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COMMUNITY HEALTH PROJECT REPORT 2015

Survey of Oral Hygiene Behaviour, Knowledge and Oral Hygiene Status among Hong Kong Adults: A Pilot Study



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Survey of Oral Hygiene Behaviour, Knowledge and Oral Hygiene Status among Hong Kong Adults : A Pilot Study

Dental Public Health Project 2015
Faculty of Dentistry, the University of Hong Kong

**Survey of Oral Hygiene Behaviour,
Knowledge and Oral Hygiene Status
among Hong Kong Adults :
A Pilot Study**

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Chapter 1

Abstract

Objectives:

To study the correlation between oral health behaviour and knowledge with respect to the oral hygiene status of Hong Kong Chinese adults.

Materials and methods:

Subject selection was by convenience sampling. A total of four outreach visits were arranged in March 2015. The participants' oral health behavior and knowledge were evaluated through a self-reported questionnaire, while existing oral conditions were recorded following clinical examination using Visible Plaque Index (VPI) and Gingival Bleeding Index (GBI). Data analysis was carried out using SPSS on results obtained from the questionnaire as well as clinical examination.

Results:

A total of 147 subjects participated in this research project, of which 72% (103/147) were female while 28% (44/147) were male. Male subjects had statistically significantly higher mean VPI scores compared to female subjects interproximally, buccally and lingually (t-test, $p < 0.05$). Furthermore, there exists a statistically significant negative correlation between oral health knowledge score (mean = 9.3, SD = 3.1) and VPI score (Pearson correlation test, $p = 0.025$). Subjects who agreed accumulation of plaque or bacteria as a contributing factor to caries and periodontal diseases are statistically significantly lower than subjects who disagreed this statement in terms of mean VPI scores (53% vs 63%, t-test, $p < 0.05$).

Conclusion:

Participants with better oral health knowledge who also recognized accumulation of plaque or bacteria as one of the contributing factors to dental caries and periodontal disease had better oral hygiene levels in terms of VPI.

Chapter 2

Introduction

A regular and efficient oral hygiene regimen is an important factor in maintaining an individual's general oral health condition, reducing the incidence of both dental caries and periodontal diseases. Plaque-induced gingivitis is gingival inflammation caused by the adherent bacterial biofilm around teeth (Mariotti, 1999) and the level of oral hygiene is directly related to the amount of plaque building up on teeth (Albandar, 2002).

Men are found to be more likely to experience severe forms of the diseases compared with women probably due to behavioral and environmental factors, for example: oral hygiene level and smoking although there are insufficient data to consider male gender as a risk factor for the onset of gingival and periodontal diseases (Haytac et al., 2013). Individuals with continuous favorable dental beliefs tend to have better oral health than those who do not, particularly in terms of gingivitis, self-rated oral health, and tooth loss due to dental caries (Broadbent, 2006). Educational level was also shown to influence the oral conditions (Paulanderet al., 2003).

Nowadays, the most frequently used oral hygiene products include the toothbrush with toothpaste and dental floss. Infrequent flossing is the strongest indicator that an individual will have gingivitis (Jessri et al., 2013). Oral hygiene instruction given to patients has to be tailor-made ideally so as to improve long-term adherence to oral hygiene. The largest clinical difference between tailor-made and non-tailor-made programs was the interproximal surfaces (Jönsson et al., 2009). Oral hygiene instruction cannot be carried out just once, it was found that a single oral hygiene instruction has a small positive effect that will last 6 months or more (Weijden et al. 2011).

In Finland, only a small percentage of regular dental attendees received oral hygiene instruction and dietary sugar advice although almost all adolescents visited the dentist during the last two years (Honkala et al., 2002).

In Hong Kong, socioeconomic disparity in dental health behaviour was observed (Mak, 2011). In 486 Southern Chinese 12-year-old Hong Kong children had more plaque and calculus than the non-Chinese children. The girls had lower plaque scores than the boys. It may be due to the higher frequency of toothbrushing by the girls as they have a greater awareness of personal appearance (King, 1986). Recently a telephone survey conducted by the Hong Kong Department of Health on adults aged 18-64 found that about one in six respondents brushed their teeth once or less a day, nearly three-fifths never used or did not use dental floss (Leung, 2012).

The aim of this study is to investigate the oral hygiene status, oral health behaviour and knowledge of Hong Kong citizens and their associations.

Chapter 3

Aim and Objectives

The aim of this study is to investigate the relationships between the oral health knowledge, oral health behaviour and the oral hygiene status of Hong Kong Chinese adults.

The objectives of this study were:

1. To describe the oral hygiene status of the selected Hong Kong Chinese by examining the dental plaque distribution and the gingival bleeding condition.
2. To study the oral health behaviour and oral health knowledge of the selected Hong Kong Chinese by self-reported questionnaire.
3. To study the correlation between the oral health behaviour, oral health knowledge with respect to the oral hygiene status of the subjects.

Chapter 4

Methods and Materials

A. Sample Selection and Venue

As this study aims at studying the relationship of Hong Kong population's oral hygiene knowledge and its performance, if any, and finding out any factors associated with oral hygiene level, Hong Kong Chinese adult residents were selected as samples.

1. Exclusion Criteria

Participants should be in good general health. Subjects who wear full denture or have manual dexterity problems such as those who suffered from a previous history of stroke excluded from the clinical exam. Non-Chinese subjects were excluded due to the possible differences in oral hygiene habits.

2. Recruitment of Subjects

Subject selection was by convenience sampling due to limited time and resources. Introductory letter (Appendix C) were attached to an invitation email sent to related organizations for subject recruitment. Four outreach visits were then arranged in March 2015. Subjects recruited were legislative councilor assistants, members of The Hong Kong Federation of Trade Unions (HKFTU), residents of Kwun Lung Lau (a public housing estate in Kennedy Town, Hong Kong) and residents of Jockey Club Student Village III (a student residential college on Lung Wah Street, Kennedy Town, Hong Kong). Walk-in subjects were also recruited. Venues of the outreach visits included the Main Campus of The University of Hong Kong, two centers offered by the HKFTU and Jockey Club Student Village III respectively.

B. Flow of visit

Throughout each visit, three portable chairs were set up and 30 to 40 subjects were examined. Consents for data collection were obtained at the beginning, after which the subjects would be asked to complete a self-reported questionnaire and undergo an intra-oral examination.

1. Questionnaire

Subjects were invited to complete a self-reported questionnaire which included a total of 25 questions (Appendix A). Questions 1 to 5 asked for background information including age and educational level. Questions 6 to 17 were set to study about dental history and oral health behavior. Question 18 to 25 were set to test the oral hygiene knowledge, as well as concepts towards dental caries and periodontal disease among subjects.

In order to evaluate the level of dental knowledge of the subjects, questions 18-25 were devised regarding oral hygiene aids and practices, risk factors as well as prevention of common oral conditions such as caries and periodontal disease. For questions with only one correct answer (Q18, Q20, Q21), one mark was given for each correct answer, while wrong answers were not given marks. For questions with multiple correct answers (Q19, Q22-25), correct answers were given one mark each, while marks were deducted for wrong answers. The total knowledge score for each subject is the sum of all marks awarded for correct answers, which is 18.

2. Examinations

Prior to clinical examinations, medical history was taken, in particular risk of infective endocarditis and use of anticoagulants. Visible Plaque Index (VPI) and Gingival Bleeding Index (GBI) of 14 index teeth (17,15,13,11,23,25,27,37,35,33,31,43,45,47) were recorded (Aniamo, 1975).

Six sites on each on each index tooth were examined and charted, namely mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual. If an index tooth was missing, the adjacent tooth was examined. If there were no adjacent teeth, the data of that index tooth was neglected. Complete denture wearers were excluded from the study.

VPI (0 for absence; 1 for presence of visible plaque, or food debris accumulation on tooth surfaces were observed under portable LED light handle with disposable mirror) and GBI (0 for absence, 1 for presence of bleeding upon gentle probing of the orifice of gingival crevice, with CPI probes) were adopted due to simplicity and reproducibility. To reduce errors, the number of examiners was restricted to 3 throughout the 4 visits. Inter-examiner examination was also carried out in every 10 subjects examined. The examination was followed by provision of oral hygiene instruction by demonstration intra-orally with oral hygiene aids including toothbrushes, ID brushes and dental floss, tailored to the individual needs of subjects. The subjects were also informed of their oral health condition, such as presence of dental caries and periodontal disease, and presented with a report form (Appendix E).

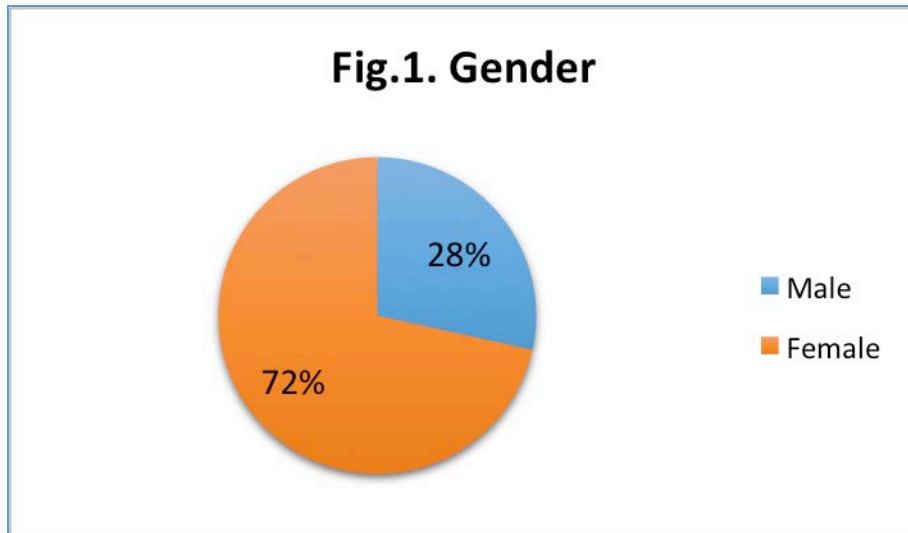
C. Data analysis

The data from the questionnaires and charting forms were entered into Microsoft Excel 2007. The data were then analyzed using SPSS 20-0 (SPSS Inc., Chicago, USA). Pearson Correlation Coefficient was used to study correlation between continuous variables. Student t-test and Analysis of the Variance (ANOVA) test were used to study various continuous independent variables. Kappa Statistic was used to study the inter-examiner reliability. The level of significance was set at 0.05.

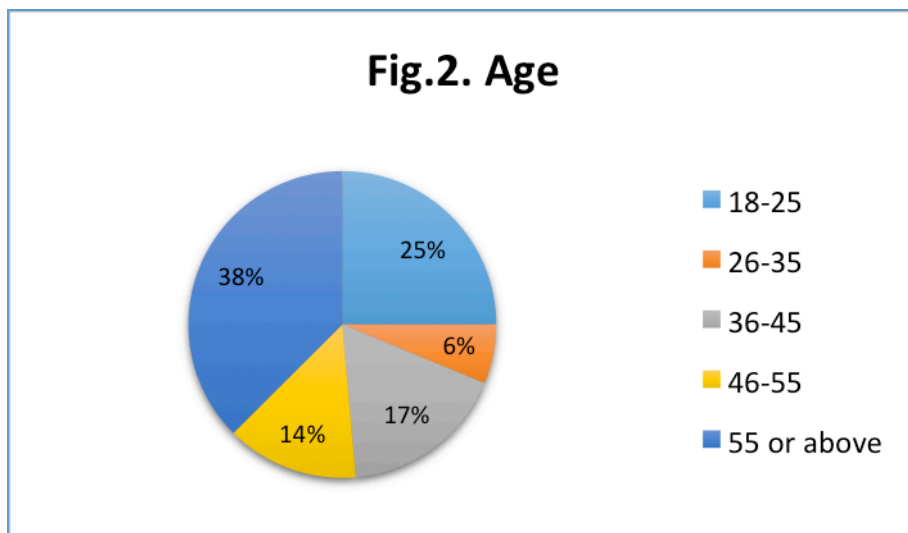
Chapter 5

Results

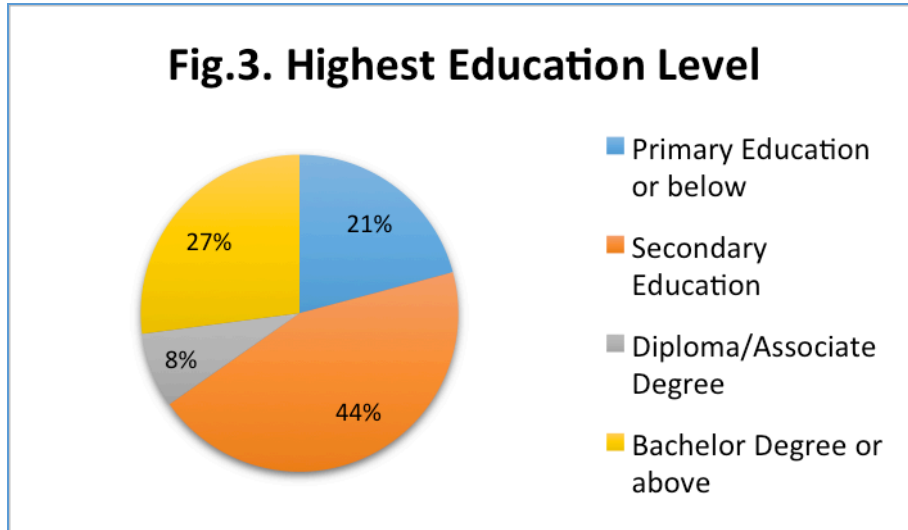
A. Background of the Subjects



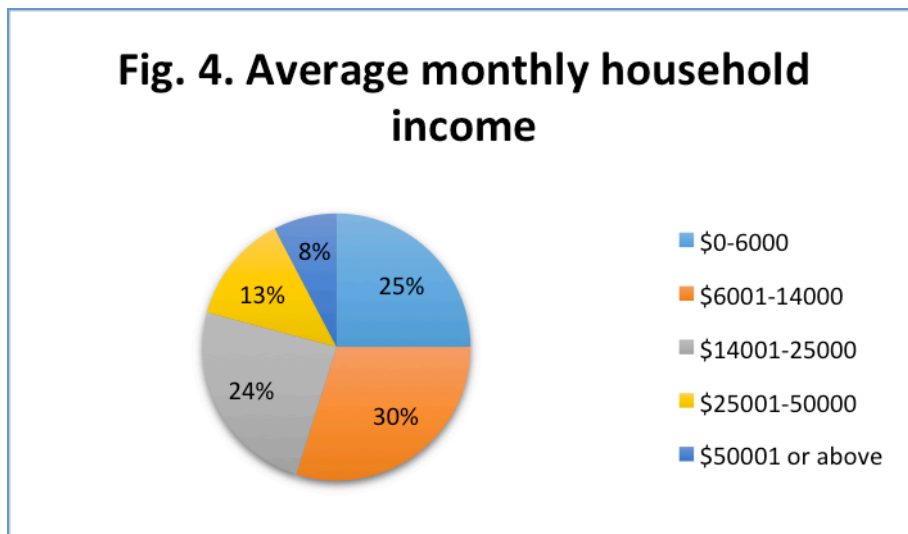
A total of 147 subjects participated in this research project, of which 72% (103/147) were female while 28% (44/147) were male (Fig. 1)



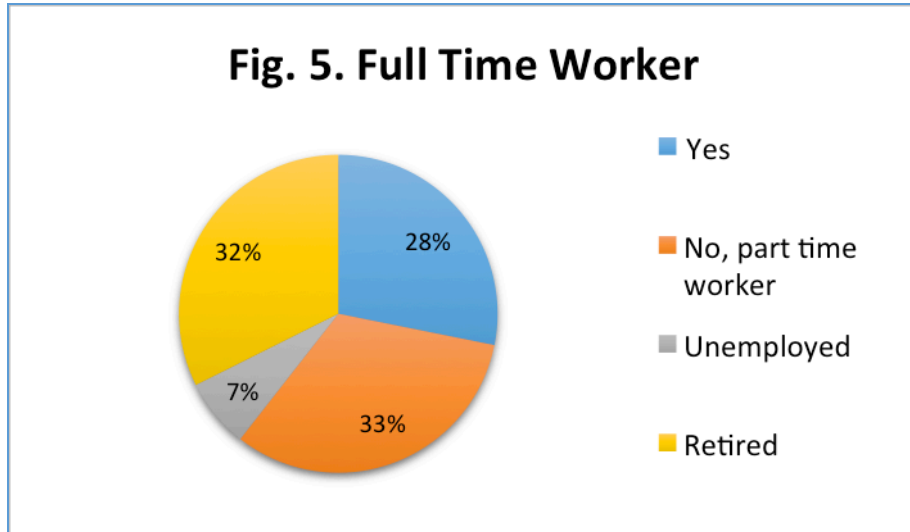
Among the subjects, 25% were between 18-25 years of age, 6% were between 26-35, 17% were between 36-45, 14% were between 46-55, and 38% were age 55 or above (Fig. 2).



For the highest education level attained by the subjects, 21% had received primary education or below, 44% had attained secondary school education level, 8% had received a Diploma or Associate Degree, and 27% achieved a Bachelor Degree or above (Fig. 3).

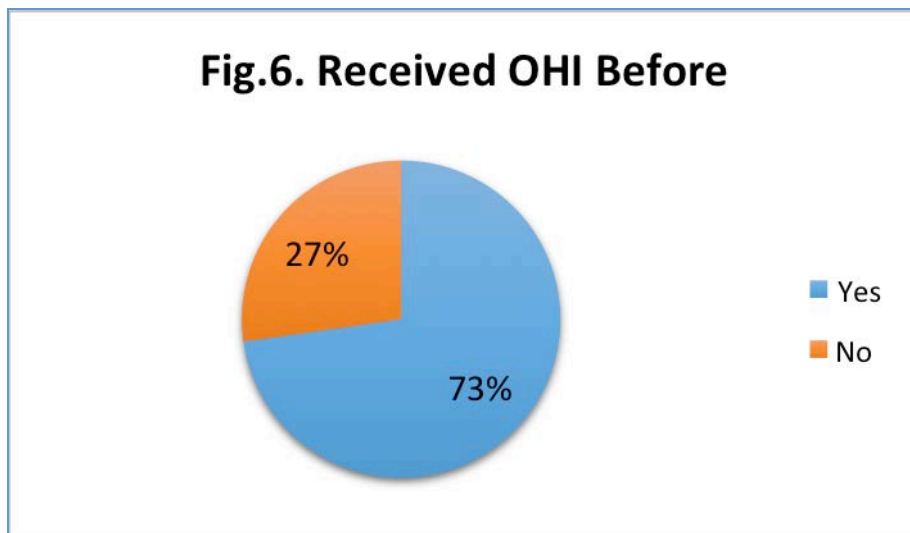


The subjects' average monthly household income per capita distribution is as follows. 25% of the subjects received \$0-6000 HKD per capita, 30% received \$6001-14000 HKD per capita, 24% received \$14001-25000 HKD per capita, 13% received \$25001-50000 HKD per capita, and 8% received over \$50001 HKD per capita (Fig. 4).

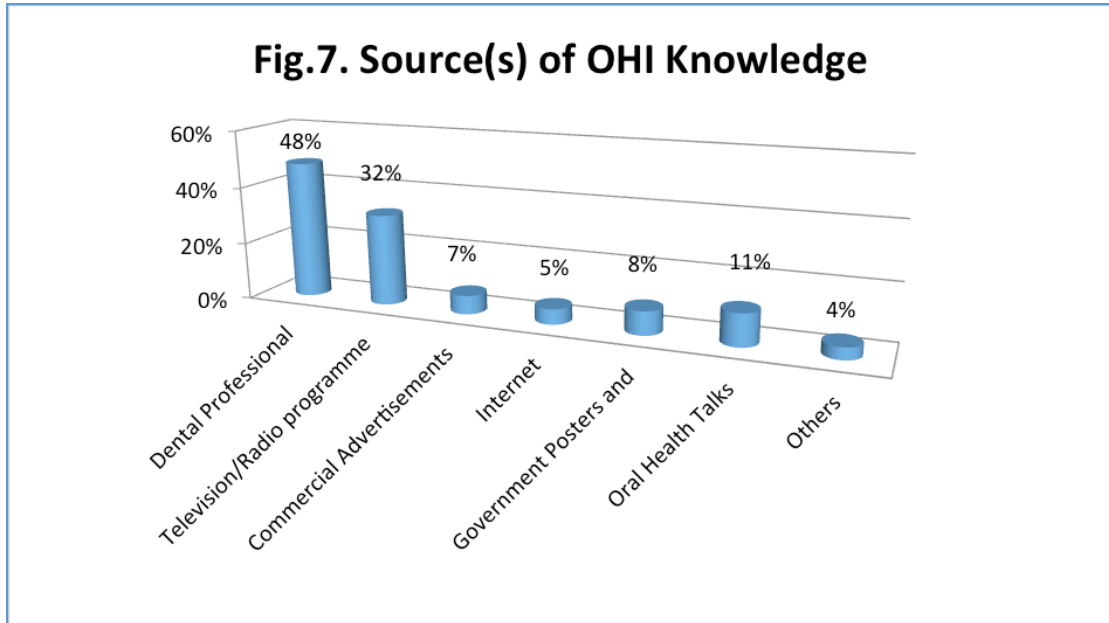


Among the subjects, 28% of them were full time workers, 33% held a part-time job, 7% were unemployed at the time, and 32% were retired (Fig. 5).

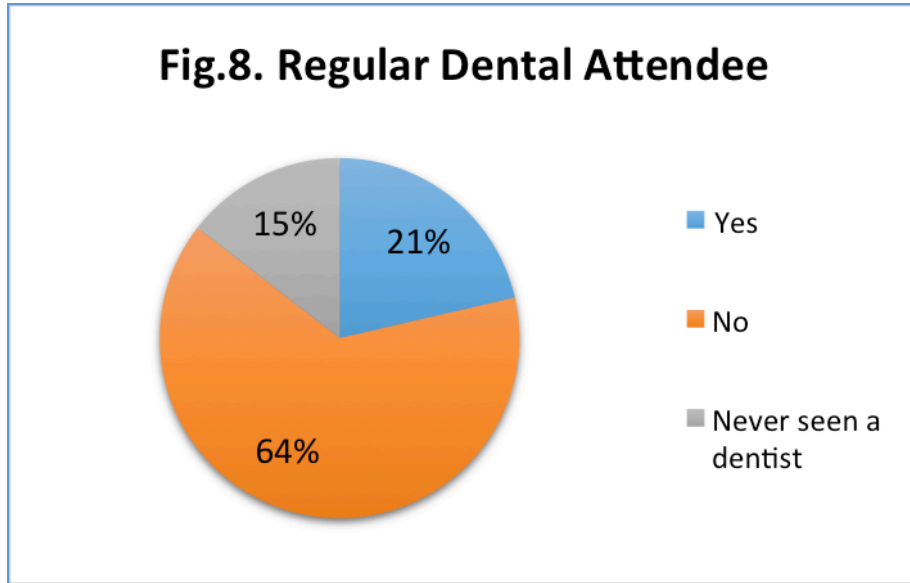
B. Oral health Behaviour of the Subjects



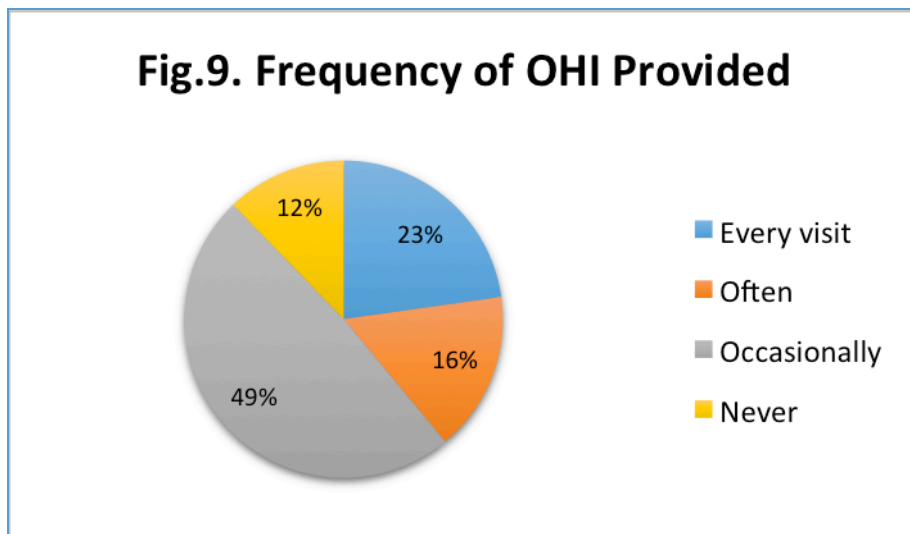
Among the subjects, 73% had received oral hygiene instruction (OHI) before, while 27% of them had not (Fig. 6).



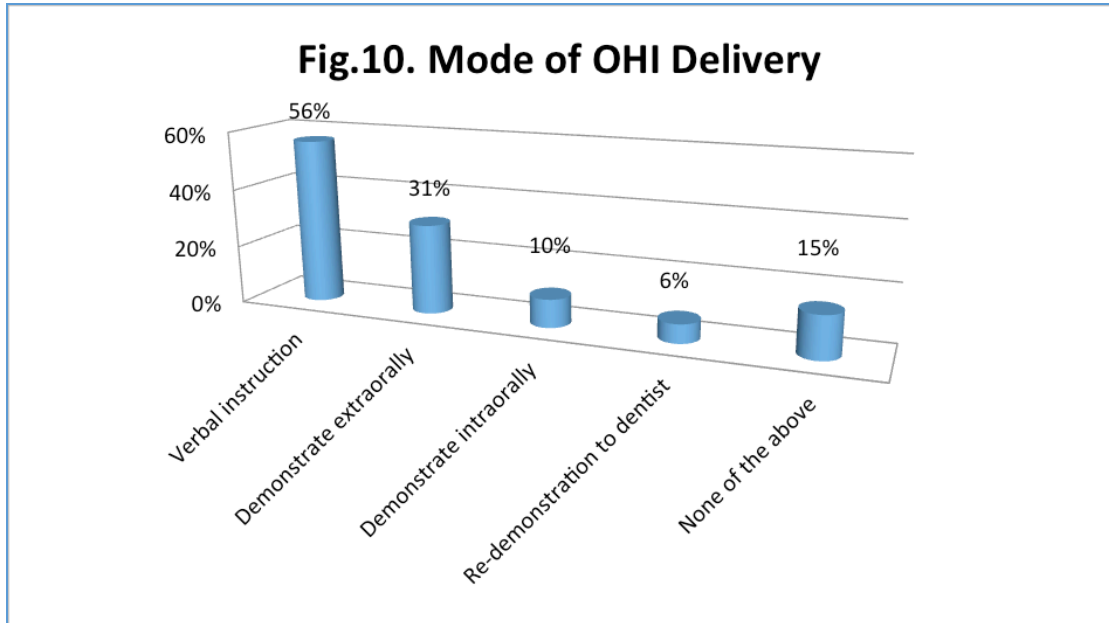
The most common source (48%) of OHI information is from dental professionals. Television or radio program is the second most common source of OHI information, while 32.11% of subjects reported Oral Health Talks, as the next most common source of oral hygiene information. Government posters and leaflets are the fourth most common source of OHI information, with 8% of subjects. Only a small proportion (7%) of subjects chose commercial advertisement as their source of OHI information. Finally, the least common source of OHI information is the internet, with 5%. Other sources of information were also recorded; an example is anecdotal information from friends of the subjects (Fig. 7).



Regarding dental history, 21% of subjects claimed to be a regular dental attendee, while the remaining 64% of them were not. A small percentage of (15%) of subjects claimed that they had never visited a dentist before (Fig. 8).

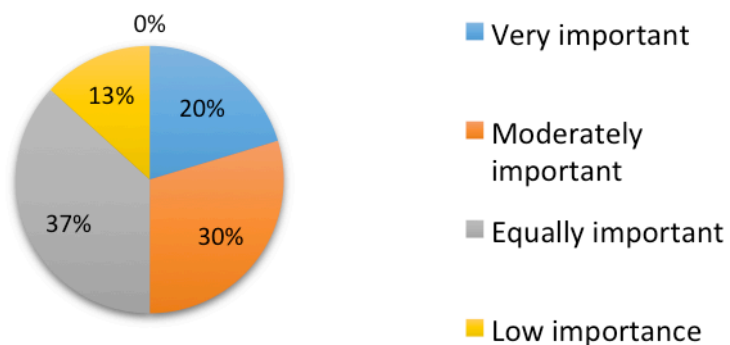


Among the subjects who have had the experience of visiting a dentist, 23% of them received OHI for every visit, 12% of them claimed that they have not received OHI in their previous dental visit, 16% of them often received OHI in their previous dental visit, and 49% of them occasionally received OHI in their previous dental visit (Fig. 9).



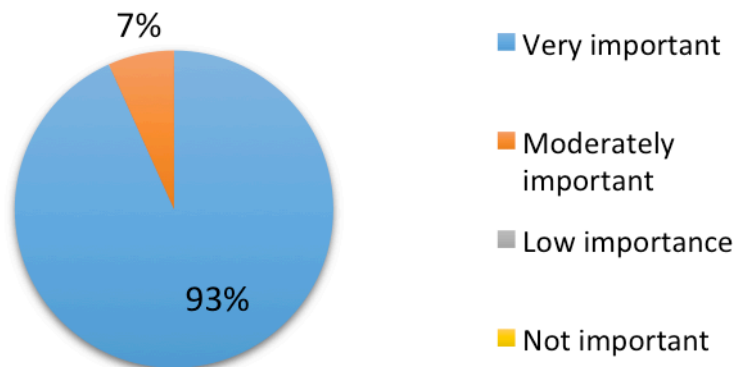
Verbal instruction was the most common mode (56%) of OHI delivery. The least common method of OHI delivery was to ask the subjects to re-demonstrate to the dentist various OH techniques, with only 6% of reported cases. Around 31% and 10% of subjects reported they received extra-oral and intra-oral demonstrations by the dentist, respectively. It was found that 15% of subjects claimed that they had received OHI information but not by any means mentioned above (Fig.10).

Fig.11. Rate Priority of OHI among Preventive Tx

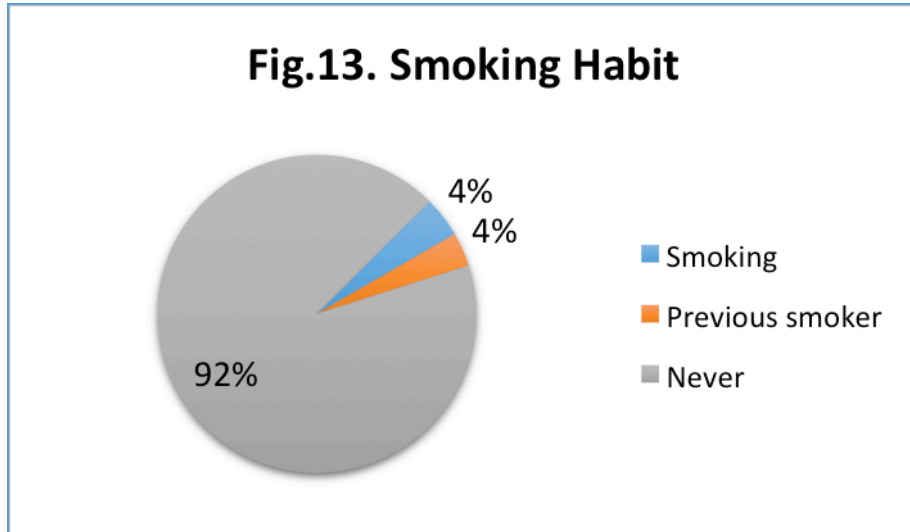


Regarding dental attitudes of the subjects, 20% believed that OHI is very important compared to other preventive dental treatment. On the other hand 13% of them claimed that OHI is at low importance relative to other preventive treatment. Around one-third (30%) of the subjects claimed that OHI is moderately important, while 37% of them claimed that OHI is at equal importance compared to other preventive treatment (Fig. 11).

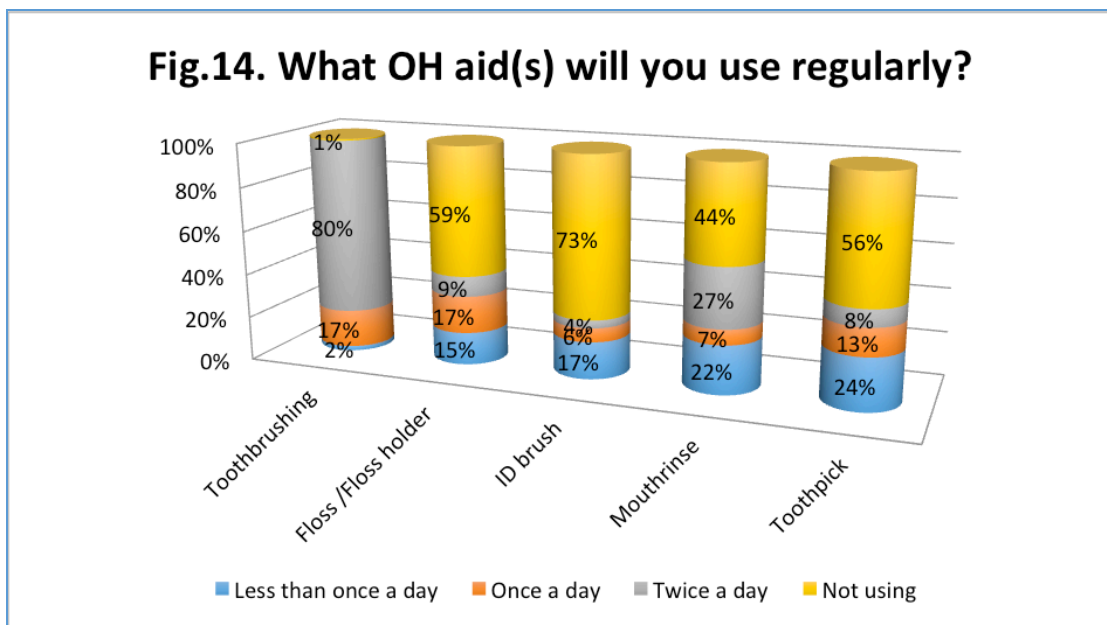
Fig.12. Expect more Preventive Tx



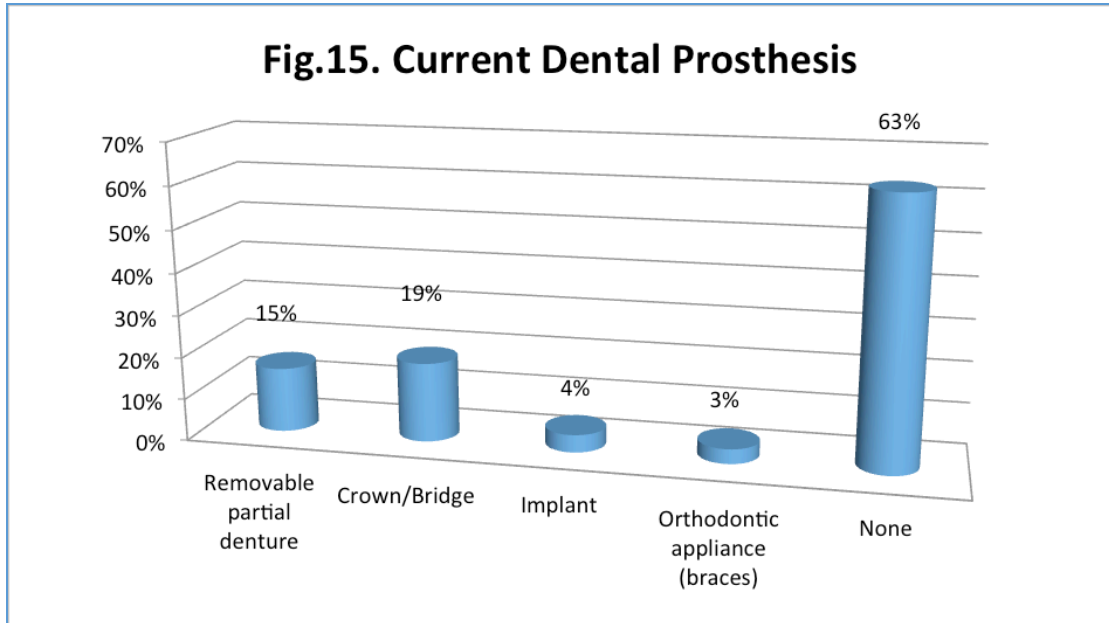
Among the subjects, 93% of them would like to receive more OHI information from dental professionals, while the rest did not (Fig. 12).



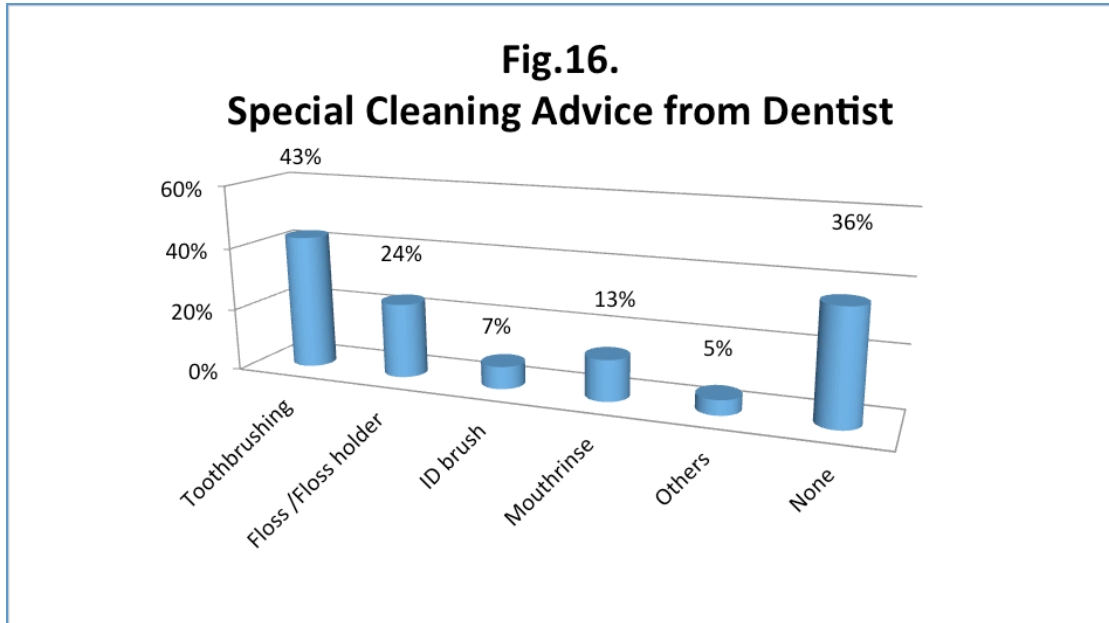
For smoking habit, 4% of subjects were smokers while a further 4% were previous smokers. The remaining 92% were non-smokers (Fig. 13).



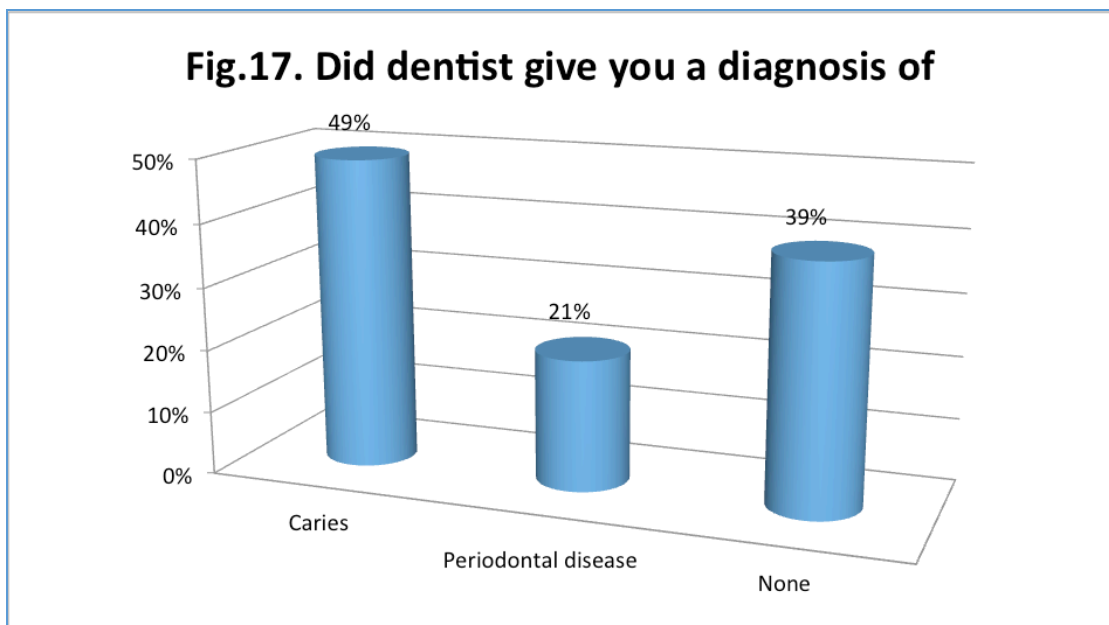
Regarding oral hygiene habits, 80% of subjects practiced tooth brushing twice a day while 1% did not exercise tooth brushing habit regularly. For interproximal cleaning habit, 17% and 9% of subjects used floss/floss holder once or twice per day, respectively, while 6% and 4% of subjects used ID brush once or twice per day, respectively. However, 59% did not use floss/floss holder and 73% did not use ID brush for interdental cleaning. For mouthrinsing, 7% and 27% of subjects used mouth rinse once or twice per day, respectively. For the usage of toothpick, 13% and 8% of subjects used toothpicks once or twice per day, respectively (Fig. 14).



For the prevalence of prosthesis wearing, it was found that 63% (90/147) of subjects did not wear any dental prostheses. The remaining 37% (57/147) who had a dental prosthesis, 19% of them had a crown/bridge, 15% carried a removable partial denture, 4% had an implant and 3% had orthodontic appliances (Fig.15).

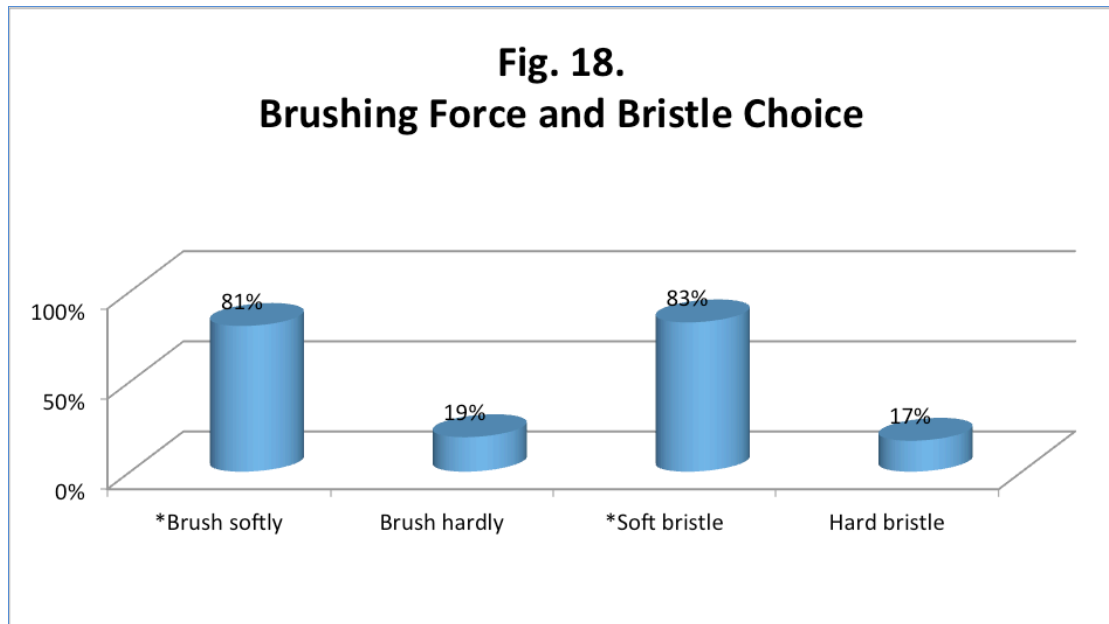


It was claimed that 38% of the prosthesis wearers did not receive special cleaning advice from their dentists specific to the dental prostheses they had. Almost half (45%) of them had received advice regarding tooth brush techniques, 25% and 8% of them received advice regarding the use of floss/floss holder and ID brush, respectively, while 14% of them received advice regarding the use of mouth rinse (Fig.16).



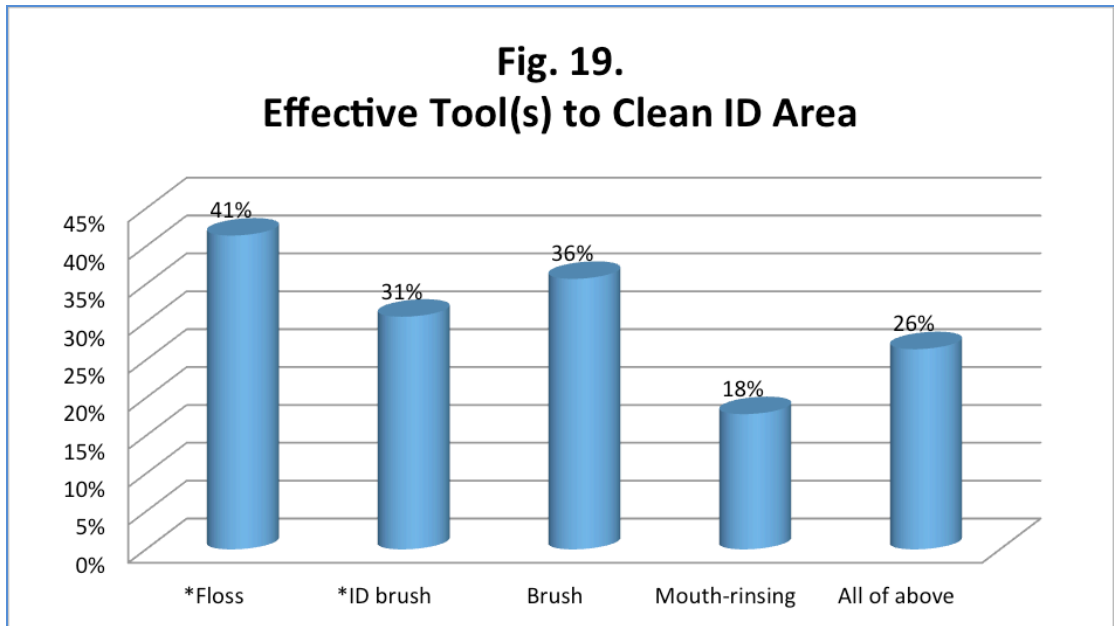
Among the subjects, 49% had previously received a diagnosis of caries, while 21% of them had been diagnosed with periodontal disease (Fig.17).

C. Oral Hygiene Knowledge of the Subjects



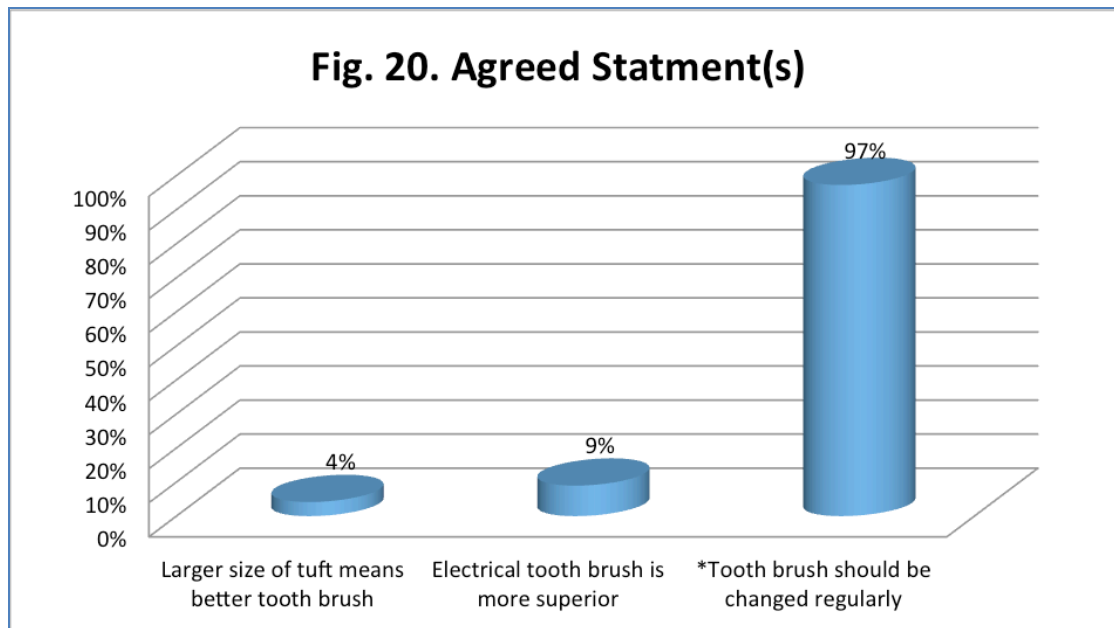
*denotes as correct answers

Regarding the findings from the self-reported questionnaire, 81% of subjects were found to prefer brushing with gentle rather than brutal force. Most (83%) of them preferred a soft bristle brush, while 17% of them preferred hard bristle brushes (Fig.18).



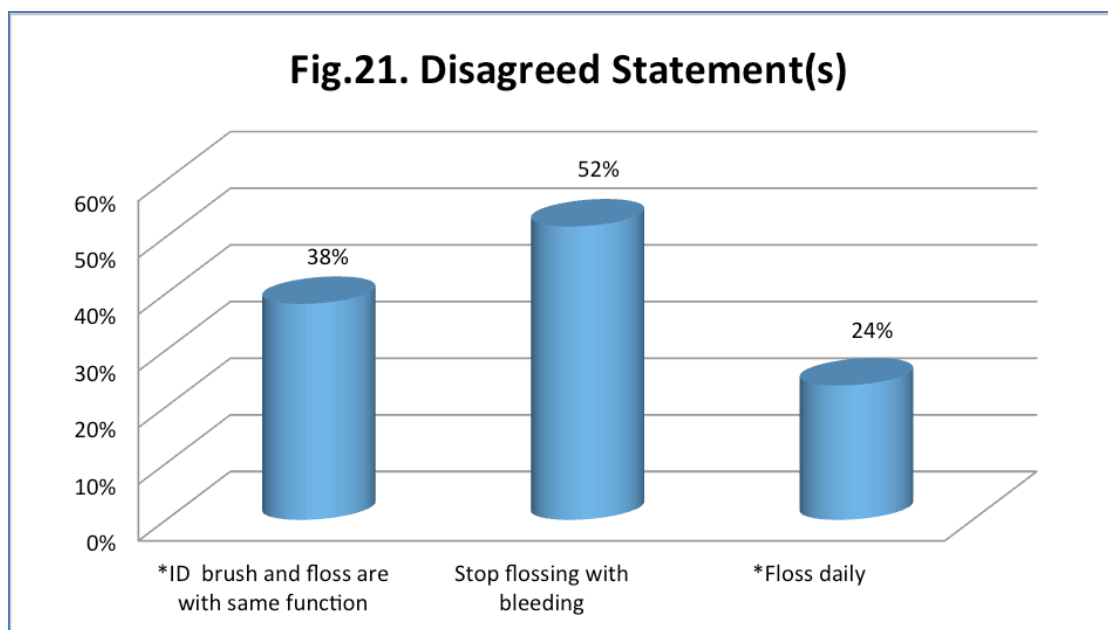
*denotes as correct answers

Question 19 requested the subjects to choose the effective tools to clean interdental spaces according to their own preference. It was found that 41% of the subjects chose floss, 31% chose ID brush, 36% chose tooth brush, 18% chose mouth-rinsing, and 16% of them thought that all of the above are effective in cleaning the interdental area (Fig. 19).



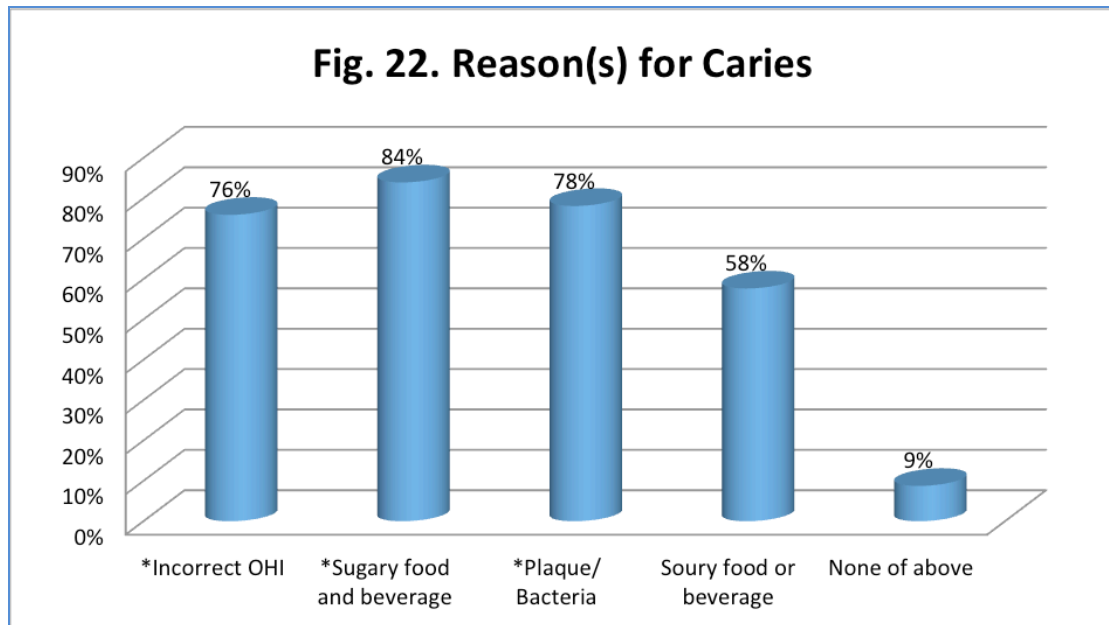
*denotes as correct answers

Three statements were listed in Question 20, and the subjects were asked to choose which of them was the correct option. They are as follows: “Larger sized toothbrushes are more effective.”, “Electrical toothbrush is superior to the manual toothbrush.”, and “Toothbrushes should be changed regularly.” 4% of subjects chose the first statement as the correct one. 9% chose the second option, while 97% of them chose the last (Fig. 20).



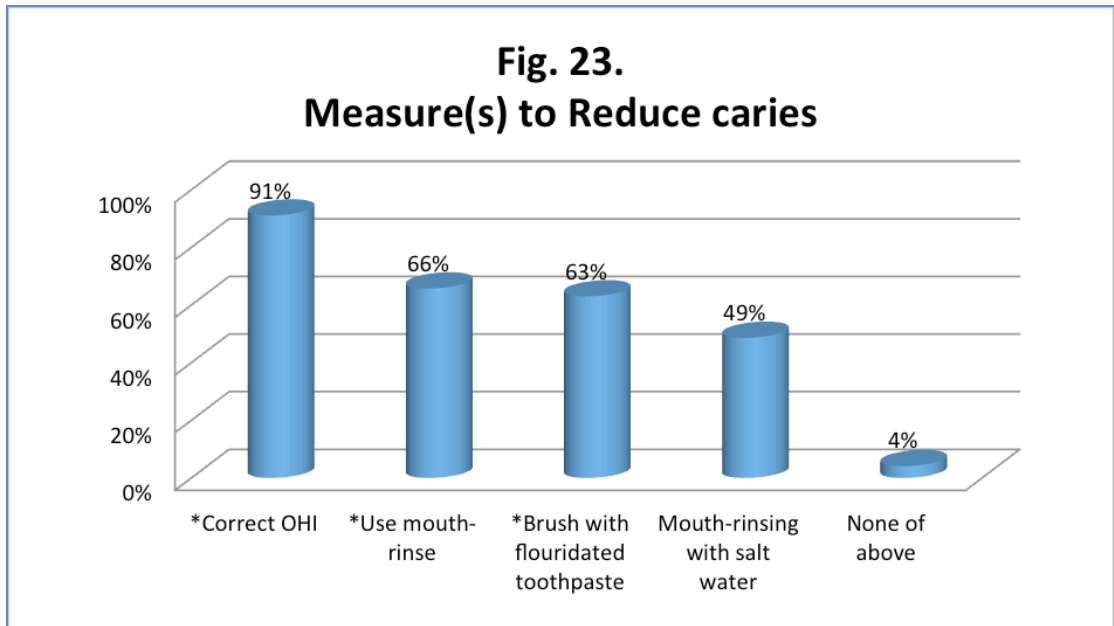
*denotes as correct answers

Likewise, in Question 21, three statements were listed for the subjects to choose, this time for the wrong answer. The statements were as follow: “ID brush and floss have the same function.”, “Flossing should be stopped when the bleeding commences.”, and “Flossing should be done daily.” 38% and 52% of subjects chose the first and second statement respectively. 24% chose the third option (Fig. 21).



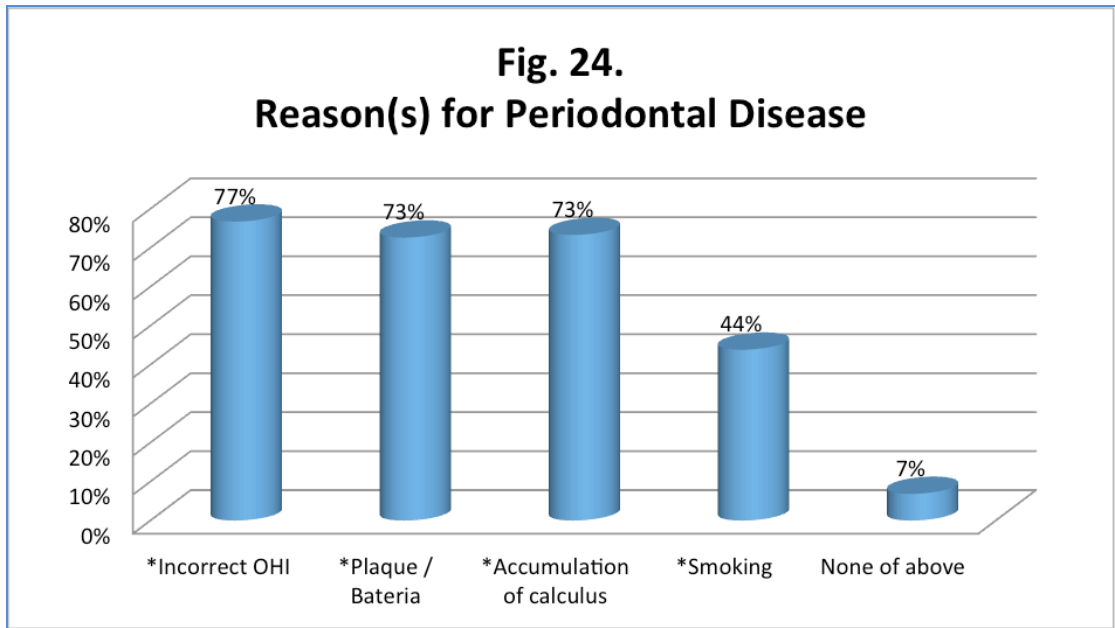
*denotes as correct answers

Among the subjects, 76% of them thought that incorrect oral hygiene practices would lead to caries development. Most (84%) of them agreed that intake of sugary food and beverages would contribute to caries development. High percentage (78%) of them thought the accumulation of plaque and bacteria would lead to caries development. Around 60% of them thought that sour food and beverages would contribute to caries development. Around one tenth (9%) of them thought none of the above stated reasons would be a contributing factor for caries development (Fig. 22).



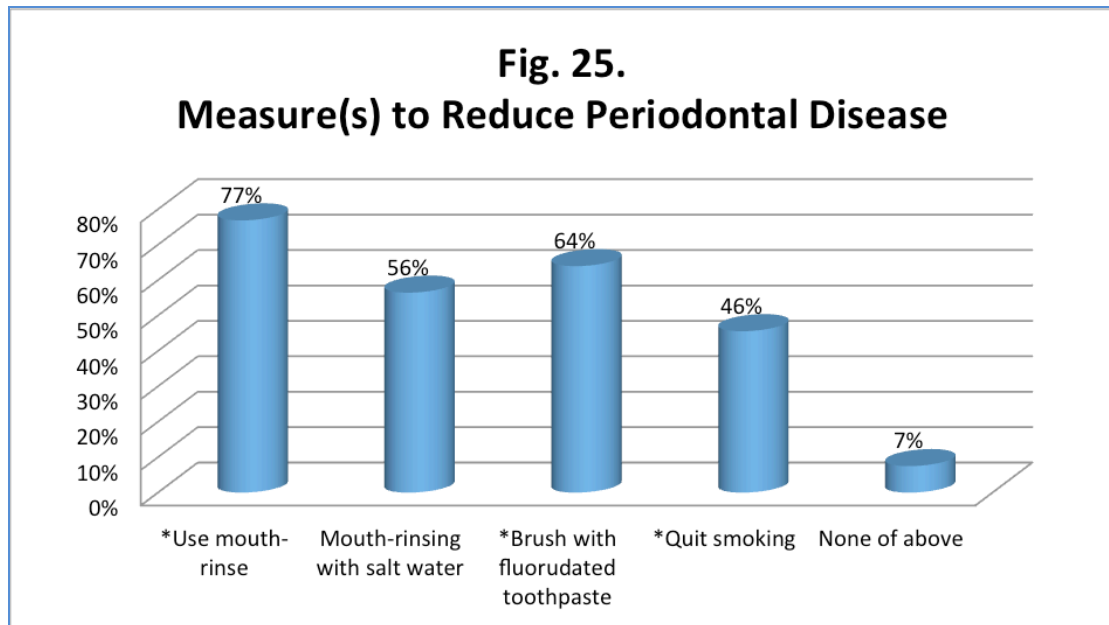
*denotes as correct answers

For the measures that can prevent caries formation, 91% of subjects agreed that correct oral hygiene practices can help reduce caries. Two-third (66%) of them believed using mouth-rinse can help to prevent caries. More than half (63%) thought that brushing with fluoridated toothpaste can reduce the chance of caries formation. Around half (49%) thought rinsing with salt water would help to reduce caries. Only 4% of them thought none of the above measures would help prevent caries (Fig. 23).



*denotes as correct answers

Regarding the causes of periodontal disease, 77% of subjects believed that incorrect oral hygiene practices would contribute to periodontal disease. Around 70% of them thought both accumulation of plaque/bacteria and calculus would lead to periodontal disease. Less than half (44%) of them believed that smoking would contribute to periodontal disease. Only 7% of them thought none of the above would lead to periodontal disease (Fig. 24).



*denotes as correct answers

Among the subjects, 77% believed that using mouth-rinse would help to reduce periodontal disease. More than half (56%) thought that rinsing with salt water would help. Around two-third (64%) agreed brushing with fluoridated toothpaste would help prevent periodontal disease. Less than half (46%) thought smoking cessation would help reduce periodontal disease. Only 7% of them did not think any of the above stated measures can help prevent periodontal disease (Fig. 25).

The total knowledge score for each subject is the sum of all marks awarded for correct answers, which is 18. The resulting average knowledge scores of the subjects is 9.4 (SD=3.1).

D. Oral Hygiene Status of the Subjects

1. Visible Plaque Index (VPI)

Table 1. Comparison of male and female in terms of VPI (mean, SE).

Mean	Male	Female	Significant
VPI (all sites)	64 (3.3)	53 (1.9)	P=0.002
VPI (Interproximal)	65 (3.3)	55 (2.0)	P=0.005
VPI (Buccal)	58 (3.8)	45 (2.4)	P=0.003
VPI (Lingual)	67 (3.6)	56 (2.8)	P=0.025

t-test was performed

The mean VPI of the subjects is 56% (SE=1.7). When comparing male and female subjects in terms of VPI (Table. 1), male subjects were found to be statistically significantly higher than female subjects in terms of mean VPI, interproximally, buccally and lingually (t-test, $p < 0.05$).

Table 2. Comparisons of VPI scores by subject backgrounds and oral health behaviour. (Only significant results presented)

		VPI Mean (SE)
Family Income	\$6000 or below	55 (3.8)
	\$6001-14000	54 (3.1)
	\$14001-25000	62 (3.5) _a
	\$25001-50000	44 (3.3) _b
	\$50001 or above	64 (5.5)
		VPI (Buccal) Mean (SE)
OHI Importance	Very	49 (4.9)
	Relatively	58 (5.2) _a
	Not too	44 (3.3) _b
	Unimportant	40 (5.4)

a> b, ANOVA test, post hoc test, $p < 0.05$.

According to the data obtained from the questionnaire and clinical examination using the Visible Plaque Index (VPI), the following significant results were observed.

In Table 2, the mean VPI for subjects with an average family income of \$25001-50000HKD per capita, when compared with the mean VPI for those with income of \$14001-25000 HKD per capita, is found to be statistically significantly lower, with the respective percentages being 44% and 62% (ANOVA, $p=0.034$).

With respect to subjects' attitudes toward receiving Oral Hygiene Instruction (OHI) from dental professionals, it was found that those who considered receiving OHI to be relatively important than receiving other forms of preventive treatment had VPI (Buccal) that were significantly higher than those subjects who considered OHI to be not so important (58% vs 44%, ANOVA, $p<0.05$).

There is a statistically significant negative correlation (Pearson's $r=-0.188$) between knowledge score and VPI score (Pearson correlation test, $p=0.025$). The higher the knowledge score, the lower the VPI score was observed.

Subjects who agreed incorrect oral hygiene measures as a contributing factor to caries are with a statistically significantly lower VPI than subjects who disagreed with this statement (53% vs 64%, t-test, $p<0.05$).

Subjects who agreed accumulation of plaque or bacteria as a contributing factor to caries are with statistically significantly lower VPI than subjects who disagreed this statement (53% vs 63%, t-test, $p<0.05$).

Subjects who agreed brushing with fluoridated toothpaste is one of the measures to reduce caries are with statistically significantly lower VPI than subjects who disagreed this statement (52% vs 62%, t-test, $p<0.05$).

Subjects who agreed accumulation of plaque or bacteria is one of the contributing factors to periodontal disease are with statistically significantly lower VPI than subjects who disagreed this statement (53% vs 62%, t-test, $p < 0.05$).

2. Gingival Bleeding Index

Table 3. Comparison of different dental floss usages with respect to Mean GBI (Interproximal) and GBI (Buccal).

		GBI (Interproximal) Mean (SE)	GBI (Buccal) Mean (SE)
Dental floss usage	Less than once daily	44 (3.8)	34 (4.2)
	Once daily	36 (3.8) _b	31 (4.4)
	More than once daily	31 (4.4) _b	24 (3.3) _b
	Never	49 (2.3) _a	43 (2.8) _a

a > b, ANOVA test, post hoc test, $p < 0.05$.

The mean GBI of all the subjects is 43% (SE=1.6). In Table 3, subjects who use dental floss once per day also show a statistically lower mean GBI (Interproximal) than those not using floss at all (36% vs 49%, ANOVA, $p = 0.026$). Subjects who claimed to use dental floss more than once per day show a statistically significantly lower mean GBI (Interproximal) than subjects not using floss (31% vs 49%, ANOVA, $p = 0.013$). No statistical significant was observed between those who use dental floss once daily and those who use more than once daily (36% vs 31%, ANOVA, $p > 0.05$).

Subjects with the habit of using dental floss more than once per day show a statistically lower mean GBI (Buccal) than those not using floss (24% vs 43%, ANOVA, $p = 0.048$). However, subjects who use dental floss less than once per day show no statistical significance in mean GBI (Buccal) to those not using floss (34% vs 43%, ANOVA, $p = 0.696$). No statistical significant was observed when correlating the knowledge score with the GBI score.

The Kappa Statistics for VPI and GBI evaluation are 0.67 and 0.61 which indicates inter-examiner-reliability is good.

Chapter 6

Discussion

A. Sampling and Target Groups

In this pilot study, convenience sampling regime was adopted due to time and resource constraints. Subjects were divided into five age groups from 18-year old to cover all the age ranges in the adult population. This is to attempt to analyze trends, if any, in oral behavior, knowledge and oral health status among continuous age groups.

In the Oral Health Survey (OHS) 2011 conducted by the Department of Health, HKSAR, only three index age groups were included in the examinations of the oral health condition and oral health related behavior of the population in Hong Kong (i.e. 35 to 44-year old adults; 65 to 74-year old non-institutionalized older persons and the aged 65 and above Social Welfare Department long term care services (LTC) users). A majority of the adult population left out in the above survey could hence be included in this study.

B. Indices in Recording Oral Conditions

A quantitative measurement of the oral conditions was conducted using the two indices: Visible Plaque Index (VPI) and Gingival Bleeding Index (GBI), which were commonly adopted in epidemiological studies and clinical trials. VPI records the presence or absence of visible plaque and food debris accumulation on tooth surfaces. GBI records the presence or absence of bleeding within ten seconds upon gentle probing along the orifice of gingival crevices, which is indicative of gingival inflammation. Such indices would be simple, reproducible with little examiner training and require relatively little time (Hazen, 1974). For both indices, a score was obtained by expressing the number of positive findings as a percentage of the number of sites examined.

Plaque Index (PI) and Gingival Index (GI) which record plaque and gingival inflammation according to various states were abandoned owing to the lack of necessity in evaluating the severity of the oral condition in the study, as well as the aim to maintain the simplicity and reproducibility of the examinations. A total of fourteen index teeth were included in the examination to reduce the duration of the process, compared to that in which all teeth present were ideally examined (full-mouth examination).

Despite the chance of underestimating oral conditions when examining only index teeth, this could still be regarded as a reliable indicator of the overall conditions as half of the teeth present were examined compared to ten index teeth as recommended by the World Health Organization (WHO), provided that a full-mouth examination would be a more time-consuming and stress-inducing to the subjects.

C. Flossing Habit and Gingival Inflammation

The association between the use of floss and gingival inflammation has received interest of investigations. Clinical studies have shown various results. According to Cochrane, there is some evidence from twelve studies that flossing in addition to toothbrushing reduces gingivitis compared to toothbrushing alone. There is weak, very unreliable evidence from 10 studies that flossing plus toothbrushing may be associated with a small reduction in plaque in 1 and 3 months. No studies reported the effectiveness of flossing plus toothbrushing for preventing dental caries (Sambunjak et al., 2012).

However, in another study, dental floss is the most effective means for removing interdental plaque and reducing interdental gingival inflammation. The patient-preferred method, flossing with floss aids, can remove plaque and decrease inflammation and bleeding as effectively as hand-held floss (Audrey et al., 2001).

Although scientific evidence has been lacking in proving the use of dental floss would reduce gingival inflammation, this study has found subjects who use dental floss once per day presented with a statistically lower GBI (Interproximal) than those not using floss (36.2% vs 48.9%, Bonferroni, $p=0.026$). Subjects who use dental floss for more than once per day presented with a statistically significantly lower GBI (Interproximal) than subjects who do not floss. (31.0% vs 48.9%, Bonferroni, $p=0.013$). Subjects with the habit of using dental floss more than once per day presented with a statistically lower GBI (Buccal) than those who did not use floss (24.5% vs 42.8%, Bonferroni, $p=0.048$). These findings might be attributed to the higher awareness and better manual dexterity in performing oral cleansing among those flossing subjects.

According to another study found in the Cochrane Library which evaluated the use of interdental brushes, there is low-quality evidence from seven studies that interdental brushing reduces gingivitis when compared with flossing, but these results were only found at one month. There was insufficient evidence to determine whether interdental brushing reduced or increased levels of plaque when compared to flossing (Poklepovic et al., 2013).

As stated in the OHS 2011, a large proportion of adults in the age group of 35 to 44-year-old used toothpick while only a small proportion of them practiced regular interdental brushing or flossing. This might account for the unsatisfactory general oral hygiene condition which was shown almost all subjects in that survey were presented with VPI over 50%. It is evident that interdental cleaning is beneficial to reducing gingival inflammation. Interdental cleansing tools were not shown to be superior to one another (e.g. interdental brushes to floss; waxed floss to un-waxed floss), but cleaning wide interdental spaces with interdental brushes was thought to have a higher efficacy than with floss.

D. Oral Health Knowledge and Oral Hygiene Performance

One of the aims of this study is to identify any association between oral health knowledge and performance level of oral care among the population, which would be reflected in the Visible Plaque Index (VPI). Previous studies on the adult Hong Kong Chinese population have indicated that their level of knowledge and attitudes toward dental health might be a potential barrier to effective oral preventive efforts (Schwarz et al., 1994). Moreover, individuals with continuous favorable dental beliefs tend to have better oral health than those who do not, particularly in terms of gingivitis, self-rated oral health, and tooth loss due to dental caries (Broadbent, 2006). According to a systematic literature review, oral health care education may have a positive effect on care home nurses' oral healthcare knowledge and attitude and on care home residents' oral hygiene, whereas any effect on care home nurses' oral hygiene skills could not be found (Lugt-Lustig et al., 2014). However, there have been no recent reviews locally in studying the direct correlation between individual's oral health knowledge and oral health status. As suggested by the OHS 2011, the establishment of healthy oral health behavior by a person may be influenced by the person's correct understanding of oral diseases.

Hence, a part of our questionnaire (Questions 18 to 25) was directed at assessment of oral health knowledge. The main components of the knowledge assessed were related to common oral hygiene habits, as well as basic periodontology and cariology, which corresponded to the main focus of OHS on preventable oral diseases. A score calculation system was followed (with a maximum score of 18) to quantify the subjects' oral health knowledge. The score was statistically related with the indices obtained in the clinical examinations. A statistically significant negative correlation between the knowledge score and VPI was found (Pearson correlation test, $p=0.025$). It is sensible to deduce that the deeper the oral health understanding an individual is equipped with, the more likely he or she possesses better skills and manual dexterity to achieve a sound oral hygiene performance, and hence a significantly lower plaque accumulation level.

E. Specific Knowledge and Oral Hygiene Performance

Knowledge of causation and prevention of the dental disease could have a direct impact on one's oral hygiene performance. The roles of plaque or bacteria and fluoride in the development and prevention of dental diseases respectively should be emphasized to the public, as subjects with adequate understanding of common oral diseases were found to have a better oral health status.

This study revealed subjects who agreed accumulation of plaque or bacteria led to caries development had statistically significantly lower mean VPI than subjects who disagreed with this statement (53% vs 63%, t-test, $p < 0.05$). In addition, subjects who agreed accumulation of plaque or bacteria is one of the contributing factors to periodontal disease are with statistically significantly lower VPI than subjects who disagreed with this statement (53% vs 62%, t-test, $p < 0.05$). Plaque, as a microbial biofilm found on tooth surfaces embedded in a matrix of exopolymeric substance, accounts for the chief cause of dental caries and periodontal diseases. Ecological changes which take place within the biofilm determine the progression of such diseases. Individuals who were aware of this concept would focus on removing plaque during their daily brushing, resulting in a higher cleansing proficiency and a lower VPI.

Meanwhile, subjects who agreed brushing with fluoridated toothpaste is one of the measures to reduce caries are with statistically significantly lower mean VPI than subjects who disagreed with this statement (52% vs 62%, t-test, $p < 0.05$). Fluoride which has been used for prevention of dental caries functions by binding to hydroxyapatite crystals in enamel and improving its resistance to demineralization, increasing rate of remineralization and exerting bactericidal and bacteriostatic effects. As little clinical evidence was available in relating the use of fluoride toothpaste and the inhibition of plaque formation, the result could be attributed to the fact that knowledge on the caries prevention role of fluoride toothpaste is one of the co-factors contributing to a low VPI.

Other co-factors might include the use of toothbrushes of appropriate sizes, better manual dexterity and a more positive attitude in oral health, which were beyond the scope of investigation in this study.

F. Comparisons of Knowledge Level with OHS 2011

The questions assessing subjects' oral health knowledge were set with reference to the question design in OHS 2011, in which only the groups of 35 to 44-year old adults and 65 to 74-year old non-institutionalised older persons (NOP) were targeted. Having considered this, the figures obtained from this study were compared against that from these two groups of samples. In general, the subjects of this study are presented with a remarkably higher level of knowledge than those of OHS 2011. 78% of the subjects recognized bacterial and plaque accumulation as a factor contributing to dental caries compared to 10.1% in 35 to 44-year old adults and 3.4% in NOP respectively.

Another notable difference is found in the identification of smoking cessation as a means to prevent periodontal disease, counting for 46% of the subjects of this study compared with 4.3% in 35 to 44-year old adults and 0.1% in NOP respectively. Such a variation in the level of knowledge could be explained by the small sampling size, superiority in the educational level and socio-economical status of the subjects recruited. Again, this proposes another scope of study for future research.

Chapter 7

Conclusions and Recommendations

Since this is a pilot study, the conclusions should be interpreted with caution and they are as follows:

1. People who have better oral health knowledge tend to have a better oral hygiene level in terms of plaque accumulation.
2. People who agreed accumulation of plaque or bacteria is one of the contributing factors to dental caries and periodontal disease have a better oral hygiene level in terms of plaque accumulation.

The recommendations of the study are as follows:

In order to improve the oral hygiene level of the population, oral health education should focus more on the role of dental plaque or bacteria as the contributing factors to dental caries and periodontal disease. It seems a better understanding of this would increase the awareness of the importance on oral hygiene practices of the population and therefore improving their oral hygiene level.

It is also the responsibilities of the dental industry, including the dental professionals in private and public sectors, the dental auxiliaries and probably the dental company to promote not only the skills to perform better oral hygiene practice but also the oral health knowledge which might be equally essential in improving the oral hygiene of the population.

Chapter 8

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CEDARS, the University of Hong Kong

The Hong Kong Federation of Trade Unions (HKFTU)

New College, the Jockey Club Student Village III, the University of Hong Kong

Aberdeen Kai-fong Welfare Association (AKA)

Chapter 9

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Effect of oral healthcare education on knowledge, attitude and skills of care home nurses: a systematic literature review *Community Dent Oral Epidemiol.* 2014 Feb;42(1):88-96

A. Questionnaire



Ref:

Dental Public Health Questionnaire 2014-2015 (Group 4.6)

Hello! We are Year 4 dental students studying at the University of Hong Kong. We are conducting a survey regarding the public's knowledge on oral hygiene practices. The aim of this survey is to investigate the oral hygiene of people who had received oral health advice from dental professionals. Please help us out by filling in this questionnaire. The contents of this questionnaire and any personal information provided will be kept anonymous and confidential. The information will be used for scientific research in the hope of further enhancing the practice of oral hygiene in Hong Kong.

Please provide us with the following background information.

1. Gender:
 Male Female
2. Age:
 18-25 26-35 36-45 46-55 56 or above
3. Highest education level attained:
 Primary Education or below
 Secondary Education
 Diploma/Associate Degree
 Bachelor Degree or above
4. Average monthly household income in HKD (per person):
 \$0-6000
 \$6001-14000
 \$14001-25000
 \$25001-50000
 \$50001 or above
5. Are you a Full time worker?
 Yes
 No, part time worker
 Unemployed
 Retired

-
6. Have you received any oral hygiene instruction in the past?
 Yes No (Please skip Q7)
7. From which of the following sources did you receive information on oral hygiene practices?
 Dental Professional Television/Radio programme
 Commercial Advertisements Internet
 Government Posters and Leaflets Oral Health Talks
 Others: _____
8. Do you visit a dentist regularly? When was your last visit?
 Regular; Last visit: _____
 Symptom driven; Last visit: _____
 Never (Please skip Q9-12)
9. How frequent does your dentist give you oral hygiene instruction?
 Every visit
 Often
 Seldom
 Never
 N/A
10. My dentist usually delivers oral hygiene instruction through:
 Using verbal instruction or leaflets
 Demonstrating the techniques on a tooth model
 Demonstrating the techniques in my mouth
 Asking me to perform the techniques in my mouth after demonstration
 None of the above
11. How important do you think your dentist values oral hygiene instruction over other forms of preventive treatment?
 Very important
 Relatively important
 Equally important
 Low importance
 Not important
12. Would you like your dentist to give you more information on oral hygiene practices?
 Yes No
13. Do you smoke?
 Yes No, but smoked in the past No

14. Which oral hygiene aids do you use regularly? How often?

	Less than once daily	Once daily	More than once daily
<input type="checkbox"/> Toothbrush	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Floss (holder)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ID Brush	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Toothpick	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Mouthrinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Others: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Please indicate which of the following dental prostheses you are currently wearing:

- Removable partial denture
- Crown/Bridge
- Implant
- Orthodontic appliance (Braces)
- None of the above (Please skip Q16)

16. Has your dentist given you special advice on cleaning your prosthesis?

- Tooth brushing
- Floss /Floss holder
- ID brush
- Mouth rinse
- Other: _____
- No

17. Did your dentist tell you that you have:

- Tooth Decay
- Periodontal disease
- None of the above

18. We should brush our teeth Softly/ Hard using toothbrushes with Soft Hard bristles

19. Which of the following oral hygiene aids can be used to clean the interdental areas effectively?

- Floss
- ID-Brush
- Toothbrush
- Rinsing (water or mouth rinse)
- All of the above

20. Which of the following sentence is correct?

- The bigger the brush head of toothbrush, the better
- Electric toothbrush is better than the traditional toothbrush
- We need to change to a new toothbrush regularly

-
21. Which of the following sentence is **NOT** correct?
- The function of floss and ID brush is the same
 - If there is bleeding during flossing, we should stop
 - We should use floss every day
22. Which of the following(s) will lead to tooth decay?
- Incorrect oral hygiene methods
 - Increase frequency of consuming sweet food/drink
 - Bacteria/plaque
 - Consuming sour food/drink
 - None of the above
23. Which of the following can reduce the occurrence of caries?
- Correct oral hygiene methods
 - Use of mouthwash
 - Use of fluoridated toothpaste while tooth brushing
 - Rinsing with water/salt water
 - None of the above
24. Which of the following will lead to periodontal disease?
- Incorrect oral hygiene methods
 - Bacteria/Plaque
 - Accumulation of calculus
 - Smoking
 - None of the above
25. Which of the following(s) can reduce occurrence of periodontal disease?
- Use of mouthwash
 - Rinsing with water/salt water
 - Use of fluoridated toothpaste when tooth brushing
 - Quit smoking/No smoking
 - None of the above

Thank you for your support

“Next, please line up for our free dental check-up and 1 to 1 oral hygiene instruction”

B. Consent Form

Faculty of Dentistry – The University of Hong Kong

Oral Health Survey Consent Form

Date: 3rd February, 2015

Dear Sir/Madam,

The Faculty of Dentistry at The University of Hong Kong is currently conducting an oral health survey on the oral health status of adults in Hong Kong, so as to enable the development of a set of effective oral health instructions to improve oral health conditions.

We sincerely invite you to participate in our study regarding oral health instruction. To fit the purpose of this study, please note that participants must be 18 years of age or above. Please kindly fill in the attached questionnaire and authorize us to conduct an examination of your oral health conditions. Please note that participation in this study is free of charge and that other than for research purposes your information will be kept strictly confidential. The research findings may be published but any private information will remain concealed and the information collected will be destroyed once the study is complete. Please kindly fill out the following reply slip if you agree to participate in the study.

If there are any further enquiries please contact Mr. Wu, the student representative at 6769-6850. Your active participation will be greatly appreciated. Thank you very much.

Yours faithfully,

Mr. Wu, On Ki
Student Representative
Group 4.6
Faculty of Dentistry
The University of Hong Kong

Dr. Anthony Wong
Group Advisor

Reply slip

I, _____, fully understand the purpose and content of the study, and understand that my involvement in this research is entirely voluntary. I also understand that I must be 18 years of age or above to participate in this study, and I hereby give my consent.

Name: _____

HKID: _____

Signature: _____

Date: _____

C. Invitation Letter

To whom it may concern:

We cordially invite you to participate in our free oral health promotion event, organized by Year 4 dental students from The University of Hong Kong, Faculty of Dentistry. We would like to provide your organization with a free oral health examination, as well as offer some oral health care advice and souvenirs.

A questionnaire will be given as part of our research study regarding professional delivery of oral hygiene instruction in Hong Kong, as part of our Dental Community Health Project.

The proposed details of the event are as follows:

Available period: 1st March – 9th March, 2015
Duration: 10am-5pm
Participants: 50-60
Content of event: Individual oral examination
Oral health advices to individual participants
Distribution of oral hygiene souvenirs
* Portable dental chairs will be brought

We plan on providing individual oral examinations for an average of 10 participants per hour, for a total of 5-6 hours.

Should you have any further questions, please contact Mr. Wu at 6769-6850. We look forward to hearing from you soon.

Yours sincerely,

Mr. Wu, On Ki
Student Representative
Group 4.6
Faculty of Dentistry
The University of Hong Kong

D. Charting Form

Ref. No.: _____

Visible Plaque Index

Q1 Buccal												Q1 Palatal											
11			13			15			17			11			13			15			17		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									A			→→→									D		
Q2 Buccal												Q2 Palatal											
21			23			25			27			21			23			25			27		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									B			→→→									C		
Q3 Buccal												Q3 Lingual											
31			33			35			37			31			33			35			37		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									E			→→→									H		
Q4 Buccal												Q4 Lingual											
41			43			45			47			41			43			45			47		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									F			→→→									G		

Gingival Bleeding Index

Q1 Buccal												Q1 Palatal											
11			13			15			17			11			13			15			17		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									A			→→→									D		
Q2 Buccal												Q2 Palatal											
21			23			25			27			21			23			25			27		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									B			→→→									C		
Q3 Buccal												Q3 Lingual											
31			33			35			37			31			33			35			37		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									E			→→→									H		
Q4 Buccal												Q4 Lingual											
41			43			45			47			41			43			45			47		
M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D	M	Mid	D
←←←									F			→→→									G		

Medical Condition

Risk of Infective Endocarditis: _____ Other: _____
 Anticoagulant or Antiplatelet Drug: _____

E. Report Form



2014-2015 牙科公共衛生學 (4.6 組)

2014-2015 Dental Public Health (Group 4.6)

日期 Date: __/__/____

口腔檢查報告 Summary of Dental Findings

經初步檢查後, 我們發現您:

After initial dental check-up, we have found that:

1. 口腔衛生情況 Oral Hygiene:

- 良好 Good
- 一般 Normal
- 欠佳 Poor

2. 蛀牙情況 Tooth Decay Status:

- 沒有明顯蛀牙 No obvious tooth decay found
- 最少有 At least __ 顆蛀牙 decayed tooth/teeth found

3. 我們建議您需要 We suggest that you should:

- 保持口腔衛生 Maintain oral hygiene
- 定期接受牙科檢查 Receive regular dental check-up
- 儘快尋求牙醫檢查/治療 Seek dental consultation / treatment immediately

是次檢查為外展性質, 故未能提供全面的口腔檢查, 亦未必能發現臨床上不明顯的蛀牙及其他的牙科問題. 我們只提供初步建議. 如有問題, 應向註冊牙醫尋求更詳細的口腔檢查及相應治療.

As this is an outreach service, we are unable to provide a thorough dental examination for you, and there may be undetected tooth decay and other dental problems. We can only provide preliminary suggestions. If you have any other doubts, please seek advice and treatments from any registered dentist in Hong Kong.