



A Dividing Line Using Diet Quality Index, Sweet Score, Glycemic Index (GI), Pufa Index and Oral Health-Related Quality of Life Between Ethnic Bengali and Tamil Subjects

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ABSTRACT:

Aim: To compare the overall diet quality and the oral health quality of life conditions among the ethnic Bengali and Tamil populations.

Materials and Methods: This was a Questionnaire-based study conducted among ethnic Bengali and Tamil subjects. Collected data from 202 participants. A pretested closed-ended questionnaire was used for the study.

Results: The mean OHIP score among of Bengali population is 2.1, and the Tamil population is 2.4. The diet quality index showed that the Tamilians have better diet quality than the Bengali population, with a difference of 5 in their mean diet quality score.

Conclusion: The Pufa index showed that the average difference in PUFA index score between the population was 2.3, with Tamilians having a lower value of 1.3 and Bengalis having a higher value of 3.5

INTRODUCTION

“Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, periodontal (gum) disease, tooth loss, oral cancer, oral manifestations of HIV infection, oro-dental trauma, noma and congenital disabilities such as cleft lip and palate”[1]. Furthermore, empirical analysis has revealed that Health-Related Quality of Life (HRQoL) is closely related to demographic (age, gender), social, economic and cultural aspects[2].

It means that cannot determine the results of the disease fully by using solely clinical measures since these do not consider the subjective experiences, personal values, attitudes and beliefs that individuals have concerning their health assessment [3].

Causes that can significantly affect the HRQoL is the individual's oral health [4,5]. Its effects can be far-reaching, leading to a reduction of daily activities as well as the health of an individual, which can even lead to their physical incapacitation. The costs and problems from such a condition have been determined to be great not only for the specific individual but to society as a whole[6]. The importance of HRQoL and its oral health facet has led to the development of a large spectrum of measures in dentistry over the last two decades to capture the impact of oral disorders both on patients'

physical and psychological as well as social well-being and their ability to perform daily activities[7,8].

The oral health status of individuals is affected by many personal, social, economic, cultural and local factors. Different regions within a country and geographical locations can account for differences in oral health status. Knowing that these differences are present, it is therefore of much interest to also compare the different parts of India for the effect of their oral status on the OHRQoL of the individuals. The aim of the present study was to investigate and find out the effect of oral health on the quality of life among ethnic Bengal and Tamil subjects.

Oral health status is also determined by dietary intake[9] because diseases like dental caries are more prevalent in people with a sweet high score. The principal substrate for causing tooth decay is sucrose. Many pieces of shreds of evidence are based on the fact that sugar intake leads to an increased incidence of dental caries[10]. A sweet score is a measure of the amount of sugar intake.

There also occurs a bidirectional association between oral health quality of life and diet quality. People with a low diet quality index are more prone to periodontal diseases.

The belief that slowly digested carbohydrates are complex carbohydrates is a myth. Glycemic index (GI) is used to rank carbohydrate quality[11]. We have used GI as a dividing factor between ethnic Tamil and Bengali subjects due to their distinct dietary intake. PUFA index developed by Monse et al. [12] increases the sensitivity of the DMF index and records the advanced stages of carious lesions.

MATERIALS AND METHODS:

This is a cross-sectional study conducted on a random sample consisting of a total of 202 participants, out of which 101 were of Bengal origin and 101 of Tamil origin. Ethical clearance was obtained from the Department of Public Health Dentistry, SRM Dental College, Ramapuram. A convenient sampling technique was used, and the sampling sample size was determined using the G Power values. The inclusion criteria included that the participants ethnically belong to the respective states for three generations and who were willing to participate in the study. Participants not willing to participate were excluded from the study.

SAMPLE SIZE - The sample size was determined using the estimated values from literature using the following parameters

- Effect size $f=0.25$
- α err prob=0.05
- Power ($1-\beta$ err prob)=0.8
- Number of groups=2
- Total sample size=202
- Actual power=0.804887

The sample size was increased by 10 %

Total sample size=202

Each group will have a sample size of 101

(Calculation done with the help of G*Power 3.0.0)

The study tool is a pre-validated questionnaire and closed-ended. The questionnaire consisted of demographic data, questions related to oral health quality of life like their educational qualification, occupation, physical disabilities due to oral health problems, regular dental visits. Other questions included their frequency of intake of sugar products, carbohydrate food like rice-wheat, intake of protein-rich food, vegetables, milk and milk products and intakes of other mineral-rich food like iron and calcium. The participants were supplied with instructions and given the questionnaire in Google form. Participants were asked to evaluate as Excellent, Very good, Good, Average, Poor and Very poor their state of teeth and gums. Questions pertaining to the frequency of cleaning teeth and aids used in cleaning were also asked. Data was also obtained regarding their socio-demographic profile (e.g. information regarding age, gender, education level and occupation). Besides OHIP-14, the questionnaire was also derived from WHO Annexure for oral health. The questionnaire also contained a section that was comprised of questions about their diet history. The questions regarding the diet history and the oral health condition related were used to get sweet score, glycemic index, PUFA index and diet quality index.

Statistical analysis

Descriptive statistical analysis was carried out in the present study. Results on continuous measurements were presented on Mean \pm SD, and results on categorical measurement were presented in number (%). The statistical software IBM SPSS statistics 20.0 was used for the analysis of the data with a P-value level at < 0.001 .

RESULTS

In this study total of 202 participants participated, out of which 101 were Bengali in origin, and 101 was ethnically Tamil in origin. Among the participants, the male to female distribution was 53.96% male and 46.04% female. (Table 1, Chart 1).

TABLE 1 :SEX WISE DISTRIBUTION

POPULATION	N	MALE		FEMALE	
NATIVE BENGALI	101	55	54.45%	46	45.55%
NATIVE TAMILIAN	101	54	53.46%	47	46.54%
TOTAL	202	109	53.96%	93	46.04%

TABLE 2 :AGE-WISE DISTRIBUTION

POPULATION	N	<34 YEARS	35-44 YEARS	44-65 YEARS	65-74 YEARS
NATIVE BENGALI	101	65	14	20	2
NATIVE TAMILIAN	101	66	12	21	2
TOTAL	202	131	26	41	4

Table 2 depicts the age distribution was done in 4 age groups <35,35-44,45-64,65-74 years. Out of 101 native Bengali participants, 65 of them were less than 34 years old, 14 of them were in the age group of 35-44 years, 20 were between the age of 44-65 years, and two were between 65-74 years. Among the 101 native TAMILIAN population, 66 of them were below 34 years old, 12 of them were between 35-44 years, 21 of them were between 44-65 and 2 of them were between 65-74 years age group.

TABLE 3: variables of educational qualification

POPULATION(N)	VARIABLES	N	MEAN OHIO (SD)	P
NATIVE BENGALI	EDUCATIONAL QUALIFICATION			
	HIGH SCHOOL	10	3.7±2.0	P<0.001
	GRADUATE	30	3.5±2.4	
	POST-GRADUATE	61	4.0±1.7	
	NO.OF TEETH			
	0	0	7.7 (10.5)	P<0.001
	1-19	33	6.0 (8.1)	
	>20	67	3.7 (5.5)	
	DENTAL VISITS			
	REGULAR	56	3.3 (5.4)	P<0.001
	IRREGULAR	44	5.9 (7.3)	
	DENTAL FLOSS			
	DAILY	12	3.7 (5.2)	P<0.001
	IRREGULAR	36	4.1 (5.8)	
	RARELY	52	4.7 (7.3)	
	TOOTHPICKS			
	DAILY	14	3.6 (5.8)	P<0.001
	IRREGULAR	43	4.0 (5.6)	
	RARELY	43	4.9 (7.8)	
	ORAL RINSE			
DAILY	12	5.4 (7.6)	P<0.001	
IRREGULAR	45	5.1 (7.2)		
RARELY	43	3.8 (5.5)		
SELF RELATED ORAL HEALTH				

	VERY GOOD	40	1.3 (2.3)	P<0.001
	GOOD	25	2.8 (3.9)	
	MODERATE	10	5.8 (6.2)	
	POOR	10	11.8 (9.5)	
	VERY POOR	5	22.6 (14.1)	
NATIVE TAMILIAN	EDUCATIONAL QUALIFICATION			
	HIGH SCHOOL	10	3.5±2.0	P<0.001
	GRADUATE	30	3.5±2.4	
	POST-GRADUATE	61	4.0±1.7	
	NO. OF TEETH			
	0	0	6.7 (10.5)	P<0.001
	1-19	35	7.25 (8.1)	
	>20	65	4.6 (5.5)	
	DENTAL VISIT			
	REGULAR	52	2.54 (5.4)	P<0.001
	IRREGULAR	48	7.6 (7.3)	
	DENTAL FLOSS			
	DAILY	10	3.43 (5.2)	P<0.001
	IRREGULAR	37	6.1 (5.8)	
	RARELY	53	8.7 (7.3)	
	TOOTHPICKS			
	DAILY	12	6.6 (5.8)	P<0.001
	IRREGULAR	44	5.0 (5.6)	
	RARELY	44	3.9 (7.8)	
	ORAL RINSE			
	DAILY	9	2.4 (7.6)	P<0.001
	IRREGULAR	46	4.1 (7.2)	
	RARELY	45	6.8 (5.5)	
	SELF RELATED ORAL HEALTH			
	VERY GOOD	41	3.3 (2.3)	P<0.001
	GOOD	23	2.8 (3.9)	
	MODERATE	11	6.8 (6.2)	
POOR	10	13.8 (9.5)		
VERY POOR	5	21.6 (14.1)		

Table 3 shows the mean score among the various variables in both groups according to 14 questions in the OHRQoL questionnaire by WHO. The native Tamil group has a higher comparatively higher score than the native Bengali group.

Table 4 shows the mean OHIP score among the two groups. Mean OHIP-14 score (SD), number of teeth, number of dental visits, dental hygiene behaviour and self-rated oral health (n 202).

TABLE 4: MEAN SCORE OF ORAL HEALTH-RELATED QUALITY OF LIFE

POPULATION	VARIABLES	MEAN SCORE
NATIVE BENGALI	FUNCTIONAL LIMITATION	2.8±2.2
	PHYSICAL PAIN	2.5±2.2
	PSYCHOLOGICAL DISCOMFORT	2.8±2.2
	PHYSICAL DISABILITY	2.0±2.0
	PSYCHOLOGICAL DISABILITY	1.5±2.2
	SOCIAL DISABILITY	1.0±1.6

	HANDICAP	2.3±1.8
	OHIP SCORE	2.1±2.6
NATIVE TAMILIAN	FUNCTIONAL LIMITATION	3.0±2.0
	PHYSICAL PAIN	2.6±1.9
	PSYCHOLOGICAL DISCOMFORT	3.0±1.8
	PHYSICAL DISABILITY	2.4±1.9
	PSYCHOLOGICAL DISABILITY	1.6±1.8
	SOCIAL DISABILITY	1.4±1.6
	HANDICAP	2.2±1.6
	OHIP SCORE	2.4±2.8

TABLE 5:MEAN SWEET SCORE

POPULATION	N	MEAN SWEET SCORE	P-VALUE
NATIVE BENGALI	101	34.75±26.58	P<0.001
NATIVE TAMILIAN	101	22.35±31.00	P<0.001

Table 5 shows the mean sweet score among the two groups. The mean sweet score among the native Bengalis is 34.75, which is much higher than that of native Tamilians, 22.35. So the risk of dental caries is higher in the Bengali population than that of the native TAMILIAN population.

TABLE 6: INTERGROUP COMPARISON OF SWEET SCORES

POPULATION	N	MEAN SWEET SCORE	P-VALUE
NATIVE BENGALI	101	20.9±6.06	P<0.001
NATIVE TAMILIAN	101	18.02±4.03	P<0.001

Wilcoxon signed-rank test, Mann Whitney U test

Table 6 shows the intro and intercomparison of the sweet score among the two ethnic groups. This comparison shows that the Bengali population has a higher sweet score than that of the TAMILIAN population.

TABLE 7: MEAN DIET QUALITY INDEX

POPULATION	N	MEAN DQI VALUE
NATIVE BENGALI	101	26.75±23.56
NATIVE TAMILIAN	101	31.35±12.43

(STATISTICALLY SIGNIFICANT, P<0.001)

Table 7 shows the mean diet quality index among the two groups. The mean diet quality index value for the native Tamilian population, 31.35, was higher than that of the Bengali population, which was found to be 26.75.

TABLE 8
MEAN GLYCEMIC INDEX RANK (0-100)

POPULATION	N	MEAN GLYCEMIC INDEX RANK
NATIVE BENGALI	101	56.75±13.23
NATIVE TAMILIAN	101	51.35±11.41

(STATISTICALLY SIGNIFICANT, P<0.001)

Table 8 gives the mean glyceimic index among the population. The mean glyceimic index rank, which is marked between 0-100, is found to be higher in the Bengali population, 56.75, whereas the mean glyceimic index rank for the Tamilian population was 51.35.

TABLE 9
MEAN NUMBER OF TEETH INVOLVED (PUFA INDEX)

POPULATION	N	MEAN PUFA INDEX SCORE
NATIVE BENGALI	101	3.5
NATIVE TAMILIAN	101	1.2

(STATISTICALLY SIGNIFICANT, P<0.001)

Table 9 shows the mean PUFA index score. The mean PUFA index score among the native Bengali population was found to be 3.5, and it is 1.2 among the native Tamilian population. This shows that oral lesions are found more among the Bengali population than that of the native Tamilians.

DISCUSSION:

This study shows that the mean OHIP score among people of Bengali population is 2.1 and Tamil population is 2.4. The basic aim of the study was to find the comparison among the Bengali and the Tamil population about their various dietary habits, dental conditions and their oral health-related quality of life. This study clearly indicates that OHRQoL is higher in the Tamilian population is higher than that of the Bengali population, which clearly indicates. The sweet score index showed that the mean sweet score among the Bengalis was 34.75, whereas the mean sweet score among the Tamilians was 22.35. This clearly indicates that the Bengalis intake much more sugar in various consistency, which in turn degrades the oral health condition of the people. Therefore measures should be taken that awareness and medical assistance should be provided to the Bengalis to abstain from the use of sugar products. The oral health quality of life in the Bengali population was found less and needed more awareness is in agreement with results found by Garg S et al. [13] in their study of assessing the oral health impact on the general health of the elderly individuals residing in the slums of Kolkata. The majority of the population has poor oral health quality and needs oral health promotion programs, and a dental checkup is in agreement with results found by JayeetaBurman et al. [14]. A study by Bobby Paul et al. in a tertiary care hospital of Kolkata also is in agreement with the results that oral health practices among the Bengalis are poor and need to improve considerably [15].

The diet quality index showed that the Tamilians have better diet quality than that of the Bengali population, with a difference of 5 in their mean diet quality score. The Pufa index showed that the average difference in PUFA index score between the population was 2.3, with Tamilians having a lower value of 1.3 and Bengalis having a higher value of 3.5, which clearly shows the difference in the oral health condition between the people of the two states.

CONCLUSION:

This study concludes that regarding both the diet quality and habits and the OHRQoL, the awareness among the Bengali population is lower, and much more public health awareness programmes need to be conducted among the Bengali population.

LIMITATIONS:

The main limitation of the study was that the participants were not interviewed physically but all measures were taken in order to avoid the interviewers' bias.

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