

# Study of Oral Hygiene of People of Valsad

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**Abstract:** *This particular study was carried out to assess the awareness about the oral hygiene and the practices performed for the same by the people of Valsad, Gujarat in India. A questionnaire was prepared asking various kinds of oral hygiene related questions to about 639 people of Valsad, Gujarat, India. The people were priorly informed about the same and their identities were completely kept confidential. Total 639 people were selected for the study and a self-constructed questionnaire through Google form was sent to them through Google form. Responses received from the people were assessed in both numbers and percentages. The results obtained through the questionnaire from Google form showed a general lack of oral hygiene awareness and various treatments modalities and preventive measures available for the same as well as the people were not very aware too about the effects of oral hygiene practices on systemic health. There is a high-priority need for various educational camps or programmes to be constructed with the goal of creating an increase in the incorporation of various oral hygiene practices and even the treatment options available for the same in case of any existing dental problems thereby oral hygiene is achieved by the people for a longer duration and even the complications are treated at an early stage so that the worst outcomes can be prevented.*

**Keywords:** Oral hygiene, Valsad, India, Gender based dental analysis, Statical analysis, White discoloration, Black discoloration, Scaling, Braces, Pericoronitis, Caries, Amalgam, Composites, Extraction, Diss-impaction

## 1. Introduction

Oral disease in modern times have an increased risk of health-related concerns as it directly or indirectly affects the quality of life in some years down the lane. According to WHO, "Promotion of oral health is a cost-effective strategy to reduce the burden of oral disease and maintain oral health and quality of life." (WHO Health: Action plan for promotion and integrated disease prevention., 2006).

The possible predisposition for the same can be developmental disturbances, excessive sugary food consumption, lack of oral hygiene, presence of any systemic conditions like diabetes, habit of long- term smoking and so on.

However, it's not actually the fault of the people around, in true sense sometimes the people are not aware or rather not well educated about the importance of oral hygiene, various materials available to look after the same and the treatment modalities available to treat the existing oral problems. Hence, it is essential to combat oral disease as a preventive approach, with the focus on health education and promotion, which should be given prime importance.

The National Oral Health Survey, conducted in 2005, by Indian Dental Association (IDA), highlighted that 95% of the population of India suffers from gum disease, only 50% use toothbrush, and just 2% of the population visit the dentist. (Bhat PK, 2010).

Actually, the maintenance of good oral hygiene is a sum total of efforts put in by the people as well as the dentists. Even though various awareness campaign is being established still the bitter truth is that the rural group of India which comprises main part of India are not that much aware and well versed with the importance somewhere lack the oral hygiene due unhealthy dietary habits like excess sugary food, junk foods like the ones loaded with cheese their consumption, etc.

And looking in mind the availability of both rural and urban population in Valsad the present study was inducted here. And hence, it's essential to combat oral disease as a preventive approach, with focus on health education and promotion, which should be given prime importance (Prakash H. Mathur, 2002)

## 2. Methods

### Ethical clearance

A total of 639 patients were selected using a convenience sampling technique. Individuals were priorly informed and verbal consent was obtained.

Study sample and sampling technique.

A total of 639 individuals participated in the current study.

A questionnaire through Google form was prepared in English language and given to 639 people of Valsad, Gujarat, India with a population of 20, 45, 678 – as per the growth rate of 20.98% to the population of 17, 05, 678 according to the 2011 census. (Census2011, 2011). Wide ranges of 18-60 years of people were selected.

The Google form questionnaire included information like their age, gender, address and so on with keeping in the mind the full confidentiality of the people.

The sample size was calculated based on the single proportion formula

$$n = \frac{z^2 p (p-1)}{d^2}$$

based upon the assumptions of confidence interval (CI) of 95% and margin of error (d) of 4%.

The questionnaire was further categorized to assess the oral hygiene and their related treatment modalities awareness.

### Questionnaire

The questionnaire (Appendix 1) was handed to the people of Valsad through Google form and a reasonable amount of time was given to them to fill in the required the details. Results were then subjected to statistical analysis. A self-made Google form questionnaire written in English language was sent to each one of them. The patients were selected from throughout the Valsad district including those of both the gender from a wide range of age group between 12 to 65 years, both from rural as well as urban population were included. The Google form questionnaire consisted

information related to the individual's name, age, sex and residence various preventive measures taken by them, their awareness about the treatment options available to treat the existing problems and the systemic diseases if any they are suffering from the assess the amount of care and complications they are subjected too.

### Statistical Analysis

The data was first transferred to Microsoft Excel and then the results were analysed by using Analytical Solver in terms of values. Associations between variables are as below. All the other variable combinations resulted in no correlation statistically.

Variable 1	Variable 2	Value	
Type of toothpaste	Black discoloration on teeth	-0.1536408	Slight inverse correlation
Duration of changing toothbrush	Black discoloration on teeth	-0.1484957	Slight inverse correlation
age group	Times of brushing teeth in a day	0.19098055	Slight linear correlation
Usage of any other cleaning aids	Undergone any dental treatment	0.15272501	Slight linear correlation
Frequency of sugar consumption in a day	Undergone any dental treatment	0.15296239	Slight linear correlation

### 3. Results

The above-mentioned study was carried out on 639 individuals. Out of them, 47.3% were male and 52.7% were female. Division of people based on age and gender is depicted in table. The major population was in the age group of 10-20 years and 21-30 years that was 45.9% and 30.8% respectively.

#### Brushing

On assessment it was seen that maximum of individuals that is 59.05% female and 64.90% male brushed their teeth once in a day, followed by 37.09% female and 32.45% male who brushed their teeth twice in a day. Some people were also seen brushing their teeth more than twice that is 3.86% female and 2.65% male. Horizontal way of brushing was seen with 13.65% female and 14.90% male and vertical way by 4.75% female and 5.63% male. Majority, 79.47% female and 81.60% male brushed their teeth in both horizontal and vertical motion. Frequency of changing the toothbrush was seen maximum at the interval of three months that is 65.58% female and 62.25% male. Changing of toothbrush at the interval of six months was seen in 26.41% female and 25.83% male and at an interval of one year was seen in 8.01% female and 11.92% male.

Majority of individuals that is 72.85% female and 79.82% male used paste form of toothpaste, followed by 17.51% female and 17.55% male who used gel form of toothpaste and at last 1.48% female and 2.65% male used powder form of toothpaste. 1.19% female and 6.95% male did not use toothpaste at all that is they used neem twigs or any other such cleaning aids.

#### Additional Cleaning Aids

Tongue cleaner was used by 38.58% female and 37.42% male, tongue cleaner plus mouth wash by 11.28% female and 7.28% male and tongue cleaner plus floss was used by

0.30% female and 0.66% male. Only mouth wash was used by 13.65% female and 14.29% male followed by 0% female and 0.99% male who used mouth wash plus floss as additional cleaning aids. There were 32.20% female and 39.40% male who did not use any other cleaning aids at all.

#### Scaling

Surprisingly, 59.35% female and 58.82% male had never undergone scaling at all. 24.04% female and 26.82% male had under gone scaling in every one a year followed by 8.31% female and 5.96% in every six months and 8.31% female and 8.94% male in every 3 months which is the ideal and sadly least number of people undergo the same.

#### Amount of sugar consumption per day

From the data, 20.2% female, 37.1% female, 34.4% female and 8.3% female consumed sugar more, twice, once and none times respectively and 16.9% male, 45.4% male, 27.8% male and 9.9% male consumed sugar more, twice, once and none times respectively. Hence, we can say that the sugar consumption pattern is more seen in male than female and so the prevalence of dental caries is more common in males than females. And with respect to the treatment modalities mentioned below, the awareness towards the importance of treatment and the various modalities available for the same is quite less.

#### Have/had braces with alignment of teeth in oral cavity

In this case 61.13% female and 67.22% male had not undergone braces as their teeth were in straight line but 21.66% female and 16.23% male had not undergone the same despite of presence of teeth which were not aligned.

11.87% female and 9.93% male had undergone braces and now their teeth are in the same line and 5.34% female and 6.62% male were undergoing braces treatment due to lack of teeth alignment.

**Discoloration of teeth**

From the data obtained, only 22% female and 20.5% male had white discoloration and 16% female and 20.9% male had black discoloration, which suggests that the chances of dental caries are as such less from the clinical discoloration data obtained the individuals. And this data co-relates with the result of the above-mentioned sugar consumption data which is seen more in males than females and same the black discoloration is seen more in males than in females.

**Other treatment**

Composite or amalgam restoration was possessed by 3.86% female and 7.62% male, crown by 14.24% female and 14.57% male, RCT was done by just 1% male only and extraction by only 0.89% female.

As compared to the data of discoloration mentioned above, the treatment percentage is as such less so, the awareness of the importance of the treatment and the various treatment modalities available for them is as such less.

**Presence of broken teeth**

From the results obtained, 14.54% female and 22.19% male were having broken teeth and 85.46% female and 77.81% male did not have broken teeth present.

From the comparison of the data of composite or amalgam filling and crown possessing people with the percentage of broken teeth we can say that there was lack of awareness among the people towards the treatment modality of the broken teeth.

**Not fully grown teeth in mouth**

From the data received, 30.9% female and 22.6% male have a presence of not fully grown teeth in their oral cavity. Out of all the majority of not fully grown teeth are in 10-20 years age group of female and in 21-30 years male is 76% and 40.8% male respectively and from this we can say that the chances of pericoronitis due to not fully grown 3<sup>rd</sup> molar are higher in female as the problem of it more of seen in the female in the molar growing age group.

From the data of extraction which is only 0.89% in comparison to the percentage of not fully grown teeth which is high we can say that somewhat were unaware about the extraction/ diss impaction treatment modality available for not fully grown teeth in the oral cavity.

**4. Discussion**

The present study concludes that the awareness among the people of Valsad that should ideally be there is lacking and on top of it is also ignored in some or the other way, which is actually a major problem. Also, the fact that this bitter truth remains the same in the areas similar to Valsad in India which we all know that somewhere such areas which such population comprises the major part of India. Hence this research paper becomes of utmost importance to get the health officials the required amount of knowledge and in

turn work towards creating the required awareness amongst the people by organizing TV commercials conveying the same message and most importantly to create free dental checkup and various basic dental treatment options for them at a certain amount of low price the economy.

Also, the educational status of Valsad people is 72.32% in rural areas and 88.84% in urban areas according to 2011 Census (Census2011, 2011) with majority of population living in rural areas that is 62.74% and minority that is 37.26% according to 2011 Census (Census2011, 2011), it becomes a mixed thought process about the existing dental awareness among the people of Valsad. Hence, the awareness camps are of utmost importance.

In the present study, 37.09% female and 32.45% male brushed their teeth twice a day and 59.05% female and 64.90% male brushed their teeth once a day which is nearly the same as 35.71% people and 58.93% people respectively which was seen in the study conducted in the patients attending the general OPD in tertiary care hospital of Kolkata, India.(Paul, 2014) Hence we can say that the brushing technique as such in west is same as that in east India even though the food habits might be different at both the places, which as such is poor as the percentage of people brushing their teeth twice a day is less.

Here, 24.93% female and 22.51% male used mouthwash as compared to only 8.93% mentioned in the above study. So here the percentages are quite favorable and so this practice is better in west than east India.

In this study, only 20.17% female and 16.88% male consumed sugar more than twice a day which is excessive as compared to 71.42% people mentioned in the above comparison study. So, the sweetness related dental problems like dental caries are quite common in east as compared to west India.

Here, as compared to the percentage of people brushing their teeth once a day as mentioned above, the percentage of people brushing their teeth in Jain et al., (Jain N, 2012) Sharda et al., (Sharda A, 2010) Chandra Shekhar et al., (Chandra Shekhar BR, 2011) Bhat et al., (Bhat PK, 2010) were comparatively low as in these studies the percentage were only 23.0%, 15.4%, 22.0%, 11.6% respectively.

Also, the percentage of people using mouthwashes, the percentage of the same in the study of Sharda et al (Sharda A, 2010) was 64.10%, which is quite high as compared to the present study.

So, when we compare in west only, the percentages quite vary in two different states, they are Gujarat and Rajasthan.

Also, when we see in Gujarat only, in this present study 37.09% female and 32.45% male brushed their teeth twice a day and 59.05% female and 64.90% male brushed their teeth twice a day as compared to 13.96% and 87.04% respectively in case of Pandya et al. (Pandya H, 2012) at Gujarat study. Hence, in the same state to the oral hygiene practices vary a lot in comparison to central and west Gujarat.

Here, 0.30% female and 0.66% male used dental floss and tongue cleaner as compared to 11.8% and 4.1% in Al-Shammari (Al-Shammari KF, 2007) and Zhu et al (Zhu, 2005) study respectively. So, as compared to Kuwaiti adults and adults in China the usage of other oral hygiene aids is very less here.

Here, 65.585 females and 62.25% males, 26.41% females and 25.83% males and 8.01% females and 11.92% males change their tooth brush at 3 months or less, more than 6 months and once in a year respectively as compared to 53%, 12% and 35% who change their toothbrush in within 6 months, after six months and when the brush gets worn out respectively in Dilip (2005) study (Dilip, 2005). So, this criterion of oral hygiene is also variable if compared west and south Gujarat than.

**5. Conclusions and Recommendations**

The present study shows that there is lack of awareness among the people of Valsad in relation to their oral hygiene and their treatment modalities even among the literate ones. Moreover, still the important fact is that people are not aware about the systemic effects of poor oral hygiene. And all of this leads to a great requirement of various dental awareness camps and advertisements related to same. Also, the lack of availability of dental clinic nearby in the rural areas is also a major concern. Hence even the establishment of various free dental checkup camps in the rural area is of utmost importance.

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**Appendix 1 - Questionnaire**

Google form link- <https://forms.gle/dydna96xLsS17opL7>

**Appendix 2 - Data Analysis**

Distribution of study population according to age and gender						
Age Group	No of Female	%of Female	No of Male	%of Male	Grand Total	Percent of Total
10-20	219	74.7%	74	25.3%	293	45.9%
21-30	87	44.2%	110	55.8%	197	30.8%
31-50	30	24.2%	94	75.8%	124	19.4%
51-65	1	4.0%	24	96.0%	25	3.9%
<b>Grand Total</b>	<b>337</b>	<b>52.7%</b>	<b>302</b>	<b>47.3%</b>	<b>639</b>	

Type of toothpaste					
Row Labels	Female	% of Female	Male	% of Male	Grand Total
Do not use toothpaste	4	1.19%	21	6.95%	25
Gel form	59	17.51%	53	17.55%	112
Paste form	269	79.82%	220	72.85%	489
Powder form	5	1.48%	8	2.65%	13
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Times of brushing teeth in a day					
	Female	% of Female	Male	% of Male	Grand Total
Once	199	59.05%	196	64.90%	395
Twice	125	37.09%	98	32.45%	223
More	13	3.86%	8	2.65%	21
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Way of brushing teeth					
	Female	% of Female	Male	% of Male	Grand Total
Horizontally	46	13.65%	45	14.90%	91
Vertically	16	4.75%	17	5.63%	33
Horizontal and Vertical	275	81.60%	240	79.47%	515
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Frequency of changing the tooth brush					
	Female	% of Female	Male	% of Male	Grand Total
Every 3 months or less	221	65.58%	188	62.25%	409
Every 6 months	89	26.41%	78	25.83%	167
Once in a year	27	8.01%	36	11.92%	63
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Usage of any other cleaning aids					
Row Labels	Female	% of Female	Male	% of Male	Grand Total
Mouth wash	46	13.65%	43	14.24%	89
Mouth wash, Floss		0.00%	3	0.99%	3
Mouth wash, Tongue cleaner	38	11.28%	22	7.28%	60
None	122	36.20%	119	39.40%	241
Tongue cleaner	130	38.58%	113	37.42%	243
Tongue cleaner, Floss	1	0.30%	2	0.66%	3
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Duration in between clinical cleaning of teeth					
	Female	% of Female	Male	% of Male	Grand Total
Every 3 months	28	8.31%	27	8.94%	55
Every 6 months	28	8.31%	18	5.96%	46
Have never undergone at all	200	59.35%	176	58.28%	376
Once in a year	81	24.04%	81	26.82%	162
<b>Grand Total</b>	<b>337</b>		<b>302</b>		<b>639</b>

Frequency of sugar consumption in a day								
Type of sugar consumption	Once		Twice		Three		Four	
	Female	% of Female	Male	% of Male	Female	% of Female	Male	% of Male
Liquids (like juices, tea, coffee, etc)	27	23.28%	18	21.43%	32	25.60%	42	30.66%
Liquids (like juices, tea, coffee, etc), Sticky (biscuits, chocolates, etc)	19	16.38%	8	9.52%	21	16.80%	22	16.06%
None	5	4.31%	4	4.76%	8	6.40%	18	13.14%
Solids (like normal sugar)	37	31.90%	36	42.86%	39	31.20%	27	19.71%
Solids (like normal sugar), Liquids (like juices, tea, coffee, etc)	4	3.45%	2	2.38%	2	1.60%	9	6.57%
Solids (like normal sugar), Liquids (like juices, tea, coffee, etc), Sticky (biscuits, chocolates, etc)	6	5.17%	11	13.10%	15	12.00%	13	9.49%
Solids (like normal sugar), Sticky (biscuits, chocolates, etc)	1	0.86%	2	2.38%	2	1.60%	1	0.73%
Sticky (biscuits, chocolates, etc)	17	14.66%	3	3.57%	6	4.80%	5	3.65%
<b>Grand Total</b>	<b>116</b>	<b>34.4%</b>	<b>84</b>	<b>27.8%</b>	<b>125</b>	<b>37.1%</b>	<b>137</b>	<b>45.4%</b>

Frequency of sugar consumption in a day								
Type of sugar consumption	More				None			
	Female	% of Female	Male	% of Male	Female	% of Female	Male	% of Male
Liquids (like juices, tea, coffee, etc)	14	20.59%	11	21.57%	1	3.57%	3	10.00%
Liquids (like juices, tea, coffee, etc), Sticky (biscuits, chocolates, etc)	7	10.29%	6	11.76%		0.00%		0.00%
None	1	1.47%	2	3.92%	21	75.00%	19	63.33%
Solids (like normal sugar)	13	19.12%	11	21.57%	6	21.43%	5	16.67%
Solids (like normal sugar), Liquids (like juices, tea, coffee, etc)	3	4.41%	1	1.96%		0.00%		0.00%
Solids (like normal sugar), Liquids (like juices, tea, coffee, etc), Sticky (biscuits, chocolates, etc)	19	27.94%	19	37.25%		0.00%		0.00%
Solids (like normal sugar), Sticky (biscuits, chocolates, etc)	2	2.94%		0.00%		0.00%		0.00%
Sticky (biscuits, chocolates, etc)	9	13.24%	1	1.96%		0.00%	3	10.00%
<b>Grand Total</b>	<b>68</b>	<b>20.2%</b>	<b>51</b>	<b>16.9%</b>	<b>28</b>	<b>8.3%</b>	<b>30</b>	<b>9.9%</b>

Any underlying health conditions				
	Female	% of Female	Male	% of Male
Diabetes (sugar)	5	1.48%	20	6.62%
Diabetes (sugar, Hypertension)	1	0.30%	2	0.66%
Hypertension	4	1.19%	11	3.64%
Hypotension		0.00%	2	0.66%
Migraine		0.00%	1	0.33%
None	327	97.03%	266	88.08%
<b>Grand Total</b>	<b>337</b>		<b>302</b>	

Undergone any dental treatment				
	Female	% of Female	Male	% of Male
Composite/Amalgam crown	13	3.86%	23	7.69%
Extraction	48	14.24%	44	14.72%
None	3	0.89%		0.00%
RCT and restoration	273	81.01%	229	76.59%
<b>Grand Total</b>	<b>337</b>		<b>299</b>	

Have/ had braces						
	Position of teeth in mouth		Female		Male	
	No	In a straight line	206	61.13%	203	67.22%
		Not in a straight line (crowded)	73	21.66%	49	16.23%
Yes		In a straight line	40	11.87%	30	9.93%
		Not in a straight line (crowded)	18	5.34%	20	6.62%
<b>Grand Total</b>			<b>337</b>		<b>302</b>	

White Discoloration of teeth								
Age Group	Female		% of Female		Male		% of Male	
	No	Yes	% of Female	Yes	% of Female	No	Yes	% of Male
10-20	163	56	61.98%	75.68%	48	26	20.00%	41.94%
21-30	73	14	27.76%	18.92%	85	25	35.42%	40.32%
31-50	27	3	10.27%	4.05%	85	9	35.42%	14.52%
51-65		1	0.00%	1.35%	22	2	9.17%	3.23%
<b>0</b>	<b>263</b>	<b>74</b>	<b>78.0%</b>	<b>22.0%</b>	<b>240</b>	<b>62</b>	<b>79.5%</b>	<b>20.5%</b>

Black Discoloration of teeth								
Age Group	Female		% of Female		Male		% of Male	
	No	Yes	% of Female	Yes	% of Female	No	Yes	% of Male
10-20	183	36	64.66%	66.67%	57	17	23.85%	26.98%
21-30	73	14	25.80%	25.93%	85	25	35.56%	39.68%
31-50	27	3	9.54%	5.56%	80	14	33.47%	22.22%
51-65		1	0.00%	1.85%	17	7	7.11%	11.11%
<b>Grand Total</b>	<b>283</b>	<b>54</b>	<b>84.0%</b>	<b>16.0%</b>	<b>239</b>	<b>63</b>	<b>79.1%</b>	<b>20.9%</b>

Presence of broken teeth				
Female	Female	% of Female	Male	% of Male
No	288	85.46%	235	77.81%
Yes	49	14.54%	67	22.19%
<b>Grand Total</b>	<b>337</b>		<b>302</b>	

Not fully grown teeth in mouth							
	Female				Female Total		Grand Total
Age Group	No		Yes				
10-20	140	60.1%	79	76.0%	219	65.0%	293
21-30	68	29.2%	19	18.3%	87	25.8%	197
31-50	24	10.3%	6	5.8%	30	8.9%	124
51-65	1	0.4%		0.0%	1	0.3%	25
<b>Grand Total</b>	<b>233</b>	<b>69.1%</b>	<b>104</b>	<b>30.9%</b>	<b>337</b>	<b>52.7%</b>	<b>639</b>
	Male				Male Total		
Age Group	No		Yes				
10-20	47	20.8%	27	35.5%	74	22.0%	293
21-30	79	35.0%	31	40.8%	110	32.6%	197
31-50	78	34.5%	16	21.1%	94	27.9%	124
51-65	22	9.7%	2	2.6%	24	7.1%	25
<b>Grand Total</b>	<b>226</b>	<b>67.1%</b>	<b>76</b>	<b>22.6%</b>	<b>302</b>	<b>47.3%</b>	<b>639</b>

	Female						Female Total
	More		Once		Twice		
10-20	9	4.1%	134	61.2%	76	34.7%	219
21-30	2	2.3%	57	65.5%	28	32.2%	87
31-50	2	6.7%	7	23.3%	21	70.0%	30
51-65		0.0%	1	100.0%		0.0%	1
<b>Grand Total</b>	<b>13</b>	<b>3.9%</b>	<b>199</b>	<b>59.1%</b>	<b>125</b>	<b>37.1%</b>	<b>337</b>
	Male						Male Total
Age Group	More		Once		Twice		
10-20	3	4.1%	52	70.3%	19	25.7%	74
21-30	1	0.9%	77	70.0%	32	29.1%	110
31-50	3	3.2%	58	61.7%	33	35.1%	94
51-65	1	4.2%	9	37.5%	14	58.3%	24
<b>Grand Total</b>	<b>8</b>	<b>2.6%</b>	<b>196</b>	<b>64.9%</b>	<b>98</b>	<b>32.5%</b>	<b>302</b>