

Oral Health Status of Rural and Urban Population of Gurgaon Block, Gurgaon District Using WHO Assessment Form through Multistage Sampling Technique

SAHIL HANDA¹, SUMANTH PRASAD², CHINMAYA BYALI RAJASHEKHARAPPA³,
AARTI GARG⁴, HANEET KOUR RYANA⁵, CHARU KHURANA⁶

ABSTRACT

Introduction: Oral health is an integral part of general health and well being. Poor oral health can affect a person physiologically and psychologically irrespective of age group.

Aim: To assess the oral health status and treatment needs of urban and rural population of Gurgaon Block, Gurgaon District, Haryana, India.

Materials and Methods: A descriptive cross-sectional study was conducted among 810 urban and rural subjects belonging to index age groups of 5, 12, 15, 35-44 and 65-74 years as recommended by WHO, in the city of Gurgaon, Haryana. The World Health Organization Oral Health Assessment Form (1997) was used for data collection in which clinical examination, soft and hard tissue findings as well as dentofacial anomalies were recorded. The subjects were selected by multistage random sampling and examined throughout the area by a house to house survey.

Statistical Analysis: The data was collected and subjected to analysis through SPSS 21. Chi-square was used for compilation of results.

Results: Of the total population 44.9% had dental caries with a mean DMFT of 1.61. Prevalence of periodontal diseases was 65%; 46% of the population suffered from malocclusions of which 21.19 % had the severe type. Dental fluorosis was found to be highly prevalent (46%) out of which 11.23% had moderate and 9.6% had severe type of fluorosis. Treatment was found to be required among 83% of population.

Conclusion: The dental health care needs are very high both in rural and urban areas in spite of basic facilities available in urban areas. Hence professional and administrative attention is required both in urban and rural areas. Gurgaon Block can be used as a model district to find the effectiveness of programs in bringing down the oral diseases and maintenance of the oral health of the people on a long term basis.

Keywords: Cross-sectional study, Dental health care needs, Survey

INTRODUCTION

Oral health is an integral part of general health and no individual can be considered fully healthy while there is active disease in the mouth as "Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity" [1].

The dental problems are initially painless but become chronic and destructive later, showing adverse effect on the vital organs of the body. It is now therefore become essential to make people aware of preventive and curative aspects of oral health so that quality of life of the people can be improved [2].

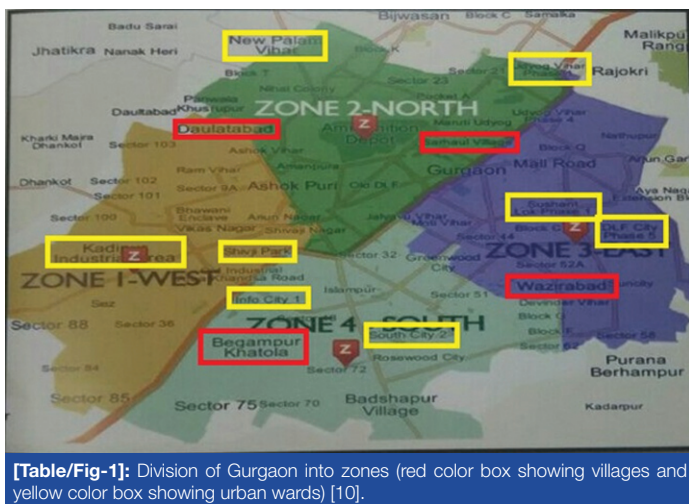
Gurgaon district covers 1215 Km² area of Haryana state divided into four zones (East, West, North And South) with a population of 15,14,085 according to 2011 census, having urban population around 68.82% and 31.18% rural population (2:1) according to 2011 census [3]. Evidence shows that there exist disparities in oral health status of urban and rural populations [4,5]. Majority of the epidemiological studies in India that have been published are focused on school children and studies done on people living in urban and rural areas covering all indexed age group appear to be fewer and limited [6,7]. Data for oral health status and treatment needs of rural population of adjacent regions like Ambala is available but information regarding people's knowledge, awareness and attitudes towards oral health and their oral health practices and treatment seeking measures in the region of Gurgaon is still lacking.

Also the areas close to Gurgaon such as Jhajjar are well known fluoride belts with fluorosis reported to be present in 50% population [8]. Thus, a survey was conducted to assess the oral health status and treatment needs, among urban and rural population of Gurgaon Block of Gurgaon District, Haryana, India.

MATERIALS AND METHODS

The study was conducted between April 2013 to September 2013. The present study was conducted among index age groups (in years)-5, 12, 15, 35-44, 65-74 as recommended by World Health Organization [9]. The study group belonged to two urban and one rural cluster from each zone of Gurgaon Block [Table/ Fig-1] [10]. All the permanent residents of Gurgaon Block in the indexed age group were included. Temporary residents and age groups other than the index age groups were excluded. Ethical clearance was obtained from the Ethical Committee of S.G.T Dental College, Hospital and Research Institute, Gurgaon and informed consent was obtained from each subject.

The sample size was estimated by "a multistage random sample survey". For the purpose of estimating the sample size, a pilot study was conducted and the minimum expected prevalence of dental caries was considered as 43.26%. The sample size was estimated to obtain the prevalence within 5% of the true value at 5% level of significance. This kind of sample design has an impact, called 'design effect' on sampling variability. As a result of this impact, the obtained sample size was multiplied by two and



[Table/Fig-1]: Division of Gurgaon into zones (red color box showing villages and yellow color box showing urban wards) [10].

the outcome was taken as the final sample size. The total of 810 sample subjects were divided in 12 clusters covering each zone of Gurgaon Block. The number of eligible subjects, registered from total of eight urban clusters were 540 and four rural clusters were 270. This was further equally divided in the age group of 5, 12, 15, 35-44 and 65-74 years respectively. Almost equal number of males and females were selected in each age group.

The identification of urban and rural clusters was done through 2001 census data. The number of urban and rural clusters was based on the ratio of 2:1 for the data of entire block.

Selection in Rural Area: Firstly we started by reaching the centre of the village, there were one or more lanes, we selected any one lane arbitrarily and then we selected households randomly on that lane. For example any 5th or 7th household having all index age group was selected and afterwards every 5th or 7th household and so on, till the completion of required number of subjects of that area.

Selection in Urban Area: In urban areas we have either Society Culture or Row Houses, so in case of societies we selected any one tower randomly from many towers. In that tower we selected a floor by lottery system for example – 5th or 7th floor, if 5 was selected then every 10, 15 or 20 floor was selected and so on, on every floor one house was selected randomly. For example 20, then 40, 60 and so on. If the desired number of subjects were not available in that tower then the next tower was selected randomly.

In case of Row Houses, we reached the centre of the sector which had many lanes, we selected one lane arbitrarily and on that very lane we selected households randomly. For example any 5th or 7th household, if say 5 was selected then every 5, 10, 15, 20.... in multiples of 5 so on was selected. Examination of index groups in each house hold in that lane was done till the completion of required number.

As children aged 5 years and 12 years were not easily available for oral health check up during the house to house survey, a school camp was organized at a prominent school of that particular village and urban ward and 5 years and 12 years old children of that particular school and nearby areas were screened.

Portable equipments were used to ensure ease of transportation to the examination sites.

Standardization exercises were conducted prior to the survey with following objectives:

- To familiarize the survey and survey form to the examiner and the recorder.
- To ensure uniform interpretation, understanding and application of the codes and criteria for the various diseases and conditions to be observed and recorded by the examiner.
- To ensure the consistency of examiner and recorder.

Only one examiner and one recorder were recruited for data collection during the entire survey. Practice sessions on a group of 30 subjects was carried out once daily on two days per week so as to calibrate for reproducibility. The results of the two examinations were compared and a consistency of 90% was observed.

Examination of a child and an adult usually took about 5-10 minutes and 15-20 minutes respectively. Considering all the miscellaneous factors for conducting the procedure, it was determined that examination of only 10 subjects could be carried out in a day. Hence to examine a sample of 810 subjects a total of 81 working days (six months) was allotted for the survey.

For data collection, all the lanes of the village and the hamlets were numbered in serial order in clockwise direction. Maps of census enumeration blocks in the urban areas were obtained from Municipal Corporation of Gurgaon.

A two-stage selection of the starting point was done using a random number table. In the first stage, it was decided whether to start the survey from the main village or the hamlet. In the second stage, the starting lane was selected. In each lane, a random house was chosen (e.g., every 5th or 7th) and then multiples of 5 or 7 and so on.

In case of non-availability of the subjects, the registration was continued in the geographically adjacent cluster on the same day till the requisite numbers were registered. The first household at the North West end of the selected lane was taken as the starting point for registration. The registration then continued into the next higher serial order lanes.

Duplicate examinations were conducted for the 5% of the sample at the beginning, about half-way through the survey, and again at the end of the survey to ensure the reliability of the examiners.

An adequate infection control was maintained throughout the survey. The examinations were carried out by wearing disposable masks and gloves to reduce the risk of cross-infection.

The areas having adequate illumination with natural light for conducting examination was chosen and any disturbance was avoided to make sure that proper examination and recording was done. A daily record of subjects was kept including personal particulars of each subject.

For the examination, the subject was seated on a chair. The examiner stood behind the subject. The recorder was seated in front of the subject close to the examiner so as to be able to hear his instructions clearly and record findings accurately.

Oral hygiene status was assessed using Simplified Oral Hygiene Index (OHI-S) [9]. Dentition status and treatment needs, enamel opacities, oral mucosal lesions, Community Periodontal Index (CPI) and dentofacial anomalies in children of 5 and 12 years age group were assessed based on WHO proforma 1997 [9]. Prevalence of periodontal disease among study participants was assessed by highest CPI score in each age group.

STATISTICAL ANALYSIS

Means of decayed, missing, filled teeth and their components along with oral hygiene scores in each age group were calculated and Chi-Square test was used to analyze the data. All the data collected above was subjected to statistical analysis through SPSS 21.

RESULTS

The present study included 540 urban and 270 rural subjects (2:1) and were divided equally among age groups of 5, 12, 15, 35-44, 65-74 years giving a total of 810 [Table/Fig-2]. Rural population constituted of more non working population (61.1%) as compared to the non working urban population (56%) of area [Table/Fig-3,4].

		Urban	Rural
Age Group	5 yrs	108	54
	12 yrs	108	54
	15 yrs	108	54
	35-44 yrs	108	54
	65-74 yrs	108	54
	Total	540	270

[Table/Fig-2]: Distribution by age and location.

It was seen that 81.5% (440) of urban and 30.6% (83) of rural respondents in the sample were using tooth brush and tooth paste whereas 18% (97) and 49.7% (134) of urban and rural areas respectively used tooth paste or powder with their finger. The use of charcoal, sand, snuff powder, etc., as oral hygiene aids are still moderately prevalent in the rural areas (11.8%). Data on deleterious habits are present in [Table/Fig-5].

Regarding clinical assessment, it is observed that 1.6% had commissural lesions and 1.4% had lesions on vermillion border

		Occupation							Total
		Unemployed	Labourer	Caste Occupation	Business	Independent Profession	Cultivation	Service	
Age	5 yrs	54	0	0	0	0	0	0	54
	12 yrs	50	0	4	0	0	0	0	54
	15 yrs	23	15	16	0	0	0	0	54
	35-44 yrs	1	12	06	0	0	35	0	54
	65-74 yrs	37	10	0	0	0	7	0	54
Total		165 (61.1%)	37 (13.7%)	26 (9.6%)	0	0	42 (15.55%)	0	270

[Table/Fig-3]: Distribution of total rural sample on the basis of occupation.

		Occupation							Total
		Profession	Semi Profession	Clerical, Shop Owner, Farmer	Skilled Worker	Semi Skilled Worker	Unskilled Worker	Unemployed	
Age	5 yrs	0	0	0	0	0	0	108	108
	12 yrs	0	0	4	3	1	0	100	108
	15 yrs	0	7	3	3	0	0	95	108
	35-44 yrs	33	32	9	14	19	1	0	108
	65-74 yrs	31	47	11	9	8	2	0	108
Total		64 (11.8)	86 (15.9%)	27 (5%)	29 (5.4%)	28 (5.1%)	3 (0.5)	303 (56%)	540

[Table/Fig-4]: Distribution of total urban sample on the basis of occupation.

Type of Habit	Urban		Rural		Total	
	No	%	No	%	No	%
No Habit	427	79	159	59	586	72.3
Smokeless (Pan)	54	10	51	19	105	12.9
Smoking	39	7.3	22	8	61	7.5
Smoking+Smokeless (Pan)	3	0.6	8	2.9	11	1.36
Alcohol	7	1.2	18	6.6	25	3
Alcohol+Tobacco (in both forms)	10	1.8	12	4.4	22	2.7
Total	540	100	270	100	810	100

[Table/Fig-5]: Number and percentage of subjects with adverse habits.

whereas 95.4% had no extra oral lesions both in urban and rural areas [Table/Fig-6]. The data regarding temporomandibular joint disorders are presented in [Table/Fig-7,8].

Healthy oral mucosal condition was evident in 80.62% and only 10.5% showed the presence for ulceration, candidiasis and 8.8% of the population suffered from leukoplakia and OSMF. Statistically significant results ($p < 0.05$) were observed among the population on the basis of leukoplakia, lichen planus, candidiasis [Table/Fig-9,10].

The overall prevalence of enamel opacities was 49%, in which high percentage of demarcated (33.3%) and diffuse opacity (40.7%)

Location			Extra Oral Examination						Total
			Normal Extra Oral Appearance	Ulceration, Sores, Erosions and Fissures (Head, Neck and Limbs)	Ulceration, Sores, Erosions and Fissures (Nose, Cheek and Chin)	Ulceration, Sores, Erosions and Fissures (Commissures)	Ulceration, Sores, Erosions and Fissures (Vermillion Border)	Enlarged Lymph Nodes (Head and Neck)	
Urban	Age	5 yrs	98 (90.74%)	1 (0.92%)	0	3 (2.77%)	3 (2.77%)	3 (2.77%)	108
		12 yrs	103 (95.37%)	0	1 (0.92%)	1 (0.92%)	1 (0.92%)	2 (1.85%)	108
		15 yrs	105 (97.22%)	0	1 (0.92%)	1 (0.92%)	1 (0.92%)	0	108
		35-44 yrs	104 (96.29%)	0	0	3 (2.77%)	1 (0.92%)	0	108
		65-74 yrs	106 (98.14%)	0	0	1 (0.92%)	1 (0.92%)	0	108
	Total		516 (95.55%)	1 (0.18%)	2 (0.37%)	9 (1.66%)	7 (1.29%)	5 (0.92%)	540
Rural	Age	5 yrs	51 (94.44%)	0	1 (1.85%)	1 (1.85%)	0	1 (1.85%)	54
		12 yrs	52 (96.29%)	1 (1.85%)	0	1 (1.85%)	0	0	54
		15 yrs	53 (98.14%)	0	0	1 (1.85%)	0	0	54
		35-44 yrs	49 (90.74%)	0	1 (1.85%)	1 (1.85%)	3 (5.55%)	0	54
		65-74 yrs	52 (96.29%)	1 (1.85%)	0	0	1 (1.85%)	0	54
	Total		257 (95.18%)	2 (0.74%)	2 (0.74%)	4 (1.48%)	4 (1.48%)	1 (0.37%)	270
Urban and Rural Total			773 (95.36%)	3 (0.46%)	4 (0.55%)	13 (1.57%)	11 (1.4%)	6 (0.6%)	810

[Table/Fig-6]: Number and percentage of subjects with normal extra oral appearance, ulceration, sores, erosion or fissures by site and enlarged lymph nodes (head and neck) of the face and jaws.

Location	Temporomandibular Symptoms			Total
		Not Present	Present	
Age	5 yrs	108 (100%)	0	108
	12 yrs	107 (99.07%)	1 (0.92%)	108
	15 yrs	106 (98.4%)	2 (1.85%)	108
	35-44 yrs	104 (96.29%)	04 (3.70%)	108
	65-74 yrs	103 (95.37%)	5 (4.63%)	108
Total		528 (97.77%)	12 (2.22%)	540
Age	5 yrs	54 (100%)	0	54
	12 yrs	54 (100%)	0	54
	15 yrs	54 (100%)	0	54
	35-44 yrs	52 (96.29%)	2 (3.70%)	54
	65-74 yrs	49 (90.74%)	5 (9.25%)	54
Total		263 (97.40%)	7 (2.59%)	270
Urban and Rural Total		791 (97.6%)	19 (2.4%)	810

[Table/Fig-7]: Number and percentage of subjects with TMJ symptoms.

Location	Healthy Oral Mucosa		Malignant Tumor (Oral Cancer)		Leukoplakia, Lichen planus		Ulceration, Candidiasis, Abscess and Others	
	No	%	No	%	No	%	No	%
Vermilion Border	653	80.6	-	-	-	-	-	-
Lips	-	-	-	-	24	2.9	-	-
Sulci	-	-	-	-	-	-	-	-
Buccal mucosa	-	-	-	-	24	2.9	15	1.9
Floor of Mouth	-	-	-	-	14	1.7	10	1.2
Tongue	-	-	-	-	10	1.2	50	6.1
Alveolar Ridge/ Gingival	-	-	-	-	-	-	10	1.2
Total	653	80.6	-	-	72	8.88	85	10.5

[Table/Fig-10]: Number and percentage of subjects with malignant tumour (oral cancer), leukoplakia, lichen planus, ulceration, candidiasis, abscess and other conditions by location.

Location			Clicking		Tenderness		Reduced Jaw Opening		Total
	Age		Not Present	Present	Not Present	Present	Not Present	Present	
Urban	Age	5 yrs	108 (100%)	0	108 (100%)	0	108 (100%)	0	108
		12 yrs	108 (100%)	0	107 (99.07%)	1 (0.92%)	108 (100%)	0	108
		15 yrs	106 (98.14%)	2 (1.85%)	108	0	108 (100%)	0	108
		35-44 yrs	106 (98.14%)	2 (1.85%)	106 (98.14%)	2 (1.85%)	107 (99.07%)	1 (0.92%)	108
		65-74 yrs	104 (96.29%)	4 (3.70%)	107 (99.07%)	1 (0.92%)	108 (100%)	0	108
	Total		532 (98.51%)	8 (1.48%)	536 (99.25%)	4 (0.74%)	539 (99.81%)	1 (0.18%)	540
Rural	Age	5 yrs	54 (100%)	0	54 (100%)	0	54 (100%)	0	54
		12 yrs	54 (100%)	0	54 (100%)	0	54 (100%)	0	54
		15 yrs	54 (100%)	0	54 (100%)	0	54 (100%)	0	54
		35-44 yrs	53 (98.14%)	1 (1.85%)	54 (100%)	0	53 (98.14%)	1 (1.85%)	54
		65-74 yrs	51 (94.44%)	3 (5.55%)	52 (96.29%)	2 (3.7%)	54 (100%)	0	54
	Total		266 (98.51%)	4 (1.48%)	268 (99.25%)	2 (0.74%)	269 (99.63%)	1 (0.37%)	270
Urban and Rural Total			798 (98.51%)	12 (1.48%)	804 (99.25%)	6 (0.74%)	808 (99.72%)	2 (0.27%)	810

[Table/Fig-8]: Number and percentage of subjects with TMJ signs.

Location and Age		Healthy Oral Mucosa		Malignant Tumor (Oral Cancer)		Leukoplakia, Lichen Planus		Ulceration, Candidiasis, Abscess and Others	
		No	%	No	%	No	%	No	%
U	5 yrs	100	92.6	0	0	0	0	8	7.4
R	12 yrs	97	89.8	0	0	1	0.9	10	9.3
B	15 yrs	108	100	0	0	0	0	0	0
A	35-44 yrs	66	61.11	0	0	19	17.6	23	21.3
N	65-74 yrs	88	81.5	0	0	20	18.5	0	0
Total		459	85	0	0	40	7.4	41	7.6
R	5 yrs	54	100	0	0	0	0	0	0
U	12 yrs	33	61.11	0	0	0	0	21	38.88
R	15 yrs	33	61.11	0	0	9	16.66	12	22.22
A	35-44 yrs	36	66.66	0	0	7	12.9	11	20.3
L	65-74 yrs	38	70.3	0	0	16	29.6	0	0
Total		194	71.9	0	0	32	11.9	44	16.3
Urban and Rural Total		653	80.62	0	0	72	8.88	85	10.5

Chi Square Test used, p values comes out to be

Comparison of other conditions in rural and urban subjects	
Leukoplakia, lichen planus	0.03*
Ulceration, Candidiasis, Abscess and Others	0.04*

[Table/Fig-9]: Number and percentage of subjects with healthy oral mucosa, malignant tumour (oral cancer), leukoplakia, lichen planus, ulceration, candidiasis, abscess and other conditions.

was found to be present in rural population at age of 12 and 35-44 yrs respectively whereas hypoplasia (23.2%) occurred higher in urban people (15 years) [Table/Fig-11]. Statistical significance ($p < 0.05$) was observed on the basis of diffuse opacity among both population.

It was seen that 46% of the population had dental fluorosis of which 11.23% and 9.6% reported to have moderate degree and severe degree of fluorosis respectively. For moderate fluorosis the results were found to be highly significant ($p < 0.01$) [Table/Fig-12].

It was seen that 65% of total sample population was periodontally affected [Table/Fig-13,14].

It was seen that overall prevalence of dental caries was 44.9%, missing due to caries was 29.4% and filled teeth was 7.6% [Table/Fig-15], having mean DMFT of 1.61 with the highest mean of 2.49 among urban people in the age group of 35-44 yrs [Table/Fig-16]. For decayed tooth, results were found to be statistically significant ($p < 0.05$). Of the total 33.2% respondents required one or two tooth surfaces to be restored, 20.8% were in need of pulp therapy and 19.6% required extractions [Table/Fig-17].

A total of 5.06% had some kind of dental prosthesis [Table/Fig-18] and the requirement of dental prosthesis is shown in [Table/Fig-19,20].

Almost 21.19% subjects suffered from handicapped malocclusion. It was observed that 45 people of urban area and 16 people of rural area of age group 35-44 years reported to have handicapped malocclusion [Table/Fig-21,22].

Location and Age		Normal		Demarcated Opacity		Diffuse Opacity		Hypoplasia		Not Recorded	
		No	%	No	%	No	%	No	%	No	%
U	5 yrs	21	19.4	23	21.3	03	2.7	03	2.7	58	53.7
R	12 yrs	48	44.4	22	20.4	12	11.1	23	21.3	3	2.7
B	15 yrs	32	29.6	30	27.8	15	13.9	25	23.2	6	5.55
A	35-44 yrs	62	57.4	22	20.4	19	17.6	2	1.9	3	2.7
N	65-74 yrs	51	47.2	23	21.3	18	16.6	16	14.9	0	0
Total		214	39.6	120	22.2	67	12.4	69	12.7	70	12.9
R	5 yrs	15	27.7	11	20.4	4	7.4	1	1.9	23	42.6
U	12 yrs	18	33.3	18	33.3	9	16.6	8	14.9	1	1.9
R	15 yrs	31	57.4	11	20.4	6	11.1	5	9.3	1	1.9
A	35-44 yrs	19	35.2	7	12.9	22	40.7	6	11.1	0	0
L	65-74 yrs	20	37	17	31.5	13	24	2	3.7	2	3.7
Total		103	38.1	64	23.7	54	20	22	8.15	27	10
Grand Total		317	39.1	184	22.7	121	14.9	91	11.2	97	11.93

Chi Square Test is used , p value comes out to be -

Comparison of enamel opacities or hypoplasia in rural and urban subjects.	
Demarcated Opacity	1.2
Diffuse Opacity	0.02*
Hypoplasia	0.32

[Table/Fig-11]: Number and percentage of subjects with enamel opacities or hypoplasia by condition and by number of teeth affected.

* Statistically significant (p<0.05)

Location			Fluorosis						Total
			Normal	Questionable	Very Mild	Mild	Moderate	Severe	
Urban	Age	5 yrs	80(74.07%)	0	6(5.55%)	22(20.37%)	0	0	108
		12 yrs	68(62.9%)	9(8.33%)	6(5.55%)	7(6.48%)	12(11.11%)	6(5.55%)	108
		15 yrs	66(61.11%)	3(2.77%)	16(14.81%)	15(13.88%)	2(1.85%)	6(5.556%)	108
		35-44 yrs	43(39.8%)	13(12.03%)	8(7.40%)	22(20.37%)	10(9.2%)	12(11.11%)	108
		65-74 yrs	61(56.5%)	1(0.92%)	2(1.85%)	12(11.11%)	12(11.1%)	20(18.5%)	108
	Total	318 (58.88%)	26(4.81%)	38(7.03%)	78(14.44%)	36(6.6%)	44(8.15%)	540	
Rural	Age	5 yrs	46(85.18%)	0	2(3.70%)	6(11.11%)	0	0	54
		12 yrs	22(40.7%)	3(5.55%)	3(5.55%)	8(14.81%)	12(22.22%)	6(11.11%)	54
		15 yrs	26(48.14%)	0	5(9.25%)	7(12.96%)	11(20.37%)	5(9.25%)	54
		35-44 yrs	9(16.66%)	5(9.25%)	3(5.55%)	6(11.11%)	20(37%)	11(20.37%)	54
		65-74 yrs	16(29.6%)	10(18.51%)	4(7.40%)	0	12(22.22%)	12(22.2%)	54
	Total	119(44%)	18(6.66%)	17(6.29%)	27(10%)	55(20.37%)	34(12.6%)	270	
Urban and Rural Total			437(53.95)	44(5.4%)	55(6.66%)	105(12.9%)	91(11.23%)	78(9.6%)	810

Chi Square Test is used and p value comes out to be

Comparison of dental fluorosis in rural and urban subjects	
Questionable	0.97
Very Mild	0.81
Mild	0.02*
Moderate	0.006**
Severe	1.47

[Table/Fig-12]: Number and percentage of subjects with dental fluorosis, by severity.

* Statistically significant (p<0.05) ** Highly significant (p<0.01)

Location and Age		Healthy Periodontium	Bleeding	Calculus	Shallow Pockets (4-5mm)	Deep Pockets (>6mm)
URBAN	12 yrs	98 (90.74%)	2 (1.85%)	8 (7.40%)	-	-
	15 yrs	49 (45.37%)	20 (18.5%)	32 (29.62%)	2 (1.85%)	5 (4.63%)
	35-44 yrs	06 (5.55%)	30 (27.77%)	40 (37%)	13 (12%)	19 (16.66%)
	65-74 yrs	00	18 (16.66%)	50 (46.29%)	10 (9.25%)	30 (27.77%)
Total		153 (35.41%)	70 (16.2%)	130 (30%)	25 (6.94%)	54 (12.5%)
RURAL	12 yrs	49 (90.74%)	2 (3.70%)	3 (5.55%)	-	-
	15 yrs	19 (35.18%)	10 (18.51%)	18(33.33%)	5(9.25%)	2(3.70%)
	35-44 yrs	6 (11.11%)	16(29.62%)	22(40.74%)	5(9.25%)	5(9.25%)
	65-74 yrs	0	4(7.40%)	26(48.14%)	3(5.55%)	21(38.8%)
Total		74 (34.25%)	32 (14.8%)	69 (31.94%)	13 (6%)	28 (12.96%)
Urban and Rural Total		227 (35%)	102 (15.74%)	199 (30.70%)	38 (5.86%)	82 (12.65%)

[Table/Fig-13]: Percentage of subjects with healthy periodontal tissues, bleeding, calculus, shallow pockets (4-5mm) and deep pockets (>6mm).

Location and Age		L0		L1		L2		L3		L4	
		No	%	No	%	No	%	No	%	No	%
URBAN	15 yrs	49	45.4	37	34.3	13	12	5	4.63	4	3.7
	35-44 yrs	48	44.4	33	30.5	17	15.7	8	7.4	2	1.8
	65-74 yrs	55	50.9	16	14.8	17	15.7	10	9.25	10	9.25
Total		152	46.9	86	26.5	47	14.5	23	7	16	4.9
RURAL	15 yrs	14	25.9	27	50	8	14.8	3	5.5	2	3.7
	35-44 yrs	12	22.2	24	44.4	3	5.5	5	9.25	10	18.5
	65-74 yrs	12	22.2	8	14.8	5	9.25	12	22.2	17	31.4
Total		38	23.4	59	36.4	16	9.87	20	12.3	29	17.9
Urban and Rural Total		190	39	145	29.8	63	12.9	43	8.8	45	9.3

[Table/Fig-14]: Number and percentage of subjects with loss of gingival attachment on the basis of the score obtained.

Location			Affected by Caries	Missing due to Caries	Filled Teeth
Urban	Age	5 yrs	36(33.33%)	12(11.11%)	9(8.33%)
		12 yrs	59(54.63%)	20(18.51%)	11(10.1%)
		15 yrs	62(57.40%)	13(12.03%)	10(9.25%)
		35-44 yrs	50(46.29%)	55(50.92%)	6(5.55%)
		65-74 yrs	44(40.74%)	33(30.55%)	8(7.4%)
	Total		251(46.48%)	133(34.63%)	44(8.14%)
Rural	Age	5 yrs	22(40.74%)	06(11.11%)	6(11.11%)
		12 yrs	27(50%)	10(18.51%)	3(5.55%)
		15 yrs	30(55.55%)	08(14.81%)	6(11.11%)
		35-44 yrs	22(40.74%)	24(44.44%)	3(5.55%)
		65-74 yrs	16(29.63%)	17(31.48%)	1(1.85%)
	Total		117(43.33%)	65(24.07%)	19(7.03%)
Urban and Rural Total			368(44.9%)	198(29.4%)	63(7.6%)

Chi Square Test is used and p value is calculated

Comparison of decayed, missing and filled teeth in rural and urban subjects	
Affected by caries	0.03*
Missing due to caries	0.45
Filled Teeth	0.29

[Table/Fig-15]: Number and percentage of subjects with decayed, missing and filled teeth.
* Statistically significant (p<0.05)

Location	Age	Decayed	Missing due to Caries	Filled	DMFT
URBAN	5 yrs	0.6759	0.1667	0.0833	0.9259
	12 yrs	0.8056	0.6389	0.1481	1.6
	15 yrs	0.8333	0.2685	0.1574	1.2593
	35-44 yrs	0.8704	1.5556	0.0648	2.49
	65-74 yrs	0.9167	1.037	0.1481	2.10
	Total	0.8204	0.7333	0.1204	1.67
RURAL	5 yrs	0.7963	0.1296	0.1296	1.036
	12 yrs	0.7407	0.5	0.0556	1.29
	15 yrs	0.8519	0.3704	0.1667	1.38
	35-44 yrs	0.6296	1.0741	0.0926	1.78
	65-74 yrs	0.4074	1.5556	0.0556	2
	Total	0.6852	0.7259	0.1	1.5
TOTAL	5 yrs	0.716	0.1543	0.0988	0.95
	12 yrs	0.784	0.5926	0.1173	1.31
	15 yrs	0.8395	0.3025	0.1605	1.2901
	35-44 yrs	0.7901	1.3951	0.0741	2.25
	65-74 yrs	0.7469	1.2099	0.1173	2.05
	Urban and Rural Total	0.7753	0.7309	0.1136	1.61

[Table/Fig-16]: Mean number of decayed, missing and filled teeth.

Location and Age		Preventive/Sealant Care		1/2 Surface Filling		Crown/ Veneer		Pulp Care		Extraction		Other Treatment	
		No	%	No	%	No	%	No	%	No	%	No	%
U	5 yrs	22	10.1	88	40.7	0	0	6	5.5	10	9.25	1	0.9
R	12 yrs	2	0.9	91	42.1	10	4.6	30	27.7	15	13.8	0	0
B	15 yrs	0	0	88	40.7	12	5.55	10	9.25	18	16.6	0	0
A	35-44 yrs	0	0	54	25	20	9.25	30	27.7	25	23.1	0	0
N	65-74 yrs	0	0	87	40.3	10	4.6	20	18.5	30	27.7	0	0
Total		24	2.2	408	37.7	52	4.8	96	17.7	98	18.1	1	0.2
R	5 yrs	14	12.9	50	46.3	0	0	3	5.5	5	9.25	1	1.8
U	12 yrs	2	1.9	39	36.1	0	0	23	42.5	7	12.9	0	0
R	15 yrs	0	0	42	38.8	2	1.9	19	35.1	9	16.6	0	0
A	35-44 yrs	0	0	14	12.9	20	18.5	20	37	10	18.5	0	0
L	65-74 yrs	0	0	10	9.25	10	9.25	8	18.5	30	55.5	0	0
Total		16	2.9	155	28.7	32	5.9	73	27	61	22.6	1	0.4
Urban and Rural Total		40	2.6	563	33.2	84	5.4	169	20.8	159	19.6	1	0.3

[Table/Fig-17]: Number and percentage of subjects requiring preventive/sealant care, 1/2 surface filling, crown/veneer, pulp care, extraction and other treatment.

It was seen that there was presence of conditions like leukoplakia, lichen planus and oral submucous fibrosis in 8.88% of the total sample subjects and 15.1% of the total sample had pain or infection with high predilection in elderly people where it was 35.8%. Only 2% of children aged five years were found to have infection or pain. Out of the total, 45.03% and out of which 75.5% of rural elderly population had to be referred for immediate care.

This referral was least among urban children in the 5 year age group [Table/Fig-23].

DISCUSSION

The importance of oral health component is well recognized in promotion of general health since many oral health conditions are reflected in systemic diseases and vice versa. Oral health remains

Location		Prosthetic Status Upper		Prosthetic Status Lower		Total
		Prosthesis Absent	Prosthesis Present	Prosthesis Absent	Prosthesis Present	
Urban	12 yrs	108 (100%)	0	108 (100%)	0	108
	15 yrs	108 (100%)	0	108 (100%)	0	108
	35-44 yrs	91 (84.25%)	17 (15.74%)	85 (78.70%)	23 (21.29%)	108
	65-74 yrs	103 (95.37%)	5 (13.88%)	102 (94.44%)	6 (5.55%)	108
Total		410 (94.90%)	22 (5.093%)	403 (93.28%)	29 (6.71%)	432
Rural	12 yrs	54 (100%)	0	54 (100%)	0	54
	15 yrs	54 (100%)	0	54 (100%)	0	54
	35-44 yrs	44 (81.48%)	10 (18.51%)	49 (90.74%)	5 (9.25%)	54
	65-74 yrs	53 (98.14%)	1 (1.85%)	50 (92.59%)	4 (7.40%)	54
Total		205 (94.90%)	11 (5.09%)	207 (95.83%)	9 (4.16%)	216
Urban and Rural Total		615 (94.90%)	33 (5.09%)	610 (94.5%)	38 (5.4%)	648

[Table/Fig-18]: Number and percentage of subjects with prosthetic status upper and lower jaw.

Location		Prosthetic Needs of Upper Jaw			
		One unit Prosthesis	Multiunit Prosthesis	Combination of Prosthesis (more than one prosthesis)	Full Dentures
URBAN	35-44 yrs	06(5.55%)	2(1.85%)	1(0.92%)	2(1.8%)
	65-74 yrs	02(1.85%)	10(9.85%)	1(0.92%)	35(32.4%)
Total		08(3.70%)	12(5.55%)	3(1.38%)	37(17.1%)
RURAL	35-44 yrs	5(9.25%)	0	0	1(1.8%)
	65-74 yrs	0	5(9.25%)	1(1.85%)	18(33.33)
Total		5(4.63%)	5(4.63%)	1(0.92%)	19(17.5%)
Urban and Rural Total		13(4.17%)	17(5.09%)	4(1.15%)	56(17.3%)

[Table/Fig-19]: Number and percentage of subjects with upper prosthetic needs.

Location		Prosthetic Need of Lower Jaw			
		One Unit Prosthesis	Multi Unit Prosthesis	Combination. of prosthesis	Full Dentures
URBAN	35-44 yrs	13(12.03%)	2(1.85%)	0	0
	65-74 yrs	1(0.92%)	10(9.25%)	3(2.77%)	35(32.4%)
Total		14(6.48%)	12(5.55%)	3(1.38%)	35(16.2%)
RURAL	35-44 yrs	1(1.85%)	0	1(1.85%)	1(1.85%)
	65-74 yrs	0	5(9.25%)	4(7.40%)	25(46.3%)
Total		1(0.92%)	5(4.6%)	5(4.63%)	26(24%)
Urban and Rural Total		15(3.7%)	15(4.16%)	8(3%)	61(20%)

[Table/Fig-20]: Number and percentage of subjects with lower prosthetic needs.

Dental Aesthetic Score	Type of Malocclusion	Number	%
Less than 25	No Malocclusion	261	53.7%
26-30	Definite Malocclusion	79	16.25%
31-35	Severe Malocclusion	43	8.8%
>35	Handicapped Malocclusion	103	21.19%

[Table/Fig-21]: Number and percentage of subjects according to type of malocclusion and Dental Aesthetic Score.

low priority area particularly in developing countries due to other basic needs such as food, clothing, shelter and medical facilities.

The present survey findings show that oral conditions of the population of Gurgaon are neglected and are alarming.

A study done by Narasimhan D et al., in Dakshina Kannada Population showed that 89% of the population used tooth brush along with toothpaste as oral hygiene method and only 11% population used other means of cleaning teeth [11]. The present study showed a much lesser population using toothbrush and toothpaste (65%).

Location and Age		Less than 25 No Malocclusion	26-30 Definite Malocclusion	31-35 Severe Malocclusion	>35 Handicapped Malocclusion
		URBAN	12 yrs	60	19
15 yrs	78		12	8	10
35-44 yrs	39		13	11	45
Total		177(54.6%)	44(13.6%)	29(8.9%)	74(22.8%)
RURAL	12 yrs	26	16	3	09
	15 yrs	34	11	05	04
	35-45 yrs	24	08	06	16
Total		84(51.9%)	35(21.6%)	14(8.6%)	29(17.9%)
Urban and Rural Total		261(53.7%)	79(16.25%)	43(8.8%)	103(21.19%)

[Table/Fig-22]: Number of subjects with dentofacial anomalies, by level of severity.

Location and Age		Life-Threatening Condition	Pain or Infection	Referrals
URBAN	5 yrs	0	1.8	1.8
	12 yrs	0.9	18.5	66.3
	15 yrs	0	18.5	42.9
	35-44 yrs	17.6	3.6	42.9
	65-74 yrs	18.5	25.2	59.4
Total		7.4	13.5	42.66
RURAL	5 yrs	0	2.1	2.6
	12 yrs	0	20.2	68.6
	15 yrs	16.66	20.2	45.2
	35-44 yrs	12.9	5.5	45.1
	65-74 yrs	29.6	35.8	75.5
Total		11.9	16.7	47.4
Urban and Rural Total		8.88	15.1	45.03

[Table/Fig-23]: Percentage of subjects with life threatening condition, pain or infection and referrals.

It was seen that there was presence of commissural lesions (1.6%) and 1.4% lesions on the vermillion border of total population. When compared to the national average (10.3%) overall, the Gurgaon population had a lower prevalence with 4.6% of extra-oral lesions [2].

It was observed that the prevalence of TMJ symptoms was 2.43% with clicking of TMJ (1.48%) being the more common one which was contrary to a study conducted by Gesch et al., in which half of the subjects (49.9%) had one or more clinical signs of TMD [12]. The difference may be attributed to distinction in the target population and the index used for TMJ examination. Tooth loss and prolonged edentulism may be mainly responsible for these temporomandibular joint problems.

Fortunately, no oral cancer lesions were detected in the total sample although national oral cancer average is 0.3% [2]. Although in a recent study done by Narwal et al., at an institution in Haryana, out of the suspected 749 cases for which biopsy was done, 130 were diagnosed with oral cancer [13].

It is relevant to note that in our study 49% of both rural and urban populations had enamel opacities which was contrary to the study done by Veerasha KL et al., on 12-15 yr old school students in Ambala district where 30.2% prevalence was seen [14]. Although in our study urban subjects (39.6%) had overall higher prevalence than rural subjects (38.1%) contrary to the National Survey [2].

Fluorosis was observed in 46% of the population having DMFT 1.6 whereas at national level dental fluorosis stands at 12% showing DMFT 5.8 [2]. A study done to check dental fluorosis in the children of Sarada Tehsil of Udaipur district by Mehta DN revealed the prevalence to be 69.84%, a study done by Chinmaya B.R, Shaikh Hyder Ali K.H et al., on oral health status in Chitradurga

district, Karnataka revealed fluorosis in about 34% of population [15,16]. Hence, it may be assumed that the moderate to high level of fluoride in this region might be responsible for deviating from the national values of fluorosis and DMFT. Many studies have proved that dental caries decrease with increasing fluorosis [17-19]. As Gurgaon Block is considered as natural fluoridated area, high prevalence of fluorosis could be due to the presence of fluoride in ground water and usually most of the population in the rural area use ground water for drinking due to non-availability of a central water supply. A separate study is required to confirm the exact relation between fluorosis and its prevalence in this area.

Periodontal disease present in our study was 65% which is less when compared to national survey (89%) and also from a study conducted by Chinmaya B.R et al., on oral health status of population of Chitradurga district, Karnataka in which prevalence was 80% [16]. The loss of gingival attachment was found to be more (61%) when compared to national survey (33.8%) [2]. Again, high prevalence of poor oral hygiene, traditional method of cleaning of teeth, ignorance and indulgence in adverse habits may be the major risk factor for the development of periodontal disease among the Gurgaon population.

Overall prevalence of caries among children was 54.6% in urban and 50.2% in rural areas which is comparable to the national survey (53%) [2]. The mean DMFT of our study was found to be less (1.6) when compared to national survey [2]. The very low DMFT levels of 1.61 in present study may be due to the type of diet and availability of slightly high fluoride levels in drinking water. The decayed teeth accounted for the greatest percentage of total DMFT/dmft value. This is in accordance with various other studies [20-24]. This may be attributed to lack of awareness, neglect, lack of motivation, lack of availability of dental facilities or may be due to economic constraints. However the poor oral hygiene practices, negligence and deleterious habits might be responsible for plaque and calculus depositions and destructive periodontitis. Hence, there is also a high prevalence of missing teeth in the population. This high prevalence may be due to the susceptibility of periodontally affected teeth to the caries promoting environment and neglect of oral hygiene in these areas. Preventive approaches seem to be a viable alternative to tackle the overwhelming problem of dental caries and other oral diseases. Screening for dental caries and its sequelae should be included in school health program.

Overall requirement of treatment need of dental caries in our study was less as compared to the national survey, due to difference in mean of DMFT. The presence of prosthetic status in the sample was 5.09% for upper and 5.4% for lower jaw which was much better than the national average of 2.7% in upper and 3.3% in lower jaw respectively [2]. Therefore, requirement of prosthetic needs found to be less when compared to the national survey and also from a study conducted by Kumar A et al., [25].

Malocclusion seems to be very high at 46% as compared to national level of 17% which was contrary to a study done on North Indian adolescent population in 2013 in which it was 52.7% [2,26]. Malocclusion was reported to be 64% in a study by Haralur SB et al., among Saudi sub population [27]. Severe or physically handicapped malocclusions was seen in 21.19% of sample which was contrary to 10% at national level, 2.75% in a study done by Chinmaya BR et al., although marginal difference was seen in a study done on Saudi sub population by Haralur SB et al., in which it was observed to be 22.8% [26,27]. Though these comparisons with the national level cannot be justified (as there are large interstate variations) there is high requirement of orthodontic treatment in the population.

Referral care for immediate attention were seen in 45% of the total population, which was much more than the national average of 0.6% [2]. Though the comparison of this situation with national level is not feasible, it is striking to note neglect of severe conditions.

LIMITATION

Our study can not be generalized over other blocks/districts, as there are differences in culture, lifestyle, health and hygiene practices and geographical variations. Present study was a cross-sectional study, a lot more can be explored by conducting longitudinal studies.

CONCLUSION

This epidemiological survey has provided baseline information to underpin the implementation of oral health programmes. In light of the high treatment needs of the study population, the health policy that emphasizes oral health promotion and prevention would seem more advantageous in addition to traditional curative cure. Furthermore, more research is required involving longitudinal study on the same target population impinging the risk factors involved in the causation of oral disease. Gurgaon Block can be used as a model, to find the effectiveness of these programs in bringing down the oral diseases and maintenance of the oral health of the people on a long term basis.

RECOMMENDATIONS

1. The existing dental clinics in the government sector should be manned and upgraded.
2. Utilizing the primary health care infrastructure and appointment of dental hygienist and assistants for wider delivery of dental care.
3. Defluoridation units should be set up in this region to solve high fluoride problem.
4. Incorporating intensive dental care in school oral health programmes both in rural and urban areas.
5. Semi trained dental personnel – licentiates and auxiliaries can be trained and employed in General Hospitals or PHCs/CHCs levels.
6. Provision to be made for separate budget for oral health programmes.
7. Transportation facilities should be improved in the rural areas to make a better accessibility to the dental health.
8. Adopting legislation of restricting the use of tobacco and sugar as well as increasing the availability of oral hygiene aids.
9. Dental insurance to make payment of care easier for the people.
10. Devising techniques for monitoring and evaluation of our oral health system.

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PARTICULARS OF CONTRIBUTORS:

1. Senior Lecturer, Department of Public Health Dentistry, College of Dental Sciences and Hospital, Indore, Madhya Pradesh, India.
2. Professor and Head, Department of Public Health Dentistry, Mahatma Gandhi Dental College, Jaipur, India.
3. Professor, Department of Public Health Dentistry, SGT Dental College, Gurgaon, Haryana, India.
4. Senior Lecturer, Department of Pedodontics, Jaipur Dental College, Jaipur, India.
5. Assistant Editor, Journal of Clinical and Diagnostic Research, New Delhi, India.
6. Post Graduate, Department of Public Health Dentistry, SGT Dental College, Gurgaon, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sahil Handa,
Senior Lecturer, Department of Public Health Dentistry, College of Dental Sciences and Hospital,
Indore, Madhya Pradesh, India.
E-mail: drsahilhand@gmail.com

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