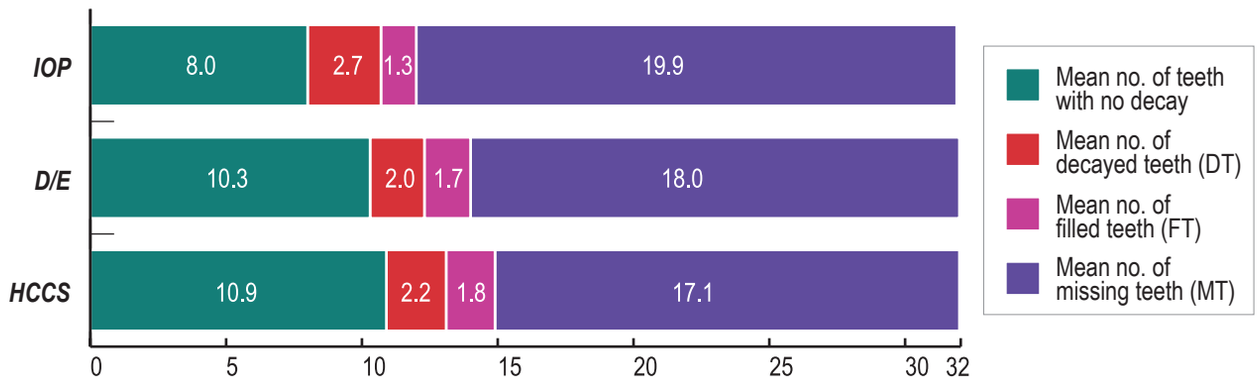
Table 7.2 ***Percentage of LTC users with oral mucosal conditions found (Multiple Conditions)***

	IOP (N=60 000)	DE (N=7 300)	HCCS (N=17 700)
Some sort of mucosal condition identifie	5.7%	8.9%	10.7%
Abscess	3.4%	5.1%	5.3%
Denture induced ulcer	0.5%	0.9%	0.7%
Other types of ulcer	0.2%	0.8%	2.6%
Dry mucosa	0.6%	0.7%	1.3%

Status of remaining teeth – tooth decay

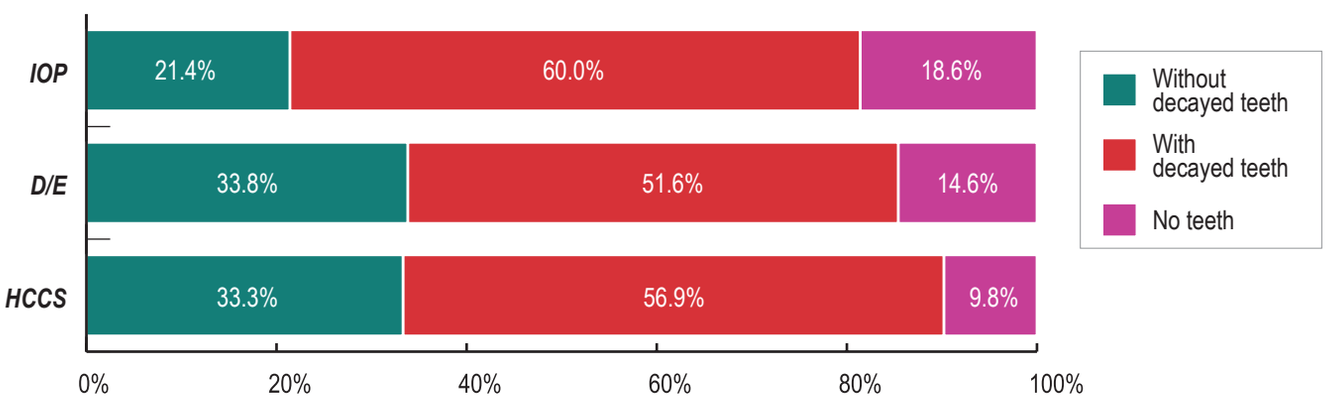
The mean number of teeth with different tooth decay experience among LTC users was shown in Figure 7.7 and detailed in Table 7.3. The proportion of LTC users affected by untreated tooth decay was shown in Figure 7.8.

***Figure 7.7** Mean number of teeth with different tooth decay experience among LTC users*



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

***Figure 7.8** Proportions of LTC users affected by untreated tooth decay*



Base:All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Table 7.3 ***Tooth decay experience among LTC users***

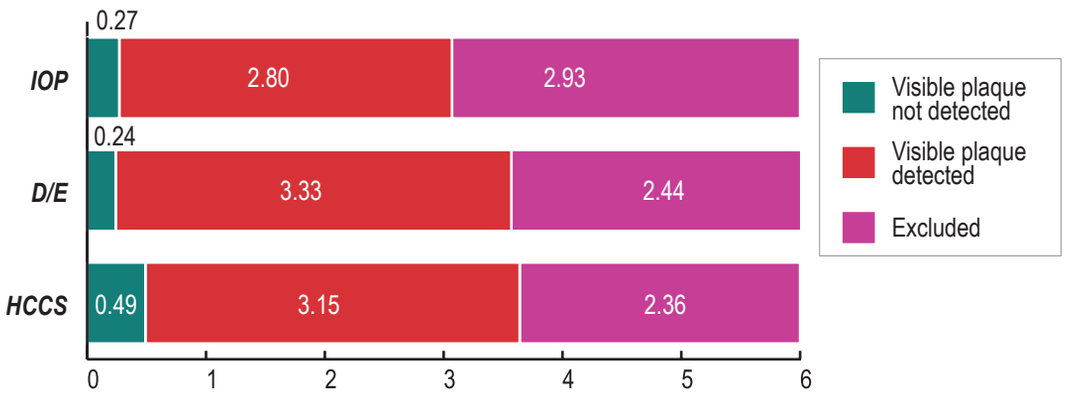
LTC	Tooth decay experience	Remaining teeth	DT (Decayed)	FT (Filled)
IOP	Mean	12.1	2.7	1.3
	% affected	81.4%	60.0%	39.2%
DE	Mean	14.0	2.0	1.7
	% affected	85.4%	51.6%	48.2%
HCCS	Mean	14.9	2.2	1.8
	% affected	90.2%	56.9%	53.4%

Base:All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Status of remaining teeth – oral hygiene and gum condition

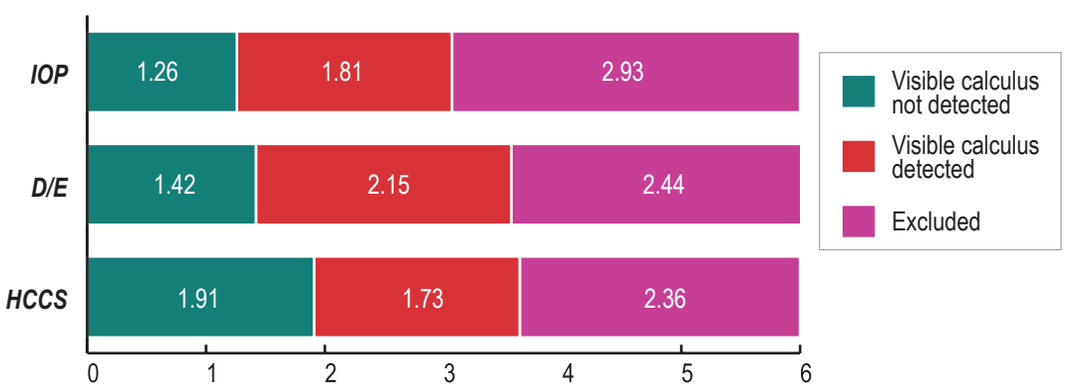
Dental plaque was found visible in most of the sextants[1] (Figure 7.9) and calculus was found in more than half of the sextants for the remaining teeth of LTC users (Figure 7.10). These indicated inadequate daily oral hygiene care and lack of professional cleaning among the LTC users.

***Figure 7.9** Mean number of sextants of LTC users with presence of visible plaque*



Base: All LTC users with remaining teeth and received gum examination
IOP: (N =46 300)
DE users:(N =5 910)
HCCS users: (N = 14 200)

***Figure 7.10** Mean number of sextants of LTC users with presence of calculus*



Base: All LTC users with remaining teeth and received gum examination
IOP: (N =46 300)
DE users:(N =5 910)
HCCS users: (N = 14 200)

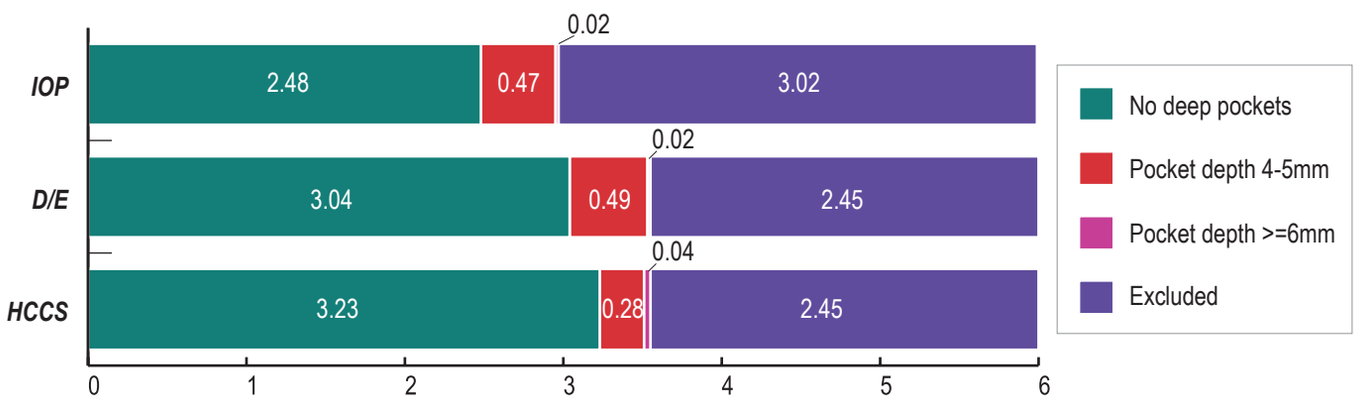
1 In the section about oral hygiene and gum condition, the unit of measurement is 'sextant'. A person has 6 sextants:

1. Upper right back teeth (3 molars and 2 premolars)
2. Upper front teeth (4 incisors and 2 canines)
3. Upper left back teeth (3 molars and 2 premolars)
4. Lower right back teeth (3 molars and 2 premolars)
5. Lower front teeth (4 incisors and 2 canines)
6. Lower left back teeth (3 molars and 2 premolars)

Positive findings for any one tooth within a sextant is regarded as positive finding for that sextant. If a sextant has only 1 tooth or no teeth left, the sextant is reported as 'excluded'. LTC users who are not suitable for receiving gum examination due to medical reasons or having no teeth are excluded. Therefore, the result in this section can reflect to 46 300 IOP, 5 910 DE users and 14 200 HCCS users.

Figure 7.11 showed the mean number of sextants of LTC users with presence of gum pockets. Among IOP, on average 0.49 out of the 2.97 (16.5%) of valid sextants of an LTC user had gum pockets. For DE users, 0.51 out of the 3.55 valid sextants (14.4%) had gum pockets, and 0.32 out of the 3.55 valid sextants (9.0%) had gum pockets among HCCS users. For all 3 groups of users, most of the gum pockets were shallow pockets with pocket depth of 4 to 5 mm.

Figure 7.11 Mean number of sextants of LTC users with presence of gum pocket



Base: All LTC users with remaining teeth and received periodontal examination
IOP: (N =46 300)
DE users:(N =5 910)
HCCS users: (N = 14 200)

There were less proportion of LTC users with complete tooth loss and there were more remaining teeth compared to 2011.

Due to certain degree of tooth loss, use of dental prostheses was common among LTC users. For those who were wearing removable dentures, cleanliness problem was common among DE users and IOP (with more than 40% of those wearing dentures).

Untreated decayed teeth were found in more than half of the LTC users with at least one tooth remaining. 73.7% of dentate IOP (60%/81.4%), 60.4% of dentate DE users (51.6%/85.4%) and 63.1% of dentate HCCS users (56.9%/90.2%) had at least one decayed teeth.

Deep gum pockets were not common among LTC users. However, cleanliness of teeth was a concern as visible plaque was found in vast majority of the LTC users with remaining teeth.

Experience in oral health problems and impact on daily lives, and oral risk related to tooth decay and periodontal disease

Perceived oral problems

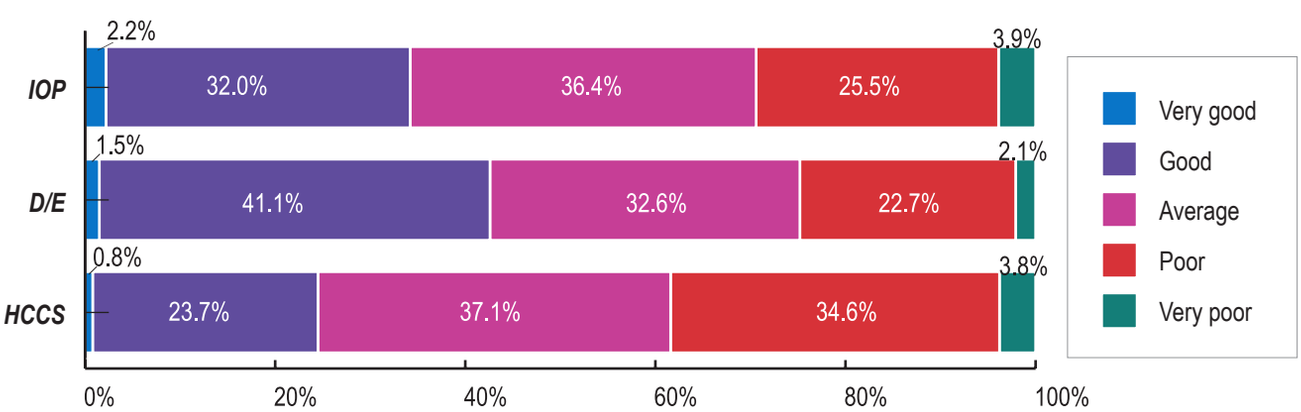
Before receiving oral examination, the LTC users were asked if they had any oral problem, more HCCS users (36.8%) reported the experience of oral problems compared with IOP (22.6%) and DE users (20.0%). Majority of them had experienced tooth or soft tissue pain that was not related to denture (Table 7.4).

Table 7.4 ***Perceived oral problems among LTC users (multiple answers)***

	IOP (N=60 000)	DE (N=7 300)	HCCS (N=17 700)
Any sort of complaint	22.6%	20.0%	36.8%
Tooth or soft tissue pain not related to denture	14.0%	14.3%	21.0%
Denture related complaint	5.3%	2.4%	8.2%
Other complaint	3.6%	4.1%	9.6%

To have a better understanding of oral health, information related to the perception of well-being and the perceived oral functions among the LTC users was collected. When being asked 'How do you feel about your oral health status?', more IOP and DE users answered good or very good (34.2% of IOP, 42.6% of DE users) than poor or very poor (29.4% IOP, 24.8% DE users) among those who were able to respond. However, more HCCS users answered poor or very poor (38.4%) than good or very good (24.5%) (Figure 7.12).

Figure 7.12 ***Distribution of LTC users who could respond to the interview according to their perceived oral status***

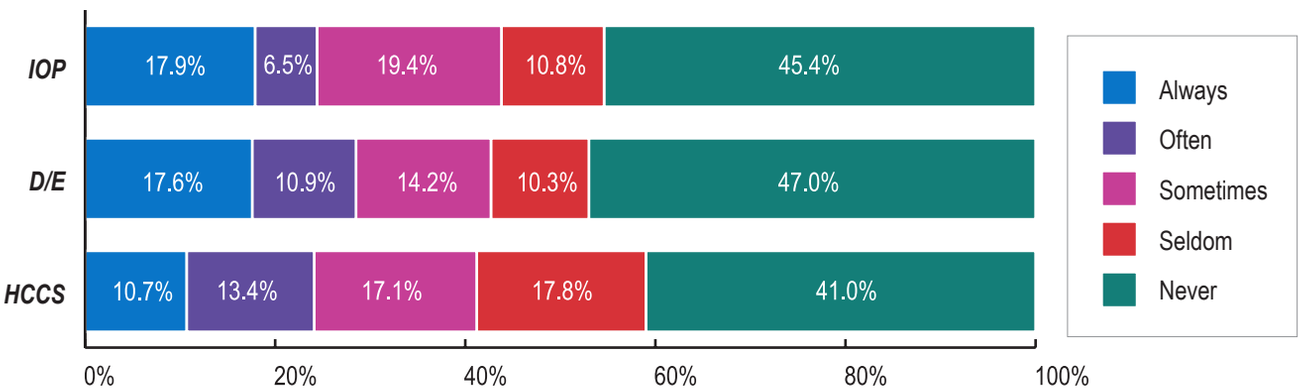


Base: All LTC users who could complete questionnaires
IOP: (N = 45 500)
DE users:(N = 6 340)
HCCS users: (N = 15 000)

Impact on daily life due to oral condition

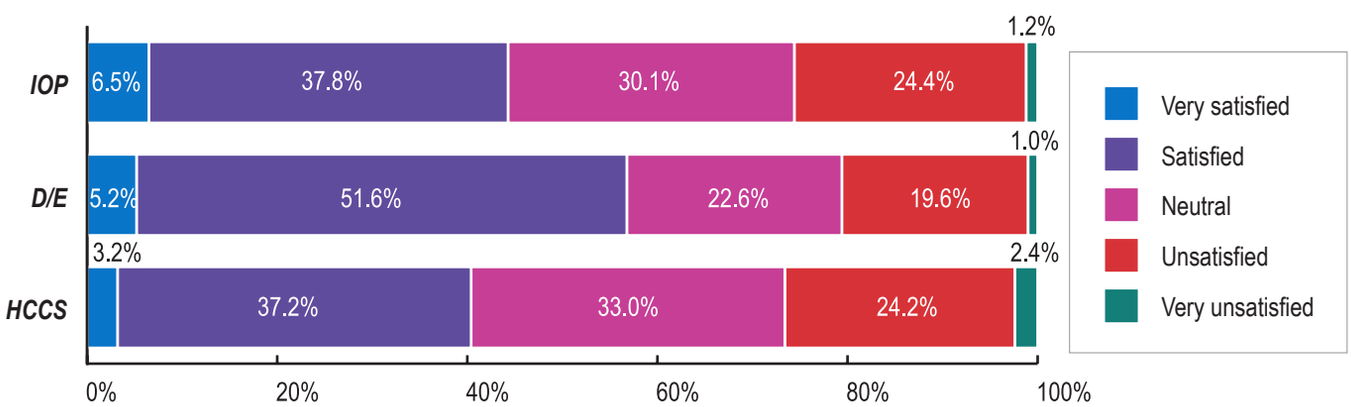
More than half of the three groups of LTC users reported the need to avoid or being unable to choose certain food in the past year (Figure 7.13). Around 24.1% (HCCS users) to 28.5% (DE users) reported 'often' or 'always' in affected food choice.

Figure 7.13 ***Impact of oral condition – limitation of food choices***



Base: All LTC users who could complete questionnaires
IOP: (N = 45 500)
DE users:(N = 6 340)
HCCS users: (N = 15 000)

Figure 7.14 ***Impact of oral condition – satisfaction to their appearance***



Base: All LTC users who could complete questionnaires
IOP: (N = 45 500)
DE users:(N = 6 340)
HCCS users: (N = 15 000)

Almost all LTC users were not very satisfied with the appearance of their teeth. The proportion of LTC users who reported they were unsatisfied or very unsatisfied with the appearance of their teeth ranged from 20.6% (DE users) to 25.6% (IOP) and 26.6% (HCCS users).

Oral risk is an indicator for the chance in developing dental disease in future. Low brushing frequency, needing assistance when brushing, high frequency of snacking and having smoking habit are considered to be high oral risk factors. The distribution of these factors for the LTC users were summarised in Table 7.5.

Table 7.5 ***Relevant oral risk factors related to caries and periodontal disease***

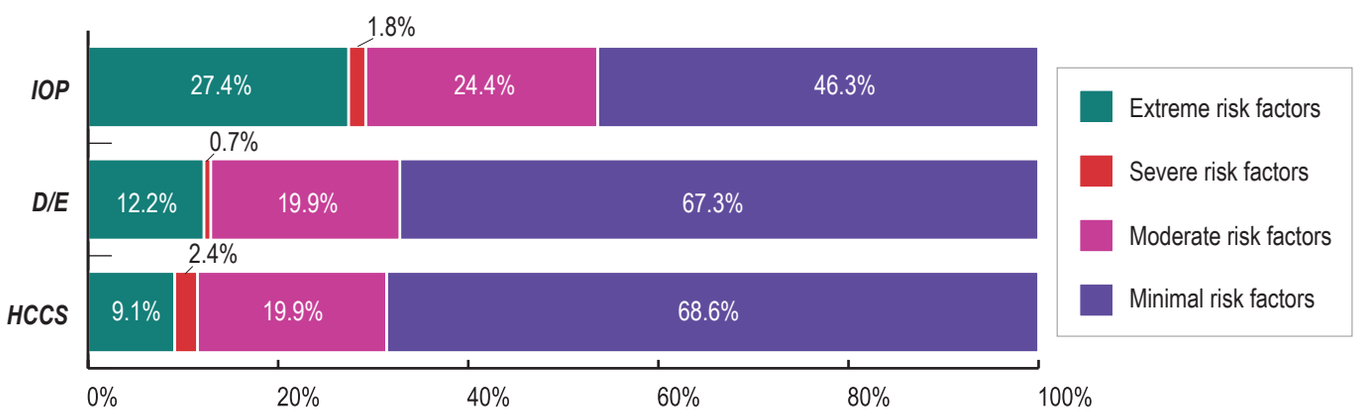
	IOP	DE users	HCCS users
Brushing frequency	(N=38 100)	(N=5 510)	(N=13 500)
0-1	51.3%	30.5%	27.1%
2 times or above	48.7%	69.5%	72.9%
Need assistance for brushing	(N=31 200)	(N=5 050)	(N=12 900)
No assistance needed	98.7%	99.3%	98.4%
Assistance needed	1.3%	0.7%	1.6%
Frequency of snacking	(N=37 900)	(N=5 500)	(N=13 400)
Less than 3 times per day	98.4%	99.3%	98.5%
3 times per day or more	1.6%	0.7%	1.5%
Smoking habit	(N=38 100)	(N=5 510)	(N=13 500)
Yes	2.0%	2.3%	3.5%
No	98.0%	97.7%	96.5%

Base:
All LTC users who could complete questionnaires, had at least one tooth and can answer the corresponding question

Figure 7.15 summarised the distribution of LTC users according to a composite indicator incorporating all the risk factors shown in Table 7.5. 'Extreme oral risk' referred to the LTC users who do not perform regular oral cleaning by themselves or their carers; with frequent snacking and current having a habit of smoking; and those who had unclear status of tooth brushing frequency, brushing assistance and smoking habit. 'Severe oral risk' referred to the LTC users who had 3 times per day of snacking or more, did not brush their teeth, brush their teeth irregularly or need assistance for toothbrushing. 'Moderate oral risk' referred to the LTC users who brush their teeth once daily and did not fall into previous categories, and 'minimal oral risk' referred to the LTC users who brushed their teeth twice daily and did not fall into previous categories.

Under such definition, around one-fourth of IOP (29.2%, 11 200) was categorised as having extreme and severe oral risk, followed by (12.9%, 710) of DE users and (11.5%, 1 560) for HCCS users. The risk level of LTC users might be contributed by their risk behaviour toward oral health, for example snacking habit and smoking habit, which usually are preventable and modifiable. Extra resources are often needed to work with the carers or patients themselves in mitigating the risk factors in order to maintain their oral health when compared to independent individuals.

***Figure 7.15** Impact of oral condition – oral risk classified by mild to severe level*



Base: All LTC users who could complete questionnaires and had at least one tooth
IOP: (N = 38 100)
DE users:(N = 5 510)
HCCS users: (N = 13 500)

Overall a high proportion of LTC users experienced negative impact of oral condition, in terms of limited food choice and dissatisfaction on the appearance of their teeth. However more HCCS users (38.4%) perceived their oral health as poor or very poor when compared to IOP and DE users (29.4% IOP, 24.8% DE users). Higher percentage of HCCS users (36.8%) reported the experience of oral problems compared with IOP (22.6%) and DE users (20. 0%).The disease pattern in terms of tooth loss and oral diseases in IOP, DE and HCCS users did not reflect their difference in self-perception of oral health and reported oral problem, in contrast to common belief that the negative impact of oral condition should be associated with tooth loss and oral diseases.

LTC users exhibited different level of oral risk especially a number of LTC users showed compromised ability to perform daily oral cleaning due to compromised health condition. The involvement of carers is necessary for this group of LTC users to maintain good oral hygiene and denture hygiene. It is essential to implement behavioural interventions to tackle those modifiable oral risk, such as comprehensive oral care training to carers, in order to promote sustainable and healthier oral habits among LTC users.

The assessed and realistic dental treatment need of LTC users

Assessed treatment need (Related to dental diseases or problems)

According to the recommendations from the World Health Organization, tooth-based treatment should be planned according to the crown and root status, the periodontal status, and mobility of the tooth. In general, treatment should be performed to:

- Eliminate pain / discomfort or to promote comfort
- Eliminate untreated decay
- Treat discoloration of a tooth, or a developmental defect
- Treat tooth defects due to trauma, abrasion, erosion or attrition
- Replace unsatisfactory fillings.

Realistic treatment need (Acceptance of assessed treatment)

The assessed treatment need was presented to the individual and the individual's acceptance of treatment was recorded as the realistic treatment need. If the individual was unable to answer, the family members or carers would be contacted and enquired on their preference to the treatment plan. Individuals were categorised as unable to respond only if they cannot express their acceptance of treatment and their family members/carers cannot be reached.

The distribution of LTC users according to their assessed treatment need and their treatment acceptance was summarised in Figures 7.16 to 7.18. Assessed treatment need was common in all LTC users, with the highest proportion among HCCS users (93.2%) followed by DE users (87.4%) and IOP (85.4%).

The acceptance of treatment need was lowest among IOP (50.5%), compared with 60.5% among DE users and 76.1% among HCCS users.

Some LTC users were unable to clearly express their acceptance to the assessed treatment need, ranging from 6.0% of HCCS users, 10.8% of DE users to 16.2% of IOP.

Figure 7.16 ***Dental Treatment need of IOP***

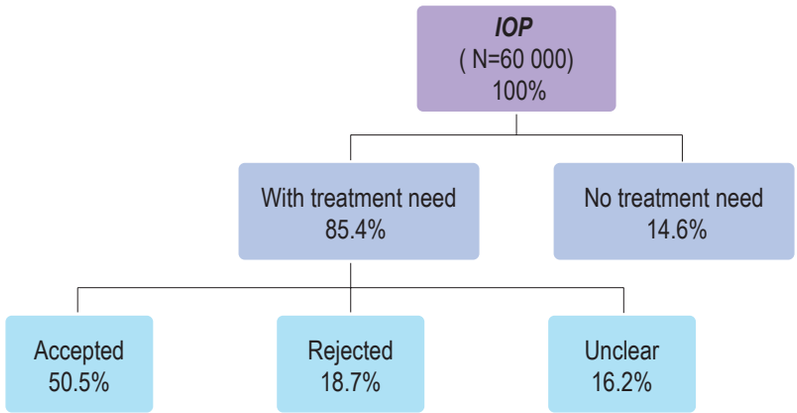


Figure 7.17 ***Dental Treatment need of DE users***

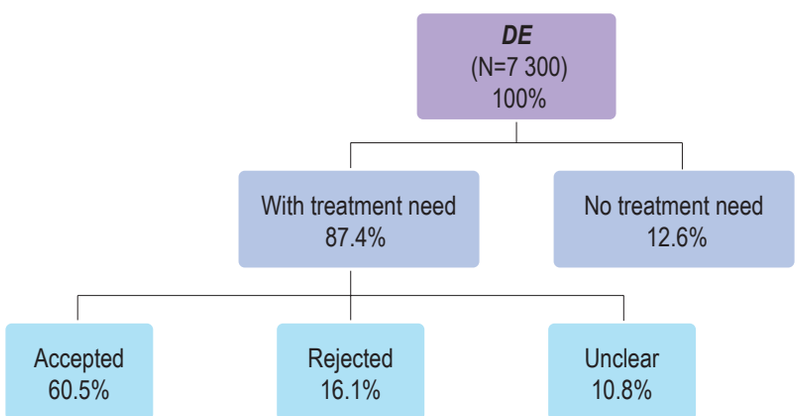
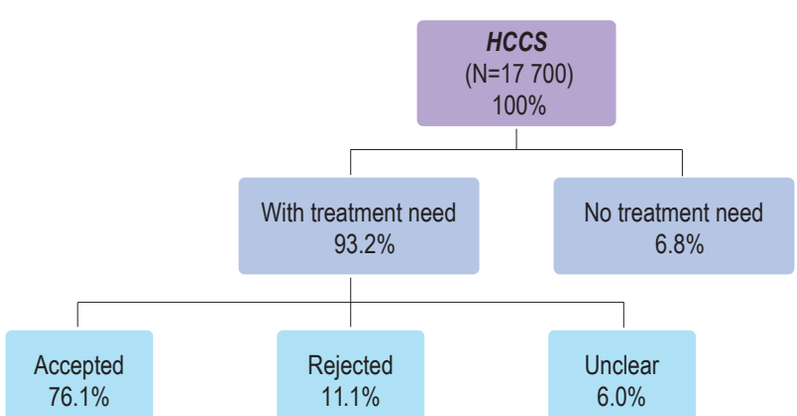


Figure 7.18 ***Dental Treatment need of HCCS users***



The needs of different treatment items at different levels were summarised in Table 7.6.

Among IOP, 'tooth extraction' was the least accepted treatment item recommended by dentist as the acceptance is just 41.4% over the assessed need. Acceptance of new denture is 47.7%. 'Repair denture' was highly accepted at 90.1%.

For DE users, the treatment least accepted by the users was 'tooth extraction' with the acceptance rate of 48.3% followed by 'new denture' with acceptance of 51.4%. 'Repair denture' is again highly accepted at 78.2%.

For HCCS users, treatment 'tooth extraction' accepted by the user was also low as 56.2%. Meanwhile, highest treatment acceptance belongs to repair of denture with acceptance of 89.9%.

Table 7.6 ***Percentages of LTC users according to the assessed and realistic needs as assessed by dentists in various treatment items***

LTC	Treatment item	Assessed need (%)	Realistic need (%)	Realistic / Assessed need (%)
IOP	Scaling	64.5	34.8	53.9
	Filling	28.0	15.5	55.5
	Extraction	42.9	17.8	41.4
	Repair denture	4.4	4.0	90.1
	New denture	51.9	24.8	47.7
DE	Scaling	73.3	51.3	70.0
	Filling	24.4	15.1	61.7
	Extraction	37.8	18.3	48.3
	Repair denture	4.3	3.3	78.2
	New denture	46.3	23.8	51.4
HCCS	Scaling	82.7	64.7	78.3
	Filling	32.8	25.2	76.9
	Extraction	38.9	21.8	56.2
	Repair denture	6.8	6.1	89.9
	New denture	49.4	37.5	76.0

The acceptance of dental treatment was relatively low among all LTC users, especially to extraction of teeth. Some LTC users were unable to express their acceptance, ranging from 6.0% of HCCS users, 10.8% of DE users to 16.2% of IOP. These LTC users may also had difficulties in giving consent in actual provision of dental services.

While the acceptance of dental treatment was found to be low among LTC users in this round of Oral Health Survey, the acceptance level was already much higher than that found in Oral Health Survey 2011. Older persons born in different generations experienced different social and economic environment and might have different perceptions towards oral health, thus their expectation and demands in oral health and dental care might also be different. This may be an indication of increasing expectations in oral health and higher demands for dental care over the past 10 years. Also, the differences in self-perception of oral health and reported oral problem between HCCS users, IOP and DE users may contribute to their difference in level of acceptance of dental treatments.

The complexities involved in providing dental services to LTC users

LTC users may present challenges to dentists providing dental care due to their medical, physical and cognitive status. To systematically assess the complexities involved in providing dental services to LTC users, this survey has set the assessment criteria with reference to an evaluative instrument adapted from an internationally recognised tool[2]. This instrument measures the barriers that dentists face while attending to persons requiring special dental care services, at which the dimensions are briefly described as follow:

- ✓ Communicative capacity reflects the issues of communication between the dental team and the LTC users and/or carers to determine if any restriction in communication and if extra aids are required.
- ✓ Willingness to co-operate reflects the difficulties the dental team faces when delivering dental care to determine what behavioural management technique (including sedation and general anaesthesia) is required to enable the person to accept the treatment.
- ✓ Medical condition of the LTC users reflects if modification is required for provision of dental care due to the patient's complex medical conditions which multi-disciplinary collaboration might be required.
- ✓ Accessibility of dental care services reflects difficulties or barriers the LTC users face during the complete course of dental care.
- ✓ Legal and ethical constraints identify the difficulties which the dental team might face when obtaining consent with the LTC users or the carers of the users, including the situations when the LTC user concerned is mentally incapacitated.

Using this tool, Oral Health Survey 2021 carefully looked into the specific details and challenges of providing dental care to LTC users. The difficulties and complexities described above reflect the amount and types of extra resources needed in order to provide dental treatment to the LTC users. The results provided information on resources planning for future service development for this targeted group.

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2 'Case Mix 2019' developed by the British Dental Association (https://www.bda.org/about-us/our-structure/representative-committees/community-and-public-dental-services/case-mix/)

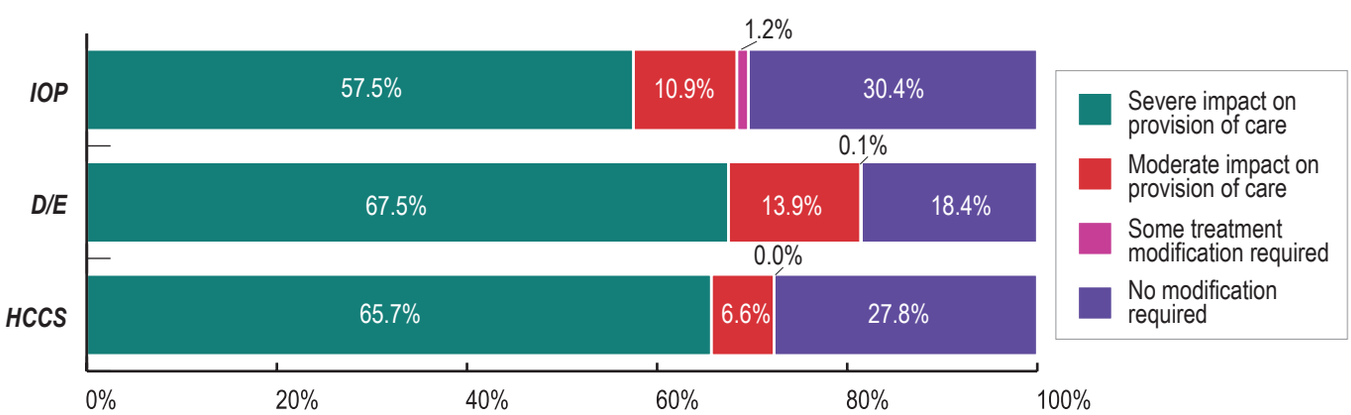
The occurrence of the most commonly recorded medical conditions among LTC users were summarised in Table 7.7 and the distribution of impact on provision of dental care due to medical status were summarised in Figure 7.19. Over half of the LTC users in all 3 groups had been categorised as having severe impact of medical condition on provision of dental care. This finding suggested that the majority had multiple medical problems, or with specific medical condition, for example, cancer or stroke, that could greatly interfere with the delivery of their necessary dental care. Less than one-third of the LTC users did not need to have treatment modification based on their medical status. Dental treatments for individuals with severe impact of their medical condition require careful coordination with the medical team to adjust their routine medication. Different approaches, including provision of dental treatments in a hospital setting, are often required in order to better manage persons with these complex medical conditions.

Table 7.7 ***The occurrence of the most commonly recorded medical conditions among LTC users (Multiple answers)***

Medical condition	IOP (N=60 000)	DE (N=7 300)	HCCS (N=17 700)
Dementia	31.6%	45.3%	14.4%
Stroke	20.9%	24.6%	16.5%
Heart diseases	15.9%	16.4%	22.8%
Cancer	3.7%	4.7%	8.5%
Mental illness / mood disorder	11.5%	9.6%	14.8%
Comorbidity (having 3 or more medical condition)	49.9%	61.4%	58.1%

Base: All LTC users

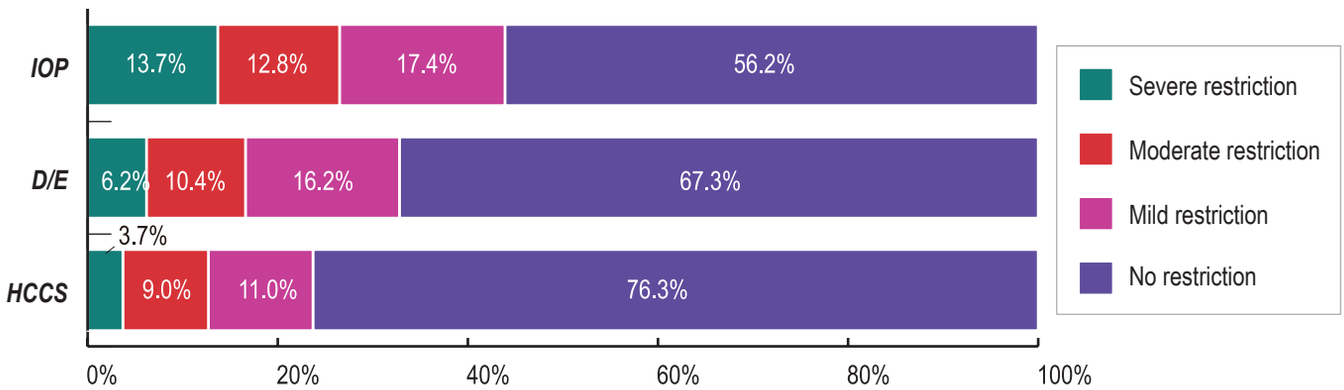
Figure 7.19 ***Distribution of LTC users according to impact on provision of dental care due to medical status***



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Restriction in communication was more common among IOP (Figure 7.20), with 13.7% (8 220) of them had severe restriction in communication. It indicated that they had only limited or no ability to communicate and their family and carers were not readily available, or third-party interpreter was required to facilitate the communication. More time and extra resource were required in provision of care to them.

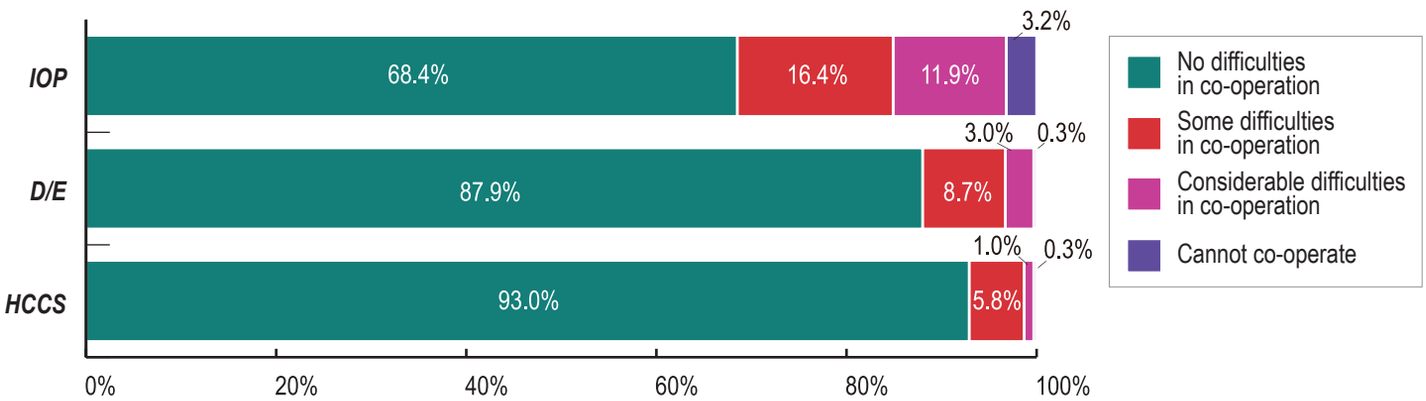
Figure 7.20 ***Distribution of LTC users according to barriers on communication assessed by the examining dentists***



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Cooperation barrier was also more common among IOP (Figure 7.21). In severely uncooperative case, dental treatments usually need to be completed using advanced behavioural management technique such as sedation and general anaesthesia, which require dentist to have special training to assess the medical risk and to coordinate with medical team for provision of dental treatments under such modalities. Extra facilities and hospital operating theatre are required to accommodate such barrier.

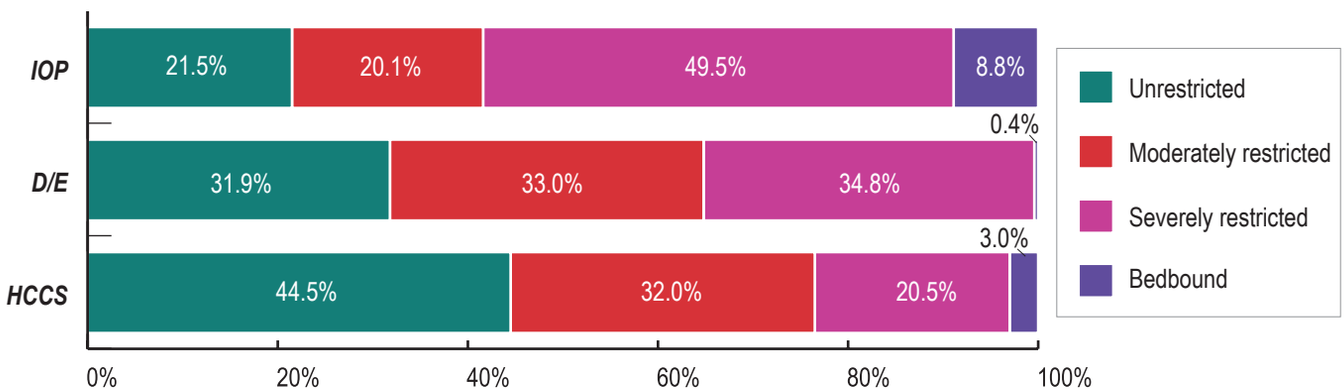
***Figure 7.21** Distribution of LTC users according to cooperativeness on cooperation assessed by the examining dentists*



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Access barrier to dental care was common among all LTC users (Figure 7.22). 78.5% of IOP (47 100), 68.1% of DE users (4 970) and 55.5% of HCCS users (9 820) required escort to access the dental clinic. 8.8% of IOP (5 280) and 3.0% of HCCS users (530) were bedbound, which required outreach dental service to provide regular on-site dental service. However if more complicated dental treatments had to be provided, additional transportation arrangement was necessary to transfer them to the dental clinic.

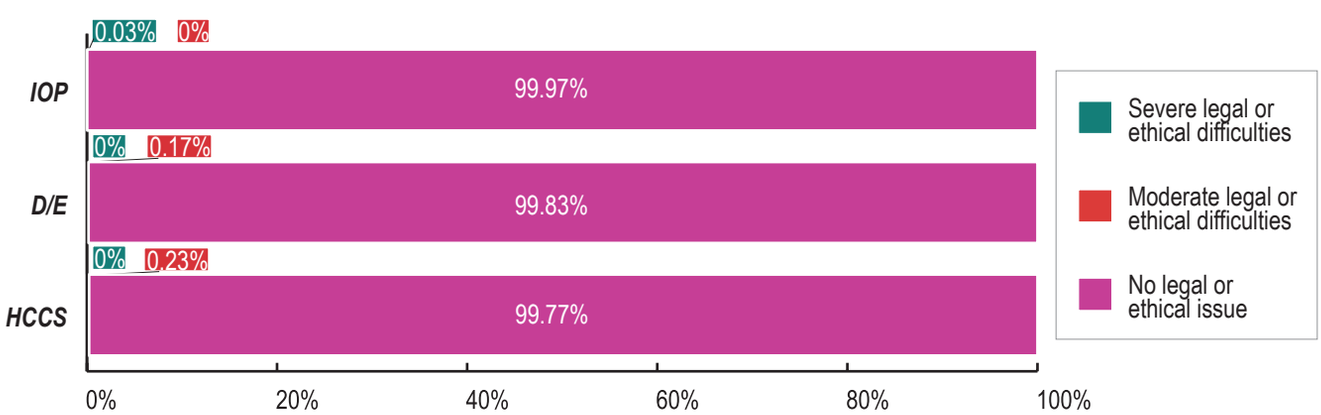
Figure 7.22 ***Distribution of LTC users according to barriers on physical access assessed by the examining dentists***



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Only a small proportion of LTC users was found with uncertain capacity (Figure 7.23). In this survey, consent had been obtained from all subjects and their family members as pre-requisite. The finding indicated that there were no subjects with severe legal or ethical difficulties would underestimate the proportion of such LTC users in the population. For individuals with severe legal or ethical difficulties, the best interest decision for dental treatment would require second doctor's opinion or guardianship board's assistance in accordance to the Mental Health Ordinance (Cap. 136).

Figure 7.23 ***Distribution of LTC users according to legal/ethical barrier assessed by the examining dentists***



Base: All LTC users
IOP: (N = 60 000)
DE users: (N = 7 300)
HCCS users: (N = 17 700)

Chapter 7 – Summary

Findings from this Oral Health Survey revealed that both the number of LTC users and the proportion of the older sub-groups among LTC users in Hong Kong population had increased. The above facts accompanied with that more natural teeth were retained but cleanliness of teeth and denture were both problematic. Tooth decay affecting majority of those with teeth remaining while gum pockets were relatively less common.

Oral discomfort and negative impacts were perceived by some LTC users. Acceptance of dental treatment was still low, but already much higher than in Oral Health Survey 2011. During clinical examinations, dentists encountered varying degrees of difficulty in both assessing and planning treatment for individuals across the different LTC categories. There were large proportion of LTC users facing non-modifiable barriers, including medical comorbidities, limited access to dental care, and challenges with communication and cooperation, which exacerbated the complexity of dental management. These barriers were often compounded by existing long-term health conditions that could limit functionality and complicate dental interventions. Providing dental services to LTC users would be challenging and extra resources were often required.

Way Forward

The present survey found that more teeth had been retained while level of untreated decay remained high amongst the three categories of LTC users. Emphasis and resources should be put into prevention in this population prior to the deterioration of their oral health due to loss of self-care ability and accelerating oral risk, at a stage before the use of long-term care service. Cleanliness of teeth was a concern as visible plaque and calculus was found in vast majority of the LTC users with remaining teeth, which indicated inadequate daily oral hygiene care and lack of professional cleaning. The importance of daily oral care must be promoted not only to the LTC users but also to people involved in the care of LTC users. In parallel, continuous professional dental care should be available and accessible no matter the LTC users are resided in institutions or in community.

While high proportion of LTC users reported oral problems and experienced negative impacts from oral conditions, it would be challenging for dentists to provide dental care to this target group as most of them had medical comorbidities, limited access to dental care, and barriers in communication and cooperation. These barriers exacerbated the complexity of dental management and required dentists with additional training, specialised additional facilities or special arrangements in provision of dental care. Cases with complex medical conditions and with cooperation problem often require medical input (e.g., require modification of medication or blood check before treatment) for dental treatment planning and require dental treatments to be performed under hospital setting. Training for dental profession on management of patients with needs in special care dental service, and availability of hospital services and facilities including sedation and hospital operating theatre are essential to address the dental needs of this vulnerable population.

To maintain the oral health and sustain the result of dental treatment for LTC users, a holistic approach with considerations on their medical, dental, and social risk should be adapted. Cross-disciplinary collaboration with the social services, medical practitioners, staff from LTC institutions, relatives and carers of the LTC users is required to cope with the raising dental need of this population. Coordinated efforts from different levels are crucial to enabling the LTC users to receive a comprehensive dental care ranged from preventive to curative treatment that is on par with the general population.

CHAPTER 8

Overview

'The World Health Assembly urged member states to reorient the traditional curative approach, which is basically pathogenic, and move towards a preventive promotional approach with risk identification for timely, comprehensive and inclusive care…'

(World Health Assembly Resolution 74.5, 2021)

Heading towards the same direction, the Government of Hong Kong Special Administrative Region (the Government) established the Working Group on Oral Health and Dental Care (Working Group) in December 2022 to review the existing dental care services and advise the Government on the long-term strategy for oral health and dental care, as well as matters including enhancement of the scope and mode of the services. It was established that the goal of primary dental care is to enhance the oral health of the community through retention of natural teeth.

Over the years, the general public has been focusing on curative dental services such as dental fillings, extraction and the prosthetic replacement of missing teeth in the demand for oral health care. However, the Working Group acknowledged that tooth loss is avoidable and should be tackled by preventive rather than by curative dental services. Curative dental services may repair the consequences of dental diseases (such as filling a decayed cavity by a dental restoration) but are unable to affect the disease processes (such as the mineral loss leading to the decayed cavity). Therefore, such services are unable to resolve dental problems and dental diseases are likely to recur (such as the appearance of new decayed cavity). It is more likely for people to prevent tooth decay and gum diseases if they can adopt the lifestyle conducive to oral health (refer to Chapter 2) and use preventive dental services such as topical fluoride or fissure sealant.

The strategies of prevention, early identification and timely intervention of chronic diseases promulgated in the Primary Healthcare Blueprint shall be applied in the development of primary dental services. The change in the mindset of the public to support these initiatives is crucial for their effectiveness.

The Interim Report of the Working Group stated that tooth decay and gum diseases are the major dental public health threats to be tackled in Hong Kong. The findings of OHS 2021 substantiate this belief as untreated tooth decay was found in 39% of 5-year old children, 32% of adults and 47% of NOP. Gum pockets were also found in 57% of adults and 70% of NOP. Much work needs to be done to prevent these levels of dental diseases from occurring again in future.

Maintaining personal daily oral hygiene habit and adopting a lifestyle conducive to oral health are the keys to promoting oral health at the individual level. The OHS 2021 found that the reported oral hygiene practices had improved, but this may give a false sense of security to the public. The results of the OHS 2001, 2011 and 2021 all indicated that the habit of regular dental check-ups was not common in all the target age groups. Possibly due to the lack of personalised instruction provided by a dental professional, the reported oral hygiene practices had left the back teeth inadequately cleaned with high risk of developing further dental diseases. The results of OHS 2021 support and reinforce the need to develop primary dental services appropriately for different age groups in order to facilitate lifestyle change among the citizens.

The periodic assessment of oral health risks should be an integral part of the primary dental services to be developed. Oral health risks are usually elevated when a person suffers from a medical condition, due to the medical condition per se or due to the side effects of medical treatment. Early initiation and sustained preventive dental care in parallel with medical treatment is necessary to reduce the high level of dental diseases observed among the long-term care service users seen in OHS 2021.

The vision of the Global Strategy on Oral Health adopted in in May 2022 at the 75th World Health Assembly (A75/10 Add.1 and WHA75(11)) is universal oral health coverage for all individuals and communities by 2030, enabling them to enjoy the highest attainable state of oral health and contributing to healthy and active lives. Shifting the focus of both the oral healthcare system and people's mindset from curative-oriented to preventive-oriented to increase the likelihood of retaining natural teeth should be the priority of public investment.

APPENDIX I
Sampling method of 5-year old children

Introduction

The 5-year old children covered in this survey were all born in 2016 & 2017. As primary schools in Hong Kong only admit children who reach age 6 or above to primary one (P1) by the end of each calendar year (age of 5 years 8 months when enrolled P1 in September of the year), it was assumed that all children in P1 were 6 years old at the beginning of the calendar year. Hence, the survey for the 5-year old children was intentionally timed at the beginning of 2022 and the children were selected from upper class of kindergartens. However, because of COVID-19 pandemic, the oral examination of Oral Health Survey was postponed and also could not be conducted continuously. The period of oral examination was finally lasted from May 2022 to March 2023. In order to select enough 5-year old children, the survey for the 5-year old children had to be recruited from two consecutive years of upper class of kindergartens in 2022 and 2023.

Oral health surveys were done in 2001 and 2011 on the 5-year old children and some of the results in those surveys were presented in this report for comparison purpose.
Readers who wish to have a summary of the major survey findings can go directly to quick reference section in green boxes of the relevant chapter.

Survey objectives

The objectives of the survey of the 5-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 behavior;
3. To collect information on the parents' knowledge on dental diseases; and
4. To collect information on parents' attitudes towards the children's oral health.

Sample design

The sample of 5-year old children was drawn using kindergarten as the primary sampling unit. Upon harmonization of pre-primary services in 2005, all pre-primary institutions providing services for children aged 3 or above are registered under Education Ordinance (Cap. 279) and operate as either kindergartens or kindergarten-cum-child care centres (collectively referred to as kindergartens in this report). A total of 68 kindergartens were selected from a database of all kindergartens provided by the Education Bureau and invited to participate in the survey.

Data collection method

The basic work units for carrying out the onsite data collection were the fieldwork teams. One or two teams were arranged for each kindergarten. Each team consisted of one dentist, one clinical assistant and one research assistant (RA). The dentist and the clinical assistant carried out the clinical data collection, i.e. conducting a oral examination on the survey children and recording the clinical findings. The RA checked the completed parental/ caregivers' questionnaires collected by the kindergarten.

A structured questionnaire was used to collect information regarding the survey of children's background, oral health and oral health related behaviours, and their parents' oral health knowledge and attitudes. Before the survey, the draft questionnaire was pre-tested on parents of younger students attending a non-survey kindergarten. Revisions were made on the questionnaire before it was finalized. The questionnaires were distributed to the parents through the kindergarten and were self-completed by children's parents or caregivers before the clinical examination of the children. Each completed questionnaire was returned to the kindergarten in a sealed opaque envelope to ensure the privacy of the parents and the children. The envelopes were collected by the kindergarten and returned to the Oral Health Survey (OHS) team. The OHS team then entered the information in the questionnaire into an electronic database. Follow-up telephone calls to the parents were made if there were unclear answers in the questionnaire. Proof reading of the entered data was carried out by the OHS team.

The oral examination of the children was taken place in a field setting in the kindergarten. The clinical procedures essentially followed the recommendation of the World Health Organization (WHO) for basic oral health survey. The clinical examination was done visually with the aid of a disposable mirror illuminated by a LED light in the mirror handle. WHO CPI probe was used to confirm presence of a dental caries lesion and its status (active or arrested). In addition, presence of visible plaque on tooth surfaces, oral mucosal lesions, and other dental conditions were assessed. No dental radiograph was taken. Findings of the examination, according to the defined diagnostic criteria of oral diseases or conditions, were directly input into an electronic device by the clinical assistant to form the electronic database.

During the fieldwork period, the calibrating examiner (an experienced oral epidemiologist) and the field examiners (dentists) conducted duplicate examinations on the survey 5-year old children to monitor examiner reliability. The number of duplicate examinations was approximately 10% of the number of survey children. Kappa statistics was calculated. It ranged from 0.87 to 0.96 for visible plaque index, to crown status.

Enumeration results

Out of the 68 selected kindergartens, 36 of them agreed to participate in this survey. A total of 1 374 children from the kindergartens were invited and 1 191 children with parental consent and sufficient records were examined. Only 5-year old children were included in the final analysis. After statistical adjustment and weighting, results from this survey could be inferred to 39 700 children aged 5 enrolled in the kindergartens. According to the Census and Statistics Department, at the end of 2022 there were 50 800 5-year old children in Hong Kong. The survey thus covered 78.1% of all 5-year old children. Some Hong Kong children in this age group were not enrolled in the above-mentioned types of institution and they were not included in this survey.

APPENDIX II
Sampling method of 12-year old students

Introduction

The 12-year old students covered in this survey were all born between 1 January 2010 and 31 December 2010. In Hong Kong, majority of 12-year old children are in Form 1 (S1) in secondary schools. The survey on this age group was thus targeted at 12-year old students in S1 in secondary schools. Owing to COVID-19 pandemic, the oral examination could not be completed by end of 2022 and it needed to be conducted continuously from November 2022 till July 2023.

Some of the results about 12-year old students from oral health surveys in 2001 and 2011 were presented in this report for comparison purpose. Readers who wish to have a summary of the major survey findings can go directly to quick reference section in green boxes of the relevant chapter.

Survey objectives

The objectives of the survey of the 12-year old students were:

1. To assess the oral health status (mainly tooth decay, gum condition and oral hygiene status);
2. To collect information on the oral health care behavior;
3. To collect information on the students' and parent's knowledge on dental diseases; and
4. To collect information on students' and parents' attitudes towards oral health and regular checkup.

Sample design

The sample of 12-year old students was drawn using secondary schools as the primary sampling unit. From a database of all secondary schools provided by the Education Bureau, 20 schools were selected. All S1 12-year old students who were born between 1 January 2010 and 31 December 2010 in the selected secondary schools were included.

Data collection method

The basic work units for carrying out the onsite data collection are the fieldwork teams. One or two teams were arranged for each school. Each team consisted of one dentist, one clinical assistant and one research assistance (RA). The dentist and the clinical assistant carried out the clinical data collection, i.e. oral examination of the survey 12-year-olds. The RA monitored the completion of the online questionnaire by the students.

Before the survey of the 12-year-old students, their parents were asked to complete a structured questionnaire. This questionnaire was for collection of information on the parents' oral health related knowledge, attitudes and behaviours, and also the parents' perceptions on their children's oral health conditions and their planning to bring their children for regular checkup. The draft questionnaires were pre-tested on students who were attending a non-survey secondary school and their parents. They were finalized after revisions. During the survey, the parents could complete the questionnaire online or they could choose to fill in a hardcopy of the questionnaire and mail it back to the Oral Health Survey (OHS) team. Upon receiving the hardcopies of the questionnaire, the OHS team would enter the information into the electronic database. Proof reading of the entered data was be carried out by the OHS team.

Another structured questionnaire was used to collect information on the 12-year-old student's oral health related knowledge, attitudes and behaviours, and also the student's perceived oral health status and utilization of dental care services. The online questionnaires were self-completed by the students onsite. They were asked to use an electronic device provided to complete the questionnaire, and the data were automatically transferred to the electronic database.

The oral examination of the 12-year-old students took place in a field setting in the school. The clinical procedures essentially followed the recommendation of the World Health Organization (WHO) for basic oral health survey. The clinical examination was done visually with the aid of a disposable mirror illuminated by a LED light in the mirror handle. A WHO CPI probe was used to confirm presence of a dental caries lesion, detect gingival bleeding upon probing and presence of calculus. In addition, presence of visible plaque on tooth surfaces, oral mucosal lesions, and other dental conditions were assessed. No dental radiograph was taken. Findings of the examination, according to the defined diagnostic criteria of oral diseases or conditions, were directly input into the electronic database using an electronic device by the clinical assistant.

During the fieldwork period, the calibrating examiner (experienced oral epidemiologist) and the field examiners (dentists) conducted duplicate examinations on the survey 12-year-old students to monitor examiner reliability. The number of duplicate examinations was approximately 8% of the number of survey students. Kappa statistics was calculated. It ranged from 0.38 to 0.90 for visible plaque index, bleeding on probing of gum tissue to tooth status.

Enumeration results

Out of the 20 selected schools, 14 of them agreed to participate in this survey. From these 14 schools, 1 667 students were selected and 1 069 of them with parental consent were successfully examined. With statistical adjustment and weighting, the results of this survey could be inferred to 50 000 students aged 12 in Hong Kong. According to the Census and Statistics Department, there were 59 500 children aged 12 in Hong Kong at the end of 2022. The survey thus covered 84.0% of all 12-year old children.

APPENDIX III
Sampling method of 35 to 44-year old adults

Introduction

The 35 to 44-year old age group is an index age group recommended by the WHO for monitoring the oral health conditions of adults. In this Oral Health Survey, data were collected to monitor the oral health status and dental service utilisation patterns of those in this age group. The information collected will be used for oral health care planning and oral health promotion in the future.

Survey objectives

The objectives of the survey of the 35 to 44-year old adult population were:

1. To collect information on the oral health status and treatment need of the adults and NOPs;
2. To collect information on their oral health care behaviours together with the related pre-disposing and enabling factors; and
3. To collect information on the impact to their quality of life by their oral diseases.

Survey design

The Survey design is similar to that of the OHS 2011 which was designed along the recommendations made by the World Health Organization. Internationally adopted indicators and parameters are used for making comparison with the surveys conducted locally and overseas.

The Survey comprised a clinical oral examination and a questionnaire interview. The clinical oral examination collected the information on oral health status and treatment need of the adults. Whereas the questionnaire interview collected information on their oral health behaviours, the related pre-disposing and enabling factors (e.g. perceived oral health, health belief, oral health knowledge, dental value, barriers and incentives of oral care seeking behaviours) and oral health impact to daily life.

The target subjects for the present oral health survey was identified through a household interview (Enumeration Exercise) by interviewers of Contractor commissioned by the Centre for Health Protection in their territory-wide general health survey, the Population Health Survey 2020-2022 (PHS 2020-2022). The interviewers of Contractor invited subjects falling into the adult age groups to participate in the OHS 2021. Later a follow-up clinical oral examination and questionnaire interview were conducted on the subjects by the fieldwork team of another Contractor commissioned by the Dental Services, DH. After subjects agreed to sign the consent form to participate in the OHS 2021, a follow-up letter was issued to them for confirmation and record purposes.

Sample size

The target effective sample size of each of the adult groups for clinical oral examination and questionnaire interviews was 550 subjects, after reviewing the experience of the last OHS, and balancing the level of precision required and the resources consideration. With such target effective sample size, the precision levels of the major clinical estimates (caries experience and prevalence of periodontal pocket) as well as the major oral health behavior (regular dental checkup rate) are estimated within acceptable level.

Sampling Frame

As the enumeration exercise of the OHS 2021 was conducted via the household survey of the PHS 2020-2022, the OHS adopted the Frame of Quarters (FQ) maintained by the Census and Statistics Department (C&SD) as the sampling frame, being the same as the survey design of the PHS 2020-2022. The FQ consisted of the Register of Quarters (RQ) and the Register of Segments (RS) which contained records of all addresses of permanent quarters in built-up areas and records of area segments in non-built-up areas respectively. Systematic replicated sampling was deployed by the C&SD for selecting a sample of replicates of living quarters in built-up areas from the RQ and a sample of replicates of area segments in non-built-up areas from the RS. Each replicate (containing approximately 500 addresses of living quarters) was a representative sample of households in Hong Kong. All households residing in a sampled living quarters were identified and all eligible members within the target age groups in each household were enumerated.

The PHS sampled a total of 24 replicates of living quarters. For OHS 2021, it was estimated that due to different subject number per household in the 35-44-year-old adult age group (adult: 0.33), all the 35-44 years old adults in 13 out of the 24 random replicates were recruited.

Subject Recruitment

Dental Services of DH provided Contractor with a list of potential survey participants. The people in the list had given consent for the oral health survey (OHS) team to contact them via their telephone numbers for making appointments. Telephone calls were made by the staff of the contractor. Individualized appointments with the outreaching OHS fieldwork team (each team comprises at least one dentist and one assistant) were made according to the participant's preference to have the clinical oral examination and questionnaire interview carried out at their homes or a designated place (Prince Philip Dental Hospital or a government dental clinic).

Data collection

Each fieldwork team of the contractor consisted of one dentist, one clinical assistant and one research assistant (RA). The dentist and the clinical assistant carried out the clinical data collection, i.e. oral examination of the survey participants, and the RA collected the other data through conducting interviews with the participants.

During the fieldwork period, the calibrating examiner (experienced oral epidemiologist) and the field examiners (dentists) conducted duplicate examinations on the survey 35-44-year-old adults to monitor examiner reliability. The number of duplicate examinations was approximately 6% of the number of survey adults. Kappa statistics was calculated. It ranged from 0.55 to 0.91 for bleeding on probing, pocket depth to tooth status.

Enumeration results

According to the PHS 2020-2022, there were 2677 household members living in sampled quarters aged between 35-44 year-old during their fieldwork period. 705 of them consented to join OHS2021. Finally 492 of them joined OHS 2021 which gave the response rate about 18.4%.

A non-response bias analysis was done and found that there was no significant difference between the responded and non-responded subjects for the adult group.

After grossing up, the survey estimates can be inferred to those of the study population (985 200 persons*) during the survey period.

* An estimate of 985 200 land-based non-institutionalised adults (excluding foreign domestic helpers, inmates of institutions and persons living on board vessels) aged 35-44 was sourced from the findings of the General Household Survey for Q2 2022 conducted by the Census and Statistics Department.

APPENDIX IV
Sampling method of 65 to 74-year old non-institutionalised older persons (NOP)

Introduction

The 65 to 74-year old age group is an index age group recommended by the WHO for monitoring the oral health conditions of adults. In this Oral Health Survey, data were collected to monitor the oral health status and dental service utilisation patterns of those in this age group. The information collected will be used for oral health care planning and oral health promotion in the future. As to the sampling method and information of the 65 to 74-year old non-institutionalised older person (NOP), please refer to the following information of this Appendix IV and Chapter 6. Whereas for information regarding the functionally dependent older persons, please refer to Appendix V and Chapter 7.

Survey objectives

The objectives of the survey of the 65 to 74-year old NOP population were:

1. To collect information on the oral health status and treatment need of the NOPs;
2. To collect information on their oral health care behaviours together with the related pre-disposing and enabling factors; and
3. To collect information on the impact to their quality of life by their oral diseases.

Survey design

The Survey design is similar to that of the OHS 2011 which was designed along the recommendations made by the World Health Organization. Internationally adopted indicators and parameters are used for making comparison with the surveys conducted locally and overseas.

The Survey comprised a clinical oral examination and a questionnaire interview. The clinical oral examination collected the information on oral health status and treatment need of the NOP. Whereas the questionnaire interview collected information on their oral health behaviours, the related pre-disposing and enabling factors (e.g. perceived oral health, health belief, oral health knowledge, dental value, barriers and incentives of oral care seeking behaviours) and oral health impact to daily life.

The target subjects for the present oral health survey was identified through a household interview (Enumeration Exercise) by interviewers of Contractor commissioned by the Centre for Health Protection in their territory-wide general health survey, the Population Health Survey 2020-2022 (PHS 2020-2022). The interviewers of Contractor invited subjects falling into the NOP age groups to participate in the OHS 2021. Later a follow-up clinical oral examination and questionnaire interview were conducted on the subjects by the fieldwork team of another Contractor commissioned by the Dental Services, DH. After subjects agreed to sign the consent form to participate in the OHS 2021, a follow-up letter was issued to them for confirmation and record purposes.

Sample size

The target effective sample size of each of the NOP groups for clinical oral examination and questionnaire interviews was 550 subjects, after reviewing the experience of the last OHS, and balancing the level of precision required and the resources consideration. With such target effective sample size, the precision levels of the major clinical estimates (caries experience and prevalence of periodontal pocket) as well as the major oral health behavior (regular dental checkup rate) are estimated within acceptable level.

Sampling Frame

As the enumeration exercise of the OHS 2021 was conducted via the household survey of the PHS 2020-2022, the OHS adopted the Frame of Quarters (FQ) maintained by the Census and Statistics Department (C&SD) as the sampling frame, being the same as the survey design of the PHS 2020-2022. The FQ consisted of the Register of Quarters (RQ) and the Register of Segments (RS) which contained records of all addresses of permanent quarters in built-up areas and records of area segments in non-built-up areas respectively. Systematic replicated sampling was deployed by the C&SD for selecting a sample of replicates of living quarters in built-up areas from the RQ and a sample of replicates of area segments in non-built-up areas from the RS. Each replicate (containing approximately 500 addresses of living quarters) was a representative sample of households in Hong Kong. All households residing in a sampled living quarters were identified and all eligible members within the target age groups in each household were enumerated.

The PHS sampled a total of 24 replicates of living quarters. For OHS 2021, it was estimated that due to different subject number per household in the 65-74 year-old NOP age group (NOP: 0.25), all the 65-74 years old NOP in 17 out of the 24 random replicates were recruited.

Subject Recruitment

Dental Services of DH provided Contractor with a list of potential survey participants. The people in the list had given consent for the oral health survey (OHS) team to contact them via their telephone numbers for making appointments. Telephone calls were made by the staff of the contractor. Individualized appointments with the outreaching OHS fieldwork team (each team comprises at least one dentist and one assistant) were made according to the participant's preference to have the clinical oral examination and questionnaire interview carried out at their homes or a designated place (Prince Philip Dental Hospital or a government dental clinic).

Data collection

Each fieldwork team of the contractor consisted of one dentist, one clinical assistant and one research assistant (RA). The dentist and the clinical assistant carried out the clinical data collection, i.e. oral examination of the survey participants, and the RA collected the other data through conducting interviews with the participants.

During the fieldwork period, the calibrating examiner (experienced oral epidemiologist) and the field examiners (dentists) conducted duplicate examinations on the survey 65-74-year-old NOP to monitor examiner reliability. The number of duplicate examinations was approximately 7% of the number of survey NOP. Kappa statistics was calculated. It ranged from 0.62 to 0.92 for bleeding on probing, pocket depth to tooth status.

Enumeration results

According to the PHS 2020-2022, there were 2511 household members living in sampled quarters aged between 65-74 year-old during their fieldwork period. 800 of them consented to join OHS2021. Finally 542 of them joined OHS 2021 which gave the response rate about 21.6%.

A non-response bias analysis was done and found that there was no significant difference between the responded and non-responded subjects for the NOP group.

After grossing up, the survey estimates can be inferred to those of the study population (883 200 persons*) during the survey period.

* An estimate of 883 200 land-based non-institutionalised persons aged 65 to 74 (excluding foreign domestic helpers, inmates of institutions, persons living on board vessels and persons aged 65 to 74 receiving long-term care services under Social Welfare Department) was sourced from the findings of the General Household Survey for Q2 2022 conducted by the Census and Statistics Department.

APPENDIX V
Sampling method of Aged 65 and above users of Social Welfare Department - Long-term Care Services

Introduction

The group of institutionalised older persons (IOP), i.e. older persons residing in residential care homes, have been included as a target group in the Oral Health Survey conducted since 2001. Older persons moving to residential care homes are commonly because of the inability to self-care and lack of support in their own homes. These reasons may also explain the differences in oral health status and oral health needs among the IOP as compared to community-dwelling older persons (i.e. NOP).

The Oral Health Survey 2001 found that 'the possible impact of being in residential care homes coupled with the inability to seek care due to poor general health had been mentioned as reasons for not seeking care. The perceived inconvenience on the need for assistance or escort by caregivers, may have accounted for the perception that their own oral health problems were minor issues.' It was also found that the standard survey criteria in assessing dental treatment need would be acceptable on individuals who are relatively fit and healthy, however may not be realistic for the IOP. As mentioned in the Oral Health Survey 2001, 'the general health condition of the IOP had not been taken into account in the survey's assessment of treatment need. Hence, the course of treatment itself, such as the removal of teeth or the filling of decayed teeth, may possibly lead to distress for some IOP.'

In Oral Health Survey 2011, an attempt was made to evaluate treatment need recommended by the dentists and the willingness of the older persons to receive the recommended treatments. This investigation echoed with international views that treatment planning for functionally dependent older persons should be rational rather than technically ideal. Furthermore, under the Government's policy to support 'ageing in the community as the core, institutional care as back-up', more and more functionally dependent older persons are expected to be living in the community. The coverage of Oral Health Survey 2011 was expanded to include older persons receiving long-term care (LTC) services categorised as community care services, i.e. the users of Day Care Centres or Units for the Elderly and the users of Enhanced Home & Community Care Services and Integrated Home Care Services (Covered Frail Cases) .

In this survey, the investigation covered the same groups of older persons as in Oral Health Survey 2011. The group receiving residential care services is equivalent to the institutionalised older persons (IOP) group in the Oral Health Survey 2001 and 2011, and they are also referred to as IOP in the remainder of this report.

The three categories of Long-term Care (LTC) services users that had been covered in this survey were listed as following:

1. Users of Residential Care Services (IOP)
2. Users of Day Care Centres or Units for the Elderly (DE)
3. Users of Enhanced Home & Community Care Services and Integrated Home Care Services (Covered Frail Cases only) (HCCS).

Survey objectives

The objectives of the survey on users of LTC services were:

1. to describe their oral status;
2. to describe the experience in oral health problems and impact of oral conditions on daily lives and oral risk related to tooth decay and periodontal disease;
3. to describe and compare dental treatment needs as assessed by dentists and their acceptance; and
4. to describe the complexities involved in providing dental care to this group of older persons.

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[1] Since 2003, the Social Welfare Department (SWD) has adopted a Standardised Care Need Assessment Mechanism for eligibility screening for subsidised long-term care (LTC) services, to ascertain the care needs, and to match the older persons with appropriate services. Subsidised LTC services can be broadly divided into two categories: Residential care services and community care services. The standardised assessment mechanisms comprehensively assess the long-term care needs of older persons, taking into account the impairment level in functional performance of daily activities, cognitive impairment, risks of living environment, carer's condition, etc, so as to better identify the various LTC service needs of the older persons, and match them with appropriate services.

[2] The Standardised Care Need Assessment Mechanism of SWD covers applications for subsidised LTC services including the following Community Care Services: (i) Day Care Centres/Units for the Elderly; (ii) Enhanced Home and Community Care; and (iii) Integrated Home Care (Frail Cases).

Survey methods

Sample design

The lists of service providers were downloaded from the website of SWD for use as sampling frames. It was confirmed with SWD that the lists were up-to-date for the purpose.

Number of LTC service providers included in the sampling procedure *

LTC Service	Provider
Residential care homes	1036 homes
Day care centres or units	91 centres
Enhanced home and community care services and Integrated home care services (covered frail cases only)	82 teams

* As at end of December 2021

The samples of LTC users were drawn in clusters with LTC service providers as a unit from the lists downloaded from the website of SWD, using a scientific sampling method.

Data collection method

The same data collection procedures were performed on three categories of LTC users selected. Data on personal particulars and medical history were obtained from the personal record kept by the LTC service providers with the consent of the selected older persons.

Data on oral health status were collected by clinical examination performed by a team of dentists. Clinical examination for IOP and DE users was performed at the selected residential care homes or day care centres using portable equipments. Examination for HCCS users was performed at the living quarters of the selected older persons.

Data on personal behaviour, experiences related to oral health and oral health service were collected through structured interview conducted by a team of trained dental surgery assistants.

Training sessions were arranged for both the examining dentists and dental surgery assistants to familiarise them with the data collection methods and to calibrate them to ensure consistency.

During the fieldwork period, the calibrating examiner (experienced oral epidemiologist) and the field examiners (dentists) conducted duplicate examinations on the survey LTC users to monitor examiner reliability. The number of duplicate examinations was approximately 12% of the number of survey LTC users. Kappa statistics was calculated. It ranged from 0.76 to 0.95 for calculus, bleeding on probing, to crown status.

Enumeration results

Residential care homes

A total of 24 residential care homes were invited to participate in the survey with 14 of them agreed to participate. A total of 1 231 IOP were invited to participate in the survey, with 668 consents received.

At the end of the survey, a total of 612 IOP were clinically examined and 402 of them were interviewed. Those who could not be interviewed had problems either in understanding the questions or in giving responses. With statistical adjustment and weighting, the final results could be inferred to some 60 000 older persons living in residential care homes. Information collected through the structured interview were inferred to 45 500 of this group.

Day care centres or units for the elderly

59 day care centres/units were selected and invited to participate in the survey with 22 out of the 59 selected centres or units agreed to participate. A total of 751 users, including full-time and part-time users were invited to participate in the survey, with 680 consents received.

At the end of the survey, a total of 599 DE users were clinically examined and 520 of them were interviewed. With statistical adjustment and weighting, the final results could be inferred to some 7 300 older persons receiving care in DE. Information collected through the structured interview were inferred to 6 340 of this group.

Home-based community support services

Seven teams providing Enhanced Home and Community Care Services (EHCCS) and 6 teams providing Integrated Home Care Services (IHCS) were invited to participate in the survey. Six of the 7 selected EHCCS teams and 4 out of the 6 selected IHCS teams agreed to participate. The IHCS is serving two types of cases, frail and ordinary cases. Only the frail cases under the IHCS were invited. A total of 1 530 HCCS users were invited to participate in the survey.

At the end of the survey, a total of 321 HCCS users were clinically examined and 271 of them were interviewed. With statistical adjustment and weighting, the final results could be inferred to some 17 700 older persons receiving EHCCS or IHCS. Information collected through the structured interview were inferred to 15 000 of this group.

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GLOSSARY

Angular chelitis	An inflammatory lesion at the corner of the mouth, and often occurs on both sides. The condition may be caused by nutritional deficiencies, fungal infections, or (less commonly) bacterial infections.
Bridge	A dental prosthesis used to replace a tooth or teeth which is cemented on a natural tooth or teeth nearby and which is not intended for removal by the individual.
Calculus	Hard deposits on teeth formed as a result of the hardening (deposition of calcium compound) of dental plaque. The presence of calculus makes removal of dental plaque more difficult.
CPI Index	Community Periodontal Index – the index recommended by the World Health Organization in the measurement of gum disease. See Chapter 1.
D/E	Day care centres / units for the elderly under the purview of the SWD
Dental plaque	The thin, sticky, colourless film of bacterial material which collects around the teeth and which is implicated in causing tooth decay and gum disease.
Denture	A removable dental prosthesis which replaces missing natural teeth in one jaw. When natural teeth are still remaining in that jaw, the denture is called a partial denture. Full denture is used to replace complete tooth loss in one jaw.
Denture-related hyperplasia	A benign reactive overgrowth of soft tissue due to chronic irritation from the border of poorly fitting dentures.
Denture-related stomatitis	Inflammation of the mucous lining due to chronic irritation of poorly fitting or dirty dentures.
Dentate	Having one or more natural teeth (as opposed to being edentulous).
DMFT index	The index recommended by the World Health Organization in the measurement of tooth decay, by adding the number of decayed teeth (DT), missing teeth (MT), and filled teeth (FT) together. See Chapter 1.
Edentulous	Having no natural teeth (as opposed to being dentate).
EHCCS	Enhanced Home and Community Care Services under the purview of the SWD
Fissure Sealant	A material, usually a resin, which has been placed in the pits and fissures (grooves) of teeth to protect against the development of decay.
Functional dependence	Need help from others to perform functions related to daily living (see Independence)
HCCS	Home and community care services
IHCS	Integrated Home Care Services under the purview of the SWD
Independence	Independence is commonly understood as the ability to perform functions related to daily living – i.e. the capacity of living independently in the community with no and/or little help from others. (WHO 2002)
IOP	Institutionalised older persons, i.e. LTC users residing in residential care homes licensed by the SWD
LTC	Long-term care services provided by the SWD
Root	The part of the tooth which is usually below the level of the gum. It may become exposed due to the recession of gums associated with the loss of gum attachment.
Scaling	Professional teeth cleaning.

Sextant	All teeth are divided into six segments called sextant for examination and recording of the gum condition. The six sextants are (1) upper right back teeth; (2) upper front teeth; (3) upper left back teeth; (4) lower left back teeth; (5) lower front teeth; and (6) lower right back teeth.
SWD	Social Welfare Department
WHO	World Health Organization

REFERENCES

World Health Organisation
Oral health Surveys: basic method. 5th Ed.
World Health Organization, Geneva 2013

Department of Health
Oral Health Survey 2001
Department of Health, the Government of the Hong Kong Special Administrative Region:
Hong Kong 2002

Department of Health
Oral Health Survey Report 2011
Department of Health, the Government of the Hong Kong Special Administrative Region:
Hong Kong 2013

Department of Health
Population Health Survey 2020-2022
Department of Health, the Government of the Hong Kong Special Administrative Region:
Hong Kong 2022

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