Prevalence and Assessment of Experience of Dental Caries Among School Going Adolescents in A Rural Area of Sylhet, Bangladesh

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Abstract:

Background: Socio-epidemiological data of dental caries helps to plan effective community interventions.***Objective:*** To estimate the prevalence and assess the experience of dental caries among school going adolescents in a rural area of Bangladesh. ***Methods:*** A cross-sectional study was donein Sylhet District in Bangladesh, between January and December of 2014. Students of class VIII, IX and X, aged 12-16 years were taken for the study. A total of 90 studentswere divided into 12-14 years and 15-16 years age groups using simple random sampling technique. A pre-designed, self-administered questionnaire was used for demographic survey. Students were examined for dental caries. Assessment of Experience of dental caries was done by Decayed, Missing and Filled teeth (DMFT) index. ***Results:*** The mean age of the respondents was 14.37±0.50 years. Females were 68(75.6%) and males were 22(24.4%). 31(34.4%), 30 (33.3%) and 29(32.2%) were from VIII, IX and X respectively. The older age group (15-16 years) had more decayed teeth than that of 12-14 years group (2.28 vs. 1.46; p=0.04). The mean DMFT score was lower in male compared to female (1.43 vs. 2.30; p>0.05).There was significant difference in the total DMFT score among the classes (p=0.009). Mean DMFT score was 1.88. Caries prevalence was 42.2% in the maxillary arch and 58.9% in the mandibular arch. Among males, the mandibular arch showed a higher caries level (63.64%) than the maxillary arch (40%), while in females, in maxillary and mandibular archeswere 42.64% and 42.65% respectively (p>0.05). ***Conclusion:*** 64.4% of the study population had dental caries with male predominance; mandibular arch was more involved.

Keywords: Dental caries, DMFT index, school going adolescents, rural area, Bangladesh.

Introduction:

Caries is one of the most important and common dental health problems around the world;dental caries is the most prevalent dental affliction of childhood[1,2]. The Global Burden of Disease Study 2017 estimated that more than 530 million children suffer from caries of primary teeth globally[1]. 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 the caries incidence[3].Oral diseases are more intense among the children and oral diseases restrict activities in school, at work and at home causing several school and work hours to be lost each year.Moreover, the psychosocial impact of these diseases often diminishes quality of life[4]. Among children, adolescents are particularly at higher risk for dental caries. Adolescence is a critical period as health practices during adolescence usually persist during adult years[1,4]. To achieve a sound oral health practice of good oral hygiene is a must. Oral hygiene is the practice of keeping mouth and oral cavity clean to prevent dental problems,especially dental caries, gingivitis and bad breath[4].

The unique characteristic of oral and dental diseases is that they are universally prevalent and do not

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undergo remission or termination if untreated and require technically demanding expertise and time-consuming professional treatment[4,5]. The other fact is socio-epidemiological data of dental caries helps to plan effective community oriented oral health promotion interventions for school children which saves millions of morbidities and millions of dollars in health care[5]. 'Polarization' of caries is occurring on a worldwide basis, where the prevalence of caries is declining in developed countries, increasing in less-developed countries, and is epidemic in countries with emerging economies[6]. Bangladesh is developing country of South Asia, with majority of its population living in the rural areas. The aim of the study is to estimate the prevalence of dental caries among school going adolescents in a rural area of Sylhet, Bangladesh, to provide basic socio-epidemiological data for planning and eventuation of oral health services in the rural areas focusing particularly in the preventive aspects.The study population was chosen adolescents aged from 12 to 16 years. This age is especially important as it is generally the age at which children move to secondary school from primary level. Moreover, this group is a reliable sample from the adolescent age which can be easily obtained through the school system[4,7]. Last but not the least, it is the age that all the permanent teeth, except third molars will have erupted. The World Health Organization (WHO) has also chosen the age as the global monitoring age for caries for international comparisons and monitoring disease trends[7].

Methods:

A cross-sectionalstudy was done at Sazzad Majumdar Bidya Niketon, situated under Voron Sultanpur Union of Zakiganj Upazilla of Sylhet District in Bangladesh, between January and December of 2014. The students of the three classes: class VIII, IX and X, aged between 12 and 16 years were taken for the study. Both the school and the study samples were collected by using simple random sampling technique. A total of 90 students were divided in two age groups: 12 to 14 years and 15 to 16 years[7]. A pre-designed, self-administered questionnaire was used for demographic survey, as per WHO protocol[7]. Clinical examinations of teeth were carried out under field conditions in a classroomsetting by one dental surgeon using plane mouth mirrors, WHO periodontal probes andnatural light as a source of illumination. A data collector recorded the observations.Students were examined whilst seated on a chair. Assessment of experience of dental caries was done by Decayed, Missing and Filled teeth (DMFT) index[7]. The components of DMFT index are DT = Decayed teeth, MT = Missing teeth and FT = Filled teeth. Presence of caries is measured by total DMFT score (maximum 32, minimum 0).

Demographic characteristics are analyzed by using frequency table and percentage. Mean age was seen; relationship between age category and sex and educational status are presented by cross tabulation.Statistical data analysis was done using SPSS version 21.0. After data collectiondata entry was done. Dataanalysis was summarized in form of proportion and frequency tables for categoricalvariables. Continuous variables were summarized using means and standard deviation. Probability (p)valueswere computed for categorical variables using Student 't' test and one-way ANOVA test; p value <0.05 was considered to constitute a statistically significant difference.

Results:

A total of 90 students who were aged between 12 to 16 participated in the study. 44(48.9%) were aged between 12 and 14 years, while 46(51.1%) were between 15 and 16 years. The mean age of the respondents was 14.37±0.50 years. Most of the participants were females 78(75.6%);the number of male participants was 22(24.4%). They were almost equally distributed according to their educational status.31 (34.4%) were from class (grade)VIII, 30(33.3%) from class (grade) IX and 29(32.2%)were from class (grade) X. (Table 1).The older age group (15 to 16years) had more decayed teeth (mean DT score was 2.28), while than that of 12 to 14 years group (mean DT score was 1.46), which was statistically significant (p=0.04). The MT score was almost equal inboth age groups and did not show any statistical difference (p>0.05). The FT score was zero in the age group 12 to 14 years and there was statistical difference (p=0.04). The mean DMFT score was lower in male (1.43), compared to female (2.30); however, no significant gender related difference was found. According to educational status, the mean DT scores were in class VIII 1.35, in class IX 1.75, and in class X 2.59; the difference was statistically significant (p=0.01). However, there was no statistically significant difference in the MT and FT scores among them according to their educational status. There was significant difference in the total DMFT score among the classes (p=0.009). The total

mean DMFT score among the respondents was 1.88 (Table 2). Caries prevalence was 42.2% in the maxillary arch and 58.9% in the mandibular arch. Among male students, the mandibular arch showed a higher caries level (63.64%) than the maxillary arch (40%). Among female students, caries in maxillary arch was 42.64% and in mandibular arch 42.65%. However, the difference was not statistically significant (p>0.05) (Table 3).

Table 1. Socio-demographic characteristics of the respondents (n=90)

Variables		Frequency	Percentage
Age	12 to 14 years	44	48.9
	15 to 16 years	46	51.1
Mean±SD	14.37±0.50 years		
Gender	Male	22	24.4
	Female	68	75.6
Educational Status	Class VIII	31	34.4
	Class IX	30	33.3
	Class X	29	32.2

Table 2. Distribution of the scores of the components of DMFT index according to the socio-demographic characteristics

Variables	DT Mean±SD	p value	MT Mean±SD	p value	FT Mean±SD	pvalue	DMFT Mean±SD	pvalue
Age in years								
12to 14	1.46±1.44	0.04*	0.02±0.15	0.95	0	0.04*	1.43±1.48	0.07
15to 16	2.28±1.92		0.02±0.14		0.02±0.14		2.30±1.93	
Gender								
Male	2.13±1.85	0.72	0.04±0.21	0.09	0	0.25	1.43±1.84	0.88
Female	1.80±1.70		0.01±0.12		0.01±0.12		2.30±1.75	
Educational Status								
Class VIII	1.35±1.50	0.01*	0	0.59	0	0.35	1.29±1.51	0.009*
Class IX	1.75±1.60		0.03±0.18		0		1.73±1.66	
Class X	2.59±1.94		0.03±0.19		0.03±0.16		2.66±1.91	

DT=Decayed teeth; MT=Missing teeth; FT=filled teeth; SD=Standard Deviation; *=P<0.05

Table 3. Arch wise prevalence of dental caries

Gender	Maxillary Arch Caries	p value	Mandibular Arch Caries	p value
Male	40%		63.64%	
Female	42.64%	0.76	42.65%	0.24
Total	42.20%		58.90%	

Discussion:

In the present study,the prevalence ofdental caries among the respondents of the study was 64.40% with a mean DMFT score1.88. More than 60% of the respondents in that rural area was affected with dental caries. This result ishigher than some studies in south Asia; in a study in India, as conducted by Suprabha et al.[8], it was observed that the prevalence of caries was59.4%among the 11 to 13 years old children in urban community. In a similar study by Dixit et al.[9], done in Nepal, caries prevalence amongthe 5 to 6years old was 52% and 12 to 13-years old was 41%. Rahman etal.[10] found in a study in Bangladesh that the prevalence of dental caries among under 5children was 44.34%. However,our result is similar to the findings ofSarwar et al.[11] and Karunakaran et al.[12]. This may be an indication of anupward trend in dentalcaries in developing countries.

Dental caries can be explained as a multifactorial disease influenced by various intraoraland extraoral factors including age and sex[13]. In the present study, therewas significant relationship between gender and caries experience.Several studies have reported variations in dental caries according toage and gender. Rehman at al.[10], Karunakaran et al.[12] and Dummer et al.[14]found caries prevalence higher among the boys compared tothe girls. On the contrary, girls were found to havehigher caries prevalence by Mishra & Shee[15] and Saimbi et al.[16]. The variation could be attributed tothe different age groups and geographic locations studies in the surveys. Inter arch comparison revealed that the caries prevalence was higher in the mandibulararch in both sexes. Rehman et al.[10] andJawadekar et al.[17] found the same findings in their studies. However, higher caries prevalence in upper arch was reported by Sathe & Mali[18].In this study, the older age group (15 to 16years) had more decayed teeth as the meanDT score was 2.28, while in 12 to 14years groups mean DT scorewas 1.46, which means the score of decayed teeth is higher in older group of participants.Our study revealed a DMFT index of 1.88. This result was higherthan earlier findings

in Bangladesh by Fakir et al.[19], as their study revealed that in the age group 8-12 yearsstudents DMFT index was 1.05 for permanent teeth and 1.72 for deciduous teeth – an increase incaries with increasing age.Dental treatment is not so difficult but proper treatmentfacilities is not available all over the country. Hence, simple preventive measure should be taken tomaintaining good oral and dental health.The oral health teaching manual should be revised to include newer concepts of oral healthcare like tooth brushing using fluoridated toothpaste twice a day at an interval of twelve hours, avoiding sugar containingfood as far as possible and ringing of the mouth properlyafter taking sweet food etc.[10,11,19].

Limitations of the study:

Due to the study design findings could not be generalized beyond the participants of the study. As this study was done in a rural school of Sylhet, it cannot be generalized in the rest of the community who live in the other parts ofBangladesh.Another limitation of this study was that it used a structured questionnaire to collect datafrom the survey population. This could provide limited responses from people and they did not have the capacity for in-depth answers.

Conclusion:

64.4% of the study population bears the burden of dental caries with a mean DMFT score 1.88. Male school children were found more affected than the females; mandibular arch was the predominantly affected arch. A high prevalence of unmet health care need still exists in the country as reflected through a high 'decayed teeth' score in DMFT index.Timely referral and restorative management of children suffering from dental caries would reduce the burden of dental caries. Hence, essential dental treatments should be easily accessible and available in the rural areas.

Conflict of interest: None to disclose.

Ethical approval issue: The study was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

Authors' contribution: Concept and study design: SAS, FH, SSI; Data collection and compilation: SAS, FH, IJ; Data analysis: SAS, FH, SSI; Critical writing, revision and finalizing the manuscript: SAS, FH, SSI, IJ.

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