Research Article

INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH

ISSN: 2395-6429, Impact Factor: SJIF: 4.656
Available Online at www.journalcmpr.com
Volume 9; Issue 7; July 2023; Page No. 386-390
DOI: http://dx.doi.org/10.24327/ 23956429.ijcmpr20230107

PREVALENCE OF DENTAL CARIES IN THE PRIMARY DENTITION, MIXED DENTITION AND PERMANENT DENTITION AND ASSOCIATING FACTORS IN SCHOOL CHILDREN IN MATHURA CITY

Mahima Panwar, Sonal Gupta, Kusum Bharti, Menia Gumro and Shilpi Dutta

Departments of Pediatric and Preventive Dentistry

ARTICLE INFO

Article History:
Received 13th April, 2023
Received in revised form 11th May, 2023
Accepted 8th June, 2023
Published online 28th July, 2023

Key words:
Oral hygiene practises

ABSTRACT

Objective: In order to ascertain the prevalence and severity of dental caries among schoolchildren aged 3 to 15 years, as well as the impact of age, socioeconomic status, oral hygiene practises, diet, and attitude towards dental knowledge on the occurence and severity of caries in children with various dentitions, this study was carried out in Mathura city for the first time.
Material & Method: Out of 900 children, 300 were from the primary dentition, 300 were from the mixed dentition, and 300 were from the permanent dentition which was individually quessionaire-examined. Following that, results were compiled and statistically evaluated.
Results: Comparing children aged 3-6 years (51.3%) and 13-15 years (53.0%), it was discovered that the occurence of dental caries was statistically substantially high in the age ranging 7–12 years (58.3%).
Conclusion: Of all the children in Mathura city that were studied, 54.2% had dental caries overall.

INTRODUCTION

One of the most significant, globally pervasive health issues that continues to harm children's oral health is dental caries. It is well recognised that the disease's genesis is complicated and that a variety of factors affect how common it is. [1] The most common and persistent oral problem, particularly in children, is dental decay. [2] The development of dental caries is influenced by the host susceptibility, oral microbes that digest carbohydrates, and dietary choices. [3-5] Dental health specialists are interested in dental decay because of its substantial morbidity potential. [6]

Caries is brought on by intricate interactions between three variables: bacterial, dietary, and host vulnerability. Dental caries can only be brought on by bacteria and plaque on the tooth surface. By digesting ingested refined carbohydrates, mainly sugars, these plaque bacteria produce acid. In most industrialised countries, the risk of caries in preschoolers appears to be falling or the trend has peaked, but it may be rising in some developing nations. The parents of children with dental caries bear a severe financial burden.

Dental care is expensive in high-income countries, where it accounts for 20% of personal health expenses and 5% of overall health costs. Dental caries are becoming more common among adults and children in low- and middle-income nations. Typically, oral health affects overall health. Pneumonia is made more likely by dental infections, diabetes is made more likely by gum disease, and infectious arthritis and endocarditis are both made more likely by oral germs. In addition to providing the body with the nutrition it requires, a healthy mouth also promotes self-esteem, social engagement, and general wellbeing. [7]

No studies on the prevalence and risk factors of dental caries among schoolchildren in Mathura, Uttar Pradesh, India, to our knowledge exist. In order to ascertain the occurence of dental caries in the primary, mixed, and permanent dentition as well as the associated factors contributing to dental caries in children, the current study was designed.

MATERIALS AND METHODOLOGY

In order to investigate the prevalence of dental caries in primary dentition, mixed dentition, and permanent dentition among school-age children in Mathura, Uttar Pradesh, the current study was carried out at the Department of Pediatric and Preventive Dentistry, Kanti Devi Dental College and Hospital. The institution's ethical committee, the school's director, and the director of our institution all provided their approval for the study and agreed that it could be carried out.
Study population: Based on socioeconomic class, participants were selected from a range of Mathura city schools. Children from high socioeconomic groups attended private schools, while those from poor socioeconomic groups attended government schools.

Sample Size Distribution

In the city of Mathura, 900 schoolchildren between the ages of 3 to 15 were chosen.

Participants were divided into 3 groups, 300 children in each group.

***Corresponding author: Mahima Panwar**
Departments of Pediatric and Preventive Dentistry

GROUP 1 consists of children aged 3-6years (deciduous dentition)

GROUP 2 consists of children aged 7-12years (mixed dentition)

GROUP 3 consists of children aged 13-15years (permanent dentition)

Scheduling

Data collection took place during school work hours. Atleast 50 children were examined per day. The sample was collected from April 2021 to April 2022.

Profoma

Data were entered in a specially designed format according to criteria suggested by WHO (1997). A profoma consists of two sections, A and B. A section of the profoma was recorded by the examiner, while the B section was given to the children for their parents and were picked the next day.

Statistical Analysis

Data from precoded survey profiles were entered into a computer. For data analysis, a master file was produced. For each category, descriptive statistics including mean, standard deviation, and percentage were generated. To examine the association between the two category variables, Pearson's chi-square test was used. The differences in means between two independent groups was examined using an independent t-test. The mean difference between more than two independent groups was examined using a one-way ANOVA.

RESULT

Caries Prevalence

Around 54.2% of the study participants had dental caries overall. Dental caries were prevalent in 51.3% of children aged 3 to 6 years, 58.3% of children aged 7 to 12, and 53.00% of children aged 13 to 15. (Figure 1).

Gender wise caries distribution

The participants in the current study were 500 girls and 400 boys. **Figure 2** shows that dental decay was more common in boys (54.60%) in comparison to girls (53.75%), with boys being more likely than girls to have it.

Table 1 Comparison of caries Prevalence in different age groups

Age Group	Total no of patients	No of patients	Percentage	Chi square value	P value
Group I	300	154	51.30%		
Group II	300	175	58.30%	3.23	0.19#
Group III	300	159	53.00%		

Chi Square test, #Significan

Table 2 Comparison of caries Prevalence in different genders

Gender	Total no of Paticipants	No of patients	percentage	Chi square value	P value
Male	500	273	54.60%	1.17	0.69
Female	400	215	53.75%		

Chi Square test, #Significant

Table 3 Comparison of caries Prevalence according to type of diet

Type of diet	Total no of participants	No of patients	percentage	Chi square value	P value
Vegetarian	850	459	51.30%		
Non vegetarian	50	29	58.30%	0.30	0.67

Chi Square test, #Significant

Diet

About 850 vegetarians and 50 non-vegetarians participated in the study. Figure 3 illustrates the prevalence of dental caries among vegetarian individuals (51.30%) and mixed vegetarian participants (58.30%).

Frequency of taking Sugar

The frequency of caries was 2.89% among those who don't use sugar on a daily basis, 6.05% among kids who do, 85.06% among adults who do, 97.26% among those who do, and 100% among those who do. Hence, the prevalence of dental caries rises as sugar consumption frequency rises. (Figure 4)

Frequency of tooth brushing

Prevalence of caries was 71.40% among participants who don't brush their teeth daily, 66.72% among participants doing brushing once daily and 28.85% among participants brushing teeth 2 times a day **(Figure 5)**. Therefore prevalence of caries decreases on increasing the daily frequency of tooth brushing.

Socio-Economic Status

Dental caries were more common in lower socioeconomic status groups (75.00%) than in lower middle socioeconomic status (55.67%), middle socioeconomic status (50.94%), and upper middle socioeconomic status (61.29%). As a result, there were no significant variations in the prevalence of caries across all socioeconomic statuses.(**Figure 6)**

Table 4 Comparison of caries Prevalence according to frequency of taking sugar

Frequency of taking sugar	Total no of participants	No of patients with caires	percent age	Chi square value	P value
0	69	2	2.89%		
1	479	29	6.05%		
2	241	205	85.06%		
3	73	71	97.26%	316.85	0.001*
4	38	38	100%		

Chi Square test, #Significant

Table 5 Comparison of caries Prevalence according to frequency of taking Tooth brushing

Frequency of tooth brushing	Total no of participants	No of patients with caires	percentage	Chi square value	P value
0	7	5	71.40%		
1	595	397	66.72%	115.52	0.001*
2	298	86	28.85%		

Chi Square test, #Significant

Plaque Score (Plaque Index)

Caries was not prevalent in any of the people with a plaque score of 0, 48.90% in those with a plaque score of 1, and 89.17% in those with a plaque value of 2. Chi square test results with a Chi square

Table 6 Comparison of caries Prevalence according to Socio Economic Status

SES	Total no of participants	No of patients with caires	percentage	Chi square value	P value
Lower	4	3	75.00%		
Lower Middle	211	120	56.87%		
Middle	530	270	50.94%	6.71	0.09
Upper Middle	155	95	61.29%		

Chi Square test, #Significant

Table 7 Comparison of caries Prevalence according to level of plaque

Plaque level	Total no of participants	No of patients with caires	percentage	Chi square value	P value
0	1	0	0.00%		
1	779	381	48.90%	69.07	0.001**
2	120	107	89.17%		

Chi Square test, #Significant

DISCUSSION

The goal of our study aim to ascertain the prevalence of dental caries in Mathura, Uttar Pradesh, India's primary, mixed, and permanent dentitions as well as its contributing factors, including nutrition, oral hygiene, and parental participation. The prevalence of dental caries has been studied in many regions of India, including Tewari *et al* study .'s in Rohtak [8], Mehta *et al* study in Uttar Pradesh, Sharma *et al* study .'s in the northeastern part of the country, Goel *et al* study .'s in Putter, Moses *et al* study .'s in Chidambaram, Shingare *et al* .'s [15]. Dental caries is still a substantial public health problem in India, according to numerous studies.

As a result, our study was designed to assess and examine the relationships between the prevalence of dental caries and factors such as age, gender, parental socioeconomic status, sugar consumption, and brushing technique among schoolchildren between the ages of three to fifteen in Mathura's urban population. The World Health Organization (WHO) states that the age range of 3 to 15 years is the worldwide surveillance age for the purposes of international comparison and monitoring and that this age range has been found to be the most influential for the evolution dental caries. [16]

Three age groups of 900 schoolchildren were studied: 3-6 (elementary school), 7-12 (mixed school), and 13-15 (high school) (secondary school).

400 (44.44%) boys and 500 (55.56%) females of the total children evaluated. In comparison to children aged 3-6 years (51.3%) and 13–15 years (53.0%), the prevalence of caries was statistically substantially higher in the age group 7–12 years (58.3%). Prevalence rates were found to be both higher (UP) and lower (Lower) than the national norm in children aged 3-5. The prevalence rate for children aged 7 to 12 was lower than the national norm and comparable to the UP.

Studies by Shingare *et al*. [13], Arangannal *et al*. [18], Bhatia *et al*. [17] Goyal *et al*. [19], Dhar *et al*. [20], and Venugopal *et al*. [21] all produced comparable findings. 54.2% of all Mathura schoolchildren had dental cavities overall, according to our survey. Bhatia *et al*. [17] from the same district also found a prevalence rate of 51.46% among kids in the age group of 3 to 15 years, which is comparable to the current study. Several researchers found varying levels of caries prevalence in India, contradicting the study's findings.

Sharma *et al*. [9] found a higher frequency of dental caries in north eastern part of India. Patloth *et al*. [15] & Arangannal *et al*. [18] found it in Chennai. Shingare *et al*. [13] found it in Maharashtra. In our study, the occurence of dental decay was found to be greater in men (54.60%) than in women (53.75%), despite the fact that results were not statistically significant. These findings are in line with research by Dhar *et al*. [20], Dash *et al*. [22], Patloth *et al*. [15], Jain, and Moses *et al*. [12] which indicated a greater prevalence rate of caries in males.

The obvious preference for sons over daughters in India, regardless of socioeconomic class, may be the cause of the higher frequency of caries in men [15]. As a result, sons and daughters are fed for longer periods of time, which leads to more caries. Nonetheless, other investigations have noted a higher prevalence of caries in females, including Arangannal *et al* [18], Ahuja [24], and Shingare *et al* [13].

In terms of food, vegans had the lowest occurrence of cavities. It was found that there was no statistically significant difference between the vegetarian diet group and the mixed diet group in terms of dmft/DMFT. These findings concur with those made by Gangwar *et al* and Srinivas [25] and Mishra and Shee [26], who reported that the prevalence of caries was 58.8 and 60.5%, respectively, in vegetarians and non-vegetarians.

The prevalence of caries was 71.40% among people who did not wash their teeth every day, 66.72% among participants who did so once per day, and 28.85% among participants who did so twice per day. Hence, when the frequency of daily teeth brushing increases, the prevalence of dental caries declines. As a result, it was discovered that tooth brushing directly affects dental caries. Several investigations, like Kusum [27] and Hang *et al* [28], also came to the same conclusion.

According to the socio-economic position, the difference between the dmft and DMFT values was determined to be highly statistically significant. These findings support those of Singh *et al*. [29] and Chawla and chandra [30], who found that children with greater socioeconomic class had higher caries prevalence.

In the instance of plaque, it was discovered that as the plaque score rose, so did the prevalence of caries. Dental decay and the oral hygiene index did not directly correspond, according to Saha and Sarka [31]. Plaque buildup reportedly rises with ageing, according to Mathur and Roy [32].

Our study concluded that dental decay was a significant health problem among school-aged children and that there was a need to spread adequate and correct information about oral health care among school-aged children in Mathura, taking all these unique risk factors into account.

Limitations

1. Due to the covid pandemic, various schools did not allow for the survey.
2. Because noncavitated and interproximal caries could not be identified on radiographs in this investigation, caries experience ratings might be an underestimate of the prevalence of caries.

CONCLUSION

Within the Limitations of the Study, Following Conclusion Has Been Drwan

1. In our study, the overall prevalence of dental caries was 54.2% among all children examined in Mathura.
2. Compared to children aged 3 to 6 years (51.3%) and 13 to 15 years (53.0%), the prevalence of dental caries was found to be statistically substantially higher (58.3%) in the age group of 7 to 12 years.
3. Despite the fact that the result were not statistically significant, our study discovered that the prevalence of dental caries was high in men (54.60%) compared to women (53.75%).
4. According to our study, children from upper middle class (61.29%), followed by children from lower middle class (56.87%), had higher prevalence rates of dental caries. These findings were statistically significant.
5. The difference between DMFT and DMFT was extremely significant, and caries prevalence increased with more sugar consumption.
6. The prevalence of caries was 0.00% in persons with a plaque score of 0 and 48.90%, 89.17%, and 89.17% in participants with a plaque score of 1. As a result, the prevalence of caries rises as plaque score does.
7. Regarding diet, caries prevalence was lower in vegetarians. The difference in dmft/DMFT between the vegetarian group and the mixed diet group was not statistically significant.

References

1. Okoye L, Ekwueme O. Prevalence of dental caries in a Nigerian rural community:A preliminary local survey. Ann Med Health Sci Res 2011;1:187-95.
2. Dawkins E, Michimi A, Ellis-Griffith G, Peterson T, Carter D, English G, *et al*. Dental caries among children visiting a mobile dental clinic in South central Kentucky: A pooled cross-sectional study. BMC Oral Health 2013;13:19.
3. Franco e Franco TC, Amoroso P, Marin JM, de Avila FA. Detection of Streptococcus mutans and Streptococcus sobrinus in dental plaque samples from Brazilian preschool children by polymerase chain reaction. Braz Dent J 2007;18:329-33.
4. García-Closas R, García-Closas M, Serra-Majem L. A cross-sectional study of dental caries, intake of confectionery and foods rich in starch and sugars, and salivary counts of Streptococcus mutans in children in Spain. Am J Clin Nutr 1997;66:1257-63.
5. Colak H, Dülgergil CT, Dalli M, Hamidi MM. Early childhood caries update: A review of causes, diagnoses, and treatments. J Nat Sci Biol Med 2013;4:29-38.
6. Moses J, Rangeeth BN, Gurunathan D. Prevalence of dental caries, socio-economic old school going children of chid ambaram status and treatment needs among 5 to 15 year old school going children Of Chidambaram. J Clin Dign Res 2011;5:146-51.
7. K. J. Chen, S. S. Gao, D. Duangthip, E. C. M. Lo, and C. H. Chu, "Early childhood caries and oral health care of Hong Kong preschool children," Clinical, Cosmetic and Investigational Dentistry, vol. 17, pp. 27–35, 2019.
8. Tewari S, Tewari S ; Caries experience in 3-7 year-old children in Haryana (India); J Indian Soc Pedod Prev Dent. 2001 Jun;19(2):52-6.
9. Sharma S, Tewari A, Chawla HS. Prevalence of dental caries in NorthEastern region of India. J Indian Soc Pedo Prev Dent 1988;6(1):48–56.
10. Mehta K, Tewari A, Chawla HS. Assessment of treatment needs of periodontal disease using CPITN in Uttar Pradesh population. J Indian Soc Pedod Prev Dent 1987;5(1):1–9
11. Goel P, Sequeira P, Peter S. Prevalence of dental caries amongst 5-6 and 12-13 year old school children of Puttur municipality, Karnataka state-India. J Indian Soc Pedod Prev Dent 2000;18(1):11–17.
12. Moses J, Rangeeth BN, Gurunathan D. Prevalence of dental caries, socioeconomic status and treatment needs among 5 to 15 year old school going children of Chidambaram. J Clin Diag Res 2011;1(5):146–151.
13. Shingare P, Jogani V, Sevekar S, *et al*. Dental caries prevalence among 3-14 year old school children, Uran, Raigad district, Maharashtra. J Contemp Dent 2012;2(2):11–14.DOI:10.5005/jp-journals-10031-1002.
14. Ingle NA, Dubey HV, Kaur N, *et al*. Prevalence of dental caries among school children of Bharatpur city, India. J Int Soc Prev Comm Dent 2014;4(1):52–55. DOI: 10.4103/2231-0762.131267.
15. Patloth T, Reddy S, Puppal R, *et al*. Prevalence of dental caries among 5-12 year old school going children in urban and rural areas of Mahabubnagar District, Telangana, India. Indian J Dent Sci 2017;1(9):1a–4a.
16. WHO. Oral health surveys: Basic methods, 5th ed. Geneva: World Health Organization; 2013
17. Bhatia HP, Shrivastava B, Khatri S, *et al*. Prevalence of dental caries among 3-15 year old school children in Ghaziabad city & its adjoining areas - A correlated survey. J Oral Health Comm Dent 2012;6(3): 135–140. DOI: 10.5005/johcd-6-3-135.
18. Arangannal P, Mahadev SK, Jayaprakash J. Prevalence of dental caries among school children in Chennai. Based on ICDAS II. J Clin Diag Res 21. 2016;10(4):9–12. DOI: 10.7860/JCDR/2016/14731.7523.
19. Goyal A, Gauba K, Chawla HS, *et al*. Epidemiology of dental caries in Chandigarh school children & trends over the last 25 years. J Indian Soc Pedod Prev Dent 2007;6(3):131–135. DOI: 10.4103/0970- 4388.36559.
20. Dhar V, Jain A, Van Dyke TE, *et al*. Prevalence of dental caries and treatment needs in the school-going children of rural areas in Udaipur district. J Indian Soc Pedod Prev Dent 2007;25(3):119–121. DOI: 10.4103/0970-4388.36560
21. Venugopal T, Kulkarni VS, Nerurker RA, *et al*. Epidemiological study of dental caries. Indian J Pediatr 1998;65(6):883–889. DOI: 10.1007/ BF02831355.
22. Dash JK, Sahoo PK, Bhuyan SK, *et al*. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). J Indian Soc Pedod Prev Dent 2002;20(4):139–143.
23. Saravanan SP, Lokesh S, Polepalle T, *et al*. Prevalence, severity and associated factors of dental caries in 3-6 year old children - A Cross Sectional Study. Indian J Dent Res 2014;6(2):5–11. DOI: 10.12691/ijdsr- 2-6A-2.

24. Ahuja R. Prevalence of dental caries among school going children of age 6-12 years in Lucknow city - A Cross-Sectional study. Unique J Med Dent Sci 2014;02(03):82.
25. Gangwar SK, Idris MZ, Bhushan V, Nirupam S, Saimbi CS, Jain JVC. Biosocial correlates of dental caries in rural area of Lucknow. JIDA 1990; 61:93-7
26. Mishra FM, Shee BK. Prevalence of dental caries in school going children in an urban area of south Orissa. JIDA 1979;51:267-70
27. Kusum P, Kannan AT, Sarna A, Aggarwal. Prevalence of dental caries and associated teeth cleaning habits among children in four primary schools. Int J Epidemiol 1986;15:581-3.
28. Liu HY, Huang ST, Hsuao SY, Chen CC, Hu WC, Yen YY. Dental caries associated with dietary and tooth brushing habits of 6-12 year old mentally retarded children in Taiwan. J Dent Sci 2009; 4:61-74.
29. Singh S, Kaur G, Kapila VK. Dental disorders in primary school children of Faridkot City. JIDA 1985; 57:305-8.
30. Chandra S, Chawla TN. Incidence of dental caries in Lucknow School children. JIDA
31. Saha S, Sarkar S. Prevalence and severity of dental caries and oral hygiene status in rural and urban areas of Calcutta. JISPPD 1996. p. 17-9
32. Mathur SK, Roy RK. Assessment of oral cleaning habit, bacterial plaque, gingivitis among school children. JIDA 1931;53:329-32

****