

A Comparative Study to Assess Oral Health Status and the Factors Influencing Oral Health Among Indian and Chinese Students of Selected Universities of New Delhi

Qing Shi *, Bindu Shaiju, Seema Rani

Rufaida College of Nursing, Jamia Hamdard, New Delhi, India

Abstract

Oral health is an essential component of general health and well-being at every stage of life. Factors such as, culture, behaviour, gender, economics, state, etc. influence our oral condition. The present study has been designed to compare and assess the oral health status, and determine the factors that influence oral health among Chinese and Indian students, so as to identify the relationship between oral health status of Indian and Chinese students with selected variables. The study was performed in Jawaharlal Nehru University, Delhi University and Central Institute of Hindi, New Delhi with a comparative survey design. 60 students (30 Chinese and 30 Indians) were selected by convenience sampling technique. The tool was structured Oral Health Assessment Questionnaire and the collected data were analysed using descriptive and inferential statistics. This study determined that the mean oral health status score in Chinese group (2.733) was higher than the Indian group (2.5) with a mean difference of 0.233. For the factors influencing oral health status among two groups, the p value were calculated on frequency of cleaning teeth ($p \leq 0.001$), the utilization of dental services i.e. their reason for a visit to the dentist ($p = 0.036$), dietary practices, i.e. every day usage of food with sugar ($p = 0.03$) and alcohol ($p = 0.002$). The p value on relationship between oral health status of two groups and their course of study was found to be 0.023. The difference in the oral health status between Chinese and Indian students was found to be not significant. However, for the factors, there were significant difference among two groups related to frequency of cleaning teeth, the reason for a visit to the dentist, every day usage of food with sugar and usage of alcohol. There was a significant association between oral health status of two groups and course of study as well.

Keywords: dental hygiene practices, dietary practices, factors influencing oral health, oral health status

*Corresponding Author

E-mail: shiqingparking@126.com

INTRODUCTION

Oral conditions have an impact on overall health and disease. Various oral health conditions are experienced by people all over the world whether they are from urban or rural background. Some common problems related to oral health includes cancer of the buccal cavity, dental caries, premature tooth decay, gingivitis and periodontitis.

In India, dental care services are available in very few states at the primary health care level. Various factors like demographic, behavioural, socio-economic, cultural, and epidemiological, etc., contribute to people's decision to either forego care or seek a professional for dental problems.^[1]

A study conducted by Rabinder K *et al.*^[2] among 147 female undergraduate

candidates aged between 16 and 21 years belonging to the state of Punjab, India reported that the prevalence of dental caries experience (DMFT>0) was 63.2% with mean DMFT(decayed, missing and filling teeth) of 2.91 in students aged 16–18 and 3.26 in those aged between 19 and 21 years. Moreover, of those with caries, 68% showed the presence of calculus, compared with 60% of subjects with DMFT=0. Hence, a significant relationship between caries experience and oral hygiene habits was obtained, thereby, highlighting the need to design and plan preventive strategies.

In China, oral diseases remain remarkably prevalent. Many factors, such as area, race, age and gender, affect the severity of oral diseases. The caries status in China exhibits characteristics typically found in developing countries. About 78.9%–91.7% of carious teeth (including third molars) of the middle-aged and elderly people have been left untreated. This situation has not improved in proportion to China's economic development hence challenging China's oral health care resources.^[3]

Wang *et al.*^[4] reported the prevalence of dental caries in Chinese children and adults at the national level. In the second national survey, a total of 140,712 individuals participated, aged 5, 12, 15, 18, 35–44 and 65–74 years, respectively. The results reported are as follows: at age 5, 76.6% were affected by dental caries and mean DMFT (decayed, missing and filling teeth) was 4.5. Mean DMFT increased with the age of the subjects. Caries occurrence was high for old-age people belonging to rural areas and for adolescents and young adults belonging to urban areas as well as in female adults, when compared to that in males. For all age groups, gingival bleeding and calculus were common problems, whereas severe periodontal conditions were relatively infrequent.

Thus, keeping this in mind, the present study was designed with the following objectives:

- (1) To assess the oral health status among Chinese and Indian students.
- (2) To compare the oral health status among Indian and Chinese students.
- (3) To determine the factors influencing oral health among Indian and Chinese students.
- (4) To identify the relationship between oral health status of Indian and Chinese students with selected variables, namely age, gender, family income, religion, native place and course of study.

METHOD

A total of 60 college students (30 Chinese students and 30 Indian students) studying in Jawaharlal Nehru University, Delhi University and Central Institute of Hindi, New Delhi were selected through convenience sampling technique. Research design adopted for the study was Comparative Survey design.

Attribute variables of the study were:

Gender, age, duration of stay in New Delhi, monthly family income, present address, native place, religion and course of study.

Inclusion criteria included all students in 18–45 years group who could speak English and were willing and available to participate in the present study. The exclusion criteria for the study included students who were in health discipline and undergoing orthodontic treatment. Ethical clearance from institutional ethical committee and the administrative permissions from each university were taken. Anonymity and confidentiality of the subjects were maintained while carrying out the study.

Based on the conceptual framework and objectives of the study, structured oral health assessment questionnaire were

developed for collecting data, including demographic data, assessment of factors influencing oral health modified and developed from WHO and structured observation rating scale to assess oral health status modified and developed from Chalmers, 2004. The tools were found to be valid and the reliability of the tool was computed by inter-rater reliability and was found to be 0.94.

The data analysis was chalked out by employing descriptive and inferential statistics.

RESULTS

The findings were organized under the following sections:

Section I: Findings on sample characteristics of Indian and Chinese students studying in selected universities of New Delhi.

Section II: Findings on assessment and comparison of oral health status among Chinese and Indian students studying at selected universities of New Delhi.

Section III: Findings related to factors influencing oral health among Indian and Chinese students.

Section IV: Findings related to association of oral health status scores of Chinese and Indian students with selected variables.

Table 1(a). Frequency and Percentage Distribution of Sample Characteristics According to Gender, Age, Duration of Stay in New Delhi and Monthly Family Income

$n_1 + n_2 = 60$

Sample Characteristics	Chinese Students ($n_1 = 30$)		Indian Students ($n_2 = 30$)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Gender				
Female	15	50	16	53.33
Male	15	50	14	46.67
Age (in years)				
18–24	19	63.33	21	70
25–35	11	36.67	8	26.67
36–45	0	0	1	3.33
Duration of stay in New Delhi				
<1 year	11	36.67	4	13.33
1–2 years	6	20	5	16.67
2–3 years	8	26.67	8	26.67
>3 years	5	16.67	13	43.33
Monthly family income (in Rupees)				
<20,000				
20,000–50,000	6	20	6	20
50,001–100,000	5	16.67	6	20
>1 lakh	14	46.67	7	23.33
	5	16.67	11	36.67

Table 1(b). Frequency and Percentage Distribution of Sample Characteristics With Respect to Their Present Address, Native Place, Religion and Course of Study $n_1 + n_2 = 60$

Sample Characteristics	Chinese Students ($n_1 = 30$)		Indian Students ($n_2 = 30$)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Present address				
Hostel	12	40	22	73.33
As paying guest	1	3.33	1	3.33
Rented accommodation	17	56.67	4	13.33
Own home	0	0	3	10
Native place				
Urban	20	66.67	10	33.33
Peri-urban	6	20	9	30
Rural	4	13.33	11	36.67
Religion				
Hindu	0	0	26	86.67
Christian	0	0	2	6.67
Muslim	2	6.67	0	0
Buddhist	1	3.33	0	0
None	27	90	2	6.67
Course of study				
Under-graduate	17	56.67	17	56.67
Post-graduate	8	26.67	6	20
M.phil	3	10	5	16.67
Ph.D	2	6.67	2	6.67

Table 2. Mean, median, mode, standard deviation, mean difference, standard error of mean difference and 't' value for significance of mean difference between oral health status scores of Chinese and Indian students $n_1 + n_2 = 60$

Group	Mean	Median	Mode	Standard Deviation	Mean D	SE _{MD}	t-Value
Chinese students ($n_1=30$)	2.733	3	3	1.526	0.233	0.355	0.66
Indian students ($n_2=30$)	2.5	3	3	1.204			

 $t'(58) = 2.00, p > 0.05.$ **Table 3.** Frequency Distribution $n_1 + n_2 = 60$

Oral Health Status	Chinese Students ($n_1=30$)	Indian Students ($n_2=30$)
	Frequency (f)	Frequency (f)
Very good	13	13
Fairly good	17	17
Poor	0	0
Very poor	0	0

Table 4(a). Frequency and Percentage Distribution Based on Teeth, Denture and Gum Status
 $n_1 + n_2 = 60$

Factor Influencing Oral Health: Teeth, Denture and Gum Status	Chinese Students		Indian Students		Test Applied	p Value
	n ₁ = 30		n ₂ = 30			
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)		
No. of natural teeth					Fisher Exact Test	1.00
1–9 teeth	0	0	0	0		
10–19 teeth	0	0	0	0		
20 teeth or more	0	0	0	0		
	30	100	30	100		
Teeth/mouth discomfort (in past 12 months)					Fisher Exact Test	0.474
Yes	12	40	8	26.67		
No	14	46.67	19	63.33		
Do not know	3	10	3	10		
No answer	1	3.33	0	0		
Removable dentures *					Fisher Exact Test	0.683
Partial denture	4	13.33	2	6.67		
Upper denture	0	0	1	3.33		
Lower denture	1	3.33	1	3.33		
Status of teeth					Fisher Exact Test	0.184
Excellent	1	3.33	5	16.67		
Very good	10	33.33	5	16.67		
Good	9	30	8	26.67		
Average	10	33.33	10	33.33		
Poor	0	0	2	6.67		
Status of gums					Fisher Exact Test	0.79
Excellent	2	6.67	2	6.67		
Very good	9	30	10	33.33		
Good	9	30	8	26.67		
Average	10	33.33	8	26.67		
Poor	0	0	2	6.67		

*These items had multiple responses.

Table 4(b). Frequency and Percentage Distribution Based on Dental Hygiene Practices
 $n_1 + n_2 = 60$

Factors Influencing Oral Health: Dental Hygiene Practices	Chinese Students		Indian Students		Test Applied	P Value
	n ₁ = 30		n ₂ = 30			
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)		
Cleaning of teeth					Chi square Test	0.001*
Once a day	5	16.67	21	70		
Twice or more-a day	25	83.33	9	30		
Measures used for dental hygiene†					Fisher Exact Test	0.115
Toothbrush	30	100	30	100		
Wooden toothpicks	3	10	4	13.33		
Plastic toothpicks	6	20	0	0		
Thread	3	10	3	10		
Chew stick/miswak	1	3.33	0	0		
Use of toothbrush					Fisher Exact Test	1.00
Yes	30	100	30	100		
No	0	0	0	0		
Toothpaste containing fluoride					Fisher Exact Test	0.876
Yes	18	60	17	56.67		
No	5	16.67	4	13.33		
Do not know	7	23.33	9	30		

*Significant at 0.05 level; †These items had multiple responses.

Table 4(c). Frequency and Percentage Distribution Based on Factors, Such as, Utilization of Dental Services and Alcohol and Tobacco Consumption $n_1 + n_2 = 60$

Factors Influencing Oral Health	Chinese Students ($n_1 = 30$)		Indian Students ($n_2 = 30$)		Test Applied	P Value
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)		
I. Utilization of dental services						
Visit to a dentist						
<6 months	5	16.67	4	13.33	Fisher Exact test	0.072
6–12 months	3	10	6	20		
1–2 years	8	26.67	4	13.33		
2–5 years	4	13.33	1	3.33		
>5 years	3	10	0	0		
Never	7	23.33	15	50		
Reasons for visit to a dentist						
Consultation/advise	5	16.67	0	0	Fisher Exact test	0.036*
Pain/trouble with teeth, gums or mouth	10	33.33	8	26.67		
Treatment/follow-up	4	13.33	2	6.67		
p	3	10	2	6.67		
Routine check-up/treatment	8	26.67	18	60		
Do not know/remember						
II. Alcohol and tobacco consumption						
Use of cigarettes						
Every day	2	6.67	2	6.67	Fisher Exact test	1.00
Several times a week	1	3.33	1	3.33		
Once a week	0	0	0	0		
Several times a month	0	0	0	0		
Seldom	2	6.67	2	6.67		
Never	25	83.33	25	83.33		
Use of alcohol						
<=1 drink	15	50	5	16.67	Fisher Exact test	0.002*
2 drinks	4	13.33	1	3.33		
3 drinks	0	0	1	3.33		
4 drinks	0	0	0	0		
>=5 drinks	2	6.67	1	3.33		
Has not drunk in past 30 days	9	30	22	73.33		

*Significant at 0.05 level.

Table 4(d). Frequency and Percentage Distribution Based on Dietary Practices

$n_1 + n_2 = 60$

Factor Influencing Oral Health: Dietary Practices	Chinese Students		Indian Students		Test Applied	p Value
	n ₁ = 30		n ₂ = 30			
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)		
Frequency of eating/drinking foods [†] Several times a day						
Food with sugar [‡]	6	3.33	4	2.22	Fisher Exact Test	0.113
Soft drinks	1	3.33	0	0		
Tea and coffee with sugar [§]	2	3.33	8	13.33		
Everyday						
Food with sugar [‡]	21	11.67	30	16.67	Fisher Exact Test	0.031*
Soft drinks	3	10	0	0		
Tea and coffee with sugar [§]	7	11.67	20	33.33		
Several times a week						
Food with sugar [‡]	44	24.44	39	21.67	Chi square Test	0.5916
Soft drinks	5	16.67	5	16.67		
Tea and coffee with sugar [§]	16	26.67	9	15		
Once a week						
Food with sugar [‡]	15	8.33	19	10.56	Chi square Test	0.5627
Soft drinks	7	23.33	7	23.33		
Tea and coffee with sugar [§]	8	13.33	5	8.33		
Several times a month						
Food with sugar [‡]					Fisher Exact Test	0.519
Soft drinks	58	32.22	33	18.33		
Tea and coffee with sugar [§]	9	30	5	16.67		
	14	23.33	4	6.67		
Never/seldom						
Food with sugar [‡]	36	20	55	30.56	Chi square Test	0.3926
Soft drinks	5	16.67	13	43.33		
Tea and coffee with sugar [§]	13	21.67	14	23.33		

*Significant at 0.05 level; [†]These items had multiple responses; [‡]Including fresh fruit; biscuits, cakes, cream cakes; sweet pies, buns; jam or honey; chewing gum containing sugar; sweets/candy/chocolates–total 6 items; [§]Including tea with sugar and coffee with sugar–total 2 items.

As far as the demographic data of Chinese students studying at selected universities of New Delhi is concerned, in the present

study, it was found that 11(36.67%) had been living in New Delhi for less than 1 year, 14(46.67%) had monthly family income of Rs. 50,001–100,000, 17(56.67%) were living in rented accommodation, 20(66.67%) belonged to urban, 27(93.33%) had no faith in religion and 17(56.67%) were undergraduates, whereas among Indian students studying at selected universities of New Delhi it was found that 13(43.33%) had been living in New Delhi for more than 3 years,

11(36.67%) had monthly family income of more than 1 lakh rupees, 22(73.33%) were living in rented accommodation, were undergraduates, as depicted in Tables 1(a) and 1(b), respectively.

The mean oral health status score in Chinese group (2.733) was higher than the mean oral health status score in Indian group (2.5) with a mean difference of 0.233, as shown in Table 2. The obtained mean difference was found to be statistically not significant as evident from the calculated 't' value of 0.66 which was lower than the table value of 2.00 at 0.05 level of significance.

Table 3 shows the frequency distribution of Chinese and Indian students with respect to their oral health status score, with 13/30 Chinese as well as 13/30 Indian students falling in the 'Very Good' category.

The obtained score of Fisher Exact value to determine the difference in factors influencing oral health among Chinese and Indian students, has been shown in Tables 4(a), 4(b), 4(c) and 4(d), respectively. The data revealed that there was a significant difference among the groups with relation to frequency of cleaning teeth, as evident from p value (≤ 0.001) [Table 4(b)], the utilization of dental services i.e. their reason for visit to a dentist, as evident from the P value (0.036) [Table 4(c)] and dietary practices, i.e. every day usage of of the known risks associated with alcohol drinking.

Another study conducted by Zhu *et al.*,^[6] revealed that the significant variables in oral health practices, i.e., frequency of brushing and dietary pattern, i.e., daily consumption of sweets, were found according to urbanization and province.

Knowledge of causes and prevention of dental disease was low with a negative attitude towards prevention.

11(36.67%) belonged to rural, 26(86.67%) were Hindus and 17(56.67%)

food with sugar($p=0.03$) as well as in terms of usage of alcohol($p=0.002$) [Table 4(d)] at 0.05 level of significance.

The obtained p values showed that there was a significant relationship between oral health status of Chinese and Indian students with selected demographic variables such as their course of study ($p=0.023$).

DISCUSSION AND CONCLUSION:

The findings of the present study revealed there was no significant difference in the oral health status among Chinese and Indian students studying at selected universities of New Delhi. However, according to the factors influencing oral health, there was significant difference among Chinese and Indian students such as frequency of brushing, consumption of sugar diet every day, consumption of alcohol drinks and reason for visit to a dentist. Findings of the present study revealed that, for the demographic variables such as course of study, there was a significant relationship among Chinese and Indian students. Results of the present study are in lines with different studies. A Study conducted by Zheng *et.al.*,^[5] reported that the oral hygiene and several oral conditions are risk factors for oral cancer, independent

A similar study was also reported by Urzua *et al.*,^[7] showed a high prevalence of dental caries and tooth loss, the educational level was one of the main risk factors.

Acknowledgement

The author wishes to acknowledge Prof. Vaishna Narang, Member Secretary, Institutional Ethics Review Board, Jawaharlal Nehru University, New Delhi, Dr. Amrit Kaur Basra, Deputy Dean of

Foreign Students, Delhi University and Dr. Geeta Sharma, Professor and Regional Director, Central Institute of Hindi, Delhi Center for granting the permission to conduct the present study.

REFERENCES

1. *Dental Health Foundation*: Links between oral & general health [Internet]; Ireland; 2014. Available at: <http://www.dentalhealth.ie/dentalhealth/causes/general.html>.
2. Rabinder K., Hardeep K., Sushil K., *et al.* Caries experience among females aged 16-21 in Punjab, India and its relationship with lifestyle and salivary HSP70 levels. *Eur J Dent.* 2010; 4(3): 308–313p.
3. Hu D. Y., Xiao H., Xue L. Oral health in China-trends and challenges. *Int J Oral Sci.* 2011; 3(1): 7–12p.
4. Wang H. Y., Petersen P. E., Bian J. Y., Zhang B.X. The second national survey of oral health status of children and adults in China. *Int Dent J.* 2002; 52(4): 283–290p.
5. Zheng T. Z., Boyle P., Hu H. F., Duan J., *et al.* Dentition, oral hygiene, and risk of oral cancer: a case-control study in Beijing, People's Republic of China. *Cancer Causes Control.* 1990; 1(3): 235–41p.
6. Zhu L., Petersen P. E., Wang H. Y., *et al.* Oral health knowledge, attitudes and behaviour of children and adolescents in China. *Int Dent J.* 2003; 53(5):289–98p.
7. Aranda W., Gamonal J. Dental caries prevalence and tooth loss in Chilean adult population: first national dental examination survey. *Int J Dent.* 2012; doi:10.1155/2012/810170.