

## Prevalence of Dental Caries among Primary School Attendees in Najran-Saudi Arabia

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**Abstract:** The present study was carried out among school age girls in Najran –Saudi Arabia to assess the prevalence of dental caries and to compare the decayed, missing and filled teeth index (DMFT Index) of two students groups. Furthermore the influences of age, parents education, frequency of sweets consumption per day, frequency of teeth brushing, genetic predisposition, family illiteracy, non-acquaintance of the importance of mouth hygiene as well as the ignorance of students on incidence of dental caries were also investigated. A total number of 192 girl students were selected from 3 different public primary schools. The subjects were grouped into two groups according to age. Group I was 10 - 11 years old (n=96) and group II was 12 - 13 years old (n=96). The principal method of data collection was a semi structured open-ended questionnaire and interview, beside a clinical examination. The incidence of dental caries was significantly high ( $p < 0.001$ ) in group I compared to group II. The DMFT index for group I was 3.83 while that of group II was 3.04. About 34.37% of the subjects surveyed brush their teeth at least twice a day and only 24.31% of them know about fluoridated toothpaste. About 83.85% of the families of the studied subjects have a positive history of dental caries. Dental caries prevalence was significantly high ( $P < 0.001$ ) among subjects who consume sweets more than twice a day, students born to illiterate parents, children of families having history of dental caries as well as children who have no idea about the importance of mouth hygiene. In conclusion the prevalence of dental caries is very high among school girl students particularly those aged 10- 11 years. Genetic factors, family illiteracy, non-acquaintance of the importance of mouth hygiene, frequency of sweet consumption per day, frequency of teeth brushing as well as the ignorance of students contribute to this high rate of dental caries.

**Keywords:** Dental caries, primary school attendees, girls, DMFT index.

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### I. Introduction

Dental caries is one of the most common conditions affecting the general health of children. Healthy teeth and the need for oral health care are important for any section of society. Dental caries (tooth decay) remains the most prevalent chronic disease in both children and adults, even though it is largely preventable. Poor oral healthcare has negative impacts on children's development. Toddlers may exhibit poor nutrition and growth when chewing is painful. Older children may miss school days or be distracted due to dental pain. Young people may interact less with their peers and society when they are uncomfortable or embarrassed by the appearance of their teeth. The effects of dental caries on growth and physical, social/emotional, and cognitive development have implications on success and productivity throughout life (Sheiham, 2012).

Harris and Franklin (2004) stated that dental caries is an infective transmittable bacterial disease characterized by a multi-factorial pathology; it is a preventable disease and it can be stopped and even potentially reversed during its early stages. People remain susceptible to the disease throughout their lives. Dental caries is a common disease with low mortality and high morbidity rate that has great impact on the general health of people. It involves an interaction of bacteria, diet, host resistance, and time (Harris and Franklin, 2004). (see Figure 1). In children, dental caries is particularly critical because even following repair the tooth structure becomes vulnerable to destruction.

Harel-Raviv et al., (1996) described caries process as a loss of mineral (demineralization) when the pH of plaque drops below the critical pH value which is 5–6. Redisposition of mineral (remineralization) occurs when the pH of plaque rises. The presence of fluoride reduces the critical pH by 0.5 pH units, thus exerting its protective effect. The tooth lesion develops due to imbalance between demineralization and remineralization but unfortunately the process of remineralization is significantly slower than demineralization (Harel-Raviv et al., 1996).

Modern evidence revealed that there is a continuum of disease states ranging from sub-clinical subsurface changes to more advanced, clinical detectable subsurface caries (called "intact" surface layers) to various stages of more advanced lesions with microscopic and later macroscopic cavitations of enamel and significant involvement of dentine (Ahmed et al., 2007). Reisine and Poster (2001) believe that the risk factors

for dental caries include physical and biological factors (e.g., a high number of cariogenic bacteria and immunological components) and behavioral factors (poor oral hygiene, poor dietary habits, frequent use of oral medication containing sugars, insufficient exposure to fluoride and inadequate use of dental-health-care services). Other risk factors include poverty, deprivation and social status (Reisine and Poster, 2001). In the developed countries, decline in dental caries prevalence has been attributed to population-based preventive programs with use of fluoride, improved participation in oral health programs and changes in oral hygiene and sugar intake habits. On the other hand, in many developing countries an increase in dental caries has resulted from unhealthy dietary habits, limited use of fluoride and poor access to oral health services (Adeniyi Abiola et al., 2009). Burt (1994) stated that any industrialized countries have experienced a decline in dental caries prevalence among children over the past decades. This trend of caries reduction may be ascribed to several factors of which the most important are improved oral hygiene, a more sensible approach to sugar consumption, improved oral hygiene practices, use of fluorides whether systemic or topical, effective use of oral health services, beside establishment of school based preventive programs (Burt, 1994). Despite the extensive and free of charge network of dental health services in Kingdom of Saudi Arabia (KSA) still dental caries is considered one of the major public health problems among schoolchildren. Therefore the present study was carried out to assess the prevalence of dental caries among school age girls in Najran-KSA.

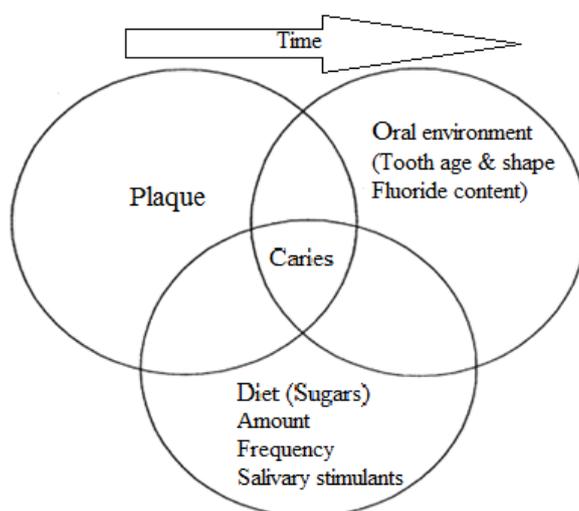


Fig. 1. Schematic diagram for conditions necessary for dental caries development.

## II. Materials And Methods

This is a cross-sectional descriptive study undertaken in Najran city during the period of October 2013 to May 2014. A total number of 192 girl students were selected from 3 different public primary schools. The subjects were grouped into two groups according to age. Group I was 10 - 11 years old (n=96) and group II was 12 - 13 years old (n=96). The principal method of data collection was a semi structured open-ended questionnaire and interview, beside a clinical examination. Structured questionnaires were used for self-administration, whereby the participants were asked about the demographic background, oral health knowledge and attitudes, self-care practices, and utilization of dental health services. Prior to data collection a pilot study was done for assessing the validity and reliability. The school girls were clinically examined in the school's medical rooms by a female dentist according to WHO guidelines. The oral conditions were assessed by using daylight, latex gloves, dental probe and mouth mirror; radiographs were not taken in this study. The examination lasted for 20 minutes. The dental caries was assessed using the decayed, missing and filled teeth index (DMFT Index).

## III. Statistical Methods

Data were analyzed using statistical package for social sciences version 20 (SPSS, Chicago, Illinois, USA). Descriptive statistics were calculated for every measured variable, in order to evaluate the studied sample. Differences between groups were determined with Chi-<sup>2</sup> and two-way ANOVA when necessary. Probabilities of  $p < 0.05$  were considered statistically significant.

#### IV. Study Sample Characteristics

Table (1) shows the characteristics of the surveyed sample.

Table (1): Composition of the surveyed sample

| School type*                      | Group | Age in years | Number of girl students | Percentage |
|-----------------------------------|-------|--------------|-------------------------|------------|
| 6 <sup>th</sup> Primary school    | I     | 10 - 11      | 32                      | 33.3%      |
|                                   | II    | 12 - 13      | 32                      |            |
| 10 <sup>th</sup> Primary school   | I     | 10 - 11      | 32                      | 33.3%      |
|                                   | II    | 12 - 13      | 32                      |            |
| 25 <sup>th</sup> Primary school   | I     | 10 - 11      | 32                      | 33.3%      |
|                                   | II    | 12 - 13      | 32                      |            |
| Total number of students surveyed |       |              | 192                     | 100%       |

\* Name given to School by ministry of education.

#### V. Results

About 34.37% of the subjects surveyed brush their teeth at least twice a day, and only 24.31% of the respondents don't know about the fluoridated toothpastes. Furthermore the majority of students (58.85%) started brushing their teeth after attending the schools and 98.61% of them claimed that they don't visit dentists unless they feel pain. The percentage of dental caries was significantly high ( $P < 0.001$ ) among subjects who consume sweets more than twice a day compared to those who consume sweets once or less (2).

Table 2. The association between dental caries & frequency of taking sweets (sugary food).

<sup>a,b</sup> Values with different superscripts in the same column differ ( $p < 0.001$ ).

| Frequency of taking sugary food | No. of students with healthy teeth (%) |             | No. of students with unhealthy teeth (%) |                          | Total (%)                |
|---------------------------------|--|-------------|--|--------------------------|--------------------------|
|                                 | Group I                                | Group II    | Group I                                  | Group II                 |                          |
| Once or less a day              | 05 (2.6%)                              | 09 (4.59%)  | 06 (3.13%) <sup>a</sup>                  | 08 (4.17%) <sup>a</sup>  | 28 (14.6%) <sup>a</sup>  |
| Twice a day or more             | 18 (9.38%)                             | 23 (11.98%) | 67 (34.9%) <sup>b</sup>                  | 56 (29.17%) <sup>b</sup> | 164 (85.4%) <sup>b</sup> |
| Total                           | 23 (11.9%)                             | 32 (16.6%)  | 73 (37.2%)                               | 64 (33.3%)               | 192 (100%)               |

Table (3) represents the clinical examination's results of the selected subjects. The overall incidence of dental caries is 71.35% among children in both groups. Group I (age =10-11) showed a significantly high ( $p < 0.001$ ) dental caries (76.04%) compared to group II (66.6%). Also DMFT index was higher ( $p < 0.01$ ) for group I compared to group II (Fig. 2).

Table (3): Incidence of dental caries in the two groups of girl students examined.

| Groups | Students with           |                         |                         |                        | No. of students with unhealthy teeth (%) |
|--------|-------------------------|-------------------------|-------------------------|------------------------|--|
|        | Healthy teeth No. (%)   | Decayed teeth No. (%)   | Missing teeth No. (%)   | Filled teeth No. (%)   |  |
| I      | 23 (11.98) <sup>a</sup> | 39 (20.31) <sup>a</sup> | 25 (13.02) <sup>a</sup> | 9 (4.69) <sup>a</sup>  | 73 (76.04) <sup>a</sup>                  |
| II     | 32 (16.67) <sup>b</sup> | 25 (13.02) <sup>b</sup> | 15 (7.81) <sup>b</sup>  | 24 (12.5) <sup>b</sup> | 64 (66.67) <sup>b</sup>                  |
| Total  | 55 (28.65)              | 64 (33.33)              | 40 (20.83)              | 33 (17.19)             | 137 (71.35)                              |

<sup>a,b</sup> Values with different superscripts in the same column differ ( $p < 0.001$ ).

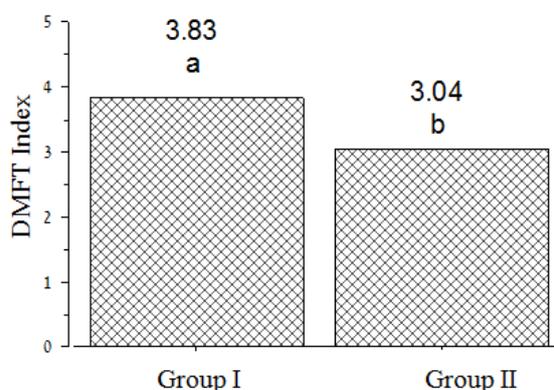


Figure 2: DMFT index for group I and group II. <sup>a,b</sup>  $p < 0.01$ .

The findings also showed that 83.85% of the participants' families have positive family history for dental caries. Parents' level of education had been studied too, the results reflects that children of low parents

education level experienced significantly higher ( $p < 0.001$ ) prevalence rate of dental caries than those of higher level of education as represented in figure (3).

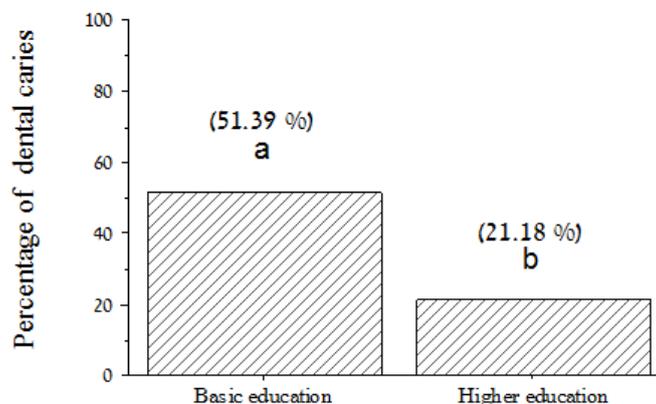


Figure 3: Influence of parents' level of education on children' dental caries incidence. <sup>a, b</sup>  $p < 0.001$ .

## VI. Discussion

Oral disease is a major public health problem due to the high prevalence in all regions of the world and the greatest impact on people's life. Determining the prevalence of dental caries is a necessary step for health care planners to identify resources needed for dental services in the community and to provide preventive and curative services to combat dental health problems. The 71.53% rate of dental caries that documented in our study for primary-school children is high and considered as an endemic problem of high prevalence among school students. From the findings of this study, caries experience among schoolchildren remained a significant problem despite the fact that the school based dental programs in Saudi Arabia were launched. Similar studies by Reisine and Poster (2001) in Saudi Arabia reported high rates of dental caries and other related tooth mortality in the range of 44% and 68% among both primary-school children and the young population in general. Studies from other developing countries reported similarly high rates. Isamil et al. (2009) argued that in many Arab countries, dental caries increasing over time, especially since the relatively recent economic growth, which has resulted in an increased consumption of refined sugar, higher than other developing countries (Burt 1994). The same findings of high prevalence of dental caries was reported by Hamissi, et al., (2008) in their study that done in Iran where the prevalence of dental caries was (75.5%).

According to our study the mean DMFT among children aged 10 -11 years old is higher than those aged 12 -13 years old. A similar rate was reported in adolescents in Kuwait (Vigild et al. 2000). Although the rate of DMFT is similar however the affected groups are different. These differences in findings could be attributed to difference in size of sample population, age selection, type of sampling, different population's cultures, or even gender. Our study findings also highlighted the strong relation between genetic factor and the occurrence of dental caries. These findings agree with the findings of Ling et al. (2003) who argued that genetic factor has impact on oral health status.

## VII. Conclusion And Recommendations

In conclusion the prevalence of dental caries is very high among school students particularly children aged 10- 11 years. Genetic factors, family illiteracy, non-acquaintance of the importance of mouth hygiene, frequency of sweet consumption per day, frequency of teeth brushing as well as the ignorance of students contribute to this high rate of dental caries.

The evaluation of caries risk is important. It gives an opportunity to improve hygiene, diet, and implement preventive measures in an exposed population.

This survey study reflects an alarmingly high rate of dental caries among schoolchildren in Najran (KSA) with greater prevalence among younger children. Although results from the study should be interpreted with caution as simple survey assessment methods were used, the findings can form a basis for planning dental health programs for this age group.

Consanguineous marriage is very common among the inhabitants of Najran and this could be the source of the genetic factor behind the high incidence of dental caries.

Furthermore such school surveys can enhance preventive measures in dental care, including sound oral hygiene and diet modification in these young and easily targeted schoolchildren.

The concerned authorities must curb dental caries among school students and strive to spread the culture of mouth hygiene in the country.

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