Original Research Article

Prevalence of Dental Caries in 11-14 Years Old School Children in Endemic Fluoride Areas of Haryana, India

Radhey Shyam[1], Manjunath BC[2], Adarsh Kumar[3], Vipul Yadav[4], Mansi Mendiratta[5*], Madhavi Wig[6]

[1]Senior Resident, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Pt. B.D Sharma University of Health Sciences, Rohtak, Haryana, India
[2]Senior Professor and Head, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, India
[3]Professor, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, India
[4]Assistant Professor, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, India
[5]Postgraduate student, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, India
[6]Postgraduate student, Department of Public Health Dentistry, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, India

Abstract

Background: Dental caries remains public health problem worldwide. It may develop in an early stage of life as soon as teeth erupt. Dental caries exhibits diminishing trends in most of the developed countries, but still increasing trends seen in many developing countries**.** ***Aim:*** To assess the prevalence of dental caries in 11-14years old school children in endemic fluoride areas of Haryana, India. ***Materials and methods:*** This study was a part of a cross sectional descriptive study which was conducted among 2200 school children of 11-14 years old age in endemic fluoride areas of Haryana, India. After obtaining the data from central ground water board, Haryana, 3 districts were selected using cluster random sampling out of 14 endemic fluoride districts. Dental examination was carried out by a single trained investigator. Socio-demographic details of children were recorded and WHO basic oral health assessment criteria for children modified (2013) was used for assessment of dental caries. The data were entered in Microsoft Excel and analyzed using SPSS 18 package for relevant statistical comparison. ***Results:*** In the present study 997 (45.3%) were males and 54.7% were females. Caries prevalence was reported to be 19% among the study subjects. Mean DMFT was found to be (0.27±0.70). ***Conclusion:*** The present study revealed that the prevalence of dental caries and DMFT was low among children. The reason behind this may be due to high concentration of fluoride in drinking water in those areas.
Key words: Dental caries, school children, endemic areas.

INTRODUCTION

Dental caries, despite availability of many preventive and treatment measure, remains public health problem worldwide. It is mainly found in the low socioeconomic groups. It may develop in an early stage of life as soon as teeth erupt. Dental caries manifests clinically as a course of action from initial visual change in enamel to frank cavitations extending to dentin and dental pulp [1].

If it is not treated in time, it may progress to more severe stages which lead to pain, difficulty in mastication and poor oral health. Although it is not a life threatening diseases, but due to its wide spread that affects school children result in social, psychological problems and other sever complications affecting oral health quality of life of school children. This burden of dental diseases also imposes financial problems on their families [2, 3].

Dental caries pattern exhibiting diminishing trends in most of the developed countries, but still increasing trends seen in many developing countries and is reported to be as high as 70% [4]. This may be due to availability of various preventable measures lie fluoride varnishes, APF gel and pit and fissure sealants it shows decreasing trends in most of developed world. The impact is far worse in developing countries, like India, where the prevalence of dental caries ranges from 30%–65% making it the most prevalent chronic disease among schoolchildren [5].

Various prevalence studies may be helpful in designing effective preventive and treatment strategies peoples who are at higher risk. There is lack of data

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regarding dental caries prevalence in endemic fluoride areas of Haryana, India. Hence the present study was undertaken to assess the prevalence of dental caries in 11-14 years old school children in endemic fluoride areas of Haryana, India.

MATERIALS AND METHODS

This study was a part of a cross sectional descriptive study which was conducted among 2200 school children of 11-14 years old age in endemic fluoride areas of Haryana, India from August 2015 to February 2016[3].

Ethical clearance was obtained from the Ethics Committee of the Post Graduate Institute of Dental Sciences, Rohtak (PGIDS/IEC/2015/56) after explaining detail of the procedure. This study was conducted according to STROBE guidelines for observational studies. Before conducting the study, permission was obtained from the District Education Officer and concerned school authorities. After explaining the purpose and details of the study, a written informed consent was obtained from the parents of all children aged 11-14 years.

After obtaining the data from central ground water board, Haryana, 3 districts were selected using cluster random sampling out of 14 endemic fluoride districts. In these three districts water fluoride concentrations ranged from 0.23–4.30 ppm [6].

Based on simple random sampling 2 tehsils from each districts were selected. Six schools were selected from each tehsil out of which four schools were from rural areas and two schools were from urban areas. Assuming 40 as average cluster size of children approximately 30-50 school children were selected.

Children present on the day of examination and who were willing to participate in the survey were included, whereas those who were uncooperative and had a history of systemic diseases and developmental anomalies were excluded. Training and calibration of the examiner was done in the Department of Public Health Dentistry, PGIDS, Rohtak, and the intra-examiner's reliability showed a good agreement (89%).

Dental examination was carried out by a single trained investigator. Socio-demographic details of children were recorded and WHO basic oral health assessment criteria for children modified [7] was used for assessment of dental caries. Dental examination of the children was done using mouth mirror and WHO probe. A set of 60 autoclaved instruments were carried for clinical examination of children. If any children required immediate care, they were referred to the Department of Public Health Dentistry PGIDS Rohtak for further treatment.

STATISTICAL ANALYSIS

The data were entered in Microsoft Excel and analyzed using SPSS 18 package for relevant statistical comparison. Descriptive and inferential statistics were used. Chi-square tests were used for the comparison of proportions. Kruskal–Wallis test was used to find significant mean DMFT across different age groups and Mann–Whitney U-test was used to find difference of mean DMFT against gender. $p < 0.05$ was considered as statistically significant.

RESULTS

Distribution of subjects according to age, gender

The present study was conducted among 2200 study participants who were of age 11-14 years where 997 (45.3%) were males and 54.7% were females. The mean age of study population was 12.38±1.07 years. Table 1 shows the characteristic distribution of study population.

Table 2 shows that overall caries prevalence was reported to be 19% among the study subjects. Higher caries prevalence of 22% was reported among 14 year old children than 11 to 13 years old children. Females were found to have higher caries prevalence (20%) than males (18%), but this distribution was statistically non significant.

Table 3 shows that mean DMFT was higher among the 14 years old children when compared to other age groups of study. This was found to be statistically significant. Table 4 shows that mean DMFT was higher among the female student (0.30± 0.751) than male student (0.23± 0.644) and this difference was statistically found significant. Overall mean DMFT was found to be (0.27±0.70).

Table-1: Age wise distribution of the study subjects

Age	Male		Female		Total	
	N	%	N	%	N	%
11	250	25.1	336	27.9	586	26.7
12	282	28.3	326	27.1	608	27.6
13	275	27.5	308	25.6	583	26.5
14	190	19.1	233	19.4	423	19.2
Total	997	45.3	1203	54.7	2200	100

Table-2: Caries prevalence among study subjects

Age	Caries prevalence	p value
11	20.0	
12	20.0	
13	16.0	0.08
14	22.0	
Total	**19.0**	

p<0.05

Table-3: Mean DMFT according to age groups

Age	Mean DMFT	p value
11	0.23±0.623	0.05
12	0.26±0.667	
13	0.22±0.636	
14	0.39±0.914	

Table-4: Mean DMFT according to Gender

Gender	Mean DMFT	p value
Male	0.23± 0.644	0.00
Female	0.30± 0.751	

DISCUSSION

It has been proved from various studies around the globe that dental caries is one of most widely distributed dental diseases. Its burden is increasing in the developing countries like India and other Africans countries reason behind this may be lack of preventive strategies which are present in European countries like pit and fissure sealants, water fluoridation programs [8].

Caries prevalence in the present study was found to be lower than Indian studies by Ghanghas M et al. [4] Janakiram C et al. [8] Shekhar et al. [9] Shivkumar et al. [10] Abraham et al.[11] Also the index age groups of 12 years also have lower caries prevalence than their counterpart studies like Praveena S et al. [12] Shaillee F et al. [13] and Sukhabogi JR et al.[14]

The presence of low dental caries prevalence of the study population could be due to the fact that this study was conducted among the endemic fluoride areas of Haryana. This fluoride which is ingested as drinking water as well as ingredients of crops and vegetables which is cultivated in present study areas. This fluoride may be act as preventable factor for development of dental caries.

However prevalence of dental caries varies accordingly change of geographic condition. The difference between the caries prevalence may be due to the difference in the socio-demographic factors, cultural factors and dietary factors.

Mean DMFT of the study population was found to be 0.27±0.70 which was similar to other studies carried out by Prabhakar J et al. [15] and less than from other studies done by Aparna M et al. [16] Reddy KS et al. [17] and Jain A et al. [18] The D score contributed maximally for DMFT scores similar to that reported by Singh S et al. [19] Mahejabeen et al. [20] and Tyagi P [21].

Index age group of 12 years old had lower mean DMFT as compare to other studies by Vijayata Sharva V et al. [22] Shaillee F et al. [13] and Mahesh KP et al. [23] and children of 14 years age group were having higher mean DMFT than other age groups.

Females had higher value of mean DMFT than males and the difference was found to be significant. This is in accordance with other studies by Sogi et al. [24] and al-Shammery et al. [25] The reason for the high DMFT in females may be due to that teeth erupts early in females than males and other reason may be the females are having habits of longer indoor stay than males which leads to more intake of diet and other sugary products.

However dental caries is a multi-factorial disease which is having interplay of many social environmental and oral hygiene factors all these factors have a marked effect on dental caries prevalence. These remain undiscovered in present study and hence further research should be conducted to evaluate the effect of these untouched factors.

CONCLUSION

The present study evaluated the prevalence of dental caries and it was found to be low among children also the mean DMFT was found to be low. The reason behind this may be due to high concentration of fluoride in drinking water in those areas.

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