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Self-esteem, oral health behaviours, and clinical oral health status in Chinese adults: An exploratory study

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Abstract

Objectives: This is an exploratory study to examine the relations among self-esteem, oral health behaviours and clinical oral health status in Chinese adults. In addition, gender differences in clinical oral health status and oral health behaviours were explored.

Methods: Participants were 192 patients from a private dental clinic in Hong Kong aged between 18 and 67 years. Prior to oral health examination, participants completed a questionnaire about their oral health behaviours and the Rosenberg's Self-Esteem Scale. A dentist and a registered dental hygienist examined their tooth condition and clinical oral health status.

Results: Participants with high self-esteem had better clinical oral health status than participants with low self-esteem despite no difference in their oral health behaviours. Male participants flossed less frequently than female participants but there was no difference in their clinical oral health status. Linear regression analyses showed that only self-esteem was, but gender, age, and tooth conditions were not, a significant predictor of clinical oral health status.

Conclusions: In general, Chinese adults in Hong Kong had satisfactory oral health behaviours. Chinese adults with high self-esteem had better clinical oral health status than those with low self-esteem. However, oral health behaviours did not differ by level of self-esteem. Implications for implementing psychosocial elements in oral health education were discussed.

Keywords

adults, Chinese, oral health, oral health behaviours, self-esteem

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Introduction

Oral health refers to a standard of the oral and related tissues including teeth, gingivae (gums) and the periodontium that enable individuals to eat, speak and socialize without active disease, discomfort or embarrassment; it contributes to individuals' general well-being and health-related quality of life.[1,2] Previous research has examined the impact of physical and psychosocial factors on oral health. For instance, individuals with Down's syndrome, Chediak-Higashi syndrome, Haim-Munk syndrome and Papillon-Lefevre syndrome were found to be more susceptible to bacterial destruction, resulting in periodontal disease and dental caries.[3–5] Smoking was also found to be a possible cause of periodontal disease.[6–9]

According to Kiyak[10, p.9] 'an individual's cultural background, health needs, beliefs, personality and demographic characteristics interact with what he/she will do vis-à-vis oral hygiene, and what oral health outcomes that person will achieve'. Research has found that psychosocial, economic, and cultural factors are associated with oral health and oral health behaviours. For example, education level and economic status were found to be associated with oral health.[11] Research that focused on psychological factors has examined the relationship between oral health behaviour and self-efficacy,[12] self-concept[13] and self-esteem[14] respectively. Besides, cultural differences have been observed in oral health status, dental visiting behaviours,[15,16] as well as oral health behaviours. For instance, in a study that compared dental students from Hong Kong, Japan, and West China, there were significant cultural differences in the majority of dental behaviours.[17] Zhang also found that acculturation influenced Chinese immigrants' use of dental services in New Zealand.[18] Therefore it is important to acknowledge culture as a factor in dental research.

This study focused on Chinese adults in Hong Kong since the Chinese population is one of the largest populations in the world but receives relatively little attention in dental research. With regard to oral health practices, previous research has found that Chinese adults in Hong Kong lacked knowledge about dental scaling[19] but using toothpicks and mouth rinsing were common in Chinese people.[20] Other studies have examined the use of dental service and dental visit behaviour in Chinese people in Hong Kong.[21,22] In the current study, we explored the relations among self-esteem, oral health behaviours and clinical oral health status in Chinese adults.

Self-esteem refers to individuals' personal judgement of their own worth.[23] Research has found that individuals with higher self-esteem rated themselves as having better oral health.[24] Oral health behaviours such as toothbrushing are effective in promoting and sustaining oral health. According to Kneckt and colleagues,[25] regular toothbrushing requires perseverance and can be enhanced by high self-esteem. For example, Regis, Macgregor and Balding[26] found that adolescents with high self-esteem brushed their teeth more frequently. Kneckt and colleagues[25] also found that insulin-dependent diabetes mellitus (IDDM) patients with high self-esteem, compared to those with low self-esteem, had a higher rate of toothbrushing but they did not find any associations between self-esteem, plague and gingival bleeding. Moreover, Kiyak and Mulligan[27] found that individuals' self-esteem improved after an intervention to promote oral self-care.

The majority of studies that examined oral health or oral health behaviour and self-esteem employed self-report measures and focused mainly on children and adolescents with few exceptions.[21,22,28–30] Following the suggestion of Benyamini, Leventhal, and Leventhal,[31] we employed clinical measures to study adults' oral health to increase the validity of the current investigation and fill the gap in the literature.

The first goal of the study was to examine the relations among self-esteem, oral health behaviours, and clinical oral health status in Chinese adults in Hong Kong. The second goal was to explore gender differences in oral health behaviours and clinical oral health status in a Chinese adult population since, to the best of our knowledge, no previous studies have been done.

Materials and methods

Participants

Participants were 192 Chinese adult patients (90 males, 102 females) from a private dental clinic in Hong Kong (age range = 18–67). The mean age was 36.59 years (*SD* = 11.00).

Procedures

Ethics approval of the study was obtained from The Hong Kong Polytechnic University and Health & Care Dental Clinic Limited. Walk-in and contract patients in September and October in 2009 were invited to participate in the study. Participants who gave their consent were asked to complete a questionnaire which included socio-demographic information, measures of oral health behaviours and self-esteem. After that, a registered dental hygienist and a dentist conducted a clinical oral health status examination for each patient.

Measures

Socio-demographics. Participants provided information about their age, gender, and ethnicity.

Oral health behaviours. Participants answered three questions about their oral health behaviours. Similar to a previous study,[32] we asked participants two questions about their self-care practices including their daily average frequency of toothbrushing (e.g. none, once, twice, three times or more, and other) and flossing frequency (e.g. every day, every two to four days, once a week, none, and other). For professional care, we asked participants to indicate the frequency of scaling (dental cleaning) (e.g. every six to nine months, every year, every two to three years, every four to five years, and other).

Clinical oral health status. A registered dental hygienist and a dentist, both blind to the study, conducted oral health examinations for the participants by using mouth mirrors, periodontal probes and straight probes. They rated the tooth conditions and clinical oral health status of the participants. The procedure lasted for approximately five minutes.

Intra-oral examination of clinical oral health status was examined by mouth mirrors and Williams periodontal probes. With reference to previous research,[33] clinical oral health status was determined by three factors, the level of plaque accumulation was measured by the Plaque Index (light = 0, moderate = 1, heavy = 2), the severity of marginal gingival inflammation (MGI) was measured by the Gingival Index (mild = 0, moderate = 1, severe = 2)[34,35] and the accumulation of calculus (light = 0, moderate = 1, heavy = 2). Periodontal condition (pocket depth) was not assessed in this study. Scores were then summed up and higher scores reflected poorer clinical oral health status.

Tooth conditions. Using mouth mirrors and straight probes, the registered dental hygienist and the dentist also examined participants' tooth conditions and recorded the number of caries, restoration and missing teeth. Third molars were excluded from the missing tooth scoring, as they were not necessarily present. Radiographs were not taken; as a result, only the visible conditions were noted.

Self-esteem. We assessed participants' self-esteem by using Rosenberg's Self-Esteem Scale[36] which demonstrated good validity and reliability. The scale included five positively worded items and five negatively worded items. The 10 items were rated on a four-point Likert scale from 'strongly agree' to 'strongly disagree'. The five positively worded items, e.g. 'On the whole, I am satisfied

with myself', and 'I take a positive attitude toward myself', were coded from 0 for 'strongly disagree' to 3 for 'strongly agree'. The five negatively worded items, e.g. 'I feel I do not have much to be proud of', and 'I certainly feel useless at times', were reversely coded. By adding up the scores, each participant had a score that ranged from 0–30 with higher scores indicating higher levels of self-esteem. We adopted the Chinese version of the Rosenberg Self-Esteem Scale[16] and its reliability was good in the current study ($\alpha = .77$).

Statistical analyses. We conducted statistical analyses using IBM SPSS Statistics 20.

Results

Oral health behaviours

Table 1 shows the overall frequencies and frequencies by gender of toothbrushing, flossing and scaling. The majority of participants brushed their teeth twice a day and less than 20% brushed their teeth only once a day. About half of the participants did not floss at all, and only 21% flossed every day. The majority of participants would have scaling at least once a year while 20% would do so every two to five years. There were no gender differences in the frequencies of toothbrushing, $\chi^2(2, N = 192) = 3.01$, $p = .22$ and scaling $\chi^2(4, N = 192) = 3.64$, $p = .46$. However, female participants flossed more frequently than male participants and the difference was statistically significant, $\chi^2(4, N = 192) = 11.74$, $p < .05$.

Tooth conditions and clinical oral health status

The inter-rater reliability of the dentist and the dental hygienist who conducted the tooth conditions and clinical oral health status examination was perfect (r = 1), indicating homogeneous rating.

Table 1. Percentage distribution of frequencies of toothbrushing, flossing and scaling of male and female

			Gender	
		N = 192	Male (*n* = 90)	Female (*n* = 102)
		%	%	%
Toothbrushing (per day)	Once	17	19	15
	Twice	82	79	85
	3 times or more	1	2	0
Flossing	Every day	21	20	22
	Every 2–4 days	12	9	15
	Once a week	13	6	19
	None	51	61	41
	Others	4	4	4
Scaling	Every 6–9 months	34	33	35
	Every year	41	39	43
	Every 2–3 years	15	20	11
	Every 4–5 years	5	3	6
	Others	5	4	5

The mean score for missing teeth was .97 (*SD* = 1.64), filled teeth was 2.61 (*SD* = 3.18) and carious teeth was .29 (*SD* = .91). There were no statistically significant gender differences in the three aspects. The mean number of missing teeth of males was 1.03 (*SD* = 1.67) and females was .92 (*SD* = 1.61), $t(190) = .47$, $p = .64$; the mean number of filled teeth of males was 2.49 (*SD* = 3.54) and females was 2.73 (*SD* = 2.85), $t(190) = -.51$, $p = .61$; and the mean number of teeth with caries of males was .30 (*SD* = .85) and females was .28 (*SD* = .96), $t(190) = .12$, $p = .91$.

Table 2 shows the clinical oral health status including plaque accumulation, calculus accumulation and marginal gingival inflammation of all participants and by gender. The majority of participants had light plaque accumulation, light calculus accumulation and mild marginal gingival inflammation. About one-quarter of the participants had moderate plaque accumulation, moderate calculus accumulation and moderate marginal gingival inflammation. There were no statistically significant gender differences in plaque accumulation, $\chi^2(1, N = 192) = 1.56$, $p = .21$, calculus accumulation, $\chi^2(2, N = 192) = 4.03$, $p = .13$, and marginal gingival inflammation, $\chi^2(2, N = 192) = .89$, $p = .64$.

Self-esteem

The mean of the self-esteem score was 19.35 (*SD* = 2.74) (range = 11–27), and the median was 19. We performed a median-split and categorized participants into a high self-esteem group and low self-esteem group as in previous studies.[25] To make the two groups more distinct from each other, data from participants with a self-esteem score of 19 (*n*=47) were excluded from the following analyses. Participants with a self-esteem score of 11–18 were categorized into the low self-esteem group (*n* = 61) whereas those with a score of 20–27 were categorized into the high self-esteem group (*n* = 84).

Table 2. Percentage distribution of accumulation of plaque, calculus, and severity of marginal gingival inflammation by gender

Oral hygiene/periodontal condition		Gender		
		N = 192	Male (*n* = 90)	Female (*n* = 102)
		%	%	%
Plaque accumulation	Light	77	81	74
	Moderate	23	19	27
	Heavy	0	0	0
Calculus accumulation	Light	70	63	76
	Moderate	27	31	23
	Heavy	4	6	2
Marginal gingival inflammation	Mild	76	77	76
	Moderate	23	23	24
	Severe	1	0	1

Self-esteem and oral health behaviours

Table 3 shows the oral health behaviours by self-esteem group. No statistically significant differences were found between participants with high self-esteem and low self-esteem in their frequencies of toothbrushing, $\chi^2(2, N = 145) = 4.38$, $p = .11$, flossing, $\chi^2(4, N = 145) = 5.04$, $p = .28$, and scaling, $\chi^2(4, N = 145) = 2.30$, $p = .68$.

Self-esteem and clinical oral health status

Table 4 shows the clinical oral health status by self-esteem group. As shown in Table 4, statistically significant differences were found between participants with high self-esteem and low self-esteem with regard to plaque accumulation $\chi^2(1, N = 145) = 38.12$, $p < .01$, calculus accumulation $\chi^2(2, N = 145) = 61.21$, $p < .01$, and marginal gingival inflammation, $\chi^2(2, N = 145) = 49.80$, $p < .01$. In general, participants with high self-esteem had less severe plaque accumulation, calculus accumulation and marginal gingival inflammation than participants with low self-esteem.

Linear regression analysis was used to examine the effects of age, gender, three tooth conditions and self-esteem on participants' clinical oral health status. Table 5 shows the results of the analysis. The results indicated that the model explained 33% of the variance in clinical oral health status (R^2 $F(6,185) = 16.59$, $p < .001$) and self-esteem was the only significant predictor in the model ($\beta = -.58$, $p < .001$).

Discussion

In the present study, the majority of participants brushed their teeth twice a day which is consistent with findings in the Oral Health Survey in Hong Kong about a decade ago.[37] The frequency of

Table 3. Percentage distribution of frequencies of toothbrushing, flossing and scaling in the low and high self-esteem group

		Self-esteem (by group)	
		Low (n = 61)	High (n = 84)
		%	%
Toothbrushing (per day)	Once	23	12
	Twice	77	86
	3 times or more	0	2
Flossing	Every day	16	26
	Every 2–4 days	10	14
	Once a week	12	16
	None	59	41
	Others	3	4
Scaling	Every 6–9 months	34	38
	Every year	38	44
	Every 2–3 years	16	12
	Every 4–5 years	5	2
	Others	7	4

Table 4. Percentage distribution of accumulation of plaque and calculus, and severity of marginal gingival inflammation in the low and high self-esteem group

Group		Self-esteem	
		Low (n = 61)	High (n= 84)
		%	%
Oral hygiene/periodontal condition			
Plaque accumulation	Light	49	94
	Moderate	51	6
	Heavy	0	0
Calculus accumulation	Light	31	93
	Moderate	59	7
	Heavy	10	0
Marginal gingival inflammation	Mild	43	95
	Moderate	56	5
	Severe	2	0

Table 5. Results of linear regression analysis examining the effects of age, gender, tooth conditions, and self-esteem on clinical oral health status

	β (95% CI)	p value
Age	.03 (−.01 to .02)	.65
Gender	.001 (−.28 to .29)	.99
Self-esteem	−.58 (−.30 to −.20)	< .001
Number of missing teeth	.10 (−.02 to .17)	.13
Number of restored teeth	.02 (−.04 to .05)	.74
Number of carious teeth	−.01 (−.18 to .15)	.85

toothbrushing twice a day is an international recommended standard for the effective removal of plaque.[38,39] Hence, most participants had a satisfactory level of toothbrushing.

The participants' frequency of scaling was also satisfactory as three-quarters of them had their teeth cleaned at least once a year. This might be due to free dental services registered by the participants' companies. As participants received dental care as their benefit from work, they might have higher motivation to seek dental service. In fact, previous studies have found that people in Hong Kong were more likely to have regular dental care when they had a dental benefit programme or dental benefit coverage.[21,22]

The frequency of flossing was relatively low. About half of the participants did not floss at all, and only 21% would floss on a daily basis. Male participants, in particular, had a significantly lower rate of flossing compared to female participants. The finding coincides with findings of other studies, for example, in Japan, that females exhibited higher rates of flossing habit.[32] It is possible that male participants perceived flossing which requires more digital skills and better dexterity as troublesome and did it less. The actual explanation for the gender differences is unclear. The results

are consistent with previous research which showed that female adults had better oral health behaviours compared to male adults.[40]

Nevertheless, female participants did not have better tooth conditions and clinical oral health status than male participants. Since we used self-report and quantitative measures for oral health behaviours, it is possible that male participants had better oral health behaviours in terms of quality which enhanced their oral health and compensated for the low frequency in flossing.

Unlike previous studies which found that higher self-esteem was associated with higher frequency of toothbrushing,[28] we found no difference between participants in the high self-esteem group and the low self-esteem group with regard to their oral health behaviours including toothbrushing, flossing and scaling. As previous studies mainly focused on adolescents in Western countries, it appears that the association between self-esteem and oral health behaviours may be different in Chinese adults. Despite no difference in oral health behaviours, the high self-esteem group had better clinical oral health status including less severe plaque accumulation, calculus accumulation and marginal gingival inflammation than the low self-esteem group. In the current study, only self-esteem was found to be a significant predictor for clinical oral health status. Age, gender, and tooth conditions were not significant predictors for self-esteem.

Contributions

This is the first study to use clinical data to explore the relations among self-esteem, oral health behaviours and clinical oral health status in Chinese adults. In the current study, the reliability of the Rosenberg Self-Esteem Scale was high. Two dental professionals examined participants' tooth conditions and clinical oral health status and demonstrated a perfect inter-rater reliability, which enhanced the validity and reliability of the data. Participants were adults from a wide age group and thus the results are informative for dental professionals, in particular those serving a Chinese population in Hong Kong.

Limitations

Since the participants called the clinic to make appointments for scaling, there might be an issue of self-selection as these participants might have a better sense of self-care. Thus this study has limitations from an epidemiological viewpoint. In addition, the relatively small sample size from one local clinic limits the generalizability of the results.

The method of oral health examination in the current study was relatively simple, which did not include procedures such as taking radiographs and probing for periodontal pockets. Therefore the clinical oral health status of the participants should be viewed as conservative.

We used self-report measures for self-esteem and oral health behaviours which had the risk of social desirability. Moreover, participants only reported their frequencies of toothbrushing, flossing, and scaling but not the quality of these behaviours. Therefore we could not examine the effects of the quality of these behaviours on clinical oral health status.

Future research directions

Future studies can include more clinics, both public and private, for a more representative sample and investigate the effects of socio-economic status such as income, education level, and occupation on oral health. Cross-cultural studies can also explore potential cultural differences in self-esteem, oral health behaviours, and clinical oral health status.

To obtain more in-depth data on the clinical oral health status of participants, future studies can use a more complex Plaque Index and bleeding index.[41] Visible plaque accumulation and marginal gingival bleeding after gentle probing can reveal extent of oral hygiene and gingival (marginal gingival) inflammation. The percentages of surfaces with plaque and bleeding after probing can then be calculated from all surfaces of all teeth. However, the major disadvantage of these procedures is that they are time-consuming.

More research is needed to understand the psychological mechanism between self-esteem and oral health. Since boosting self-esteem requires a substantial period of time, longitudinal studies are needed to evaluate the effect of strengthening self-esteem on oral health behaviours and clinical oral health status. Beside self-esteem, other psychological factors, such as job satisfaction and sleep pattern, can also be taken into account in future studies.

Implications and conclusion

In general, Chinese adults in Hong Kong had satisfactory oral health behaviours in terms of quantity. Although oral health behaviours did not differ by level of self-esteem, Chinese adults with high self-esteem had better clinical oral health status than their counterparts with low self-esteem. Self-esteem was the only significant predictor of clinical oral health status. The psychological mechanism between self-esteem and clinical oral health status requires further investigation. There is evidence that psychological intervention is effective in oral health behaviours.[42] In particular, self-esteem has the potential for improving the outcomes of interventions designed to improve health behaviours.[43] Hence, oral health programmes can include the education and enhancement of self-esteem. Dental professionals may collaborate with psychologists in providing dental education that incorporates psychosocial elements for patients. Future research that combines dental factors and psychological factors may be useful in informing dental professionals and psychologists on how to enhance patient's oral health.

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