



The Prevalence of dental caries among 5-12 years old schoolchildren of Raebareli district of Uttar Pradesh: Based on ICDAS II.

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ABSTRACT

Introduction: Dental caries is the most common chronic disease of childhood that interfere with speech, daily routine activities and normal nutritional intake. Dental caries prevalence is associated with oral hygiene practice, sugar consumption and implementation of preventive oral health program. **Aim:** The purpose of this study was to know the prevalence of dental caries among 5-12 years old schoolchildren of Raebareli district of Uttar Pradesh

Material and Methods: Total of 1000 children aged 5-12 years were examined for dental caries using ICDAS II criteria in the schools of Raebareli district of Uttar Pradesh. **Results:** The prevalence of dental caries was 58.8% in the surveyed population. There was slightly higher prevalence of dental caries among females than males in the study population. Age-wise prevalence of dental caries showed prevalence of 55.9% for 5-6 years of age, 54.7% for 7-8 years of age .63.1% for 9-10 years of age and 56.6% for 11-12 years of age. The distribution of CARS (Caries Associated with Restorations and Sealants) in the surveyed population was 1.5%. **Conclusion:** Distribution of cavitated carious lesions was less than non cavitated /early carious lesions in the studied population and indicated a requirement of a sustained dental health preventive program in the given population.

KEYWORDS: Dental caries, early diagnosis, non cavitated lesion, visual inspection.

Key Messages: Teeth surfaces with early caries (ICDAS 1&2) are common in young children so early diagnosis can decrease risk of extensive dental caries.

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I. INTRODUCTION :

Dental caries is the most prevalent chronic disease affecting humans irrespective of age, sex, race and socioeconomic status¹. Dental caries has high worldwide prevalence and is one of the most common chronic childhood diseases. As around 90% of the school children and most of the adults have been affected by dental caries hence it has been considered as the most important global oral health burden². Basic oral health surveys are the first and foremost basis for assessing the oral health care needs of a population and provides a reliable data on which oral health programs and plan for oral health promotion disciplines for specific age groups can be based³. During the last two decades the changes in prevalence of dental caries as well as the distribution and pattern of disease have been reported by various authors. In 2002 the International Caries Detection and Assessment System (ICDAS) was first introduced by international team of caries researchers⁴. In 2005 it was further developed as ICDAS II in order to integrate several newly added criteria systems in to one standard system for caries detection and assessment as well as to improve its consistency. ICDAS II based on visual inspection was developed for use in clinical research, clinical practice and for epidemiological purpose. Main advantage of ICDAS is to record the incipient carious lesions unlike the old recording systems which use to record only cavitated lesions^{5,6}. This cross-sectional study presents prevalence of dental caries among 5-12 years old schoolchildren of Raebareli district of Uttar Pradesh. It also describes the pattern of dental caries development and relation of socioeconomic status (SES) level of participated children to development of dental caries.

II. MATERIAL AND METHODS

-Sample size

The study population of this cross sectional descriptive study was the entirety of the schoolchild population of Raebareli district of Uttar Pradesh. The research was approved by Institutional research committee and Institutional Ethics Board vide Ref. no -2021-8-IMP-1. Out of 18 blocks of the district Raebareli two schools one government and one private were selected randomly from each block for study population in order to make the sample uniformly distributed in the whole Raebareli district. Total of 1000 children aged 5-12 years were examined for dental caries and using ICDAS II criteria.

-Prior Calibration

Two Examiners were calibrated before the study began to record ICDAS II coding for dental caries. Examiners performed a calibration exercise in which they examined 5 children using recording criteria and compared their results. Kappa scores were found to be 0.80 and was considered to be acceptable.

-Prior permission Informed Consent

Permission from school principal was taken prior to examination visit and consent forms were handed over to school authorities to be signed by child parents before examination visit. The children parents were given detailed information on examinations to be performed in the parent information form and were asked to give their consent by signing the authorization. Only those children were recorded in the study who could obtain written consent from parents regarding the examination. Children who did not meet the criteria of age, lack of informed consent and those with special health care needs were excluded from the study

-Clinical Examinations

ICDAS II criterion was followed for recording of dental caries. Plane mouth mirror, WHO periodontal probe, pair of latex gloves and face masks were used for each examination. All examinations were performed by calibrated examiners in the schools under day light with child sitting on a chair with his/her head extended. All surfaces of all the teeth present and measurable were examined for dental caries initially under wet conditions. The surfaces were the air dried for five seconds to observe any changes in color.

Data Analysis: Data was entered Microsoft excel spreadsheet and analyzed using SPSS 17.0 software. Descriptive statistics were used for data summarization and presentation.

III. RESULTS

The present study was undertaken to assess the prevalence of dental caries among schoolchildren in Raebareli district of Uttar Pradesh using ICDAS II. A total of 1000 Children aged 5-12 years were examined. Overall Prevalence of dental caries was 58.8% (Table/Fig1). Age-wise prevalence of dental caries showed prevalence of 55.9% for 5-6 years of age, 54.7% for 7-8 years of age, 63.1% for 9-10 years of age and 56.6% for 11-12 years of age and there was no statistically significant association between age and dental caries prevalence (Chi-Square=5.111, P=0.164) (Table/Fig2). There was no statistically significant association between gender and dental caries prevalence (Chi Square 0.176, P=0.698) though there was slightly higher prevalence of dental caries among female (59.4%) as compared to males (58.1%) (Table/Fig3)

Higher prevalence of dental caries among children of government schools (62.4%) was noted in the study as compared to that in private schools 53.3% and there was statistically significant association between school and dental caries prevalence. (Chi-square =8.158, P=0.005) (Table/Fig 4)

Results of the study also showed that overall prevalence of caries in permanent teeth was 40.8% with prevalence of Enamel caries (ICDAS 1-3 scores) 38.2% as compared to Dentinal caries ICDAS 4-6 SCORES) 5.5% (Table/Fig 5).

Overall prevalence of dental caries in primary dentition was 29.9% in which 19.8% was enamel caries (ICDAS 1-3 scores) and 16.2 % was dentinal caries (ICDAS 4-6 SCORES) (Table/Fig 6)

In this study, there were only 15 children (1.5%) with secondary caries which was detected by CARS (Caries Associated with Restorations and Sealants) detection criteria of ICDASII.

IV. DISCUSSION :

Untreated oral diseases in children frequently lead to serious general health, significant pain, and interference with eating and lost school time⁷. Increase in caries prevalence is mostly due to lack of oral health care system, because this system mostly focus on curative care, but there is no periodical implementation of community health prevention and oral health promotion⁸. On a world wide basis there has been an increase in prevalence of caries along with emerging economies. Whereas prevalence is decreasing in developed countries due to improved oral hygiene practice and implementation of community level prevention programs⁹. The World

Health Organization has ranked dental caries as number three among all chronic non – communicable diseases (NCDs) that require worldwide attention for prevention and treatment¹⁰. ICDAS (International Caries Detection and Assessment System) is a universally accepted system to evaluate the prevalence of dental caries, in which estimation of early enamel lesions, helps in planning early treatment and monitoring caries patterns at the population level¹¹. The use of ICDAS -II in the present study showed a prevalence of 58.8% among 5-12 years old schoolchildren which is close to prevalence shown by studies done by Bilal D etal¹² and Viana SVC etal¹³. Comparing age wise prevalence of dental caries in 5-12 years old children present study showed highest prevalence of dental caries (63.1%) around 9-10 years of age which reduced by the age of 12 years (56.6%). This was in agreement with the studies done by Grewal etal¹⁴ and Goyal etal¹⁵ where the highest prevalence was around 10 years of age after which there was decrease in the caries prevalence until age of 12 years . They suggested higher caries prevalence around 9-10 years of age could be due to susceptibility of newly erupted teeth to become decayed in existing poor oral hygiene conditions. Decrease in caries prevalence around 12 years might be due to increase in manual dexterity of child in improving oral hygiene, increased awareness about oral health and replacement of carious deciduous primary molars with healthy premolars. In the present study there was slightly higher prevalence of dental caries among female (59.4%) as compared to males (58.1%) though the difference was not statistically significant. This result is comparable to the studies done by kumar etal¹⁶ and Shingare etal .⁹ There was higher prevalence of dental caries among children of government schools (62.4%) as compared to that in private schools (53.3%) and there was statistically significant association ($P=0.005$) between school and dental caries prevalence. Similar results were shown by Singh N etal¹⁷ in their study in which prevalence of dental caries was significantly more in government schoolchildren (63.1%) as compared to private school children (56.9%)

The distribution of caries code in the study population was assessed and analyzed according to ICDASII. In the sample of 1000 subjects 1,17,288 teeth surfaces were assessed and coded by ICDASII criteria. Among total surfaces assessed 1,15,154 were code 0 which is about 98.18%, while remaining 2134 (1.82%) surfaces were coded between code 1 to code 6 with code values of 0.83% for code 1, 0.48% for code 2, 0.11% for code 3, 0.16% for code 4, 0.03 % for code 5 and 0.19% for code 6. Highest coding percentage was seen in code 1 which represents first visual change in enamel in form of opacity or discoloration visible at pit or fissure as per ICDAS II criteria, which implies the need for preventive treatment modalities so as to prevent the progression of dental caries to this study group.

Out of 1000 subjects, 15 children with secondary caries i.e. caries associated with some kind of restoration were also detected by CARS detection criteria. All such children were advised to get the new restorations done in order to treat secondary caries below the existing restorations.

V. CONCLUSION:

Early enamel carious lesions (ICDAS1&2) were the most common in surveyed population. Preventive programs and careful monitoring could decrease the risk of dental caries and minimize the need for invasive and painful treatment procedures in future.

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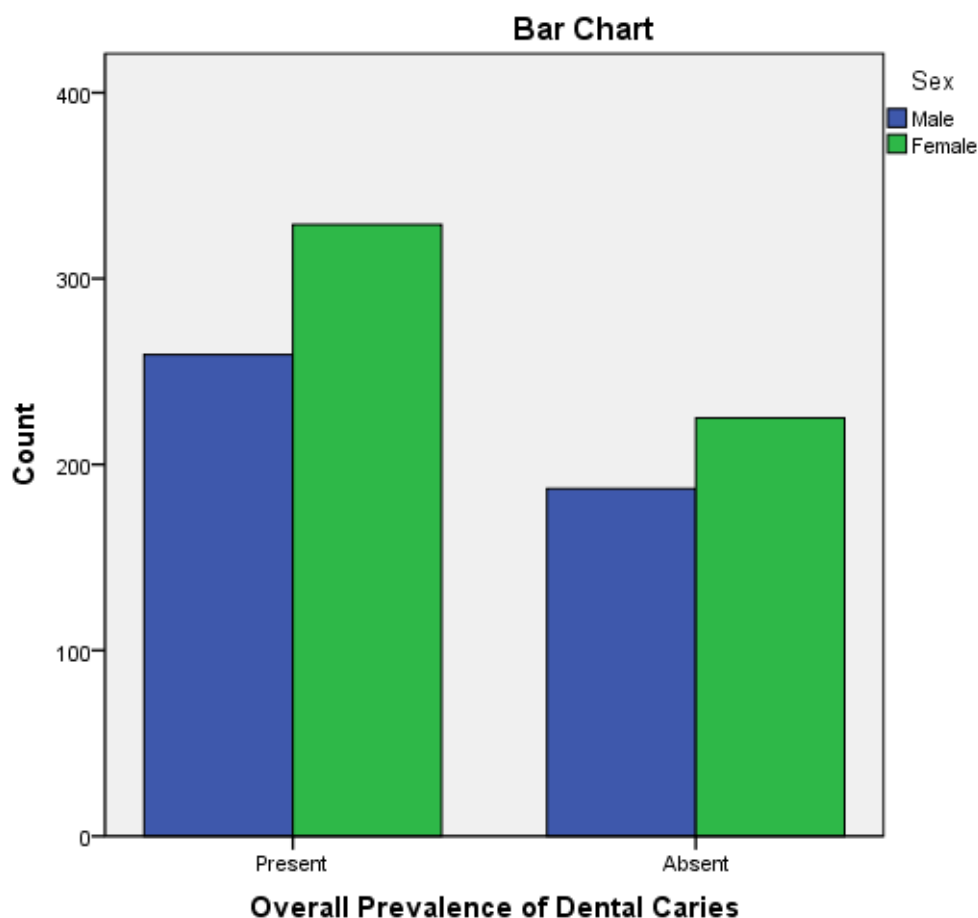
Table/Fig1. Overall Prevalence of Dental Caries among

Dental Caries Status	Count	Percent Affected
Present	588	58.8
Absent	412	41.2
Total	1000	100.0

Table/Fig 2. Caries Prevalence according to age group

Age Group	Total Patients	Patient count with caries	% Affected
5-6 years	68	38	55.9
7-8 years	150	82	54.7
9-10	393	248	63.1
11-12	389	220	56.6

Table/Fig 3. Gender wise Prevalence of Dental caries



Table/Fig4 . Prevalence of Dental Caries according to school

School	Government	Private	Total
Count	374	214	588
% caries	62.4%	53.4%	58.8%

Chi-square=8.158, $P=0.005^*$

Table/Fig5 . Caries Prevalence in Permanent Dentition

	Present	Absent
Overall Caries Prevalence	408 (40.8%)	592 (59.2%)
Enamel Caries (ICDAS 1-3)	382 (38.2%)	618 (61.8%)
Dentinal Caries (ICDAS 4-6)	55 (5.5%)	945 (94.5%)

Table/Fig6. Caries Prevalence in Deciduous Dentition

	Present	Absent
Overall Caries Prevalence	299 (29.9%)	701 (70.1%)
Enamel Caries (ICDAS 1-3)	198 (19.8%)	802 (80.2%)
Dentinal Caries (ICDAS 4-6)	162 (16.2%)	838 (83.8%)

Table/fig7. Distribution of secondary caries by ICDASII (CARS Criteria)

CARS	Counts	%
Absent	985	98.5
Present	15	1.5
Total	1000	100

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