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Research Article

Proportion of Dental Plaque Associated with Oral Hygiene Among the Students of A Dental College in Rajshahi, Bangladesh

A Awal[1]*, T Akhter[2] and T Akbar[3]

[1]*Assistant Professor, Department of Public Health, Varendra University, Rajshahi, Bangladesh*

[2]*Dental Surgeon, Doha, Qatar, Rajshahi, Bangladesh*

[3]*Assistant Professor, Department of Paediatric Dentistry, Udayan Dental College, Rajshahi, Bangladesh*

***Corresponding Author:** A Awal, Assistant Professor Department of Public Health, Varendra University, Rajshahi, Bangladesh.

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Abstract

This cross sectional type of descriptive study was conducted among the students of a Dental College, Rajshahi, Bangladesh with a view to estimate the proportion of dental plaque associated with oral hygiene. A total of 300 students were interviewed and examined which were selected purposively. The respondents were selected purposively. Data were collected from the respondents by face to face interview according to a partially structured questionnaire. The mean age of the respondents was 20.97 (SD ± 1.76) years. Majority of the respondents (96.7%) were under graduate students. The average monthly income of the family was BDT 24293.33 (SD ± 6809.44). Most of the respondents (60.7%) brushed their teeth twice a day and 72% of them brushed up and down and both surface of the teeth. About 88% used tooth paste and 96.3% used tooth brush. Among the respondents, 40.3% had no plaque, 43.7% had separate flecks at the cervical margin, 15.7% had plaque up to 1 mm and 0.3% had plaque wider than 1 mm. In this study dental plaque had significant relationship with monthly family income ($p < 0.05$), residence ($p < 0.001$), frequency of tooth brushing ($p < 0.001$), technique of tooth brushing ($p < 0.001$), materials used for tooth brushing ($p < 0.001$) and chewing habit ($p < 0.05$). This study provided some important information which might help the concerned people to take appropriate measures and might be the basis for further in-depth study on this issue.

Keywords: Dental Plaque; Oral Hygiene Practices; Predisposing Factors; Bangladesh

Introduction

Dental plaque is a biofilm, usually a pale yellow thing that develops naturally on the teeth [1]. Like any biofilm, dental plaque is formed by colonizing bacteria trying to attach themselves to the tooth's smooth surface. It has been speculated that plaque forms part of the defense systems of the host by helping to prevent colonization of microorganisms that may be pathogenic. Oral cavity contains the only known anatomical aspect of the human body that does not have a regulated system of shedding surfaces: the teeth [2]. This allows microorganisms to adhere to the surface of teeth for long periods of time. These multiple species of bacteria become dental biofilm. Dental biofilm, more commonly referred to as dental plaque, is composed of about a thousand species of bacteria that take part in the complex ecosystems of the mouth [3]. The natural, non-frequent regulation of tooth shedding plays a large role in making dental biofilm the most diverse biofilm in the human body despite the relatively small size of the teeth. The human oral cavity is also called the human oral microbiome. This is because the human oral cavity can contain several environments at a given moment that could vary from tooth to tooth. Additionally it has been estimated that 25,000 species of bacteria reside in the mouth [4]. This is in contrast to the previously estimated 700+ species. This is also in contrast to the previous estimate of more than 500 species as part of the dental biofilm [5]. These 1,000 species have

the ability to change their environment through a series of biotic relationships. At first, the biofilm is soft enough to come off by using the fingernail. However, it starts to harden within 48 hours, and in about 10 days the plaque becomes dental calculus (tartar), which is hard and difficult to remove [6]. Dental plaque can give rise to dental caries (tooth decay) the localized destruction of the tissues of the tooth by acid produced from the bacterial degradation of fermentable sugars and periodontal problems such as gingivitis and chronic periodontitis [1]. Effective oral hygiene has been proposed as a key factor in the reduction of dental plaque colonization [7].

Materials and Methods

This cross sectional type of descriptive study was carried out among the students in a Dental College, Rajshahi, Bangladesh. Sample size was 300 and that was selected purposively. All the students of a Dental College Rajshahi, Bnagladesh were included during the study period of 6 months. Dependent variable was used dental plaque in this study. As independent variables we used age, sex, monthly family income, frequency of tooth brushing, technique of tooth brushing, instruments and materials for brushing, mouth wash, smoking and chewing habit. Data were collected according to a duly pre-tested and partially structured questionnaire by face-to-face interview with the help of a key informant. The data were analyzed according to the objectives of the study by using SPSS/PC+ software (Version-21) computer program. Descriptive variables were explained with mean and standard deviation. Statistical significance was found by applying relevant statistical tests at appropriate probability level (p = 0.05 or p = 0.01).

Results

Variables	Respondents		Variables	Respondents	
	No.	%		No.	%
Age of the respondents:			**Monthly family income**		
15 – 17 years	8	2.7	Up to BDT 10000	6	2.0
18-20 years	108	36.0	BDT 10001-20000	95	31.7
21-23 years	174	58.0	BDT > 20000	199	66.3
24+ years	10	3.3	**X ± SD = BDT 24293.33 ± 6809.44**		
X ± SD = 20.97 ± 1.76 years			**Technique of tooth brushing:**		
Frequency of brushing:			Prevent tetanus	78	26.0
Once daily	108	36.0	Do not know	216	72.0
Twice daily	182	60.7	Prevent others disease	6	2.0
More than 2 times daily	4	1.3	**Materials for brushing**		
Irregular	6	2.0	Tooth paste	264	88.0
Instruments for brushing			Powder	34	11.3
Tooth brush	289	96.3	Charcoal	02	0.7
Wood stick	11	3.7	**Dental plaque area measurement**		
Use of mouth wash			No plaque	121	40.3
Once daily	161	53.7	Separate flecks of plaque at the cervical margin	131	43.7
Twice daily	22	7.3			
No	117	39.0	Plaque up to 1 mm at the cervical margin	47	15.7
Plaque thickness measurement			Plaque wider than 1 mm but less than 1/3rd of surface	1	0.3
No plaque	165	55.0			
Plaque at gingival margin	104	34.7			
Thick plaque	31	10.3			

Table1: Distribution of the respondents by dental plaque and their socio-demographic characteristics.

Variables	Dental plaque			Total	
	No plaque	Minimum plaque	Moderate to severe plaque		
Low income	30(29.7%)	47(46.5%)	24(23.8%)	111(37.0%)	P<0.05
High income	91(45.7%)	84(42.2%)	24(12.1%)	189(63.0%)	
Rural	5(13.9%)	8(22.2%)	23(63.9%)	36(12.0%)	P<0.001
Urban	116(43.9%)	123(46.6%)	25(9.5%)	264(88.0%)	
Once daily brushing	26(24.1%)	47 (43.5%)	35(32.4%)	108(36.0%)	P<0.001
Twice daily brushing	93(51.1%)	82(45.1%)	7(3.8%)	182(60.7%)	
More than 2 times daily	2(50.0%)	2(50.0%)	0(0.0%)	4(1.3%)	
Irregular	0(0.0%)	0(0.0%)	6(100.0%)	6(2.0%)	
To and fro technique of brushing	7(8.3%)	45(53.6%)	32(38.1%)	84(28.0%)	P<0.001
Up & down tech of brushing	114(52.8%)	86(39.8%)	16(7.4%)	216(72.0%)	
Tooth paste for brushing	119(45.1%)	116(43.9%)	29(11.0%)	264(88.0%)	P<0.001
Other materials for brushing	2(5.6%)	15(41.7%)	19(52.8%)	36(12.0%)	
No chewing habit	108(44.1%)	100(40.8%)	37(15.1%)	245(81.7%)	P<0.05
Has chewing habit	13(23.6%)	31(56.4%)	11(20.0%)	55(18.3%)	

Table 2: Relationship between dental plaque and other conditions.

Variables	Dental plaque thickness measurement			Total	
	No plaque on gingival margin	Plaque at gingival margin	Moderately thick plaque		
15-17 years of age	2(25.0%)	2(25.0%)	4(50.0%)	8(2.7%)	P<0.05
18-20 years	53(49.1%)	44(40.7%)	11(10.2%)	108(36.0%)	
21-23 years	103(59.2%)	57(32.8%)	14(8.0%)	174(58.0%)	
24+ years	7(70.0%)	1(10.0%)	2(20.0%)	10(3.3%)	
Rural	7(19.4%)	16 (44.4%)	13(36.1%)	36(12.0%)	P<0.001
Urban	158(59.8%)	88(33.3%)	18(6.8%)	264(88.0%)	
Once daily brushing	33(30.6%)	53(49.1%)	22(20.4%)	108(36.0%)	P<0.001
Twice daily	128(70.3%)	51(28.0%)	3(1.6%)	182(60.7%)	
More than 2 times daily	4(100.0%)	0(0.0%)	0(0.0%)	4(1.3%)	
Irregular	0(0.0%)	0(0.0%)	6(100.0%)	6(2.0%)	
To and fro technique fro brushing	29(34.5%)	34(40.5%)	21(25.0%)	84(28.0%)	P<0.001
Up & down	136(63.0%)	70(32.4%)	10(4.6%)	216(72.0%)	
Using tooth brush	165(57.1%)	102(35.3%)	22(7.6%)	289(96.3%)	P<0.001
Using wood stick	0(0.0%)	2(18.2%)	9(52.8%)	11(3.7%)	
Mouth wash once daily	101 (62.7%)	46(28.6%)	14(8.7%)	161(53.7%)	P<0.001
Twice daily	18(81.8%)	4(18.2%)	0(0.0%)	22(7.3%)	
No	46(39.3%)	54(46.2%)	17(14.5%)	117(39.0%)	

Table 3: Relationship between dental plaque thickness measurement and other conditions.

Discussion

This study was carried out with a view to estimate the proportion of dental plaque associated with oral hygiene of the students of a dental college, Rajshahi, Bangladesh. The age range is mostly within young adult group of the population. Poor oral health was observed in this elderly population from South Brazil [2]. About monthly family income it was observed that majority (66.3%) of the respondents had monthly family income of BDT more than 20000 followed by (31.7%) of the respondents had monthly family income of BDT 10001 - 20000. Subjects with a low socio-economic status are significantly more likely than others to develop periodontal disease [3]. Regarding frequency of tooth brushing (60.7%) used to brush teeth twice daily, most of the respondents (72.0%) used to brush both surface up and down of teeth, majority (96.3%) used tooth brush as an instrument of brushing. In the multivariable model, the risk of fissure development was two times higher with medium hard compared with soft toothbrushes [4]. Figure 1 showed that most of the respondents (88.0%) belonged to rural area. There was a strong association between cigarette smoking and risk of periodontitis among older Thai adults [5]. It was evident that there was a significant relationship between income of the respondents and dental plaque ($p < 0.05$). Socio-demographic disparities accounted for most of the burden of disease and treatment needs [6]. Subjects with a low socio-economic status are significantly more likely than others to develop periodontal disease [7].

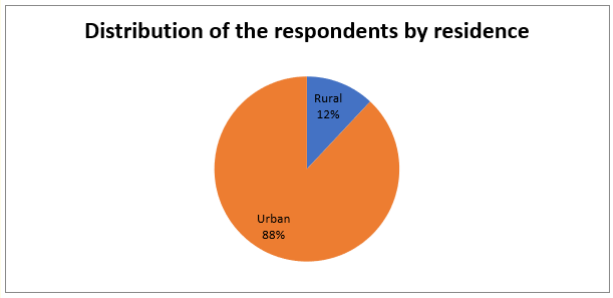

Figure 1: Distribution of the respondents by residence.

Conclusion

This study has provided an insight into the periodontal status and predisposing factors for periodontal diseases of selected groups over eight months. As such they provide valuable information to help plan a full national study, should resources be made available for such a study. The respondents were dental students so, they would have to know more about the oral hygiene instructions.

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