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# ASSOCIATION BETWEEN CARIES PREVALENCE AND CARIES RELATED FACTORS IN 6 – 12 YEAR OLD CHILDREN- A CROSS-SECTIONAL STUDY

Dental Science

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## ABSTRACT

**BACKGROUND AND AIM:** Prevalence of caries is associated with variables such as age, gender, drinking water, sweet consumption, brushing frequency, mode of teeth cleaning and level of oral cleanliness. The objective of this study is to know the prevalence of dental caries in school children of of 6-12 years of age in Shirur village of Udupi district and the association of caries with the identified risk factors.
**MATERIALS & METHODS:** A survey was conducted at Shirur village to assess the prevalence of dental caries and association with identified risk factors. Caries was recorded according to WHO criteria 1997. Oral hygiene status was assessed according to OHI-S (Greene and Vermillion 1964)
**RESULTS:** In the deciduous dentition, 8 year old shows a highest prevalence and the lowest prevalence in the 12 year age group. The dmf scores declined progressively as age increased. In the permanent dentition, 12 year old children showed a highest prevalence and the lowest prevalence in the 6 year age group. DMF scores increased progressively with age.
**CONCLUSION:** The above study yields valuable data on the caries prevalence and severity in the above mentioned population. This will enable public health authorities to plan preventive and curative interventions for this segment of the population.

## KEYWORDS

Dental Caries, Prevalence, Dmft, Dmft, Risk Assessment.

## INTRODUCTION

Caries is a multifactorial disease biofilm mediated. Among other reasons, its importance is due to the fact that it is one of the most prevalent diseases worldwide. Its prevalence among children and adolescents living in developed countries has decreased significantly in recent decades, increasing the number of caries-free subjects.[1,2]

Dental caries is the most common type of oral health problem globally. Despite credible scientific advances and the fact that caries is preventable, the disease continues to be a major public health problem. In developing countries, changing lifestyles and dietary patterns are markedly increasing incidence of caries.[3,4]

Habits children acquire early in life continue to shape attitude and lifestyle choices they make as adults. Thus, good oral hygiene and dietary habits adopted at an early age ensure optimal oral health later in life. In accordance with the Social Learning theory these habits are largely acquired through observational learning and modeling. For a child, significant others are primarily, the parents and immediate family members.[5,6]

Dental caries is known to have multifactorial etiology with a number of variables that influence the prevalence of the condition. In the past, innumerable studies and surveys have been conducted to determine the prevalence of the disease and the variables associated with its prevalence across the globe. Still a number of towns and districts lack data on the prevalence of oral health problems which is very essential to formulate an action plan to combat them.[7,8]

Parents inculcate good habits in their children based on their own attitudes and beliefs. Various intergeneration processes connect parental oral health status with that of their offspring. [2],[3] At the age of 5 years, a child's dietary choices and oral hygiene behavior, and consequently their dental health is predominantly dictated by their care givers. The choices parents make are influenced by a variety of factors which include their oral health attitudes, behaviors as well as various socio-demographic factors.

Voluminous literature exists on the status of dental caries in the Indian population. Despite several attempts to cure and prevent the disease, its prevalence has increased over the last couple of decades. These changing trends in the prevalence of dental caries need continuous understanding and investigation. Thus, review of the past and prediction of the future is the need of the hour.[9]

Information on caries prevalence and severity forms the basis for the magnitude and quality of caries prevention programs and treatment needs in a population. Therefore, a continuous need remains to field caries prevalence and severity information.[1,10]

The present study was undertaken to study the prevalence of dental caries in school children 6-12 years of age and association of caries with factors like age, sex, diet, sweet consumption, mode of tooth cleaning and oral cleanliness.

## MATERIALS & METHODS

A study on the prevalence of dental caries in school going children of 6-12 years in District was undertaken by the Department of Pedodontics and Preventive Dentistry. Sample populations of all primary school children of 6-12 years of were included in the study.

### METHOD OF COLLECTION OF DATA:

Information and lists of government and unaided schools in Shirur village was obtained from the Block Education Officer, Byndoor. Approval to conduct the study was obtained from the Block Education Officer for the government schools. In case of unaided schools, consent for the examination was obtained from the respective heads of the institutions. Sample included all the primary school students in the 6-12 years age group of Shirur village.

### INCLUSION CRITERIA:

Primary school going children of 6 to 12 years of age of schools located.

### EXCLUSION CRITERIA:

Children below 6 and above 12 years of age.

The survey was carried out using a specific proforma which consists of two parts. First part consists of a questionnaire to collect information of the school children's demographic data, oral hygiene practices, dietary habits and source of drinking water at school. The second part consisted of the clinical examination.

Depending on the physical conditions of the school, exact arrangements for examination were made. Subjects were examined on an upright chair in adequate natural daylight. Subjects were not allowed to crowd around the examination chair, to allow for sufficient light and to prevent errors during examination and recording.

Examination was undertaken by a single examiner to avoid inter examiner variability. Recording was done by a trained person who assisted throughout the study. Chemical sterilization (5% glutara ldehyde) was used to sterilize the instruments. Clinical examination - Caries was recorded as per WHO criteria (1997). The CPI probe should be used to confirm visual evidence of caries on the occlusal, buccal and lingual surfaces. The C.P.I probe has a .5 mm ball at the tip and markings at 3.5,8.5 and 11.5mm. It has color coding from 3.5 - 5.5 mm.

Total of 4 posterior and 2 anterior teeth are examined. In the posterior

segment, the first fully erupted teeth distal to 2nd bicuspid, usually the 1st molar but sometimes the 2nd or 3rd molar is examined in each quadrent. The buccal surfaces of upper molars and lingual surface of lower molars are examined. In the anterior segment, the labial surface of upper right and the lower left incisor are scored. In the absence of either of these, the central incisor of the opposite side is substituted. Only fully erupted teeth are scored. Natural teeth with full crown restorations and surfaces reduced in height by caries or trauma are not scored.

In schools where well water was used for drinking, samples for water analysis were collected in clean poly pet bottles of 1 litre capacity. A string was attached to the neck of the bottle and bottle is lowered into the well and allowed to fill up. The bottle was then raised and lid replaced immediately. Bottles were labelled regarding serial number, place and time of collection of sample.

In schools where tap water was available, sample was collected from the tap used for drinking water. Water was allowed to run for 2 minutes to discharge stagnant water in service pipe and water was filled from a gentle stream avoiding splashing. Bottle was then covered and labelled. Cyber scan Ion 510 was used for the fluoride analysis of the water.

**METHOD:**

2 point calibration of the instrument was undertaken prior to the testing of water samples at 1 and 10 ppm. To 50 ml of water, add 50 ml of TISAB (Total Ionic Strength Adjustment Buffer). The Fluoride ion selective electrode was placed in the solution for measurement of fluoride concentration .The fluoride content of water can be read out directly from the digital display. Before the testing of the next sample, the electrode was washed with de ionized water.

**RESULTS**

A study to evaluate the prevalence of dental caries was conducted on a sample of 2450 children of 6-12 years of age. Caries was related to age, sex, diet, socioeconomic status, sugar consumption and mode and frequency of tooth cleaning. Out of the total 2450 children, there were 1425 male and 1025 females.

In the deciduous dentition, 9 year old shows a highest prevalence of 83.5% and the lowest prevalence of 26.5% in the 12 year age group. The relation of age with caries prevalence in the primary dentition was very highly significant. In the permanent dentition, 12 year old children showed a highest prevalence of 30.6% and the lowest prevalence of 6.6% in the 6 year age group. The relation of age with caries prevalence in the permanent dentition was very highly significant.

The prevalence of dental caries in males for the deciduous dentition was higher (74.2%) when compared to female students (69.2%). However the difference was not statistically significant. The prevalence of dental caries in females for the permanent dentition was higher (19.2%) when compared to male students (13.2%). However the difference was not statistically significant.

**Table `1: Prevalence of dental caries in deciduous dentition as per sex**

| | | Male (%) | Female (%) |
|---|---|---|---|
| dmf | Caries free | 25.8 | 30.8 |
| | With Caries | 74.2 | 69.2 |
| Total | | 100 | 100 |

**Table `2: Prevalence of dental caries in permanent dentition as per sex**

| | | Male (%) | Female (%) |
|---|---|---|---|
| DMF | Caries free | 80.8 | 86.8 |
| | With Caries | 19.2 | 13.2 |
| Total | | 100 | 100 |

**Table 3: Comparison in respect to diet**

| | | Mix (%) | Veg (%) |
|---|---|---|---|
| dmf | Caries free | 29.8 | 30.5 |
| | With Caries | 70.2 | 69.5 |
| Total | | 100 | 100 |

**Table 4: : Comparison in respect to diet**

| | | Mix (%) | Veg (%) |
|---|---|---|---|
| DMF | Caries free | 87.1 | 84.8 |
| | With Caries | 12.9 | 15.2 |
| Total | | 100 | 100 |

In the deciduous dentition, the prevalence of caries was slightly higher in the children using a mixed diet (70.2%) than those on a vegetarian diet. (69.5%). The results are not statistically significant. In the permanent dentition, the prevalence of caries was slightly higher in the children using a vegetarian diet (15.2 %) than those on a mixed diet (12.9%). The results are not statistically significant.

The prevalence and severity of dental caries in the deciduous dentition progressively increased as sweet consumption increased from 68.3% in the low consumption group to 71.2% in children with high sweet consumption. These results were very highly significant. The prevalence and severity of dental caries in the permanent dentition progressively increased as sweet consumption increased from 19.2% in the low consumption group to 11.3% in children with high sweet consumption. These results were not significant.

The prevalence of dental caries in relation to source of drinking water at school was 63.7% for well water and 62.6% for bore well water. The results were not significant. In the permanent dentition, the prevalence of dental caries in relation to source of drinking water at school was 11.4% for well water and 35.2 % for bore well water. The results are very highly significant.

The caries prevalence and mean dmf scores in children who brush once daily 69% was higher than in those children who brush twice a day 48.9%. These results were very highly significant. The caries prevalence and mean DMF scores in children who brush once, twice and after every meal were 11.2%, 18.1% and 0% respectively. These results were very highly significant.

**DISCUSSION**

Caries is the most prevalent disease in children. Despite credible scientific advances and the fact that caries is preventable, the disease continues to be a major public health problem. In developing countries, changing life styles and dietary patterns are markedly increasing caries incidence.[11]

Universal sampling method was followed in this study and total number of children examined was 2,450. The age group selected was 6-12 years and this was significant. 12 years is the global monitoring age for dental caries.77 This is because at this age all permanent teeth (except third molars) are erupted. Also it is generally the age at which children leave primary school and therefore in many countries, is the last age at which a reliable sample may be obtained through the school system.

In the deciduous dentition, 9 year old shows a highest prevalence of 83.5% and the lowest prevalence of 26.5% in the 12 year age group. The prevalence of caries for 6 years was 78.6%. Shetty and Tandon[12] observed a prevalence of 71.11% whereas Gaikwad and Indurkar[13] reported a low prevalence of 47.8%.The dmf scores declined progressively as age increased. This may be attributed to the loss of primary teeth as age advances as a result of normal exfoliative process. Rao et al[14] reported similar reduction in dmf scores in their study.

The prevalence of dental caries in males for the deciduous dentition was higher when compared to female students. However in the permanent dentition prevalence of dental caries in females was higher when compared to male students. The difference was not statistically significant. This is in conformity with the study by Shetty and Tandon.

In the deciduous dentition, the prevalence of caries was slightly higher in the children using a mixed diet (63.6%) than those on a vegetarian diet. (62.2%). In the permanent dentition, the prevalence of caries was slightly higher in the children using a vegetarian diet (18.9 %) than those on a mixed diet (16.7%). The results are not statistically significant. These findings are in accordance with the studies by Srinivas and Gangwar and Misra and Shee.[15] However the comparision of dmf values in vegetarians (1.56) and those on a mixed diet (2.54) were significant.

The prevalence and severity of dental caries in the deciduous dentition progressively increased as sweet consumption increased in the low consumption group in children with high sweet consumption. These results were very highly significant. In the permanent dentition, caries

prevalence progressively increased as sweet consumption increased in the low consumption group to children with high sweet consumption. However these results were not statistically significant.

In our study, females are at a greater risk for caries compared to males. Comparison was made between children consuming well and bore well water. The relative risk for bore well water was 1.99. This result is significant. The sample consisted of populations who brushed once daily, twice daily and after every meal. The results were very highly significant for this category. Relative risk for children using toothpowder and tooth brush was lower when compared to children using tooth paste and toothbrush. However the results were not statistically significant.

## CONCLUSION

The data from the present study provides valuable information on the caries prevalence and association of specific risk factors in the above mentioned population. This will enable public health authorities to plan and implement interventions to improve the oral health of this population.

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