ORIGINAL RESEARCH

Influence of Sociodemographic Factors, Oral Health Practices, and Sugar Consumption on Dental Caries Among 15-Year-Old Schoolchildren in Patna, Bihar.

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Abstract:
Introduction: Dental caries is the most common cause of disturbances of normal functions in the oral cavity and lack of preventive and curative measures have further worsened the situation. It is the most common non-communicable disease in the world.
Aim of the study: To assess the influence of Sociodemographic Factors, Oral Health Practices, and Sugar Consumption on Dental Caries Among 15-Year-Old Schoolchildren in Patna, Bihar.
Material & methods: The present cross-sectional study was conducted to among 600 children aged 15 years of Patna, Bihar in which DMFT along A pre-tested self-administered questionnaire along with socioeconomic status recorded using pre-validated questionnaire modified Kuppuswamy socioeconomic scale updated for the year 2019. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA) and the level of significance was set at $p < 0.05$.
Results: The mean ± SD was 0.10 ± 0.54, whereas when SES class III-IV were associated with DMFT, the mean ± SD was 0.41 ± 0.71 & watch out zone sweet score was associated with DMFT, the mean ± SD was 0.31 ± 0.62 & frequency of brushing once a day was associated with DMFT results was found to be statistically significant.
Conclusion: In this study population, dental caries with socioeconomic status and life style (oral hygiene and dietary habits) were assessed and showed the correlation. All the factors considered in the study are interrelated and health promoting strategies will only improve children wellbeing and provide them with good quality of life.
Keywords: DMFT, Oral hygiene Practice, SES, Sweet score.

Introduction:

"Oral Health" enables an individual to speak, eat and socialise without active disease, discomfort or embarrassment. Oral health is fundamental to general health and wellbeing, significantly impacting on quality of life.[1] Oral health is now recognised as equally important in relation to general health. Dental caries and periodontal diseases are the two foremost oral pathologies that remain widely prevalent and affect all populations throughout the lifespan. Various factors like nutritional status, tobacco smoking, alcohol, hygiene, stress, etc. are linked to a wide range of oral diseases forming the fundamental basis of the common risk factor approach (World Health Organisation, 2000) to prevent the oral diseases.[2] The health and well-being of school children has become a significant issue as this has been used for numerous government initiative and policies and receiving considerable public attention.

Schools provide an effective platform for promoting oral health as they reach over one billion children worldwide. The health and well-being of school staff, families and community members can also be enhanced by programmes based in schools.Children who suffer from poor oral health are 12 times more likely to have more restricted-activity days including missing school than those who do not.[3]

Tooth decay and gum disease are among the most widespread conditions in human populations, affecting over 80% of schoolchildren in many countries[4]. Children who suffer from poor oral health are 12 times more likely to have restricted-activity days than those who do not[5]. More than 50 million school hours are lost annually because of oral health problems which affect children's performance at school and success in later life.[6]Dental caries is the most common cause of disturbances of normal functions in the oral cavity and lack of preventive and curative measures have further worsened the situation. It is the most common non-communicable disease in the world (Beaglehole, et al., the oral health atlas 2009)[7].

Various studies carried out across the country and found the prevalence of dental caries to be the highest in 15-year-olds, followed by 5 and 12-year-olds (62.02, 48.11, and 43.34% respectively). Lack of knowledge has been considered as an obstacle for improvement of oral health. Knowledge related to oral health has been accepted as

a prerequisite for health-related behaviour. Research has shown that children with good oral health habits had high knowledge on oral health. As the age of the child increases, the level of its knowledge on oral health is expected to increase from home, school, and social experiences. Age seems to have an influence on the oral health status and the knowledge of children on oral health.[8]

As recommended by the WHO, the 15-year-old age group was the standard age group for the surveillance of oral health conditions among adoloscents. By utilizing data of this age group, health planners and decision makers can assess the full effect of dental caries, the level of severe periodontal involvement, and the general effects of oral health care provided. Hence, the present study was done to assess the influence of Sociodemographic Factors, Oral Health Practices, and Sugar Consumption on Dental Caries Among 15-Year-Old Schoolchildren in Patna, Bihar.

Material and Methods: The present Descriptive cross-sectional study conducted among 15-year-old school children of Patna for the period of four months from January 2019 to April 2019. Prior to the start of the study, a protocol of the intended study was presented to the Institutional Ethical Review Board and ethical clearance for the present study has been obtained. Official permission was obtained from the district educational officer Patna. Informed consent was obtained from the respective school headmasters and parents of the children.

Sample Size Calculations: A pilot study was carried out among 50 school children aged 15-year-old from one private and one public school. Based on this sample size was decided Considering power of the study as 80% and a design effect of 1 the sample size was decided withn = 566. However, an additional 20% were included in the study to compensate for potential refusals. The sample size was determined to be 598 which was rounded up to 600. A total of 600 school going children from Patna of 15 years old were enrolled in the study using simple random sampling.

Inclusion and exclusion Criteria: Inclusion criteria for the study was Subjects who are in the age group of 15 year from selected school in Patna and Subjects who give consent. Subjects who are medically compromised and who gave an incomplete questionnaire excluded from study.

Data Collection: Data collection was done through face-to-face interviews using a standardized, pretested questionnaire applied to all participants in the English language. The questionnaire was piloted on a group of twenty cases who were interviewed to gain feedback on the overall acceptability of the questionnaire in terms of length and language clarity. Based on their feedback, the questionnaire did not require any corrections. Cronbach's coefficient was found to be 0.80, which showed an internal reliability of the questionnaire. The mean content validity ratio was calculated as 0.87.

A pre-tested self-administered questionnaire which includes questions related to age, gender, oral hygiene practice, frequency of sugar intake, form & consistency to get sweet score along with socioeconomic status recorded using pre-validated questionnaire modified Kuppuswamy socioeconomic scale updated for the year 2019[9] in which the scale is based upon three components i.e., Occupation of the head of the family, Education of the head of the family and Total monthly income of the family from all sources. The scale yields score of 3–29 and classify the study population into upper, upper middle, lower middle, upper lower and lower.

After the interview, oral clinical examination was conducted in which dental caries were recorded according to the rules and criteria of the DMFT index, was recorded according to the guidelines of WHO Oral Health Assessment Form 2013.[10]

Statistical Analysis: Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). For each assessment point, data were statistically analysed using factorial ANOVA. Difference between two groups was determined using student t-test and the level of significance was set at $p < 0.05$.

Results:

Table 10: Distribution of the study subjects according to their mean Decayed teeth (DT), Missing teeth (MT), Filled teeth (FT) and Dental Caries Experience (DMFT).

VARIABLES	Male		Female		TOTAL		p value (t test)
	Mean	SD	Mean	SD	Mean	SD	
Decayed teeth	0.23	0.55	0.24	0.57	0.23	0.555	0.37
Missing teeth	0.02	0.12	0.01	0.02	0.02	0.100	0.10
Filled teeth	0.02	0.12	0.01	0.02	0.02	0.100	0.10
DMFT	0.28	0.56	0.26	0.57	0.27	0.565	0.76

Table 1showed the mean decayed teeth (DT), Missing teeth (MT), Filled teeth (FT) and mean DMFT score among the study subjects. The total mean decayed teeth component was 0.23 ± 0.555. The mean missing teeth component was 0.02 ± 0.100. The mean filled teeth component was 0.02 ± 0.100. And for total DMFT, the mean score was 0.27 ± 0.565. Among males and females, for decayed teeth component, the mean was 0.23 ± 0.55 and 0.24 ± 0.57 respectively; for missing teeth component, the mean was 0.02 ± 0.12 and 0.01 ± 0.02 respectively; for filled teeth component, the mean was 0.02 ± 0.12 and 0.01 ± 0.02 respectively and lastly for overall DMFT component, the mean was 0.28 ± 0.56 and 0.26 ± 0.57 respectively the results were not statistically significant when compared with gender with p value more than 0.05.

Table 2: Association between Socio-Economic Status with mean decayed, missing, filled and DMFT among the study subjects.

SES		Decayed	Missing	Filled	DMFT
I-II	Mean	0.08	0.01	0.01	0.10
	SD	0.528	0.101	0.101	0.539
III-IV	Mean	0.41	0.00	0.00	0.41
	SD	0.71	0.000	0.000	0.71
t test		28.24	0.07	0.07	26.45
p value		<0.01*	0.94	0.94	<0.01*

*: statistically significant

Table 2 described the association of SES with decayed, missing, filled and DMFT. When SES, upper and upper middle class (class I-II) were associated with DMFT, the mean $\pm$ SD was 0.10 ± 0.54, whereas when SES lower middle class and upper lower class (class III-IV) were associated with DMFT, the mean $\pm$ SD was 0.41 ± 0.71. It showed statistically significant value. When SES, upper and upper middle class (class I-II) were associated with decayed teeth (DT), the mean $\pm$ SD was 0.08 ± 0.53; when associated with missing teeth (MT) the mean $\pm$ SD was 0.01 ± 0.101; when associated with filled teeth (FT) the mean $\pm$ SD was 0.01 ± 0.101. whereas when SES lower middle class and upper lower class (class III-IV) were associated with decayed teeth (DT), the mean $\pm$ SD was 0.41 ± 0.71.

Table 3: Association of sweet score with mean decayed, missing, filled and DMFT.

Sweet Score		Decayed	Missing	Filled	DMFT
Excellent	Mean	0.04	0.00	0.01	0.05
	SD	0.11	0.000	0.101	0.11
Good	Mean	0.25	0.00	0.00	0.25
	SD	0.442	0.000	0.000	0.442
Watch Out Zone	Mean	0.30	0.01	0.00	0.31
	SD	0.618	0.115	0.000	0.623
Anova Test		14.58	0.97	0.17	10.89
p value		<0.01*	0.38	0.77	<0.01*

*: statistically significant

Table 3 highlighted the association of sugar/sweet score with decayed, missing, filled and DMFT. It stated that when excellent sweet score was associated with DMFT, the mean $\pm$ SD was 0.05 ± 0.11, when good sweet score was associated with DMFT, the mean $\pm$ SD was 0.25 ± 0.44, and when watchout zone score was associated with DMFT, the mean $\pm$ SD was 0.31 ± 0.62. It showed statistically significant findings. When the decayed component was associated with the excellent sweet score the mean and SD was 0.04 ± 0.11 for good sweet score it was 0.25 ± 0.44 for the watch out zone it was 0.30 ± 0.61. when the missing component was associated with watch out zone the mean and SD was 0.01 ± 0.101, the filled component associated with excellent sweet score the mean and SD was 0.01 ± 0.115.

Table 4: Association of Oral hygiene practice with mean decayed, missing, filled and DMFT

Oral Hygiene		Decayed	Missing	Filled	DMFT

Practice					
Frequency of Brushing					
Once a Day	Mean	1	0.01	0.00	1.01
	SD	1.04	0.101	0.000	1.04
Twice a Day	Mean	0.22	0.00	0.01	0.23
	SD	0.59	0.000	0.101	0.54
t test		24.34	0.07	0.07	22.27
p value		<0.01*	0.94	0.94	<0.01*
Method of Brushing					
Horizontal	Mean	0.27	0.01	0.00	0.28
	SD	0.61	0.101	0.000	0.61
Combination (Horizontal+ Vertical + Circular)	Mean	0.12	0.00	0.01	0.13
	SD	0.33	0.000	0.101	0.33
t test		7.99	0.07	0.07	10.82
p value		0.005*	0.94	0.94	0.001*

*: statistically significant

Discussion:

Oral diseases are ranked among the most significant of human diseases, mainly because of their high frequency of occurrence. Many epidemiological data show that oral health problems are one of the most commonly observed diseases around the world. These diseases may never be eradicated because of complex interplay of social, behavioral, dietary and biological factors that are found to be associated with their initiation and progression. Hence, the present study was done to assess the influence of Sociodemographic Factors, Oral Health Practices, and Sugar Consumption on Dental Caries Among 15-Year-Old Schoolchildren in Patna, Bihar.

In the present study the Dental caries experience (DMFT score) was higher in males (19.8%) as compared to females (18.1%) This finding was in accordance with the study conducted in Madurai city of Tamil Nadu among 7–17-year-old children by Rajagopalan A et al (2016)[11] which shows highest caries prevalence among males (78.10 %) and females (75.92 %) , the result was in contrast with the another study done by (José O. García-Cortés et al 2009[12]) on Mexican students' males sample were less affected (71.7 % prevalence) and (81 % prevalence) in females ,this can be attributed to the fact that females are more conscious and gives more attention to their oral health wellbeing than males.

The present study showed SES class I-II were associated with DMFT, the mean ± SD was 0.10 ± 0.54, whereas when SES class III-IV were associated with DMFT, the mean ± SD was 0.41 ± 0.71. Similar to study done by Chauhan P et al[13] showed heavy weight children belonged to upper and lower middle class of socioeconomic status and more dental caries was found in upper middle class. The increased caries and increased weight may be due to the mother's low education level and high family income. Less educated mothers were more likely to consume soft drinks and sweets and also permit their children to consume the same than highly educated mothers.

The present study showed excellent sweet score was associated with DMFT, the mean ± SD was 0.05 ± 0.11, when good sweet score was associated with DMFT, the mean ± SD was 0.25 ± 0.44, and when watchout zone score was associated with DMFT, the mean ± SD was 0.31 ± 0.62.Similar to the findings of the present study, Teresa AM, et al[14] conducted a study in 2006and stated that higher exposures to sugars atsnacks increased the risk of caries, which wassimilar to the results of this study where theconsumption of sweets and snacks daily had morecarious lesions than the others. This could be due to the consumption of refined carbohydrates(glucose, sucrose, fructose) provides favourableenvironment for the bacteria to act upon andproduce acids which in turn demineralise the toothstructure. This effect is increased if thecarbohydrate is taken in the form of solid, stickyfoods and if consumed in between meals.

The present study showedfrequency of brushing once a day was associated with DMFT, the mean ± SD was 1.01 ± 1.04, and when frequency of brushing twice a day was associated with DMFT, the mean ± SD was 0.23 ± 0.54.The findings were similar to the studies conducted by Kapoor AK et al., (1980)[15], Sarvanan S et al., (2003)[16]. The high prevalence of dental caries who use these indigent oral hygiene aids could be attributed to the fact that they were applied with finger which might not permit them to clean the inaccessible areas of the oral cavity. It might also be possible that dentifrices deliver active ingredients like fluoride which lead to effective plaque control and prevention of caries.

Our study provided baseline data for dental caries and treatment needs in Patna, children. Within the limits of this study, we could conclude that the dental caries was high in this area. Healthier children are more likely to attend school, and modest improvements in schooling will allow for the continuation of education. Hence, authorities should consider this data and should plan appropriate action strategy to decrease the overall prevalence and unmet treatment need among this target group along with other prevailing general health problems. Oral health promotional activities like use of topical fluoride, teaching and reinforcing appropriate

brushing technique and frequency of brushing, demonstrating plaque using disclosing agents, decreasing the availability of sugar/sweetened food in the school premises and promotion of sugar free (toothfriendly sweets) should be reinforced and recommended.

Conclusion:

In this study population, dental cariessocioeconomic status and life style (oral hygiene and dietary habits) were assessed and shows the correlation. All the factors considered in the study are interrelated and health promoting strategies will only improve children wellbeing and provide them with good quality of life. The population should be made aware on the preventive and restorative care of teeth for better oral hygiene. This can be done at community and individual level. As a member of dental health team, it is critical that dentist maintain awareness of these problems and participate in assessment and prevention of children's obesity and dental caries.

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