Original Article

Dental Caries Determinants in High School Students of Public Sector in District Sialkot

Dental Caries Determinants in Students

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ABSTRACT

Objective: To find out the determinants of dental caries in the high school children at public sector in district Sialkot.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Dental Materials, Islam Dental College Sialkot. from June 2017 to December 2017.

Materials and Methods: In this study 382 high school children of 9 public sector girls (4) and boys (5) high schools in district Sialkot were included. Simple random sampling technique was applied. Study tool was a questionnaire. The data was analyzed using SPSS version 24.0.

Results: Almost 62.83% of children had dental problems in the past and about 52.9% missed school due to dental pain. Almost 87.4% of the children ate sweets several times a week. About 37.2% had never visited a dentist.A strong association ($p \leq 0.05\%$) was found between dental caries and high intake of sweets, chocolates, juices, fizzy drinks etc. and poor oral hygiene practice.

Conclusion: Students consuming moderate carbohydrates and sugars, were less susceptible to dental caries. The maintained oral hygiene was one of the possible reasons. We can say that moderate sugar intake with regular brushing, at least twice daily with fluoridated toothpaste is essential to minimize the chances of dental cavities.

Key Words: Prevalence, Dental Caries, Tooth Decay, District Sialkot

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INTRODUCTION

Dental caries is a contagious illness that destroys the mineralized portion of the tooth. It is described as "an irreparable bacterial disease of the tooth, in which dead substance of the tooth is deprived of minerals and living portion of the tooth is impaired that results in the formation of empty space within tooth called cavitation". For this to occur, an association of four factors is required: a vulnerable tooth surface, presence of certain bacteria in dental plaque, duration of exposure and a carbohydrates rich diet, mainly sugars. Caries is derived from a Latin word which means, 'rotten'[1].

Dental caries is one of the most common childhood diseases, affecting a large population of the world. Dental caries is identified as one of the important problems among school children. It has shown that age range of 11–14 years is highest risk group[2]. In the United States and Europe, about sixty to eighty percent patients of tooth decay have been reported in children[3].

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In the United Kingdom, in a national survey in 2003, 34% of 12 year olds and 49% of 15 year olds had detectable carious lesion[4]. Dental caries is a process that involves an imbalance of demineralization and re-mineralization activities in the dental surface due to intermittent acid attack[5]. Sugar intake in form of candy, honey, pastries and soft drink produces acid that destroy mineralized tooth structure[6]. It is known that poor oral hygiene is related to increased risk for caries development whereas accurate tooth brushing lowers the prevalence of dental caries[7]. Besides the main etiological factors, bacteria like streptococcus mutans and lactobacilli and salivary secretion and buffering capacity are also risk factors for dental caries[8]. It is now accepted that it is not amount but frequency of carbohydrate ingestion is important in the etiology of dental caries[9].

Oral health is a public health issue that affects children and impairs their quality of life. This disease causes pain, discomfort and has a high morbidity potential. Furthermore, it puts a financial burden on public health services. WHO has revealed that almost 60-90% of the school going children have dental caries experience globally[10]. About 2.43 billion young people and almost 620 million children of the world are having dental caries in their teeth. Majority of cases of dental caries have been reported in Latin America, South Asia and Middle East[11]. Every year, children loss almost fifty-one million school hours because of dental caries which is the second-most common adverse health state[12]. Dental caries complications are cavernous sinus

thrombosis or Ludwig angina which is characterized by infection of the soft tissues around the tooth and can be even life-threatening[13]. In Pakistan,prevalence of dental caries is 50-70% and it is due to the inadequate access to oral health care[14].

Despite oral health promotion in the developed and developing countries, oral diseases are still considered a health issue worldwide. Caries prevention is one of the most important strategies in many countries. It is recommended, that for maintaining good oral health, tooth brushing with fluoridated toothpaste twice daily is best practice[15]. The levels of antioxidants change in response to an infection or inflammation or disease[16]. Salivary peroxidase controls oral bacteria which lead to dental caries. It has been shown that total protein and total antioxidant level of saliva were increased with caries activity[17]. No epidemiological studies done so far to evaluate the dental caries in high school children of district Sialkot so this study is conducted in public sector school children to find out the determinants of dental caries. Educating the people regarding the awareness of these determinants may result in reduction of this disease.

MATERIALS AND METHODS

This study was conducted at the Department of Dental Materials, Islam Dental College Sialkot. from June 2017 to December 2017. Sampling frame was made which included listing of all the public schools in district Sialkot. List was obtained from DDO /EDO Education. Schools were selected by convenient sampling method. Selected schools name are Government Boys M.C E/S High School, Government Girls High School HabibPura, Sialkot, Government. High School, AdalatGarah, Sialkot, Government Lady Anderson Girls High School, Sialkot, Government Higher Secondary School ,Sialkot City, Sialkot, Government Pilot Higher Secondary School, Sialkot, Government Girls High School Dharowal, Sialkot, Government Boys High School, Gunna, Sialkot, Government Boys High School, Badiana, Sialkot.

Informed consent was obtained from participants to fill up the questionnaire. In this study, 382 children at public sector high schools in district Sialkot were included. Simple random sampling technique utilized. One boys and one girls school was visited weekly from 9a.m.to 1 p.m. with aim of taking response of 76 students in a week. It took 5 weeks to get sample of 382 students. Inclusion criteria included students in public sector schools in district Sialkot, age range 12 – 16 years and belonging to district Sialkot. Exclusion criteria were residents other than the district Sialkot, private school students and non-cooperative students.

Ethical approvals were obtained from the concerned authority and verbal permission was obtained from participants. The response of participants was recorded on questionnaire. The questionnaire was in English and contained questions on variables of dental caries. Students of grade 6 and 7 needed guidance while grade 8 to 10 students filled the questionnaire conveniently. The data was entered and analyzed using SPSS version 24.0. Data is shown in tables and figures.

RESULTS

Table 1: Depicts that out of 382 participants, **67.74%** students of all schools were from class 8th whereas **65.11%** students were from class 6th the second highest. This includes all schools and both gender.

Table No.1: Screening results (n=382)

Have you suffered from any dental problem in the past					
		Yes	No	Total	Percentage who suffered Caries
Classes	6th	56	30	86	65.11%
	7th	63	44	107	58.88%
	8th	63	30	93	67.74%
	9th	41	28	69	59.42%
	10th	17	10	27	62.96%
Total		240	142	382	62.83%

Table No.2: Association between Mother Education and Dental Caries.

Have you suffered from any dental problem in the past?		Yes	No		%age suffered
Mother Education	<Primary	1	1	2	50%
	Primary-SSC	79	45	124	63.71%
	HSSC-Graduate	146	88	234	62.39%
	Masters	14	8	22	47.40%
Total		240	142	382	62.83%

Chi square = 3.39, df = 3, P value = 0.01

Table No.3: Association between Monthly Income and Dental Caries.

Monthly Income versus dental Caries					%age of affected children
Have you suffered from any dental problem in the past?					
		Yes	No		
Monthly Income	15000-25000	39	15	54	72.22%
	25000-35000	144	97	241	59.75%
	35000-45000	43	24	67	64.18%
	>45000	14	6	20	70%
Total		240	142	382	62.83%

Chi square = 0.207, df = 3, P value = 0.006

Table 2: Association between Mother Education and Dental Problem (Caries). Well educated mothers' children will have regular dental checkup with good brushing habits. Mothers' education of **63.71%** students was high school. Lowest affected students were the

children of mothers who were qualified up to master's level, i.e. 47%.

Table 3: Association between Monthly Income and Dental Problem (Caries).About **72.22%** students from all schools were from lowest socioeconomic status. Students from high socioeconomic level were eating unhealthy or Junk food which shows that lack of oral hygiene and selection of unhealthy foods contribute to dental caries.

Table 4: Association between Regular Tooth brushing and Dental Caries

Table 5: Association between Eating Chocolates and Dental Caries**.**

Table No.4: Association between Regular Tooth brushing and Dental Caries.

		Dental Caries found			%age of affected students.
		Yes	No		
Do you brush your teeth?	Yes	236	135	371	63.61%
	No	4	7	11	36.36%
Total		240	142	382	62.83%

Chi square = .065, df = 1, P value = 0.066

Table No.5: Association between Eating Chocolates and Dental Caries.

		Dental Caries Found.		Total	Percentage of affected students
		Yes	No		
Do you eat chocolates?	Yes	222	132	354	62.71%
	No	18	10	28	64.29%
Total		240	142	382	62.83%

Chi square = .028, df = 1, P value =.027

DISCUSSION

The study shows the assessment of risk factors for caries such as high frequency of cariogenic food intake, inadequate oral hygiene care, insufficient fluoride exposure, poor oral hygiene, inappropriate methods of tooth brushing and poverty. The approach to primary prevention should be based on common risk factors. The results of the study were similar to a cross-sectional study conducted by Umer MF, et al in four schools of Sargodha district[18]. The incidence of dental caries was found higher in children who did not brush their teeth or brushed occasionally. The study also showed that children never visited the dentist for treatment. The current study confirmed the association of dental caries and role of sugars. Sugars and other carbohydrates provide substrate for the actions of oral bacteria, which in turn lower plaque and salivary ph. The resultant action is tooth demineralization. Many factors in addition to sugars affect the caries process, including the form of food, the duration of exposure, nutrient composition, sequence of eating and oral hygiene. The current study has confirmed the direct relation between intake of dietary sugars and dental caries during growing age. Since the introduction of fluoride, the incidence of caries worldwide has decreased, despite increases in sugars consumption. S Abdullah, et al studied determinants of dental caries to find out any possible association of caries with oral hygiene and food habits. In this study 543patients with dental caries between 6-9 years were selected from dental OPD of Children's Hospital, PIMS, Islamabad. They concluded that substandard oral health and sucrose rich diet increases the likelihood of dental caries[19].

Similarly across sectional study was carried out to calculate the caries frequency and risk factor in 12-15 years school children in Malir Town, Karachi. The prevalence of dental caries observed was 66.67%[20]. The dental caries increased as the age increased from 12 to 15 year. The current study shows that excessive use of sugars as cakes, biscuits and chocolates triggers high teeth problems. Even the use of fruit juices and milk or tea with sugars is damaging for the teeth. Moreover, the analysis of the association speaks volumes regarding the findings of the research.

Similar results were shown by a cross-sectional study that was conducted in North West Ethiopia among 280 patients attending Debre Tabor General Hospital dental clinic. Prevalence of dental caries was found high. Socioeconomic status, literacy level, and poor oral hygiene were associated factors for dental caries[21]. Another similar study was conducted by LonimPrasai Dixit and his team at Chepang School, Nepal. The study reported 31% school children aged 8-16-year old suffered oral pain. The brushing habit was reportedly low with only 24% of the children brushing twice daily[22].

CONCLUSION

According to this study, the determinants of dental caries in high school children of district Sialkot were, lack of awareness about oral hygiene measures in parents, limited knowledge of tooth brushing techniques, fluoride toothpaste and flossing because of low socioeconomic status.

Frequently, high intake of carbohydrates and sugar containing food makes children prone to dental caries. Age range of 12 -16 year is important because of deep pits and fissures of permanent teeth, growth hormones in children causes more craving for sweets, change in eating habits in school and home and self-selection of food. Lack of frequent dental visits or visit only when there is severe pain due to poor socioeconomic status and lack of awareness were the other factors. Unavailability of fluoridated water in many areas of community makes dental tissues more prone to carious attack. Lastly, unavailability of preventive care strategies and fluoridation methods in many areas of district Sialkot increased the risk of carious attack in school children in public sector.

Recommendations

- Oral hygiene awareness for brushing teeth with fluoride-containing toothpaste in children.
- The health department and NGOs must play their role to boost the knowledge of population through electronic and print media about dental caries, its significant factors and safety measures.
- Awareness and counseling of parents regarding role of nutrition and dietary modifications to reduce caries risk in children.
- Non cariogenic foods for snacks should be used for munching
- Cariogenic food should be limited to mealtime and should be avoided between meals.
- Cariogenic foods should be immediately cleared from the child's mouth by tooth brushing or by consumption of protective foods.
- Sugar snacks that are slowly eaten should be restricted e.g. candy, cough drops, lollipops and suckers.
- Limiting the access to regular soda and powdered beverages among children.
- Increasing plain water, milk, and milk products consumption.
- Using xylitol-containing products to help in preventing dental caries especially while targeting high-risk populations.
- Further studies may be recommended to establish the prevalence of dental caries in Sialkot district as a whole including non-school going children.

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Author's Contribution:

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