



A STUDY TO EVALUATE VARIOUS ASSOCIATED RISK FACTORS RELATED FOR OCCURRENCE OF DENTAL CARIES DURING THE MIXED DENTITION PERIOD (6 TO 12 YEARS) RESIDING IN URBAN AND RURAL AREA OF WARDHA DISTRICT.

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ABSTRACT

Worldwide, 60–90% of school children and nearly 100% of adults have dental cavities. Risk factors for oral diseases include unhealthy diet, tobacco use, harmful alcohol use, and poor oral hygiene. This study was conducted to evaluate various associated risk factors related for occurrence of dental caries during the mixed dentition period (6 to 12 years) residing in urban and rural area of Wardha district. The study was conducted in the two selected schools of Wardha district. School was chosen where child comes from an urban area and other where they came from rural area. It was observed in the rural area that 76.19% caries was reported in those who never ate fruits while overall those who ate fruits reported 51.89%. It was concluded that chances of Dental caries were 3.41 times more in the rural than in urban children.

KEYWORDS : Dental Caries, Biscuits, Jam, Chewing Gum, Mixed Dentition

INTRODUCTION

“Oral health is a state of the mouth and associated structures where disease is contained, future disease is inhibited, the occlusion is sufficient to masticate food and the teeth are of a socially acceptable appearance” defined by Yewe-Dwyer⁽¹⁾. Worldwide, 60–90% of school children and nearly 100% of adults have dental cavities. Dental cavities and periodontal disease are major causes of tooth loss. Complete loss of natural teeth is widespread and particularly affects older people. Globally, about 30% of people aged 65–74 years have no natural teeth. Risk factors for oral diseases include unhealthy diet, tobacco use, harmful alcohol use, and poor oral hygiene⁽²⁾. Good oral hygiene results in a mouth that looks and smells healthy, this means: teeth are clean and free of debris. Gums are pink and do not hurt or bleed when one brushes or floss. Bad breath is not a constant problem⁽³⁾. In growing children, oral health is of most importance as this is stage when shedding of deciduous teeth and eruption of permanent teeth takes place, if caries occur during this stage, it can cause permanent hazard to permanent teeth, which is very much necessary for person to eat food⁽⁴⁾.

Many general disease conditions have oral manifestations that increase the risk of oral disease which, in turn, is a risk factor for a number of general health conditions. There is a strong correlation between several oral diseases and non-communicable chronic diseases and this correlation is due to common risk factors between both diseases. Oral diseases and conditions may have a significant impact on general health conditions and general health also may affect oral health status⁽⁵⁾. Worldwide, 60-90% of school children and nearly 100% of adults have dental cavities, often leading to pain and discomfort. Dental caries is the single most common chronic disease of childhood, occurring five to eight times as frequently as asthma, the second most common chronic disease in children. Despite the reduction in cases of caries in recent years, more than half of all children have caries by the second grade, and, by the time students finish high school, about 80 percent have caries during their schooling⁽⁴⁾. Therefore this study was done to evaluate various associated risk factors related for occurrence of dental caries during the

mixed dentition period (6 to 12 years) in urban and rural area of Wardha district with the following objective;

OBJECTIVE:

To evaluate various associated risk factors related for occurrence of dental caries during the mixed dentition period (6 to 12 years) residing in urban and rural area of Wardha district.

MATERIAL & METHOD:

The study was conducted in the two selected schools of Wardha district. School was chosen where child comes from an urban area and other where they come from rural area. Thus one school forms pool of urban children and other rural. The study was conducted from July 2015 to March 2016. Permission was obtained from the concerned authorities of respective schools and also from the Institutional Ethic Committee (I.E.C) of DMIMS (DU) Sawangi (M). A written consent was taken from the principal of respective school prior to conducting an oral health check-up (verbal concern was taken from the parents on day of examination)

INCLUSION CRITERIA:

Those children whose guardian gave verbal consent for participation in the study, Children of age group 6-12 years, Children who were present in schools on the day of data collection

EXCLUSION CRITERIA:

Physically or mentally challenged children, medically compromised or with gross dental/ Oro-facial defects like cleft lip or cleft palate, Not co-operative, those that do not belong to specific pool, example: schools with urban children pool, the children from rural area were excluded.

Literature review indicated that urban dental caries observed was found to be 47.4% and the rural dental caries was found to be 27%.

Based on the above observations, with α -level of 0.05 and β of 0.05 (Power = 95%), it was estimated that at least 75 individ

uals need to be examined in each group. (26)
 $n = (Z\alpha/2 + Z\beta) 2 \times [P1(1-p1) + p2(1-p2)] / (p1 - p2)^2$
 $= (1.642 + 0.84) 2 \times [0.27(0.73) + 0.47(0.53)] / (0.27 - 0.47)^2$
 ≈ 75 in each group i.e. urban and rural school

DATA COLLECTION PROCEDURE:

A cross sectional comparative study was carried out among 100 school children age 6-12 yrs in two schools at Wardha district. Considering the drop-out rates of 10% and additional 10% were added to 75. Thus sample size became 82.5. Initially school children were selected from rural area. On the day of dental examination, 100 children with guardians were present therefore; all of them were taken as sample for study. Hence in other school also, from where urban children had to be selected, 100 sample sizes were chosen for the study purpose.

DATA ANALYSIS:

Data was entered in MS excel and analyzed by Epi info

version 6 and SPSS 17. Descriptive statistics was used. Inferential statistics like chi square and odds ratio was used evaluate the association with different factors. Cut off point for significance was considered at 5% level. The data thus analyzed was presented in the form of tables, graphs etc.

OBSERVATIONS & RESULT:

Figure-1 Reason for visiting a dentist (pie diagram)

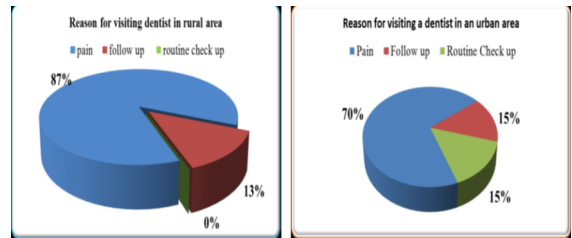


Table 1 Area wise distribution of frequency of intake of fruits with dental caries

Frequency of Intake of Fruits	Rural (n=100)		$\chi^2 = 16.206$ $df=2$ $P=0.000$ S*	Urban (n=100)		$\chi^2 = 0.630$ $df=2$ $P=0.730$ NS*
	Total Children examined	Children with caries		Total Children examined	Children with caries	
Never 16(72.72%)	21	16 (76.19%)		01	0(00.00%)	
Several times month 19(33.92%)	08	05(62.50%)		48	14(29.16%)	
Once a week 26(63.41%)	36	24(66.66%)		05	02(40.00%)	
Several times in a week 06(31.50%)	05	04(80.00%)		14	02(14.28%)	
Every day 18(30.50%)	30	08(26.66%)		29	10(34.48%)	
Several times a day	00	00(00.00%)		03	00(00.00%)	
Total 85(42.50%)	100	57(57.00%)		100	28(28.00%)	

*Chi square applied between rural caries and non caries children and urban caries and non caries non children *S= Significant, NS= Non significant (never & several times a month, once a week & several times a week ,every day & several times a day is added for calculation of chi-square.)

Table 2 Prevalence of Dental caries with respect to Frequency of Biscuit intake in the diet in Rural and Urban area

Frequency of Intake of Biscuit	Rural (n=100)		$\chi^2 = 2.970$ $df=2$ $P=0.538$ NS	Urban(n=100)		$\chi^2 = 0.812$ $df=2$ $P=0.666$ NS
	Total Children Examined	Children with caries		Total Children Examined	Children With caries	
Never 15(53.57%)	19	13 (68.42%)		09	2 (22.22%)	
Several times month 9(29.03%)	02	2 (100.00%)		29	7 (24.13%)	
Once a week 14(58.33%)	21	13 (61.905)		03	1(33.33%)	
Several times week 10(33.33%)	07	04 (57.14%)		23	6 (26.08%)	
Everyday 35(42.68%)	49	24 (48.97%)		33	11 (33.33%)	
Several times a day 2(40.00%)	02	01 (50.00%)		03	01 (33.33%)	
Total 85(42.50%)	100	57 (57.00%)		100	28 (28.00%)	

*Chi square applied between rural caries and non caries children and urban caries and non caries non children *S= Significant, NS= Non significant,(Several times a month and once a week were added together, every day and several times a day were added together for calculation purpose of chi square test)

Table 3 Prevalence of Dental caries with respect to frequency of Soft drink intake in Rural and Urban area

Frequency of Intake of soft drink	Rural n=100		$\chi^2 = 4.970$ $df=1$ $P=0.026$ S	Urban n=100		$\chi^2 = 0.978$ $df=1$ $P=0.323$ NS
	Total Children Examined	Children with caries		Total Children Examined	Children with caries	
Never 68(51.51%)	81	51 (62.96%)		51	17 (33.33%)	

Several times month 12(25.00%)	03	02 (66.66%)		45	10 (22.22%)	
Once a week 04 (40.00%)	09	03 (33.33%)		01	01 (100%)	
Several times week 00(00.00%)	00	00 (00.00%)		02	00 (00.00%)	
Everyday 01(12.50%)	07	01 (14.28%)		01	00 (00.00%)	
Total 85(42.50%)	100	57 (57.00%)		100	28 (28.00%)	

*Chi square applied between rural caries and non caries children and urban caries and non caries non children *S= Significant, NS= Non significant, Several times a month and once a week, several times a week and every day were added together for calculation purpose of chi square test.

Table 4 Prevalence of Dental caries with respect to Frequency of intake of jam in Rural and Urban area

Frequency of Intake of jam	Rural (n=100)		$\chi^2 = 2.116$ df=1 P=0.146 NS	Urban (n=100)		$\chi^2 = 0.597$ df=1 P=0.440 NS
	Total Children Examined	Children with caries		Total Children Examined	Children with caries	
Never 62(48.43%)	88	53 (60.22%)		40	09 (22.50%)	
Several times month 05(26.31%)	00	00 (00.00%)		19	05 (26.31%)	
Once a week 03(50.00%)	04	02 (50.00%)		02	01 (50.00%)	
Several Times week 07(38.88%)	01	01 (100.00%)		17	06 (35.29%)	
Everyday 08 (28.57%)	07	01 (14.28%)		21	07 (33.33%)	
Several times a day 00(00.00%)	00	00 (00.00%)		01	00 (00.00%)	
Total	100	57 (57.00%)		100	28 (28.00%)	

Chi square applied between rural caries and non caries children and urban caries and non caries non children Chi square applied between rural caries and non caries children and urban caries and non caries non children *S= Significant, NS= Non significant, Several times a month and once a week, several times a week and every day were added together for calculation purpose of chi square test.

Table 5 Prevalence of Dental Caries with respect to Frequency of intake Chewing gum in Rural and Urban area

Frequency of Intake of Chewing gum	Rural (n=100)		$\chi^2 = 10.081$ df=2 P=0.006 *S	Urban (n=100)		$\chi^2 = 4.134$ df=2 P=0.127 NS
	Total Children Examined	Children with caries		Total Children Examined	Children with Caries	
Never 71(47.65%)	69	45 (65.21%)		80	26 (32.50%)	
Several times month 03(21.40%)	01	01 (100.00%)		13	02 (15.38%)	
Once a week 04(66.66%)	06	04 (66.66%)		00	00 (00.00%)	
Several times week 00(00.00%)	00	00 (00.00%)		01	00 (00.00%)	
Everyday 07(23.33%)	24	07 (29.16%)		06	00 (00.00%)	
Several times a day 00(00.00%)	00	00 (00.00%)		00	00 (00.00%)	
Total	100	57(57.00%)		100	28(28.00%)	

*Chi square applied between rural caries and non caries children and urban caries and non caries non children *S= Significant, NS= Non significant, Several times a month and once a week were added together, several times a week, every day and several times a day were added together for calculation purpose of chi square test

Table 6 Area wise distribution of habit of tobacco and chewable products

Tobacco And Similar products	Area				Total n=200	Percent
	Rural n=100	percent	Urban n=100	percent		
Beetle nuts with Tobacco (Kharra)	16	16.00%	0	0.00%	16	8.00%
Sweet Beetle nuts	9	9.00%	8	8.00%	17	8.50%
Fennel seeds (Saunf)	2	2.00%	31	31.00%	33	16.50%
None	73	73.00%	61	61.00%	134	67.00%
Total	100		100		200	

Table 7 Logistic Regression

Variables	Unadjusted	Adjusted (for all)
age (ref 12 yrs)	1.093 (0.25)	0.919 (0.46)
Sex (ref :Male)	1.256 (0.43)	1.016(0.97)
Area (ref :Rural)	3.41(0.005)	7.69 (0.0001)
fruit (ref: Never)	1.33 (0.005)	1.29(0.086)
biscuit(ref :everyday)	0.959 (0.65)	0.942(0.640)
soft drink (ref: Never)	1.88 (0.003)	1.58 (0.060)
jam and honey (ref: Never)	1.21 (0.045)	0.83 (0.203)
chewing gums (ref :everyday)	0.777(0.25)	1.063(0.627)

RESULTS & DISCUSSION:

The above diagram shows 87% visited dentist for pain in teeth and 13% for follow-up. The above pie-diagram showed the 70% visited dentist for reason of pain and 15% each for follow-up and routine check-up.

In the present study in **Table 1** it was observed in the rural area that 76.19% caries was reported in those who never ate fruits while overall those who ate fruits reported 51.89%. The result in urban area showed that those children who never ate fruits had no prevalence of caries and overall who consumed fruits had 28.22 % caries prevalence. A significant association was found in the levels of fruits consumption and caries in the rural area but not in the urban. The role of fruits in dental caries is not clearly defined. Studies like **Rugg-Gunn⁽⁶⁾ et al** showed negative association. One study that compared from workers who ate about 8 apples a day showed higher caries than grain workers who ate less than an apple a day. The relationship of frequency of intake of biscuit and prevalence of dental caries was found to be inconsistent and non-significant in both the study groups. In **table 2** soft-drinks was found to be inversely associated with prevalence of dental caries. In **table 3** everyday, several times a week consumption of jam was related with lesser dental caries than those who never consumed it. In **table 4** results are biased due to information bias. Response needed to be rechecked by guardians of those who ate jam. Regarding chewing gums in **table 5** those who consumed it daily, had lesser prevalence of dental caries in both the groups. Thus suggesting that chewing gum had protective effect, but the difference in prevalence of dental caries among frequency of chewing gum was not significant.

Overall in the rural area in those who ate chocolates had caries 58.66% and those who never ate had 52.00% caries. In urban area 29.54% chocolate eaters and 16.66% non-eaters had caries. This variation shows that rural area had higher prevalence of caries in chocolate eaters than the urban. The **table 6** shows that rural children have habit of eating kharra (dry tobacco) and urban children have habit of consuming saunf (fennel seeds).

Sreebny LM⁽⁷⁾ in a study found dental caries to be positively correlated with dietary sugar. He calculated that every 25 g of sugar per day one tooth per child would be decayed, missing, filled. **Petersen PE⁽⁸⁾** observed that high frequency of consumption of sweets and sugary drinks implied significantly higher dental caries. This was found after the control of confounders related to oral hygiene practices and socio-economic status. **Rodrigues CS⁽⁹⁾ et al.** found that nursery school children with frequency of sugar intake of 4–5 times per day were 6 times more likely to develop high caries levels over 1 year compared with children with the lowest frequency.

CONCLUSION:

Prevalence of dental caries in children was twice more commonly seen in rural area than urban residence children. Overall 57% prevalence of dental caries was found in rural residence children and 28% in urban residence children. Chances of dental caries were 3.41 times more in the rural than in urban children. A significant association was found in the levels of fruits consumption and caries in the rural area but not in the urban. The role of fruits in dental caries is not clearly defined.

The relationship of frequency of intake of biscuit and prevalence of dental caries was found to be inconsistent and non-significant in both the study groups. Regular intake of chewing gum was associated with lesser prevalence of caries in rural residence children

RECOMMENDATIONS:

Regular and correct brushing should be made a habit right since childhood. Proper brushing techniques should be highlighted wherever necessary so as to get rid of chew-sticks and brushing with fingers. Chocolates, sweets, soft-drinks, cakes, jams, sugar must be avoided to keep dental caries away. During mixed dentition period more dental care should be done by parents and atleast one visit should be done during this period.

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