Use of oral cleaning devices and their perceived benefits among Malaysians in Kuala Lumpur and Johor Bahru: An exploratory structured approach

Original Article

Use of Oral Cleaning Devices and Their Perceived Benefits among Malaysians in Kuala Lumpur and Johor Bahru: An Exploratory Structured Approach

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Abstract

Background and Objectives: Various devices have been used to maintain oral hygiene. These include toothbrush and toothpaste, mouthwash, dental floss, miswak, and toothpick. This study attempts to investigate the use of various oral cleaning devices and their perceived benefits among Malaysians. **Methods:** A quantitative cross-sectional study conducted in two different cities of Malaysia. A convenience sampling approach was adopted. A total of 787 participants agreed to participate in the current research. A validated questionnaire translated into national language was used for data collection. **Statistical Analysis Used:** Data analysis was performed using Statistical Package for Social Sciences version 20. **Results:** About 302 respondents were in the age range of 18 – 25 years old (38.4%). There were marginally more females (55.7%) than males (44.3%). Although 99.9% of the participants used a toothbrush, a significant majority (n = 590, 75%) used more than a single device to maintain their oral hygiene. Only 311 respondents knew that toothpicks were inappropriate to use to remove food between teeth and gums, while a majority (n = 592, 75.2%) did not realize that some mouthwashes can stain the teeth. Less than half (42.1%) knew that improper use of miswak might harm the teeth. **Conclusions:** Although their oral hygiene behaviors are relatively at a higher level, their perceived oral health benefits did not compare well.

Keywords: *Oral cleaning devices, oral hygiene, perceptions*

Introduction

Oral health is defined well when an individual is devoid of any acute and/or chronic mouth diseases such as periodontal disease, oral sores, tooth loss, tooth decay and oral cancers. Oral diseases are mostly preventable, but dental caries is still considered a significant health issue among Malaysians. The sixth common cancer in the world was oral cancer, while it was fifth in Malaysia.[1] In order to prevent oral diseases, proper oral hygiene must be practiced to make sure the mouth, gums, and teeth are healthy.[2] Besides thwarting formation of dental caries and plaque build-up, it helps reduce halitosis.[3,4] Good oral health practice is a result of two interrelated sets of behavior; self-care habits (dental hygiene, and restriction of sugar products) and utilization of dental services (regular dental examinations, oral health education, and prophylaxis measures).[3,4]

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Throughout history, various devices have been used to maintain oral hygiene. These include toothbrush and toothpaste, mouthwash, dental floss, miswak (chewing stick) and toothpick. The choice of oral cleaning devices to maintain oral hygiene, however, may vary by age, gender, and socioeconomic levels.[5,6] It was observed that, in Sweden, dental floss dominates younger age groups. Daily toothpicks were reported to be more popular among females and elderly.[6] However, the popularity of miswak was associated with religious aspects and was more common among men.[7]

A few studies also reported about school children having irregular oral hygiene practices.[1,8,9] Although girls were found to consume more sweets, they brushed their teeth more frequently than boys.[10,11] The oral health knowledge status was poor, especially in children from the low socioeconomic strata as this reflects on their frequency of dental visits and oral hygiene behavior to prevent oral diseases.[12] Majority of them were not using any additional oral cleansing aids and do not have proper knowledge of oral health care.[13,14] As opposed to school children under 16 years old, college and university undergraduate students have a better attitude towards oral hygiene practices.[15] The elderly lacked confidence in dentists and believed in traditional remedies.[16,17] Age influences oral hygiene beliefs as well as behavior.[18,19] Although oral health status for the visually imparted population was not much worse, the results showed that they had less knowledge about dental health.[20,21] For people with diseases such as congenital heart disease, age group, and gender played an important role in oral health practices and their perception.[22] Young females were reported to be more aware of prevention of oral diseases.[23,24] Since different oral cleaning devices have varying level of effectiveness in cleaning teeth,[25] oral health literacy is crucial for better oral health practices and clinical health status.[26] Hence, prior assessment of knowledge, attitude, and practice may serve as a measure to comprehend the demographics and trends of oral cleaning devices used.[24] This study attempts to quantitatively explore the use of various oral cleaning devices and their perceived benefits among Malaysians.

Methods

This is a quantitative cross-sectional study which was conducted from July to September 2013. The study was ethically approved by the Research and Ethics committee of the International Medical University. A convenience sampling method was used in this study. Using Raosoft sample size calculator, the sample size was determined to be 385 with 95% confidence interval and 5% margin of error. The sample size was increased to 787 on account of any non-response potential. Conveniently, Malaysian adults (18 years old and above) were selected from public areas such as outside popular shopping malls, and dental facilities, Light Rail Transit (LRT) stations, and other popular local gathering spots in Kuala Lumpur and Johor Bharu. The exclusion criterion comprised of those adults who were unwilling to participate and those who incompletely filled the questionnaires.

Data were collected using structured questionnaires which had few options with multi-choice answers, while most required participants to choose one best response. The questionnaire was originally designed in English and later translated to the national language, Bahasa Malaysia. It was validated by a panel of professionals from members of the University. Prior to data collection, the questionnaire was piloted on 40 participants. Minor changes to the questionnaire were made based on feedbacks from the pilot study. Items which lacked clarity and relevance were removed.

The questionnaire consisted of four parts. The first was about socio-demographic factors of the participants comprising of age, gender, marital status, monthly income, and education level. The second part (13 items) investigated the oral hygiene behaviors of participants with 13 items. The third part (18 items) gauged the perceived oral health benefits of participants. The final part (9 items) assessed the knowledge of participants.

Data analysis

Data analysis was done using Statistical Package for Social Sciences version 20. Descriptive statistics were applied to evaluate the sociodemographic characteristics of the participants. Chi-square test was used to investigate the association between variables and statistical significance was defined at a level of P value less than 0.05.

Results

Socio-demographic factors

A total of 787 respondents consented to participate in the study. A majority of 302 (38.4%) respondents were in the age range of 18 – 25 years old. There were marginally more females (55.7%) than males (44.3%) in the sample. Of the total, 224 (28.5%) participants reported a monthly income of more than RM2500. A majority of 451 (57.3%) respondents had college/university education. The detailed demographic characteristics of the respondents are presented in Table 1

Table 1: Demographic characteristics of respondents

Characteristic		Frequency (%)
Age range (Years)	18–25	302 (38.4)
	26–33	164 (20.8)
	34–41	101 (12.8)
	42–49	82 (10.4)
	>50	138 (17.5)
Gender	Male	349 (44.3)
	Female	438 (55.7)
Marital status	Single	398 (50.6)
	Married	379 (48.2)
	Divorced	10 (1.3)
Monthly income	< RM1000	217 (27.6)
	RM1001-RM1500	122 (15.5)
	RM1501-RM2000	113 (14.4)
	RM2001-RM2500	111 (14.1)
	>RM2501	224 (28.5)
Education level	Less than high school	72 (9.1)
	High school	264 (33.5)
	College/ university	451 (57.3)

Oral hygiene behaviors

Although 99.9% of the participants used a toothbrush, a significant majority of 590 (75%) participants used more than a single device to maintain their oral hygiene. In combination with tooth brushing, 159 (20.2%) respondents used mouthwash, while 149 (18.9%) respondents used dental floss and mouthwash. A detailed choice of oral cleaning devices among the respondents is presented in Table 2.

Table 3 presents the oral health behavior and its perceived benefits according to gender. There was a statistically significant association between gender and frequency of dental flossing (P = 0.001), quality of breath (P = 0.016), and perception of overall oral health rate (P = 0.028).

More females claimed to never experience bad breath [n = 106, (60.9%)]. A higher percentage of males do not use dental floss [n = 235 (67.3%)]. A majority of the participants who floss their teeth every day are females [n = 67 (70.5%0]. Ironically, more males perceived to have excellent overall oral health [n = 14 (53.8%)]. Most of them who perceived very poor oral health were females [n = 10 (62.5%)]. A majority of 642 (81.6%) respondents claimed to visit the dentist, of which most respondents (n = 413, 52.5%) cited that they only visit the dentist when in pain. Most participants stated the lack of time alone (n = 228, 29.0%) as the reason for avoiding dentists. There was no significant difference in the frequency of dental visit by gender (P > 0.05).

More than half the respondents (n = 451, 57.3%) claimed toothbrush as the most effective oral cleaning device,

Table 2: Oral Cleaning Devices for Maintenance of Oral Hygiene

Oral cleaning devices	Frequency (%)
Toothbrush & Toothpaste	198 (25.2)
Toothbrush & toothpaste + mouthwash	159 (20.2)
Toothbrush & toothpaste + dental floss + mouthwash	149 (18.9)
Toothbrush & toothpaste + dental floss	58 (7.4)
Toothbrush & toothpaste + Miswak	38 (4.5)
Toothbrush & toothpaste + dental floss + mouthwash + toothpick	35 (4.4)
Toothbrush & toothpaste + mouthwash + toothpick	31 (3.9)
Toothbrush & toothpaste + toothpick	31 (3.9)
Toothbrush & toothpaste + mouthwash + Miswak	25 (3.2)
Toothbrush & toothpaste + dental floss + mouthwash + Miswak	22 (2.8)
Toothbrush & toothpaste + dental floss + toothpick	14 (1.8)
Toothbrush & toothpaste + toothpick + Miswak	11 (1.4)
Toothbrush & toothpaste + dental floss + Miswak	6 (8)
Toothbrush & toothpaste + charcoal	3 (0.4)
Toothbrush & toothpaste + toothpick + Miswak + charcoal	2 (0.3)
Toothbrush & toothpaste + mouthwash +toothpick + miswak	1 (0.1)
Toothbrush & toothpaste + dental floss + mouthwash + toothpick + Miswak	1 (0.1)
Toothbrush & toothpaste + others	1 (0.1)
Toothbrush & toothpaste + dental floss + others	1 (0.1)
Charcoal	1 (0.1)

followed by the combined use of toothbrush and other oral cleaning devices (n = 312, 39.6%) and other oral cleaning devices alone (n = 383, 48.7%). Miswak was perceived by a majority of respondents (n = 533, 67.7%) as the least effective oral cleaning device. The bar chart below [Figure 1] explains further. A majority of 428 (54.4%) participants felt that a single oral cleaning device is sufficient to reduce gum disease effectively. Almost half (n = 200, 46.7%) opined that toothbrush alone is the most effective oral cleaning device to do so. A majority of 103 (13.1%) participants felt that toothbrush, mouthwash, and dental floss were the best combination of oral cleaning devices to reduce gum disease effectively.

A total of 402 (51.1%) participants felt that a single oral cleaning device was sufficient to effectively reduce tooth decay, in which toothbrush (n = 244, 60.7%) was the most favored device. Among the respondents who felt a combination of oral cleaning device were more effective in reducing tooth decay, a majority of 135 (35.0%) participants opined that toothbrush, dental floss were most suitable.

Table 3: Oral hygiene behavior and its perceived benefits according to gender

Variables	Total (%)	Gender		*P* value
		Male [n(%)]	Female [n(%)]	
Oral hygiene Behavior				
Effectiveness of tooth cleaning technique				0.363
a. Yes. 100%	159 (20.2)	76 (47.8)	83 (52.2)	
b. May be	447 (56.8)	202 (52.2)	245 (54.8)	
c. I am not sure	149 (18.9)	60 (40.3)	89 (59.7)	
d. No	32 (4.1)	11 (34.4)	21 (65.6)	
Frequency of tooth brushing				0.008
a. Once per day	59 (7.5)	33 (55.9)	26 (44.1)	
b. Twice per day	343 (43.6)	130 (37.9)	213 (62.1)	
c. More than twice per day	316 (40.2)	155 (49.1)	161 (50.9)	
d. Others	69 (8.8)	31 (44.9)	38 (55.1)	
Duration of tooth brushing				0.649
a. Less than one minute	41 (5.2)	18 (43.9)	23 (56.1)	
b. 1 minute	276 (35.1)	117 (42.4)	159 (57.6)	
c. 2 minutes	264 (33.5)	115 (43.6)	149 (56.4)	
d. More than 2 minutes	206 (26.2)	99 (48.1)	101 (51.9)	
Type of brush used				0.001
a. Soft	270 (34.3)	102 (37.8)	168 (62.2)	
b. Medium	404 (51.3)	175 (43.3)	229 (56.7)	
c. Hard	75 (9.5)	51 (68.0)	24 (32.0)	
d. I don't know	38 (4.8)	21 (55.3)	17 (44.7)	
Items used for tooth brushing				0.858
a. Toothpaste	751 (95.4)	331 (44.1)	420 (55.9)	
b. Powder	4 (0.5)	2 (50.0)	2 (50.0)	
c. Salt	1 (0.3)	1 (100.0)	0 (0.0)	
d. Others	4 (0.5)	1 (25.0)	3 (75.0)	
e. Toothpaste and powder	13 (1.7)	7 (53.8)	6 (46.2)	
f. Toothpaste and salt	12 (1.5)	2 (50.0)	2 (50.0)	
g. Toothpaste, powder and salt	2 (0.3)	1 (50.0)	1 (50.0)	
Time of mouthwash use				0.107
a. Before brushing	39 (5.0)	18 (46.2)	21 (53.8)	
b. After brushing	266 (33.8)	101 (28.9)	165 (62.0)	
c. Anytime when I have bad breath	129 (16.4)	59 (45.7)	70 (54.3)	
d. I don't use mouthwash	342 (43.5)	167 (48.8)	175 (51.2)	
Frequency of mouthwash use				0.013
a. Once a month	159 (20.2)	61 (38.4)	98 (61.6)	
b. Once a week	273 (34.7)	141 (51.6)	132 (48.4)	
c. More than once a week	81 (10.3)	38 (46.9)	43 (53.1)	
d. Everyday	89 (11.3)	30 (33.7)	59 (66.3)	
Frequency of dental flossing				0.001
a. Once a month	62 (7.9)	29 (46.8)	33 (53.2)	
b. Once a week	98 (12.5)	42 (42.9)	56 (57.1)	
c. More than once a week	52 (6.6)	15 (28.8)	37 (71.2)	
d. Everyday	95 (12.1)	28 (29.5)	67 (70.5)	
e. I do not use dental floss	480 (61.0)	235 (49.0)	245 (51.0)	
Dental visit				0.058
a. Yes	642 (81.6)	286 (44.5)	356 (55.5)	
b. No	145 (18.4)	63 (43.4)	82 (56.6)	
Reasons for avoiding a dental visit				0.001
a. Cost	157 (19.9)	86 (54.8)	71 (45.2)	
b. Time	228 (29.0)	120 (52.6)	108 (47.4)	
c. Fear	122 (15.5)	23 (18.9)	99 (81.1)	
d. Others	36 (4.6)	16 (44.4)	36 (55.6)	
e. Cost, time and fear	60 (7.6)	26 (43.3)	34 (56.7)	

Table 3: Continued

Variables	Total (%)	Gender		*P* value
		Male [n(%)]	Female [n(%)]	
f. Cost and time	129 (16.4)	71 (55.0)	58 (45.0)	
g. Cost and fear	27 (3.4)	3 (11.1)	24 (88.9)	
h. Time and fear	27 (3.4)	4 (14.8)	23 (85.2)	
i. Time and others	1 (0.1)	0 (0.0)	1 (100.0)	
Frequency of dental visits				0.289
a. When I am in pain	413 (52.5)	177 (42.9)	236 (57.1)	
b. Every 6 months	144 (18.3)	73 (50.7)	71 (49.3)	
c. Regularly for check up	103 (13.1)	39 (37.9)	64 (62.1)	
d. I do not visit the dentist	96 (12.2)	46 (47.9)	50 (52.1)	
e. Once a year	31 (3.9)	14 (45.2)	17 (54.8)	
Quality of breath				0.016
a. Always have bad breath	28 (3.6)	19 (67.9)	9 (32.1)	
b. Never had bad breath	174 (22.1)	68 (39.1)	106 (60.9)	
c. Sometimes have bad breath	585 (74.3)	262 (44.8)	323 (55.2)	
Perceived oral health benefits				
Rate the stains on teeth				0.178
a. No stains	106 (13.5)	56 (52.8)	50 (47.2)	
b. Severe	54 (6.9)	25 (46.3)	29 (53.7)	
c. Moderate	289 (36.7)	130 (45.0)	159 (55.0)	
d. Slight	338 (42.9)	138 (40.8)	200 (59.2)	
Presence of gum bleeding while cleaning teeth				0.001
a. Never	229 (29.1)	131 (57.2)	98 (42.8)	
b. Sometimes	512 (65.1)	202 (57.9)	310 (60.5)	
c. Always	46 (5.8)	16 (34.8)	30 (65.2)	
Rate gum bleeding				0.001
a. No gum bleeding	228 (29.0)	131 (57.5)	97 (42.5)	
b. Slight bleeding	508 (64.5)	188 (53.9)	320 (63.0)	
c. Moderate bleeding	48 (6.1)	29 (60.4)	19 (39.6)	
d. Heavy bleeding	3 (0.4)	1 (33.3)	2 (66.7)	
Rate the presence of gum disease				0.004
a. No gum disease in my mouth	370 (47.0)	189 (51.1)	181 (48.9)	
b. Slight	316 (40.2)	119 (37.7)	197 (62.3)	
c. Moderate	93 (11.8)	37 (39.8)	56 (60.2)	
d. Severe	8 (1.0)	4 (50.0)	4 (50.0)	
Rate the level of tooth decay				0.315
a. No tooth decay in my mouth	293 (37.2)	136 (46.4)	157 (53.6)	
b. Slight	347 (44.1)	152 (43.8)	195 (56.2)	
c. Moderate	130 (16.5)	57 (43.8)	73 (56.2)	
d. Severe	17 (2.2)	4 (23.5)	13 (76.5)	
Heard of dental plaque				0.643
a. Yes	530 (67.3)	232 (66.5)	298 (56.2)	
b. No	257 (32.7)	117 (45.5)	140 (54.5)	
Overall health rate				0.028
a. Very poor	16 (2.0)	6 (37.5)	10 (62.5)	
b. Poor	65 (8.3)	30 (46.2)	35 (53.8)	
c. Average	395 (50.2)	154 (39.0)	241 (61.0)	
d. Good	285 (50.2)	145 (50.9)	140 (32.0)	
e. Excellent	26 (3.3)	14 (50.9)	12 (46.2)	
Redness in gums				0.392
a. Never	416 (52.9)	194 (46.6)	222 (53.4)	
b. Sometimes	359 (45.6)	150 (41.8)	209 (58.2)	
c. Always	612 (1.5)	5 (41.7)	7 (58.3)	

Table 3: Continued

Variables	Total (%)	Gender		*P* value
		Male [n(%)]	Female [n(%)]	
Gums swelling				0.274
a. Never	409 (52.0)	183 (44.7)	226 (55.3)	
b. Sometimes	371 (47.1)	165 (44.5)	206 (55.5)	
c. Always	7 (0.9)	1 (14.3)	6 (85.7)	
Pain in mouth				0.142
a. Never	308 (39.1)	150 (48.7)	158 (51.3)	
b. Sometimes	465 (59.1)	193 (55.3)	272 (58.5)	
c. Always	14 (1.8)	6 (42.9)	8 (57.1)	
Sense of freshness in mouth after use of oral cleaning device				0.397
a. Yes	681 (86.5)	302 (44.3)	379 (55.7)	
b. Not sure	79 (10.0)	32 (40.5)	47 (59.5)	
c. No	27 (3.4)	15 (55.6)	12 (44.4)	
Frequency of consuming sweet foods per day				0.036
a. Less than 1 time	422 (53.6)	182 (43.1)	240 (56.9)	
b. 2–4 times	327 (41.6)	144 (44.0)	183 (41.8)	
c. 4–6 times	23 (2.9)	17 (73.9)	6 (1.4)	
d. More than 6 times	15 (1.9)	6 (40.0)	9 (2.1)	
Frequency of consuming soft drinks				0.241
a. Never/once in a while	479 (60.9)	207 (43.2)	272 (56.8)	
b. Once a week	128 (16.3)	50 (39.1)	78 (60.9)	
c. Twice a week	68 (8.6)	38 (55.9)	30 (44.1)	
d. 3–5 times a week	69 (8.8)	34 (49.3)	35 (50.7)	
e. Everyday	32 (4.1)	16 (50.0)	16 (50.0)	
f. Several times per day	11 (1.4)	4 (36.4)	7 (63.6)	

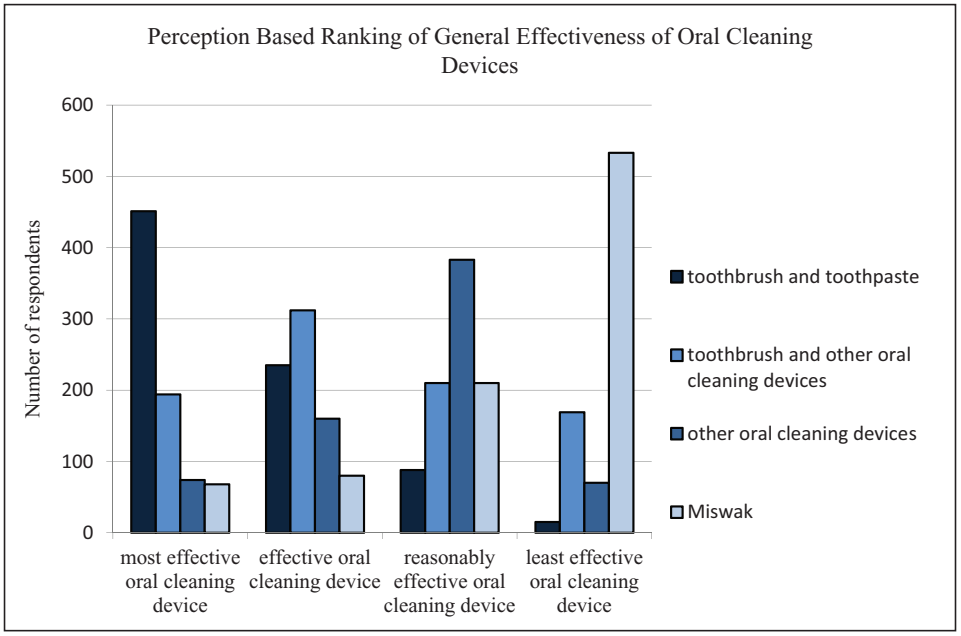

Figure 1: Perception-based ranking of general effectiveness of oral cleaning devices

Similarly, a majority of 413 (52.5%) participants perceived that a single oral cleaning device was sufficient to reduce mouth debris, in which toothbrush was the cited as the most common tool (n = 188, 45.5%). Among participants who felt that a combination of oral cleaning devices was most effective in reducing mouth debris, toothbrush, mouthwash, and dental floss were perceived as the best combination (n = 112, 29.9%). These findings are illustrated in Figures 2–4.

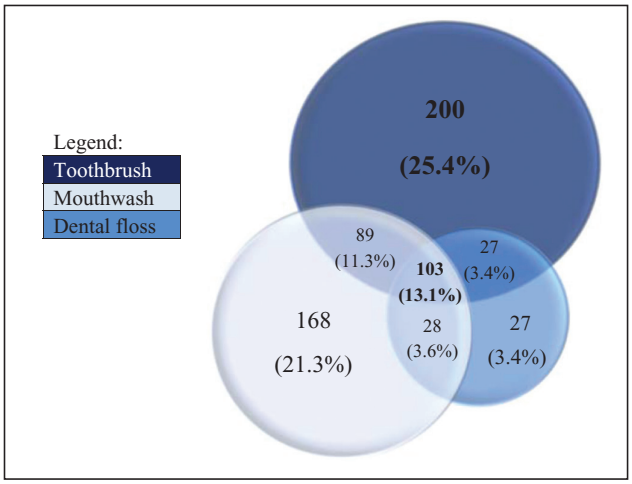

Figure 2: Most effective oral cleaning devices against gum disease

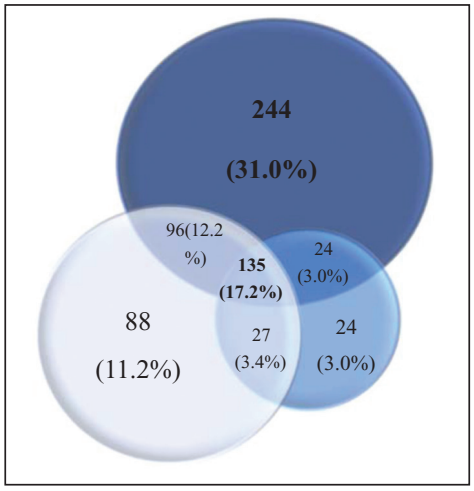

Figure 3: Most effective oral cleaning devices in reducing tooth decay

Knowledge of oral hygiene

There were 9 statements in which the participants were required to report using true or false. A correct answer warrants a score of 1, while a wrong answer warrants no score. The minimum score was 0 (n = 2; 0.3%), while the maximum score was 9 (n = 23, 2.9%). 392 (49.8%) respondents scored below the mean score of 5.5.

Three most common questions that were answered incorrectly were questions number 5, 6, and 7. Only 311 respondents knew that toothpicks were inappropriate to be used to remove food between teeth and gums; while more than half of the respondents (n = 592, 75.2%) did not know that some mouthwashes can stain the teeth, and only 331 (42.1%) respondents knew that improper use of Miswak may harm the teeth. There was no statistically significant association between knowledge score and the type of devices used. The results of the knowledge score of oral health are detailed in Table 4.

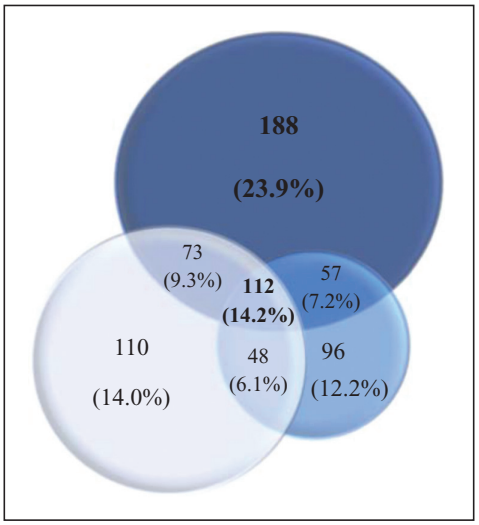

Figure 4: Most effective oral cleaning devices in reducing mouth debris

A scoring system [Table 5] was developed among selected variables of perceived oral health benefits and oral hygiene behavior domains to test the hypothesis.

The sum of scores for both domains was analyzed for correlation. The use of oral cleaning devices significantly correlates positively with oral health behavior (r = 0.321, P = 0.001). There is an increase in oral health behavior with the types of oral cleaning devices used. No significant correlation was observed between the perceived oral health benefits and the types of oral cleaning devices used (r = 0.048, P = 0.339).

Discussion

The current research was executed in Malaysia and aimed to explore the uses of oral cleaning devices and their perceived benefits followed by the knowledge of oral health. A previous study was conducted in Malaysia exploring the oral health knowledge, attitude, and practices among secondary school students in Kuching, Sarawak. The target population of the current study was adult Malaysians of 18-year-old and above, instead of secondary school students.[11]

Despite the differences of targeted participants, in both studies, most respondents reported brushing their teeth at least twice a day. There were also few studies done targeting different populations in other countries that reported the similar results.[8,10,13,27] On the other hand, the frequency of brushing teeth was significantly associated with gender. Like a couple of other studies, this study observed that females brush their teeth more often than males. Ironically, they also consume more sweet foods than males.[10,11]

Table 4: Knowledge of oral health

Statements	Correct responses n (%)	Incorrect response n (%)
It is appropriate to share toothbrushes with others	725 (92.1)	62 (7.8)
A toothbrush can be stored in a desk drawer	613 (77.9)	174 (22.1)
Flossing is the best way to clean the interproximal spaces	563 (71.5)	224 (28.5)
It is appropriate to use a toothpick to remove the food between teeth and gums	311 (39.5)	476 (60.5)
Some mouthwashes can stain your teeth	195 (24.8)	592 (75.2)
Improper use of Miswak may cause harm to your teeth	331 (42.1)	456 (57.9)
Using fluoride strengthens the teeth	370 (47.0)	417 (53.0)
Using a finger with powder/toothpaste to maintain oral hygiene is better than brushing	587 (74.6)	200 (25.4)

Table 5: Perceived Oral Health Benefits and Oral Hygiene Behavioural Scoring System

Questions		Score
	Oral health behaviour	
1	What do you use for cleaning your teeth?	0: a single device 1: more than a single device
2	Do you think that your tooth-cleaning technique is effective?	0: No 1: I am not sure 2: May be 3: Yes. 100%
3	What is the frequency of toothbrushing	0: I don't brush teeth 1: Once per day 2: twice per day 3: more than twice per day
4	How long do you spend your time brushing your teeth	0: less than one minute 1: 1 minute 2: 2 minute 3: more than 2 minutes
8	How often you use a mouthwash	1: once a month 2: once a week 3: > once a week 4: everyday
9	How often you floss	1: once a month 2: once a week 3: > once a week 4: everyday
13	Quality of breath	0: always bad breath 1: sometimes bad breath 2: never bad breath
Oral health benefits		
2	Rate stain on teeth	0: severe 1: moderate 2: slight stains 3: no stain
3	Do your gums bleed	0: always 1: sometimes 2: never
6	Rate gum disease	0: severe 1: moderate 2: slight 3: no
7	Rate tooth decay	0: severe 1: moderate 2: slight 3: no
8	Heard of plaque	0: no 1: yes
9	Rate overall health	0: poor/very poor 1: average 2: good 3: excellent
10	Redness gum	0: always 1: sometimes 2: never
11	Swelling gums	0: always 1: sometimes 2: never
13	Devices most effective reducing gum disease	0: single device 1: more than single device
14	Most effective reduce tooth decay	0: single device 1: more than single device
15	Most effective reduce mouth debris	0: single device 1: more than single device
16	Sense of freshness in mouth	0: no 1: yes
17	Frequency sweet food per day	0: > 6 times 1: 4–6 times 2: 2–4 times 3: less than one time
18	Frequency soft drinks	0: several times per day 1: every day 2: 3–5 times a week 3: twice a week 4: once a week 5: never/once a while

Almost all the respondents in the current research used toothbrush and toothpaste to clean their teeth. Only one-quarter of them used toothbrush alone. Although extra oral hygiene aids were reported to be not popular in many studies,[28,29] a majority in the current research used more than one device to maintain their oral hygiene. The percentage of mouthwash users in this study was like the study done in Sarawak. However,

dental floss was not well known among secondary school students.[12] Since there is a significant religious association between Islam and the use of miswak, the number of miswak users in this study is dramatically lower than similar studies done in Saudi Arabia and Jordan.[29,30]

The perception of the majority that a single oral cleaning device is sufficient to reduce gum diseases effectively, toothaches and mouth debris are of concern. Studies have shown that the benefits of a combination of oral cleaning devices outweigh the use of any single oral cleaning devices.[25,31] Although toothbrush may be the best tool to remove plaque on buccal surfaces of a tooth, dental floss is more superior for interdental cleaning.[32] Mouthwash, however, complements the primary mechanical methods of cleaning as it reduces both supragingival plaque levels and dental sensitivity.[33]

About 80% of the respondents had dental visit experiences in this study, and half of them visited dental facilities only when they had a toothache. This result was inconsistent with a similar with a study done among students in Kuwait and India.[10,34] Oral prophylaxis especially using tooth brush and removing dental plaque is highly advocated in both developing and developed regions followed by the enhancement of 'quality tooth brushing' with a combination of dental flossing and inter-dental tooth brushing.[35,36] The routine dental check-up rate was also found to be low in the current study which was generally perceived as 'time-consuming'.

However, among school children in North Jordan, fear was the given factor that they skipped regular dental visits.[8] These findings indicate a void in the local public education regarding the importance of regular dental check-ups in preventing periodontal diseases.

The use of miswak needs to be promoted locally and its medicinal applications need to be highlighted emphasizing the potential role of each bioactive compound as its constituent.[37] Moreover, miswak products, most notably mouthwash, already reported to decrease the proliferation of cariogenic bacteria.[38]

Limitations

As the self-reported oral health status was not confirmed by clinical examinations, this somehow limits the findings. The inability to seek opinions across all Malaysian ethnicities may affect the generalizability of study findings.

Conclusion

The results showed that dental knowledge of adult population in Malaysia needed to be improved. Despite their oral hygiene behaviors are relatively at a high level, but their perceived oral health benefits did not compare well. Initiatives to promote the awareness of oral health strategies and benefits are needed.

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