

## Prevalence of Dental Caries in Indian School Children in Relation with Body Mass Index

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### Abstract

**Background and Objectives :** Obesity is a leading preventable cause of death worldwide, with increasing prevalence in adults and children, and authorities view it as one of the most serious public health problems of the 21st century. There is a high level of evidence which shows direct association between obesity and dental caries. Various surveys have been conducted world wide in different ethnic populations to see the association between the caries development and BMI of children. Currently there is no data available in relation between BMI and prevalence of dental caries in Indian school children indicating the need for further well-designed studies to demonstrate the relationship between the two. **Methodology:** Data collection was part of the Oral Health Survey and free dental check up camp in various schools in Noida. A total of 250, 9-11 year-old school children constituted the study group. **Results:** The Pearson correlation was used to find the relationship between the prevalence of dental caries and BMI of the school children included. A significant correlation existed between the two. **Conclusion:** Together with obesity as a matter of concern in school children worldwide the maintenance of dental health also need to be emphasized for this at risk group.

**Keywords:** Obesity; Dental caries; Body mass index

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### Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems.[1,2] Body mass index (BMI), a measurement which compares weight and height, defines people as overweight (pre-obese) if their BMI is between 25 and 30 kg/m<sup>2</sup>, and obese when it is greater than 30 kg/m<sup>2</sup>. [3] Obesity is a leading preventable cause of death worldwide, with increasing prevalence in adults and children,

and authorities view it as one of the most serious public health problems of the 21st century.[2] Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis.[2] There is a high prevalence rate of overweight, obesity and abdominal obesity and their associated factors in a large sample of worldwide population. The overall prevalence of abdominal obesity in urban Indian school children is about 4.5% with the higher prevalence of overweight and abdominal obesity in females than males. There is a substantial burden of childhood obesity in India, which necessitates comprehensive campaigns for its prevention and control.[4] The rising trend of BMI in Indian children and adolescents observed in this multicentric study rings alarm bells in terms of associated adverse health consequences in adulthood.[5] Dental decay is the most common childhood disease worldwide and most of the decay remains untreated. Caries being the most common disease amongst children in the world today, there is a need to fully understand risk factors that may be related to caries. There is a high

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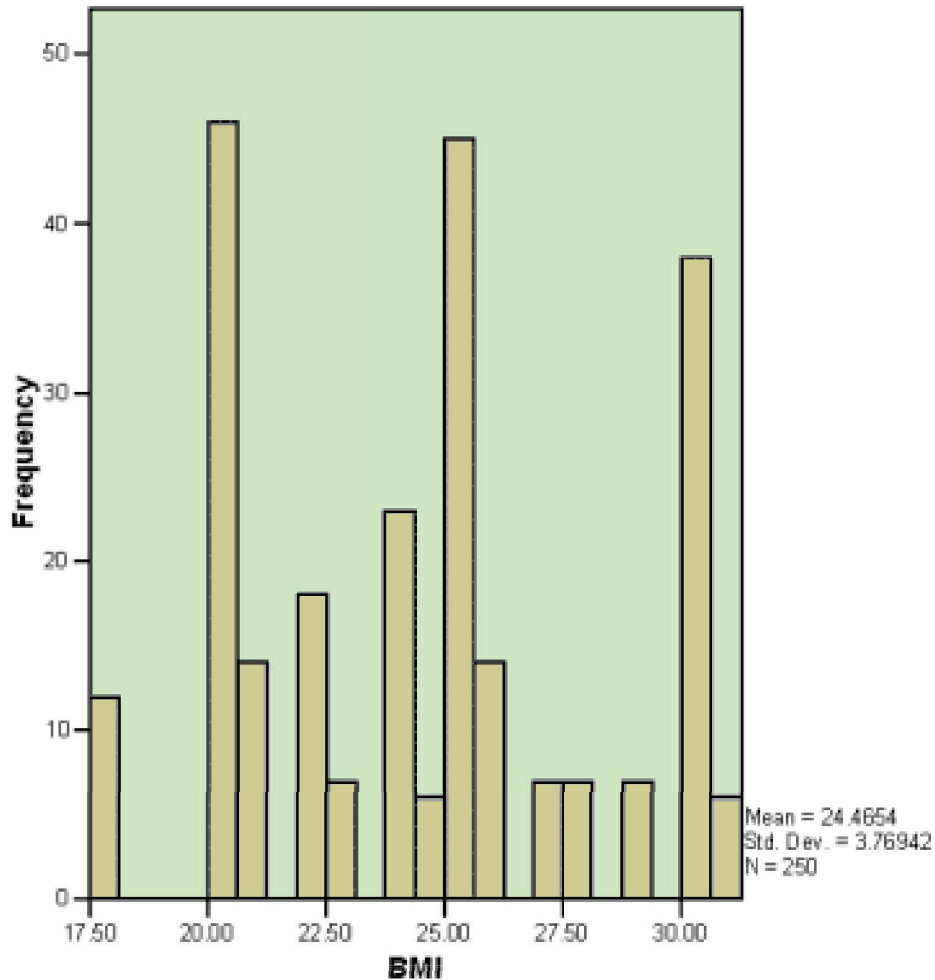
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(Received on 04.12.2012, Accepted on 16.03.2013)

**Table 1: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
BMI	250	17.85	31.06	24.4654	3.76942
Valid N (list wise)	250				

**Figure 1: Frequency distribution of BMI**

level of evidence which shows direct association between obesity and dental caries.[7,8] Together with obesity, poor oral hygiene habits, children's feeding, snacking and brushing habits, and parents' education attainment were the significant predictors for new caries development of preschool children.[9,10,11] Research shows a significant association between caries and BMI and particularly between odontogenic infections and below normal BMI. [12] Various surveys have being conducted world wide in different ethnic populations to see the association between the caries development and BMI of

children.[13,14] Currently there is no data available in relation between BMI and prevalence of dental caries in Indian school children indicating the need for further well-designed studies to demonstrate the relationship between the two.

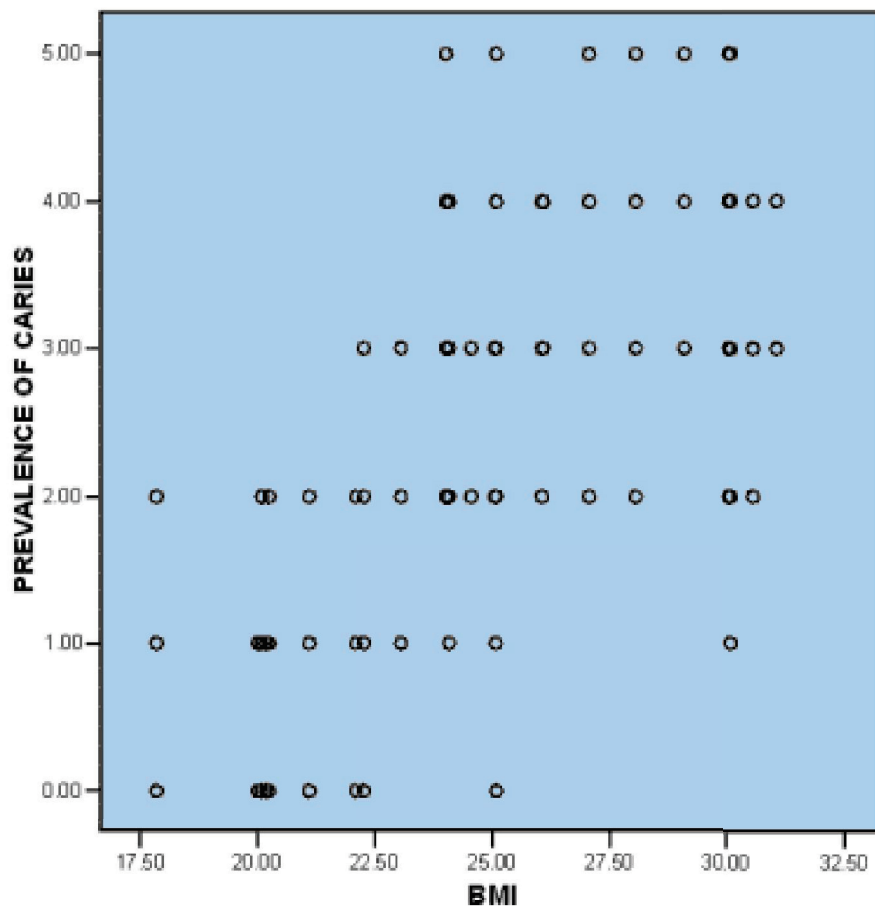
### Methods

Data collection was part of the Oral Health Survey and free dental check up camp in various schools in Noida. A total of 250, 9 -11

**Table 2: Correlation between caries prevalence and BMI**

		Prevalence of caries	BMI
Prevalence of caries	Pearson Correlation	1	.720(**)
	Sig. (2-tailed)	.	.000
	N	250	250
BMI	Pearson Correlation	.720(**)	1
	Sig. (2-tailed)	.000	.
	N	250	250

**Figure 2: Scatter diagram for correlation between caries prevalence and BMI**



year-old school children constituted the study group. The prior permission was obtained from the school authorities and the informed consent was taken from the parents of the respective children before the collection of data. The data collection was done in the respective school premises and each of the student was examined individually. Standard procedures were used to measure the weight and height of the subjects and a questionnaire

was conducted to obtain information regarding the brushing habits and dental hygiene for all. Caries was scored according to WHO criteria (1997) and anthropometric measures were performed by trained nurses. After BMI is calculated for children, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking. The percentile indicates the relative

position of the child's BMI number among children of the same sex and age.

## Results

The data obtained was recorded for further analyses. The descriptive statistics was initially calculated for 250 subjects (Table 1) (Figure 1). The mean BMI was 24.47 kg/mt<sup>2</sup> The Pearson correlation was used to find the relationship between the prevalence of dental caries and BMI of the school children included (Table 2) (Figure 2) which was found to be statistically significant.

## Discussion

Dental caries and childhood obesity epidemics are multifactorial complex disease and children's dietary pattern is a common underlying etiologic factor in their causation. The diet with high and frequent carbohydrates consumption especially between meals increases the risk of nutritional diseases and dental decay. We found that children with obesity and overweight had increased prevalence of dental caries in both primary and permanent dentition compared to normal weight children, which was statistically significant and there is a need for multidisciplinary approaches to change the lifestyle factors causing both overweight/obesity and dental caries.[15,16] The prevalence of overweight children was about 29% and obese was about 18% in the study population. Together with prevalence of caries data was also obtained regarding the brushing habits of the children and other dental problems and treatments taken by them in the past. It was found that majority of the children brushed their teeth just once in a day and about 2% of the sample was irregular for even brushing once a day. Reasons being lack of motivation, less parental supervision and lack of awareness about the importance of dental hygiene. Clinical data were collected on dental fluorosis, periodontal status, dental caries and

treatment needs. It was seen that other than caries poor oral hygiene, malalign teeth and periodontal diseases are among major public health concerns which may affect children's growth and development. A need exists for addressing obesity, oral health and nutrition jointly in health promotion strategies to improve children's well-being and empower good life-style factors.[17,18] Although literature shows a slightly higher percentage of dental caries in boys than in girls [19] but no conclusion could be drawn from the present study. Larger samples may be analyzed in future to know the difference.

There appears to be a significant association between childhood obesity and overweight with caries experience however, further studies are needed to better understand this relationship.[20,21] 50% children with normal weight showed naturally healthy teeth, while overweight and obese children displayed naturally healthy teeth in 40.5 % and 32 % of the cases, respectively. A low BMI showed a correlation with the absence of carious lesions, and a high BMI was linked to a high number of caries lesions which is in accordance with other studies in literature.[22]

## Conclusion

In future preventive programs, the importance of nutrition should not only be emphasized with respect to general diseases but also with regard to carious lesions.[23] The implementation of preventive programs as including restriction of sweets in school premises for the children is the key to good oral health.[24] Together with obesity as a matter of concern in school children worldwide the maintenance of dental health also need to be emphasized for this at risk group.

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