

Comparative Assessment of Oral Hygiene Practices with Socio-Demographic Factors in 15-74 Years Old Patients Reporting for Scaling in the Department of Periodontology: A Cross-Sectional Study

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Abstract: Oral hygiene is the practice of maintaining the oral cavity clean and healthy by the daily oral hygiene practices mainly such as tooth brushing, interdental cleaning aids, usage of mouth rinses, cessation of tobacco usage, and regular dental visits. Every individual's adherence to the recommended oral hygiene regime is a fundamental factor in the prevention and therapy of periodontal diseases associated with tooth loss. The current study was conducted with the aim of assessing the awareness of oral hygiene practices in individuals and also considering the difference in sociodemographic factors in population.

Keywords: oral hygiene practices, Gender, Occupation, Income, Education, Kuppuswamy's Socio-economic status scale

1. Introduction

Previous evidence in literature, historically, subscribes to the surmise that it was an accepted fact that each and every individual is equally susceptible to contracting gingival and periodontal disease, and that poor oral hygiene, deleterious oral habits, accumulation of dental plaque, calculus, occlusal trauma etc. contribute in even measure to the individual developing periodontitis. However, in recent times, especially during the last few decades, it has been accepted and proven that periodontal disease results due to specific bacterial infections and that individuals show extremely diverse variations in susceptibility to the disease as well as the amount of damage caused by the disease.¹

Oral hygiene is the practice of maintaining the oral cavity clean and healthy by the daily oral hygiene practices mainly such as tooth brushing, interdental cleaning aids, usage of mouth rinses, cessation of tobacco usage, and regular dental visits. Every individual's adherence to the recommended oral hygiene regime is a fundamental factor in the prevention and therapy of periodontal diseases associated with tooth loss.^{2,3}

A global public health problem, especially in the developing countries, is oral diseases which have a negative impact on the life of affected individuals due to their high prevalence and economic consequences.⁴

Some population groups like well-developed countries have lower prevalence rate of dental diseases while others, especially among rural population suffer from higher incidence of diseases. This notifies the timely need for prevention intervention and motivation. India is a vast country, comprising of both urban and rural population. Empowering and motivating the young budding community, with proper emphasis on health education with individual oral health plan may definitely prevent many of the oral diseases.^{5,6}

The current study was conducted with the aim of assessing the awareness of oral hygiene practices in individuals and also considering the difference in sociodemographic factors in population.

2. Aim & Objective

The aim of this study was to assess and compare oral hygiene practices with socio-demographic factors in 15-74 years old patients reporting for oral prophylaxis in the Department of Periodontology of a dental college in Pune, India.

The objectives of the current study were as follows:

- 1) To assess oral hygiene practices.
- 2) To compare oral hygiene practices with socio-demographic factors i.e. Gender, Occupation, Income, Education and overall Kuppuswamy's Socio-economic status scale.

3. Materials and Methods

Study Design

This was a cross-sectional study carried out in the department of Periodontology of a Dental College in Pune, India. The study was approved by the Institutional Research Board and Institutional Ethics Committee.

Sampling Procedure

Sampling was done using consecutive sampling procedure.

Patient Selection Criteria

A total of 1500 participants were selected from the patients reporting for oral prophylaxis at the Department of Periodontology. The participants were given the details of the study and informed consent was obtained. Patients were physically and mentally capable and efficient to perform tooth brushing and interdental cleaning.

Inclusion Criteria

Any patient from 15-74 years of age was included in the study after obtaining the informed consent.

Exclusion Criteria

Pregnant females and patients with any systemic diseases were excluded from this study.

Procedure

Collection of Data

Participants were screened according to the selection criteria after obtaining the informed consent. A structured questionnaire was recorded for each participant response by a single examiner. Basic professional tooth cleaning was done to all the participants. They were given a complete standardized motivation about oral hygiene by the trained dental professionals.

1) Questionnaire

A questionnaire was structured and validated by subject experts which included items to record the socio-economic scale of the participant according to the Kuppaswamy's Socio-Economic status scale⁷(2014), the medical and dental history of the participant and questions about participant's dental care knowledge and practices.

2) Kuppaswamy's Socioeconomic Status

The Kuppaswamy's Socioeconomic status was assessed using the Kuppaswamy's Classification of Socioeconomic status given originally in the year 1976 but we have used its modification given in January-2014.⁷ It consists of Occupation, Income, Education from which we could assess the socio-economic status of the individual which could later be compared to the oral hygiene practices.

Data Analysis

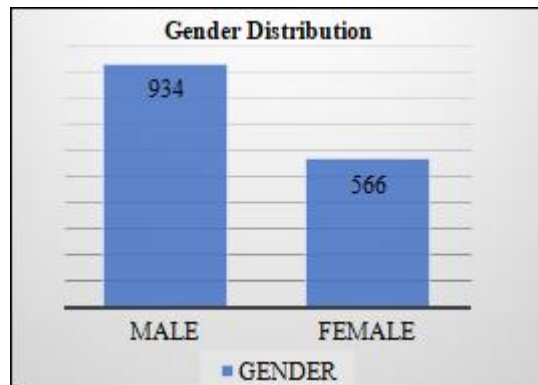
Data were entered in Microsoft Excel spread sheet, and analysis was done using a computer software i.e. Statistical Package for the Social Sciences (SPSS) version 21.0 by Chi-square test.

4. Results

Fifteen hundred patients participated in the study. The results were calculated as prevalence and frequency with each response and their correlation with socio-demographic factors. The Chi-square test ($p < 0.05$) was calculated. There was no significant difference between the baseline characteristics of all the enrolled participants.

Table 1: Gender Distribution

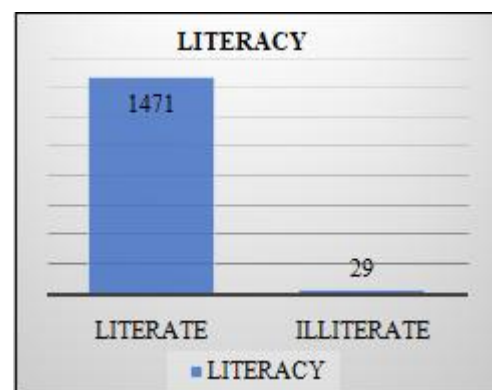
	Frequency	Percent	P value
Male	934	62.3	
Female	566	37.7	<0.05
Total	1500	100.0	



Graph 1: Gender distribution

Table 2: Literacy

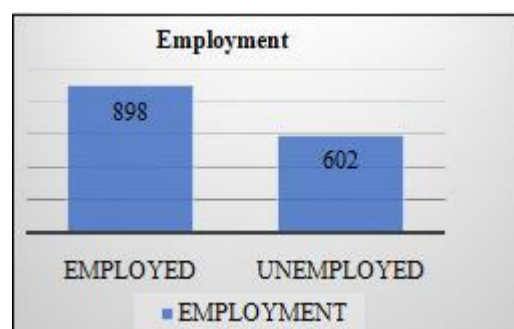
	Frequency	Percent	P Value
Literate	1471	98.1	
Illiterate	29	1.9	<0.05
Total	1500	100	



Graph 2: Literacy

Table 3: Employment

	Frequency	Percent	P Value
Employed	898	59.9	
Unemployed	602	40.1	<0.05
Total	1500	100.0	



Graph 3: Employment

Table 4: Income

	Frequency	Percent	P Value
High Income	679	45.3	
Low income	821	54.7	<0.05
Total	1500	100.0	



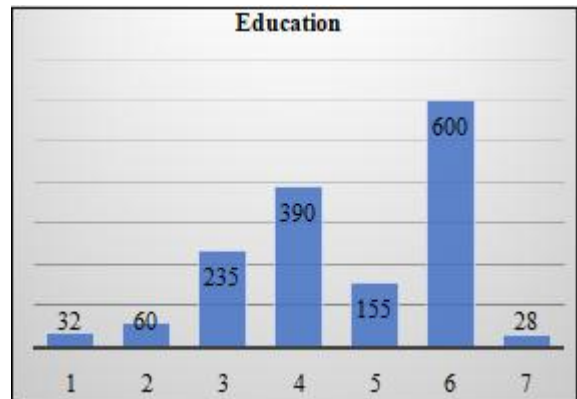
Graph 4: Income

Table 5: Class

	Frequency	Percent	P Value
Upper	555	37.0	
Lower	945	63.0	<0.05
Total	1500	100.0	



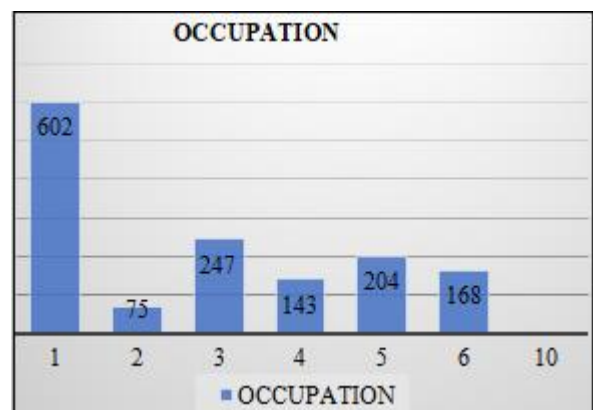
Graph 5: Class



Graph 6: Kuppuswamy's Education score

Table 7: Kuppuswamy's Occupation score

	Frequency	Percent	P Value
1	602	40.1	
2	75	5.0	
3	247	16.5	
4	143	9.5	
5	204	13.6	<0.05
6	168	11.2	
10	61	4.1	
Total	1500	100.0	



Graph 7: Kuppuswamy's Occupation score

1) Assessment of Kuppuswamy Socio-Economic Status Scale:

(Table and Graph 6-9)

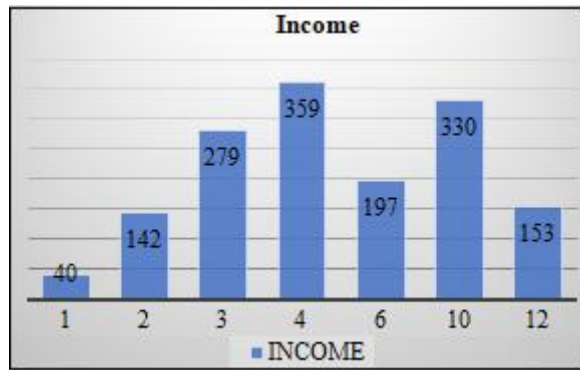
The Kuppuswamy socio-economic status was assessed using the Kuppuswamy socio-economic status scale⁷ which assessed the education, occupation and income of the enrolled participants. After all these parameters were individually assessed we could determine the Kuppuswamy's grade which was later compared to the oral hygiene practices.

Table 6: Kuppuswamy's Education score

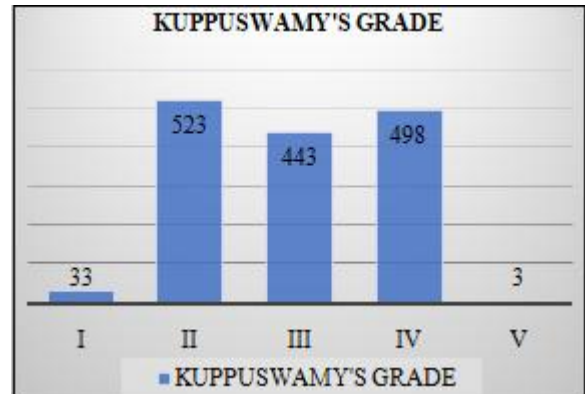
	Frequency	Percent	P value
1	32	2.1	
2	60	4.0	
3	235	15.7	
4	390	26.0	
5	155	10.3	<0.05
6	600	40.0	
7	28	1.9	
Total	1500	100.0	

Table 8: Kuppuswamy's Income score

	Frequency	Percent	P value
1	40	2.7	
2	142	9.5	
3	279	18.6	<0.05
4	359	23.9	
6	197	13.1	
11	330	22.0	
12	153	10.2	
Total	1500	100.0	



Graph 8: Kuppuswamy's Income score



Graph 9: Kuppuswamy's Grade

Table 9: Kuppuswamy's Grade

	Frequency	Percent	P value
Upper	33	2.2	
Upper Middle	523	34.9	
Lower Middle	443	29.5	<0.05
Upper Lower	498	33.2	
Lower	3	.2	
Total	1500	100.0	

2) Assessment of Oral Hygiene Practices: (Table 10)

The assessment of the oral hygiene practices done with the help of a questionnaire helped us determine the various oral hygiene practices of the enrolled participants which could be compared the socio-economic status of the patient.

Table 10: Assessment of Oral Hygiene Practices

Sr No	Questionnaire With Responses	Frequency	Percent (%)
1	How do you clean your teeth?		
	Toothbrush	1405	93.7
	Finger	91	6.1
	Twig	3	0.2
	Other	1	0.1
2	What technique do you use for brushing?		
	Vertical	184	12.3
	Horizontal	620	41.3
	Circular	254	16.9
	Combination	442	29.5
3	What material do you use for brushing?		
	Toothpaste	1397	93.1
	Toothpowder	57	3.8
	Ash	3	0.2
	Mishri	41	2.7
	Other	2	0.1
4	How many times do you brush?		
	Once	1087	72.5
	Twice	393	26.2
	Thrice	20	1.3
5	At what times do you brush your teeth?		
	Before breakfast	1483	98.9
	After breakfast	26	17
	Before dinner	55	3.7
	After dinner	310	20.7
	Any other time	13	0.9
6	Do you use other oral hygiene aids?		
	None	1249	83.3
	Interdental aids	66	4.4
	Oral mouth rinse	147	9.8
	Others	38	2.5
7	Within how many days you change your toothbrush?		
	Don't use toothbrush	73	4.9
	Before 3 months	538	35.9
	After 3 months	343	22.9
	Within 4-6 months	469	31.3
	After 6 months	77	5.1
8	Why do you change your toothbrush?		
	Don't use a tooth brush	73	4.9
	Flaring of bristles	1267	84.5
	Told by dentist	66	4.4

	Other	93	6.2
	Read about it	1	0.1
9	Why do you brush your teeth?		
	For bad breath	213	14.2
	For colour of teeth	358	23.9
	Cleanliness	872	58.1
	Other	55	3.7
10	Do you check mirror after brushing?		
	Yes	682	45.6
	No	816	54.4
11	Do you use tongue cleaners &/or mouthwash?		
	Only tongue cleaner	308	20.5
	Only mouthwash	150	10
	Both	77	5.1
	None	965	64.3
12	Do you rinse mouth after eating anything?		
	Yes	679	45.3
	No	272	18.1
	Sometimes	547	36.5
13	Do you think brushing keeps your body healthy?		
	Yes	1273	84.9
	No	214	14.3
	Don't know	13	0.9
14	How do you choose your toothpaste?		
	As recommended by a dentist	125	8.3
	As propagated by TV and media	525	35
	As recommended by friends or relatives	538	35.9
	Based on cost	82	5.5
	Other	230	15.3
15	How many times do you visit your dentist in a year?		
	Once per year	211	14.1
	Twice per year	104	6.9
	Only when needed	787	52.5
	Never	396	26.4
16	Reason for last dental visit?		
	Pain	808	53.9
	Cleaning	362	24.1
	General check up	74	4.9
	Other	254	16.9
17	What is the potential barrier to avoid dental treatment?		
	Cost	532	35.3
	Time	304	20.3
	Distance	83	5.5
	Need not felt	766	51.1
	Fear and anxiety	23	1.5

Comparison of Oral Hygiene Practices with Socio-demographic Factors

1) Gender: (Table 11)

There was no significant difference seen on comparison of the oral hygiene practices to the gender except for when responses for question 4 were evaluated, it was found that 712 males brushed once daily, 214 males brushed twice daily and 8 males brushed thrice daily. Among the females, 375 brushed once daily, 179 brushed twice daily and 12 brushed thrice daily. And also, to question 13, 787 males said that brushing helped in maintaining overall health of the body, 142 felt this statement was not true and 5 didn't know of this association. Among the females, 486 felt brushing helped in maintenance of the overall health, 72 said it was not true and 8 females didn't know of this association.

Table 11

Sr No	Questionnaire With Responses	Males (Frequency)	Females (Frequency)	P Value
1	How do you clean your teeth?			
	Toothbrush	880	525	0.168
	Finger	51	40	
	Twig	3	0	
	Other	0	1	
2	What technique do you use for brushing?			
	Vertical	112	72	0.963
	Horizontal	390	230	
	Circular	157	97	
	Combination	275	167	

3	What material do you use for brushing? Toothpaste Toothpowder Ash Mishri Other	879 32 2 20 1	518 25 1 21 1	0.344
4	How many times do you brush? Once Twice Thrice	712 214 8	375 179 12	0.000
5	At what times do you brush your teeth? Before breakfast After breakfast Before dinner After dinner Any other time	924 17 22 169 7	559 9 33 141 6	0.475 0.456 0.07 0.1 0.359
6	Do you use other oral hygiene aids? None Interdental aids Oral mouth rinse Others	786 38 90 20	463 28 57 18	0.490
7	Within how many days you change your toothbrush? Don't use toothbrush Before 3 months After 3 months Within 4-6 months After 6 months	41 348 207 291 4	32 190 136 178 30	0.543
8	Why do you change your toothbrush? Don't use a tooth brush Flaring of bristles Told by dentist Other Read about it	41 800 40 52 1	32 467 26 41 0	0.427
9	Why do you brush your teeth? For bad breath For colour of teeth Cleanliness Other	123 239 541 31	92 119 331 24	0.098
10	Do you check mirror after brushing? Yes No	424 510	253 313	0.477
11	Do you use tongue cleaners &/or mouthwash? Only tongue cleaner Only mouthwash Both None	189 86 54 605	119 64 23 360	0.288
12	Do you rinse mouth after eating anything? Yes No Sometimes Don't know	427 161 344 2	252 111 203 0	0.474
13	Do you think brushing keeps your body healthy? Yes No Don't know	787 142 5	486 72 8	0.092
14	How do you choose your toothpaste? As recommended by a dentist As propagated by TV and media As recommended by friends or relatives Based on cost Other	74 344 317 55 144	51 181 221 27 86	0.181
15	How many times do you visit your dentist in a year? Once per year Twice per year Only when needed Never	125 86 498 244	86 37 291 152	0.829
16	Reason for last dental visit? Pain Cleaning	502 229	308 133	0.838

	General check up	46	28	
	Other	157	97	
17	What is the potential barrier to avoid dental treatment?			
	Cost	332	200	0.306
	Time	196	108	0.206
	Distance	45	38	0.076
	Need not felt	479	287	0.435
	Fear and anxiety	14	9	0.524

2) Education: (Table 12)

The comparison of oral hygiene practices with education showed significant differences.

Table 12

Sr No	Questionnaire With Responses	1	2	3	4	5	6	7	P value
1	How do you clean your teeth?								
	Toothbrush	23	54	213	363	131	594	27	0.00
	Finger	9	6	22	25	24	4	1	
	Twig	0	0	0	2	0	1	0	
	Other	0	0	0	0	0	1	0	
2	What technique do you use for brushing?								
	Vertical	1	1	18	36	38	87	3	0.00
	Horizontal	22	43	124	196	34	193	8	
	Circular	4	6	35	62	23	118	6	
	Combination	5	10	58	96	60	202	11	
3	What material do you use for brushing?								
	Toothpaste	24	51	209	353	141	592	27	0.00
	Toothpowder	6	3	11	15	14	7	1	
	Ash	1	0	0	1	0	1	0	
	Mishri	1	6	15	19	0	0	0	
	Other	0	0	0	2	0	0	0	
4	How many times do you brush?								
	Once	22	46	196	283	102	420	18	0.00
	Twice	7	11	36	103	53	173	10	
	Thrice	3	3	3	4	0	7	0	
5	At what times do you brush your teeth?								
	Before breakfast	32	60	228	384	155	596	28	0.061
	After breakfast	0	2	7	9	0	8	0	0.227
	Before dinner	6	5	12	19	8	4	1	0.00
	After dinner	9	9	31	76	29	147	9	0.005
	Any other time	1	0	0	0	12	0	0	0.000
6	Do you use other oral hygiene aids?								
	None	29	59	203	347	138	451	22	0.00
	Interdental aids	0	0	10	10	1	45	0	
	Oral mouth rinse	1	1	5	27	12	95	6	
	Others	2	0	17	6	4	9	0	
7	Within how many days you change your toothbrush?								
	Don't use toothbrush	6	5	10	26	24	1	1	0.00
	Before 3 months	6	27	104	135	53	199	14	
	After 3 months	8	2	44	95	28	158	8	
	Within 4-6 months	7	19	60	115	37	228	3	
	After 6 months	5	7	17	19	13	14	2	
8	Why do you change your toothbrush?								
	Don't use a tooth brush	6	5	10	26	24	1	1	0.00
	Flaring of bristles	23	53	208	337	119	505	22	
	Told by dentist	0	0	5	10	4	45	2	
	Other	3	2	12	17	8	48	3	
	Read about it	0	0	0	0	0	1	0	
9	Why do you brush your teeth?								
	For bad breath	9	1	38	52	33	77	3	0.00
	For colour of teeth	2	5	49	75	29	192	8	
	Cleanliness	13	47	133	241	93	328	17	
	Other	8	7	15	22	0	3	0	
10	Do you check mirror after brushing?								
	Yes	4	11	87	151	67	343	18	0.00
	No	27	49	148	239	88	257	10	
11	Do you use tongue cleaners &/or mouthwash?								
	Only tongue cleaner	5	1	22	62	33	176	9	0.00
	Only mouthwash	2	0	6	30	35	74	3	
	Both	1	1	5	5	5	57	3	

	None	24	58	202	293	82	293	13	
12	Do you rinse mouth after eating anything?								
	Yes	14	38	122	215	71	208	11	0.00
	No	12	7	53	50	50	96	5	
	Sometimes	6	15	60	125	34	296	12	
13	Do you think brushing keeps your body healthy?								
	Yes	18	47	193	332	111	546	26	0.00
	No	13	9	35	58	44	53	2	
	Don't know	1	4	7	0	0	1	0	
14	How do you choose your toothpaste?								
	As recommended by a dentist	2	2	8	37	19	56	1	0.00
	As propagated by TV and media	5	9	82	133	36	247	13	
	As recommended by friends or relatives	10	17	71	136	17	224	10	
	Based on cost	10	7	18	38	0	7	2	
	Other	5	25	56	46	30	66	2	
15	How many times do you visit your dentist in a year?								
	Once per year	3	2	17	32	13	136	10	0.00
	Twice per year	4	0	9	33	4	52	2	
	Only when needed	17	29	125	221	60	322	13	
	Never	8	29	84	104	78	90	3	
16	Reason for last dental visit?								
	Pain	20	27	158	241	85	268	11	0.00
	Cleaning	5	4	30	74	35	202	12	
	General check up	0	0	4	10	2	56	2	
	Other	7	29	43	65	33	74	3	
17	What is the potential barrier to avoid dental treatment?								
	Cost	8	16	79	134	47	245	7	0.144
	Time	2	5	43	52	25	167	10	0.00
	Distance	4	5	13	20	23	17	1	0.00
	Need not felt	2	40	130	228	76	256	14	0.00
	Fear and anxiety	1	0	7	3	0	11	1	0.135

3) Occupation: (Table 13)

Occupation was found to be significantly related to the oral hygiene practices carried out by the study participants. It was seen that the unemployed showed better oral hygiene practices than the ones who were professionals because since this study was carried out in a college setup there were maximum students enrolled and they were included in the unemployed category.

Table 13

SR NO	QUESTIONNAIRE WITH RESPONSES	1	2	3	4	5	6	10	P value
1	How do you clean your teeth?								
	Toothbrush	588	63	216	131	180	167	60	0.00
	Finger	13	12	28	12	24	1	1	
	Twig	0	0	3	0	0	0	0	
	Other	1	0	0	0	0	0	0	
2	What technique do you use for brushing?								
	Vertical	102	3	21	14	11	27	6	0.00
	Horizontal	252	47	145	51	80	41	4	
	Circular	102	10	28	26	49	32	7	
	Combination	146	15	53	52	64	68	44	
3	What material do you use for brushing?								
	Toothpaste	572	71	215	125	189	165	60	0.00
	Toothpowder	18	0	14	18	3	3	1	
	Ash	3	0	0	0	0	0	0	
	Mishri	9	4	16	0	12	0	0	
	Other	0	0	2	0	0	0	0	
4	How many times do you brush?								
	Once	409	60	211	106	165	98	38	0.00
	Twice	180	14	33	36	39	68	23	
	Thrice	13	1	3	1	0	2	0	
5	At what times do you brush your teeth?								
	Before breakfast	594	70	247	142	201	168	61	0.00
	After breakfast	10	5	3	2	3	3	0	0.54
	Before dinner	20	7	9	7	12	0	0	0.004
	After dinner	164	8	30	16	27	55	10	0.00
	Any other time	13	0	0	0	0	0	0	0.003
6	Do you use other oral hygiene aids?								
	None	481	69	215	130	179	125	50	0.00
	Interdental aids	37	6	2	2	6	10	3	
	Oral mouth rinse	72	0	9	9	19	30	8	
	Others	12	0	21	2	0	3	0	

7	Within how many days you change your toothbrush? Don't use toothbrush Before 3 months After 3 months Within 4-6 months After 6 months	10 218 155 187 32	12 23 5 24 11	14 82 59 76 16	12 62 26 34 9	24 63 43 70 4	1 61 41 60 5	0 29 14 18 0	0.00
8	Why do you change your toothbrush? Don't use a tooth brush Flaring of bristles Told by dentist Other Read about it	10 517 35 40 0	12 61 0 2 0	14 216 5 12 0	12 121 4 6 0	24 164 7 9 0	1 146 11 9 1	0 42 4 15 0	0.00
9	Why do you brush your teeth? For bad breath For colour of teeth Cleanliness Other	90 170 329 13	13 8 42 12	36 43 156 12	18 31 89 5	20 48 123 14	27 52 89 0	11 6 44 0	0.00
10	Do you check mirror after brushing? Yes No Not relevant	267 332 2	18 57 0	80 163 2	74 69 0	101 101 2	110 58 0	25 36 0	0.00
11	Do you use tongue cleaners &/or mouthwash? Only tongue cleaner Only mouthwash Both None	146 91 39 326	2 0 0 73	26 7 4 210	23 8 4 108	35 16 6 147	61 23 19 65	15 5 5 36	0.00
12	Do you rinse mouth after eating anything? Yes No Sometimes Not relevant	226 142 233 1	36 12 27 0	143 29 74 1	74 29 40 0	106 22 76 0	65 25 78 0	29 23 19 0	0.00
13	Do you think brushing keeps your body healthy? Yes No Don't know	530 68 4	58 10 7	187 58 2	116 27 0	177 27 0	157 11 0	48 13 0	0.00
14	How do you choose your toothpaste? As recommended by a dentist As propagated by TV and media As recommended by friends or relatives Based on cost Other	71 180 256 17 78	1 28 11 26 9	7 79 64 29 68	17 58 51 6 11	11 95 69 2 23	11 76 56 2 23	7 9 31 0 14	0.00
15	How many times do you visit your dentist in a year? Once per year Twice per year Only when needed Never	98 38 317 149	10 1 42 22	16 7 134 90	6 16 85 36	9 12 111 72	48 12 85 23	26 18 13 4	0.00
16	Reason for last dental visit? Pain Cleaning General check up Other	312 169 25 96	56 7 2 10	158 38 1 50	80 23 4 36	116 48 1 39	75 69 3 21	13 8 38 2	0.00
17	What is the potential barrier to avoid dental treatment? Cost Time Distance Need not felt Fear and anxiety	220 112 40 295 10	28 9 2 47 0	67 47 21 146 3	49 23 10 78 7	15 29 5 113 0	67 64 2 64 3	30 20 3 23 0	0.021 0.00 0.009 0.00 0.012

4) Income: (Table 14)

Income was found to be significantly related to the oral hygiene practices carried out by the study participants. When income was compared to the oral hygiene practices it was seen that those participants having an income of about 5387-36016 showed better results than those who had a lower income.

Table 14

SR NO	QUESTIONNAIRE WITH RESPONSES	1	2	3	4	6	11	12	P value
1	How do you clean your teeth?								
	Toothbrush	39	130	252	324	182	326	152	0.00
	Finger	1	12	26	33	15	3	1	
	Twig	0	0	1	2	0	0	0	

	Other	0	0	0	0	0	1	0	
2	What technique do you use for brushing?								
	Vertical	25	10	20	40	9	41	39	0.00
	Horizontal	10	83	122	142	102	123	38	
	Circular	2	21	64	56	29	57	25	
	Combination	3	28	73	121	57	109	51	
3	What material do you use for brushing?								
	Toothpaste	38	130	243	334	180	323	149	0.00
	Toothpowder	2	7	13	9	16	6	4	
	Ash	0	1	0	1	1	0	0	
	Mishri	0	4	21	15	0	1	0	
	Other	0	0	2	0	0	0	0	
4	How many times do you brush?								
	Once	20	111	205	307	145	208	91	0.00
	Twice	20	26	66	51	52	118	60	
	Thrice	0	5	8	1	0	4	2	
5	At what times do you brush your teeth?								
	Before breakfast	40	142	273	352	195	328	153	0.152
	After breakfast	0	2	7	7	2	7	1	0.702
	Before dinner	0	6	31	6	7	3	2	0.000
	After dinner	20	17	50	43	29	91	60	0.000
	Any other time	0	0	1	0	12	0	0	0.000
6	Do you use other oral hygiene aids?								
	None	39	132	254	313	174	236	101	0.00
	Interdental aids	0	3	9	12	5	12	25	
	Oral mouth rinse	1	4	12	16	14	76	24	
	Others	0	3	4	18	4	6	3	
7	Within how many days you change your toothbrush?								
	Don't use toothbrush	1	10	26	20	14	1	1	0.000
	Before 3 months	4	50	89	152	69	114	60	
	After 3 months	19	28	60	69	40	76	51	
	Within 4-6 months	4	34	87	109	74	125	36	
	After 6 months	2	20	17	9	0	14	5	
8	Why do you change your toothbrush?								
	Don't use a tooth brush	1	10	26	20	14	1	1	0.00
	Flaring of bristles	36	122	224	299	167	287	132	
	Told by dentist	2	2	6	16	7	20	13	
	Other	1	8	23	24	9	22	6	
	Read about it	0	0	0	0	0	0	1	
9	Why do you brush your teeth?								
	For bad breath	14	9	34	53	43	46	16	0.00
	For colour of teeth	4	12	46	89	50	103	54	
	Cleanliness	21	105	168	214	104	177	83	
	Other	1	16	31	3	0	4	0	
10	Do you check mirror after brushing?								
	Yes	7	56	98	169	83	171	93	0.00
	No	33	86	180	185	113	159	60	
	Not relevant	0	0	1	5	1	0	0	
11	Do you use tongue cleaners &/or mouthwash?								
	Only tongue cleaner	4	16	53	59	37	94	45	0.00
	Only mouthwash	29	3	6	16	18	53	25	
	Both	0	4	6	7	6	34	20	
	None	7	119	214	277	136	149	63	
12	Do you rinse mouth after eating anything?								
	Yes	7	69	136	176	83	146	62	0.00
	No	16	31	64	64	47	35	15	
	Sometimes	17	42	179	119	67	149	76	
13	Do you think brushing keeps your body healthy?								
	Yes	27	125	216	284	178	311	132	0.00
	No	13	14	54	75	19	18	21	
	Don't know	0	3	9	0	0	1	0	
14	How do you choose your toothpaste?								
	As recommended by a dentist	15	16	15	18	9	31	21	0.00
	As propagated by TV and media	5	39	103	107	75	146	50	
	As recommended by friends or relatives	19	49	86	141	68	119	56	
	Based on cost	0	12	28	27	7	7	1	
	Other	1	26	47	66	38	27	25	
15	How many times do you visit your dentist in a year?								
	Once per year	4	13	17	42	21	67	49	0.00

	Twice per year	0	18	11	29	7	26	13	
	Only when needed	19	73	154	188	106	174	73	
	Never	17	38	97	100	63	63	18	
16	Reason for last dental visit?								
	Pain	17	108	164	202	107	157	55	0.00
	Cleaning	20	18	36	73	40	104	71	
	General check up	1	3	5	33	6	18	8	
	Other	2	13	74	51	44	51	19	
17	What is the potential barrier to avoid dental treatment?								
	Cost	18	39	105	132	64	115	59	0.577
	Time	4	15	32	66	42	91	54	0.00
	Distance	13	11	16	18	10	11	4	0.00
	Need not felt	7	91	168	190	107	150	53	0.00
	Fear and anxiety	0	2	4	0	5	11	1	0.017

5) Kuppuswamy’s Grade: (Table 15)

Kuppuswamy’s grade was found to be significantly related to the oral hygiene practices carried out by the study participants. Finally, when the total Kuppuswamy’s grade was compared to the oral hygiene practices it was noticed that those having Grades I, II and III showed the best oral hygiene practices.

Table 15

Sr No	Questionnaire With Responses	I	II	III	IV	V	P value
1	How do you clean your teeth?						
	Toothbrush	31	518	402	452	2	
	Finger	1	3	40	46	1	0.00
	Twig	1	2	1	0	0	
	Other	0	0	0	0	0	
2	What technique do you use for brushing?						
	Vertical	8	80	36	60	0	
	Horizontal	3	176	185	253	3	0.00
	Circular	3	86	97	68	0	
	Combination	19	181	125	117	0	
3	What material do you use for brushing?						
	Toothpaste	32	511	406	446	2	
	Toothpowder	1	9	24	23	0	0.00
	Ash	0	0	1	1	1	
	Mishri	0	1	12	28	0	
	Other	0	2	0	0	0	
4	How many times do you brush?						
	Once	10	349	349	378	1	0.00
	Twice	23	168	91	110	1	
	Thrice	0	6	3	10	1	
5	At what times do you brush your teeth?						
	Before breakfast	33	521	433	493	3	0.087
	After breakfast	0	8	11	7	0	0.638
	Before dinner	0	5	21	28	1	0.00
	After dinner	9	148	60	91	2	0.00
	Any other time	0	0	12	1	0	0.00
6	Do you use other oral hygiene aids?						
	None	24	379	396	448	2	
	Interdental aids	3	37	12	14	0	0.00
	Oral mouth rinse	6	97	29	15	0	
	Others	0	10	6	21	1	
7	Within how many days you change your toothbrush?						
	Don’t use toothbrush	0	4	39	29	1	
	Before 3 months	5	195	155	183	0	
	After 3 months	11	130	92	110	0	0.00
	Within 4-6 months	17	176	143	131	2	
	After 6 months	0	18	14	45	0	
8	Why do you change your toothbrush?						
	Don’t use a tooth brush	0	4	39	29	1	
	Flaring of bristles	29	448	363	425	2	0.00
	Told by dentist	3	33	17	13	0	
	Other	1	37	24	31	0	
	Read about it	0	1	0	0	0	
9	Why do you brush your teeth?						
	For bad breath	8	72	56	78	1	
	For colour of teeth	6	160	105	87	0	0.00

	Cleanliness	19	287	268	297	1	
	Other	0	4	14	36	1	
10	Do you check mirror after brushing?						
	Yes	13	288	195	181	0	
	No	20	235	242	316	3	0.00
		0	0	6	1	0	
11	Do you use tongue cleaners &/or mouthwash?						
	Only tongue cleaner	17	138	85	67	1	
	Only mouthwash	3	84	25	38	0	0.00
	Both	5	47	12	13	0	
	None	8	254	321	380	2	
12	Do you rinse mouth after eating anything?						
	Yes	14	227	203	235	0	
	No	1	62	85	122	2	0.00
	Sometimes	18	233	155	140	1	
		0	1	0	1	0	
13	Do you think brushing keeps your body healthy?						
	Yes	32	467	370	402	2	0.00
	No	1	55	73	85	0	
	Don't know	0	1	0	11	1	
14	How do you choose your toothpaste?						
	As recommended by a dentist	6	48	24	47	0	0.00
	As propagated by TV and media	4	211	169	141	0	
	As recommended by friends or relatives	19	194	164	158	3	
	Based on cost	0	8	24	50	0	
	Other	4	62	62	102	0	
15	How many times do you visit your dentist in a year?						
	Once per year	16	111	45	40	1	0.00
	Twice per year	5	45	22	32	0	
	Only when needed	7	271	238	270	1	
	Never	5	96	138	156	1	
16	Reason for last dental visit?						
	Pain	10	242	245	312	1	
	Cleaning	9	174	105	73	1	0.00
	General check up	13	36	13	12	0	
	Other	1	71	80	101	1	
17	What is the potential barrier to avoid dental treatment?						
	Cost	15	192	162	162	1	0.819
	Time	22	138	70	74	0	0.00
	Distance	1	17	21	44	0	0.002
	Need not felt	8	229	248	279	2	0.00
	Fear and anxiety	0	14	1	8	0	0.03

Since this study was carried out in a college setup it was difficult to obtain patients of the upper grade (Grade IV) thus not showing significant results in Grade IV.

5. Discussion

India, is a country with diversities in its social, cultural and economic aspects.⁸ Oral health disorders are multifactorial and are a result of age, socioeconomic status, diet and nutrition along with other local factors like plaque and calculus playing crucial role in occurrence and progression of the diseases.⁸ To improve oral health worldwide, promoting oral health of adolescents through health promoting schools has been prioritized by the World Health Organization (WHO).⁹

India being home to nearly 1.2 billion people and one amongst the rapidly developing country, its population requires being systemically as well as orally healthy to lead a good quality of life. However due to large heterogeneity amongst its residing population in terms of geographical area, culture, education, socioeconomic status, a variety of oral diseases like periodontal diseases are prevalent here. Even though the early studies suggested that the population

is highly susceptible to the disease, the true prevalence of periodontal disease has not been found yet due to paucity in literature available. Due to non-availability of same age groups in selected studies an overall prevalence rate could not be obtained. However, it was observed that few areas of states like West Bengal, Uttar Pradesh and Assam have reported a prevalence rate of periodontal disease of more than 85% in their general population.¹⁰

Epidemiological studies have repeatedly shown that despite pervasive need for treatment, less than half adult population visits dentists in a year.¹¹

Thus, in a vast country like India, a prevention-based oral health-care study would be more useful and advantageous than treatment approach. Dayakar *et al.*¹² insisted on the immediate need for comprehensive educational programs to promote better oral health and correct oral hygiene practices at an elementary level. However, Kay and Locker¹³ showed those oral health promotion strategies have not shown any improvement in the behavior and clinical outcome of disease.

Based on this statement many studies are carried out to

analyze the awareness, knowledge and attitudes of populations about dental treatments and satisfaction by dental care.

The education score of majority participants was found to be Kuppuswamy's education score 6, i.e. graduates and post-graduates, (40%) majority of them were unemployed (SES score- 1) (40.1%) and had an income ranging from 8989-13494 INR/month (SES score-4) (23.9%). These findings may be due to the fact that, this study was conducted in a hospital which is present in a college campus and hence maximum population was 'students' appearing for their 'graduation and post-graduation courses' from 'middle class' working families. Another explanation for this range of per month family income could be, since the hospital treated patients free of charge, the main lot attracted to this center was from economically poor background (upper lower class).

But overall study participants included individuals from each score.

According to this study 98.1% of the population was found literate (minimum primary school certificate holders) and 59.9% of the population was employed in some or other kind of jobs. It was found that 45.3% was a high-income population and 63% were upper-class participants. This is the first study of its kind where the population was classified in the above manner.

Further in the study it was found that 93% of the total population used a toothbrush as the main cleaning device. 94.2% males and 92.7% females used a toothbrush. These findings were similar to those given by Azodo et al (2012).⁴

In this study, maximum participants used horizontal brushing technique (41.3%) and according to gender 41% males and 40% females used horizontal technique but there was no significant difference between males and females.

Maximum number of participants used toothpaste but there was no significant difference between the males and females. The correlation between toothpaste and good oral hygiene was significantly strong (100%, $p=0.000$). Maximum number of participants brushed only once daily without any significant difference. Also, almost all the participants brushed before breakfast. These results were similar to results by Oberoi et al (2014).¹⁴

Oral hygiene aids like interdental brushes, dental floss mouth rinses and tongue cleaners were seen to be used by fewer participants. The results about use of interdental aids was similar to that by Oberoi et al (2014)¹⁴; in which the author had found a higher use of tongue cleaners as compared to the present study, but no difference was seen between usage by males and females.

A significantly higher number of patients changed their toothbrush within/before 3months mainly due to flaring of bristles as shown by Azodo et al (2012).² This can be explained by a greater number of participants using horizontal technique of brushing. These results were similar to that found by Kuppuswamy VL et al (2014).⁹

A significantly high number of participants preferred using a toothpaste as compared to toothpowder and mishri application.

The number of participants who brushed only once was quite on the higher side in this study and the number of males who brushed their teeth at least once was significantly higher than that of females. These results were similar to the study by Azodo et al (2012)² and maximum study participants preferred brushing before breakfast.

The study participants like those in the study by Kuppuswamy et al (2014)⁹ were not aware of the oral hygiene aids other than toothbrush and hence did not use them. This may be due to the fact that the study population driven to this center was low in awareness and availability of basic dental products like floss and interdental brushes.

The main reason for the study population to brush their teeth was cleanliness. Unlike, results were achieved by Azodo et al (2012)² in their study in 2012 where prevention of caries was considered the main reason for brushing. Interestingly, it was found that around 4% population brushed their teeth only because everyone else did or because they were taught to do so since childhood.

A criterion which was not incorporated in any of the recent studies was evaluated in this study and it was found that participants did not have the habit to check or see the mirror after brushing to self-evaluate their own oral hygiene practice. Also, mouth rinsing with plain water after any meal wasn't a habit carried out in this population. In the study by Oberoi et al (2012)¹⁴, this calculated practice was significantly low unlike in this study where there was no significant difference.

Like the results by Kuppuswamy et al (2014)⁹, in the current study as well participants were unaware of the fact that poor oral hygiene has a deleterious effect on the overall body and their health. This should be considered among the critical issues that create a potential barrier between necessity and use of the dental services.

Many of the study participants especially with poor oral hygiene depended only on information from near ones and media while choosing their oral hygiene devices for example selection of a toothpaste for daily use. A very low population referred the dentist and used the toothpaste recommended by their dentist. This is supported by the results seen in the study by Paul B et al (2014)¹⁵. The matter of fact that many participants also chose the toothpaste that was cheaper at cost explains the lower economic background of the study population and which is also considered to play a role in oral hygiene practices of the population.

In this study, it was found that many visited a dental clinic in the recent past. Although, the dental clinic visits ranged mainly only when the need arises and the main cause was pain in the teeth. These findings matched with the previous studies by Oberoi et al (2012)¹⁴, Kuppuswamy VL et al (2012)⁹, and Fotedar et al (2013)¹¹.

After asking about the barrier to visit the dental clinics the

maximum number of participants felt there was no need to visit a dental clinic until severe symptoms or need arises. The other reasons were lack of time, fear and anxiety etc. similar results were seen by Oberoi et al (2012)¹⁴ and Fotedar et al (2013)¹¹, in their respective studies. Interestingly, a very small number of participants mentioned reasons like mistrust in the rendered treatment was also one of these other causes.

The limitations of such studies are that the oral hygiene practice questionnaire mainly depends on the subjective knowledge and memory of the participants. So, to overcome this, more standardized scales need to be designed.

6. Conclusion

The success of any periodontal treatment is largely dependent upon the regular and efficient control of gingival inflammation obtained by means of supragingival plaque control. The patients' adherence to homecare oral hygiene practices for plaque removal is influenced by the presence of psychosocial and sociodemographic characteristics.¹⁴

If the assumption that an adequate oral hygiene customs and practices are a desirable component of oral health care strategies, thus specific, culturally and socially appropriate method to support, motivate and stimulate adherence to these practices should be introduced.¹⁶

The proper perception of oral health could influence adherence to oral health care instructions,⁷ by revealing the degree of importance the patient attaches to the treatment, in turn determining a high or low acceptance of the oral hygiene instructions.¹⁷

Oral health problems in a study population are a direct consequence of neglected oral hygiene practices. Good oral health outcomes for patients are defined as the primary purpose of dental health care practice, and therefore are essential dimensions for success.¹⁴

To summarize, it was found that education, occupation and income according to the Kuppaswamy's grades of socio-economic status do affect the oral hygiene habits of an individual. Hence it of paramount importance to create knowledge and awareness about the oral hygiene practices and to increase preventive education of oral health care.

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