ISSN 2305-9664

Journal of Contemporary Dental Sciences

Volume : 04, No : 02

July, 2016

Contents

An Official Publication of Sapporo Dental College, Dhaka, Bangladesh
Recognized by Bangladesh Medical & Dental Council (BM&DC)

ISSN 2305-9664

Journal of Contemporary Dental Sciences (JCDS)

Recognized by Bangladesh Medical & Dental Council (BM&DC)

Vol. 4, No. 2, July, 2016

An Official Publication of Sapporo Dental College Uttara, Dhaka

Address :

Sapporo Dental College & Hospital

Plot # 24, Court Bari Road, Sector # 08, Uttara Model Town

Dhaka-1230, Cell : 01678026854, 01678026855, 01678026858

E-mail : sdch@bol-online.com, Web : www.sapporodentalcollege.com.bd

Graphics Idea : Maruf Hussain, SDCH

Publication of Sapporo Dental College and Printed at
IDEA Printers, Katabon, Dhaka. 02-9612438
E-mail : ideaprinters@yahoo.com

Journal Committee

* **References:** Accuracy of reference data is the author's responsibility. Verify all entries against original sources, especially journal titles, inclusive page numbers, publication dates. All authors must be listed if less than six. List only first three and add et. al. if more than six. Personal communications, unpublished observations, and submitted manuscripts must be cited in the text as "({name/s}, unpublished data, year)". Abstracts may be cited only if they are the sole source and must be identified in the references as "Abstract". "In press" citations must have been accepted for publication and add the name of the journal or book including publisher. Use Vancouver style, for example:

1. World Health Organization: WHO recommendations: Obesity: Preventing and Managing the Global Epidemic. Geneva, World Health Org., 2000 (Tech. Rep. Ser. No. 894)
2. Rashid M. Food and Nutrition. In Rashid KM, Rahman M, Haider S eds. Textbook of Community Medicine and Public Health. 4th edn. RHM Publishers 2004; 126-140
3. Sayeed MA, Hussain MZ, Banu A, Rumi MAK, Azad AK. Prevalence of diabetes in a suburban population of Bangladesh Diab Res Clin Prac 1997; 34: 149-155
4. Jarett RJ. Insulin and hypertension (Letter). Lancet 1987; 2: 748- 749
5. Banerji MA, Faridi N, Atulri R, Chiken RI, Lebovitz HE. Body composition, visceral fat, leptin and insulin resistance in Asian Indian men. J Clin Endocrinol Metab 1999; 84: 137-144 (Abstract)
6. Anwar AKMN & Fariduddin KM, Innovation and re-orientation in medical education and research: Challenges for Ibrahim Medical College. Ibrahim Med. Coll. J. 2007;1(1): 1-2 (Editorial)

Tables

* Each table must be typed on a separate sheet and double spaced. The table number should be Arabic, followed by a brief informative title. Place explanatory matter in footnotes. For footnotes use symbol in this sequence: *, **, etc.

Figures

* Line drawings, photomicrographs, colour prints and halftones should be camera ready, good quality glossy prints. Submit only originals of laser prints, not photocopies. A set of original figures must be submitted. Indicate figure number, short figure title on top of figure lightly in pencil. Any abbreviations or symbols used in the figure must be defined in the figure or figure legend. Keep an original set for your records.

Editing:

* All submitted manuscripts are subject to scrutiny by the Chief Editor or any member of the editorial board. Manuscripts containing materials without sufficient scientific value and of no priority issue, or not fulfilling the requirements for publication may be rejected or may be sent back to the author/s for resubmission with necessary modifications to suit one of the submission categories of the journal. Manuscripts fulfilling the requirements and found suitable for publications are sent for peer review. Submissions found suitable buy the reviewer, may need revision/modifications before being finally accepted. Editorial board finally decides upon the publish ability of the revised manuscript. Proof of an accepted manuscript may be sent to the author/s and should be corrected and returned to the editorial board within one week. No addition to the manuscript at this stage should be accepted. All accepted manuscripts are edited according to the Journal's rule.

Communication Information:

* Communication information for all correspondence is always printed in the title page of the journal. Any additional information or any other inquiry relating to submission of the article the Chief Editor or the Journal office may be contacted.

Copyright:

Journal of Contemporary Dental Sciences
Official Publication of Sapporo Dental College, Uttara, Dhaka

Editorial

The issue 2, Volume 4 of Journal of Contemporary Dental Sciences (JCDS) contains a wide range of Original and clinical case papers. Risk factors and intensity of gingivitis among 6-13 years school going children has been explored by Mahjabeen et al. Another original research by Dr. Suraiya and her team compared dental caries status among rural and urban children. Dental anxiety of orthodontic patients is investigated using Anxiety assessment scales in a paper by Shahabuddin Ahmed. A research paper by MBM Haque et al. discusses Tobacco use and betel quid related factors among Bangladeshi Rural adults while Oral health related quality of life among Bangladeshi population was the theme of a Cross-sectional study carried out by S Shahan.

This issue also includes interesting case reports on Management of Bimaxillary Median diastema through interdisciplinary approach (Dr. MM Bhuiyan), Management of intraoral sinus by single visit endodontic treatment (MAH Sheikh et al.) and Surgical Management of Verrucous Carcinoma at Sapporo Dental College Hospital (SM Omar).

Professor (Dr.) Asad-Uz-Zaman BDS, DDS, PhD
Professor and Head
Department of Oral Pathology and Periodontology
Sapporo Dental College & Hospital
Chief Editor, Journal of Contemporary Dental Sciences.
Mailing Address: Plot-24, Courtbari Road, Sector-8,
Uttara Model town, Dhaka -1230, Bangladesh
Email: sdch@bol-online.com, asifkhan34@hotmail.com

Journal of Contemporary Dental Sciences (JCDS)
An Official Publication of Sapporo Dental College, Uttara, Dhaka

Vol. 4, No.2 July 2016

Contents

Risk Factors and Intensity of Gingivitis among 6-13 Years Old Elementary School Children in Dhaka

R Mahjabeen,[1] D Sharmin,[2] N Anwar,[3] SR Nawshin,[4] S Haque,[5] MH Khan[6]

Abstract

Purpose: *Gingivitis or gingival inflammation is the most common and prevalent oral disease in children. The aim of the study was to investigate the related factors and evaluate the prevalence and intensity of gingivitis among the elementary school children living in different areas of Dhaka city.* ***Materials and Methods:*** *A cross sectional study was conducted among 6-13 years old children from 3 randomly selected schools in Dhaka. The questionnaire comprised of 16 questions and the children were interviewed based on those questions related to their age, gender, location, parent's occupation, oral hygiene practice, dietary habit etc. The clinical examination of gingival was carried out using a mouth mirror and periodontal probe.* ***Results:*** *About 94% both of males and females were found to brush their teeth every day. 41.8 % students had mild gingivitis and 24.5 % was considered to have poor oral hygiene. The mean gingival index (GI) was significantly higher in males of 6-9 years than females (P< 0.05). Besides, there is no association between sex and plaque indices. But, a significant correlation was found between dental caries, plaque and gingival scores in both age group (P <0.05) and also the level of socio-economic status was highly associated with dmft/DMFT and gingival index (P < 0.05). Males are 1.3 times (odds ratio [OR= 0.285]) more likely to have gingivitis compared with females. Similarly, children of 6-9 years old were 1.43 times more likely to have gingivitis compared with the children of 10-13 years. Interestingly, it was found that, tooth brushing frequency was not significantly associated with gingivitis.* ***Conclusion:*** *It was concluded that gingivitis has embedded its root among the children of all socio-economic strata.*

Key words: Gingivitis, 6-13 years children, risk factors

(J Cont Dent Sci 2016;4(2):1-5)

Introduction

Like most of the developing countries the prevalence of dental diseases among the children are considerably high in Bangladesh. Gingivitis is one of the most common oral diseases in children and adolescents. It is the inflammatory and recurrent reaction of free gingiva without detectable bone loss or clinical attachment loss.[1,2] It is stimulated by both local and systemic factors.[3,4] In case of children, the dependency on adult for the maintenance of oral hygiene is considered to be the most important local predisposing factor.[2] Gingivitis is mostly caused by the poor oral hygiene which facilitates the accumulation of plaque, food debris and micro-organism that gear up the inflammation. As the children are fond of sweets and chocolates the risk of the reaction between plaque, starches, sugars and bacteria increases resulting in severe gingivitis. Gingivitis is reversible with professional treatment and maintenance of good oral hygiene but periodontitis is irreversible. Sometimes the gingival inflammation becomes so severe that it can develop susceptible hosts into more alarming situations like periodontitis, bone destruction and even tooth loss.

The condition is more significant among the children having musculoskeletal disabilities or intellectual disorders like Down syndrome, Autism who are not able to maintain proper oral hygiene. It is due to the negligence towards oral health of the parents or care providers who are responsible for maintaining their daily oral hygiene. When compared with other normal children their oral and dental conditions have been explored to be poorer. Gingivitis is commonly seen in children during the eruption and exfoliation of teeth, which is considered to be a physiological cause. But if it is not managed carefully, it may result in discomfort during brushing, mastication and cause restlessness

1. Dr. Riftana Mahjabeen,BDS, Intern doctor, Dhaka Dental College & Hospital
2. Dr. Dilruba Sharmin, BDS, MPH (NIPSOM), Ex-Lecturer, Department of Orthodontics, Marks Dental College & Hospital.
3. Dr. Nabila Anwar, BDS, FCPS (Orthodontics), MFD RCSI,Ex-Assistant Professor, Department of Orthodontics,City Dental College & Hospital.
4. Syeda Rubaiya Nawshin, Intern Doctor, Saphena Women's Dental College and Hospital
5. Dr. Sejuty Haque, BDS, PhD, Ex-Professor & Head, Department of Science of Dental Materials, Bangladesh Dental College.
6. Dr. Mahfujul Haq Khan, BDS, DDS, PhD, Professor and Head, Department of Dental Surgery, BIRDEM, Unit Head and BDS Course Coordinator of Dental Unit, Ibrahim Medical College.

Address of Correspondence

Dr. Mahfujul Haq Khan, Professor and Head, Department of Dental Surgery, BIRDEM, Unit Head and BDS Course Coordinator of Dental Unit, Ibrahim Medical College.Mobile: 01819249262. E-mail: mahtink@yahoo.com

in children. During puberty, it becomes significant due to hormonal changes. Besides these reasons gingivitis become exaggerated in cases of compromised immunity, chronic illness and fevers like malaria, chicken pox or measles. It is also seen in the children having malocclusion and in the children using orthodontic appliances and if proper measures are not taken the condition deteriorates.

At present the high prevalence of gingivitis in children is related to the higher consumption of western type of diet including refined carbohydrates and poor oral hygiene maintenance. In Dhaka gingivitis is mainly exaggerated due to the lack of awareness, insufficient knowledge, improper maintenance of oral hygiene, lack of government funded policies and inadequate oral health service providers. The current image of gingivitis in Dhaka represents that is has already become a public health problem. The situation can be improved with regular dental visits, reinforcement of oral health education. It is now essential to organize more dental health programs to promote and instruct the proper brushing techniques and healthy dietary habit to prevent gingivitis especially targeting the schools where we can instruct children, parents and teachers at the same time. They are significantly predisposed to gingivitis due to their dietary habit, poor oral hygiene and also special physiological changes in gingival tissue during puberty. Children cannot verbalize the feeling of pain like adult, therefore, prevention and early intervention should be emphasized to avoid the acuteness of diseases. So our study was conducted to find out the prevalence, risk factors and evaluate the severity of gingivitis among primary school going children in Dhaka which will further navigate us towards the direction of prevention of gingivitis in children.

Materials and Method

A cross-sectional study was conducted among 6-13 years children in Dhaka. A simple random sampling technique was used to conduct the survey. We selected three schools randomly in the urban area of Dhaka city. Children were interviewed and examined by four trained dental practitioners according to the queries of the questionnaire. The questionnaire comprised of 16 questions based on the demographic status, anthropometric measurements, socio-economic condition, dietary habit, oral hygiene practice, oral and dental conditions of the children.

At the first section of the questionnaire there were questions regarding the age, gender, grade of children and occupation of the parents. For the socio-economic status of their parents we also took the help from the parents and teachers. And then the children were asked some question regarding the brushing technique, brushing time, tooth cleansing device and brushing substance.

After that they were also asked some related questions about their dietary habit and nutrition.

Finally, the children were examined using mouth mirror, sterilized instruments, Community Periodontal Index (CPI) probe, caries probe, disposable gloves and masks. Standardized oral diseases indicators like DMFT and Loe and Silness Gingival Index were included in the questionnaire. The indicators included gingivitis, oral mucosal abnormalities and also decayed, missing and filled teeth. Four gingival regions of gum (mesio-buccal, disto-buccal, mesio-lingual, disto-lingual) in teeth were examined carefully. Gingival index given by Loe and Silness in 1963 measures severity of gingivitis on a scale ranging from 0.1 to 3.0 (0.1-1.0: mild gingivitis, 1.1-2.0: moderate gingivitis, and 2.1-3.0: severe gingivitis) [5, 6]. And they were coded respectively using the following signs -, +, ++, +++.

The state of oral hygiene was evaluated as follows: Good (plaque index 0.0 i.e. absence of plaque), Fair (plaque index 0.1-1.9 i.e. presence of plaque) Bad (plaque index 2.0-3.0 i.e. plaque seen by naked eye)[7].

Statistical Analysis

Data were summarized as means, SD or percentages as appropriate. Significance of differences in clinical parameters by age group, gender was sought using independent Student's t-test or ANOVA for continuous variables (PI, CAI, and GI). To identify determinants of gingival status adjusted for confounding in each age group, ordinal regression analysis was carried out using gender, mean PI, and mean CAI as factor or covariates as appropriate. A p value of <0.05 was considered as significant. All analyses were performed using SPSS version 20.

Results

Table 1: Frequency of tooth brushing (%) by children according to gender

Sex	Tooth brushing frequency (%)				Total N
	Everyday	Once/ week	Two-three times /week	None	
Male	93.9	.5	5.1	.5	196
Female	93.5	.5	4.3	1.6	184

In this above table, about 94% both of males and females were found to brush their teeth everyday, only 5% brush their teeth two -three per week and less than 2% of both males and females did not brush their teeth at all.

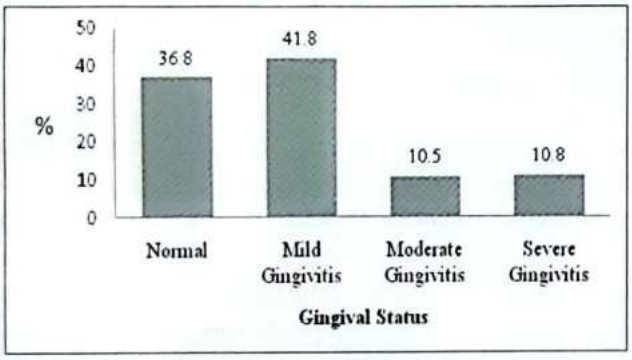

Fig 1: Gingival status according to gingival index (GI)

The Gingival status was classified as Normal, Mild gingivitis, Moderate gingivitis, Severe gingivitis. 41.8 % students had mild gingivitis, 10.5% had moderate gingivitis, 10.8% had severe gingivitis while 36.8 % had healthy gingiva.

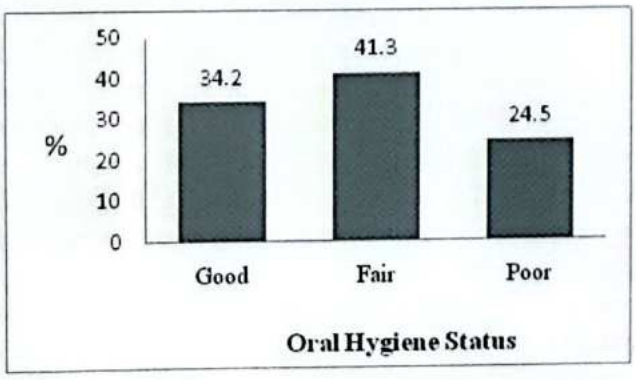

Fig 2: Oral hygiene status according to plaque index (PI).

Oral hygiene status according to plaque index (PI) in Fig.2 was classified as Good, Fair, Poor. About 41.3 % students had fair oral hygiene, 34.2% had good oral hygiene and 24.5 % was considered to have poor oral hygiene.

Table 2: Mean plaque index, gingival index, DMFT scores in children

Gender	Age					
	6-9 years			10- 13 years		
	Mean±SD		P value	Mean±SD		P value
	Male	Female		Male	Female	
DMFT	1.02±.737	.865±.687	.105	.789±.696	.91±.723	.524
Plaque index	2.02±.766	1.83±.732	.314	1.85±.724	1.88±.927	.391
Gingival index	2.04±.908	1.08±.908	.029	2.06±.958	2.18±1.27	.608

In this above table, mean gingival index (GI) was significantly higher in males of 6-9 years than females (mean: 2.04[SD: .908] vs. mean: 1.08 [SD:.908]; P=.029, less than 0.05). Whereas among the children of 10-13 years , females had higher mean scores compared with males (mean: 2.18[SD: 1.27] vs. mean: 2.06 [SD: .958]; P=.608, not less than 0.05)

Table 3: Relationship between plaque and gingival indices with mean DMFT/dmft scores

	Plaque index				Gingival index				
	0	0.1-1.9	1.1-2.0	P	0	0.1-1.0	1.1-2.0	2.1-3.0	P
DMFT/dmft (6-9	0.58±0.77	1.04±0.654	1.11±0.56	0.00	0.60±0.75	1.10±0.63	1.00±0.71	1.09±.530	0.000
DMFT/dmft (10-13	0.60±0.65	1.17±0.696	1.2±0.73	0.003	0.65±0.63	1.05±0.69	1.55±0.69	1.22±0.83	0.032

In this above table, there is significant correlation between dental caries, plaque and gingival scores in both age group (P <0.05).

Table 4: Relationship of DMFT/dmft, plaque and gingival indices with level of socio-economic status

	Level of socio-economic status		
	Mean ± SD	Chi ^{2}	P value
DMFT/dmft	0.92±0.718	0.304	0.000
Plaque index	1.90±0.761	-0.002	0.969
Gingival index	1.95±0.952	0.052	0.000

In this above table, it was showed that the level of socio-economic status was highly associated with dmft/DMFT and gingival index. (P < 0.05)

Discussion

Our present study emphasizes on the prevalence and intensity of gingivitis and oral behaviors among elementary school children in one of the areas in Dhaka. It is evident from our study that, about 41.8% children are suffering from mild gingivitis. Similar studies conducted in Tafelah, Jordan and Lucknow, India reported that 69.9% school children aged 6-11 years and 71.11% school children aged 8-10 years were suffering from mild to moderate severity respectively.[8,9] In our study we saw that the prevalence of gingivitis is higher in boys rather than girls whereas another study conducted in Irbid, Jordan[10] shown that the frequency of brushing was significantly higher in females than males. The underlying causes of the higher frequency of gingivitis in case of boys are more consumption of chocolates, sugar containing foods and negligence towards brushing. On the other hand the frequency is less in case of girls due to their grooming and obedient nature. Another study in Sharjah reported that, gingival inflammation noted to be higher among girls more than 6 years old which was due to the early onset of puberty compared to boys.[11] Our study depicted that about 41.8 % children of 6-13 years old had mild, 10.5% moderate and 10.8% severe gingivitis also complaining of gum bleeding during brushing whereas, in Lithuania more than 50% of children of 11-15 age group complained of gum bleeding.[12] This study depicts that, the chances of gingivitis are less among children using tooth brush and paste ($P<0.001$) compared with the children who use neem stick and ash, charcoal. In our previous study we had seen that, tooth brush and paste were found to have reduced chances of gingivitis ($P <0.001$) compared with other tooth cleaning devices like ash, charcoal, ash.[13]

In our study, we saw that, about 93.7% children brush their teeth daily and 77.9% brush their teeth before breakfast by using toothpaste and tooth brush. In Tafelah, Jordan, 54.2% children brushed their teeth at least once to twice per day [8]. There tooth brushing was not routinely practiced among the school children. In Andhra Pradesh, India, 99.99% children used tooth brush to clean their teeth and only 0.01% of them used the finger for cleaning their teeth and none of them used Neem stick. Moreover, 98% of the children used tooth paste and tooth brush and only 2% of them used tooth powder along with tooth brush there. In a previous study conducted in Moulovi Bazar, Sylhet, showed that 7.2 % children used nothing but water as the only practice to keep their oral cavity clean. 40.4% children used ash, 29.2% used tooth powder, 12% used tooth paste and 11.2% used charcoal. In this study it was also found that 76.8% children used to clean their oral cavity once per day (mostly in the morning) and followed by 23.2% twice per day. About 62.4% of them did not use toothbrush.[14]

Our study revealed that, 34.2% had good oral hygiene, 41.3 % % scored fair where 24.5% scored very poor in oral hygiene maintenance. A study conducted in the areas with high incidence of Noma in Nigeria showed that only 8.3% children had good, 79.1% had fair and 12.6% had poor oral hygiene.[15]

Another study conducted in Argentina6 reported that the children from low income families show significantly higher levels of gingivitis compared to the children from middle and high income families and it was due to the significantly less healthy oral health practices and attitudes of low income families than the middle or higher class families. In our study we found that the level of socio-economic status was highly associated with dmft/DMFT and plaque index ($P < 0.05$) and oral hygiene practice among the children of medium class had the higher prevalence of gingivitis.

Similar studies of Roberts[16], Mitchell et. al[17] attributed the beginning of deficient oral health status to the poor socio-economic level. In Nigeria the prevalence of gingivitis and calculus is lower in the private school children of higher socio-economic class and the prevalence is higher in public school children of lower socio-economic class.[18] They reported that better oral hygiene practice in children of higher class has reduced the prevalence of gingivitis. In South Wales, a survey presented the effect of socio-economic status on gingival condition of 11-12 years old school children.[19] It described that the gingival bleeding scores have an overall trend to increase from higher to lower socio-economic strata. While focusing on the precipitating factors of gingivitis, two main predisposing factors could be enumerated for the prevalence of gingivitis and periodontitis in case of children.

Firstly, oral condition of children is considered to be very important during mixed dentition because the deciduous teeth gradually exfoliate and permanent teeth erupt which cause physiological, hormonal changes in puberty and arise the circumstance for prevalence of gingivitis. Secondly, the negligence of the children and also parents towards maintaining proper oral hygiene is also responsible for gingivitis.[20]

Conclusion

Our study magnified the association between gingivitis and socio-economic backgrounds of the primary school going children of Dhaka city. Here we have found an inverse relationship between gingivitis and socio-economic conditions. Similar findings from other studies[13,21] conducted previously in Bangladesh regarding gingivitis and periodontal condition confirm the findings of our study. So for the betterment of present situation of gingivitis in children proper measures should immediately be taken without socio-economic discrimination.

References

1) Pourhashemi SJ, Motlagh MG, Khaniki GRJ. Prevalence and intensity of gingivitis among 6-10 years old elementary school children in Tehran, Iran. J. Med. Sci; 2007; 7(5): 830-834.
2) Folakemi Oredugba and Patricia Ayanbadejo (2012). Gingivitis in Children and Adolescents, Oral Health Care - Pediatric, Research, Epidemiology and Clinical Practices, Prof. Mandeep Virdi (Ed.), ISBN: 978-953-51-0133-8, InTech, Available from: http://www.intechopen.com/books/oral-health-care-pediatric-research-epidemiologyand-clinical-practices/gingivitis-in-children-and-adolescents
3) Ainamo J and I. Bay, Problems and proposals for recording gingivitis and plaque. Int. Dent. J, 1975; 35: 251-261.
4) Am Laugsson S. and T. E. Magnusson, Prevalence of gingivitis in 6 years old in Reykjavik, Icelan. Acta Odontol. Scand., 54: 242-252.
5) Singh AK. Prevalence of gingivitis and periodontitis among schools children in Lucknow region of Uttar Pradesh, India. IOSR J Dent Med Sci. 2014;13:21 3.
6) Al-Haddad KA, Ibrahim YT, Al-Haddad AM, Al-Hebshi NN. Assessment of gingival health status among 5- and 12-year-old children in Yemen: a cross-sectional study. ISRN Dent. 2013;26:1±7.
7) Al-Mutawa SA, Shyama IM, Al-Duwairi IY, Soparkar P. Oral hygiene status of Kuwaiti schoolchildren. East Mediter Health J. 2011;17:387±91.
8) Rodan R, Khlaifat F, Smadi L, Azab R, Abdalmohdi A; Prevalence and severity of gingivitis in school students aged 6±11 years in Tafelah Governorate, South Jordan: results of the survey executed by National Woman's Health Care Center; Rodan et al. BMC Res Notes (2015) 8:662 DOI 10.1186/s13104-015-1532-y
9) Singh AK. Prevalence of gingivitis and periodontitis among schools children in Lucknow region of Uttar Pradesh, India. IOSR J Dent Med Sci. 2014;13:21±3.
10) Tani Q; Oral health in Jordan; International Dental Journal (2004) 54, 395±400 Ravera E, Sanchez GA, Squassi AF, Bordoni N; Relationship between dental status and familyschool and socioeconomic level; Acta Odontol. Latinoam, 2012; Vol. 25 N±1 / 2012 / 138-147 ISSN 0326-4815.
11) Gopinath VK, Rahman B, Awad MA; Assessment of gingival health among school children in Sharjah, United Arab Emirates; Eur J Dent 2015;9:36-40.
12) Zaborskyte A, Bendoraitiene E; Oral hygiene habits and complaints of gum bleeding among schoolchildren in Lithuania. Stomatologija; 2003;5:31±6.
13) Mishu MP, Hubbard RM, Haque S, Sayeed MA, Imam ST, Khanam PA, Begum T, Khan MH; Gingivitis in primary school children of Bangladesh; Ibrahim Med Coll. J; 2009; 3(2): 71-74.
14) Sarwar AFM, Kabir MH, Rahman AFMM,Haque A, Kasem MA, Ahmad SA, Debnath PK, Mallick PC, , Haque M, Hossain KA, Khan SI, Ahmed AHHU , Parveen S; Oral hygiene practice among the primary school children in selected rural areas of Bangladesh; J. Dhaka National Med. Coll. Hos. 2011; 18 (01):43-48.
15) Okolo SN, Chukwu GA , Egbuonu I, Ezeogu FA, Onwuanaku C, Adeleke OA, Hassan A, Ngoe-nesoah A; Oral hygiene and nutritional status of children aged 1-7 years in a rural community Ghana Med J. 2006 Mar; 40(1): 22 25.
16) Roberts NW. Dental Health of children, were we are today and remaining challenges. J Clin Pediat Dent; 2008; 32: 231-234.
17) Mitchell DA, Borell LN, Lasitter SL, Formicola AS. Theoral health status of adolescents in northern Manhattan. JHealth Care Poor Underserverd; 2007; 18:814-832.
18) Adenubi J O. The Gingival health of eight year old Nigerian children. J of Public Health Dentistry 1984;44(2): 61-72.
19) Dummer PMH, Addy M, Hicks R, Kingdon A, Shaw WC; The effect of social class on the prevalence of caries, plaque, gingivitis and pocketing in 11-12 year old children in South Wales; J. Dent.; 1987; 15: 185-190.
20) Tohnue S; Epidemiology of gingivitis; J. Clin. Periodontal; 1986; 13: 366.
21) Hannan MA, Chowdhury MTH, Anjum A; Prevalence of gingivitis, plaque accumulation and decayed, missing and filled teeth among slum population in Bangladesh; Bangladesh Med Res Counc Bull. 2014; 40: 47-51.

Prevalence of Dental Anxiety of Orthodontic Patients using Anxiety Assessment Scales

S Ahmed,[1] KJ Hossain,[2] S Ahmed,[3]

Abstract

Purpose: *Dental anxiety is the most common psychological condition seen in dentistry and affects a significant percentage of the population. Patients undergoing orthodontic treatment go through some difficult time during the whole treatment period. The purpose of the study was to determine the prevalence of dental anxiety of the patients undergoing orthodontic treatment.* ***Methods:*** *A cross sectional study was carried out among 220 adult orthodontic patients following convenient method of sampling from Orthodontia department of Dhaka Dental College Hospital and Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2014 to June 2015. Data following the questionnaire were collected by the investigator. Dental anxiety of the respondents was assessed using Modified Dental Anxiety Scale (MDAS) and Modified Dental Anxiety Scale for Orthodontics (MDASO) by the investigator.* ***Results:*** *More than three fourth (78.2%, n=172) of the respondents stated that they were not anxious about their orthodontic problem. In assessment of anxiety using MDAS, 22.2% (n=49) of the respondents were found anxious about their dental problems, only 0.5% (n=01) extremely anxious and rest of them (77.3%, n=170) did not suffer from dental anxiety. In assessment of anxiety in orthodontic treatment by MDASO, 28.6% (n=63) of the respondents were found dentally anxious, 3.7% (n=08) extremely anxious and rest of them (67.7%, n=149) did not suffer from anxiety.* ***Conclusion:*** *Dental anxiety was prevalent among patients seeking orthodontic treatment. Female sex, increased age group, unmarried and low economic condition had significant ($p<0.05$) influence on dental anxiety. Respondents' self reported long duration dental anxiety was a contributor ($p<0.05$) to overall dental anxiety (in both MDAS and MDASO scale).*

Key words: Prevalence, Dental anxiety, Dental anxiety assessment scale, Orthodontic treatment. ***J Con Dent Sci 2016;4(2): 6-11***

Introduction

Dental anxiety is the most common psychological condition seen in dentistry and affects a significant percentage of the population.[1-3] Prevalence of dental anxiety is ranges from 10% to 20%.[4,5]Anxiety in patients influences both the psychology (e.g. avoidance of dental care) and the physiology (e.g. palpitations, nausea) of the dental experience, which leads to a variety of behaviors that impact dental care, such as delay and avoidance of dental treatment. Dental anxiety not only leads to avoidance of dental care, but it may also affect individuals generally by causing sleep disturbance, negative thoughts, and feelings of low self-esteem and confidence.[6] Patients avoiding dental treatment may have untreated dental disease leading to poorer oral health, reduced dental visits and consequently poorer oral health-related quality of life.[7-9] Treating anxious patients has been identified as one of the most common stressors of dentists along with causing pain, running behind schedule, late patients and heavy workload.[10]Dentally anxious patients are reported to be more challenging to treat for several reasons such as harsh attitudes towards dental personnel, more negative feelings about treatment, less satisfaction with treatment.[11-13]Although dental anxiety is undoubtedly present in dental practice, some practitioners act as if dental anxiety does not exist. In one survey about perceptions of dentally anxious patients, about two-thirds of dentists thought that anxious patients were somewhat or always a problem and about one-third of the practitioners believed dental anxiety was not an issue in dental practice.[14]

Dental anxiety described by Klinberg and Broberg[15] as a state of apprehension that something dreadful is going to happen in relation to dental treatment or certain aspects of dental treatment. Dental anxiety in the context of orthodontic treatment therefore defined as self-reported anxiety occurring in response to some aspect of orthodontic treatment. The anxiety might be initiated by orthodontic treatment, the anticipation of such treatment, or due to factors associated with orthodontic treatment. Although studies have assessed several aspects of anxiety related to dental treatment, there have been a few studies that have investigated dental anxiety among patients receiving orthodontic treatment.

1. Dr. Shahabuddin Ahmed, BDS, MSc, MPH, MPhil, Senior Consultant (Dental), 250 Bedded General Hospital, Gopalganj
2. Dr. Kazi Jahangir Hossain, MBBS, MPhil, PhD, Associate Professor, Department of Health Education, NIPSOM, Mohakhali, Dhaka
3. Dr. Salauddin Ahmed, BDS, PhD, Associate Professor, Dept. of Oral Pathology and Periodontology, Dhaka Dental College, Dhaka

Address of Correspondence

Dr. Shahabuddin Ahmed, Senior Consultant (Dental), 250 Bedded General Hospital, GopalganjPhone no: 01819116433, E-Mail address: shahabferdous@yahoo.com

Despite the unknown prevalence of patients anxious about orthodontic treatment, orthodontists anecdotally report many cases of dentally anxious orthodontic patients in their practice. The aim of orthodontics is to achieve a functional and aesthetically harmonious occlusion by permanently altering the position of natural teeth. It can also help to look after the long-term health of the teeth, gums and jaw joints, by spreading the biting pressure over all the teeth. Orthodontic treatment brings about many alterations in the patient's life like in career opportunities, social interaction and self-confidence. Person's dentofacial appearance can have a significant improvement on the overall quality of life.[16,17] In the past, most orthodontic patients were children. In recent years, the demand for adult orthodontic treatment has grown rapidly.

Self-report questionnaires are the most common method of assessing dental anxiety and their reliability, validity and uses are well documented.[18] The Modified Dental Anxiety Scale (MDAS) was developed by Humphris et al.[19] The scale has shown advantageous psychometric properties in comparison with the original Dental Anxiety Scale (DAS). Its reliability and validity have also been proven to be adequate.[20] One of the advantages of the MDAS is that it requires less time to complete compared to other dental anxiety measures.[19] Moreover, the scale does not increase anxiety in respondents, regardless of the patient's initial level of dental anxiety.[21] Newton and Buck18 recommended the use of the MDAS to measure dental anxiety in adults in clinical dental settings and research purpose. A modified version of the Modified Dental Anxiety Scale adapted to Orthodontics (MDASO) is applicable to assess anxiety related to orthodontic treatment. The intent of modifying the MDASO is to allow patients to clearly distinguish a visit to the dentist from a visit to the orthodontist.[22]

By far no study has been conducted for assessment of dental anxiety of orthodontic patients in Bangladesh. Prevalence of dental anxiety as it relates to orthodontic treatment has not been investigated. The aim of the study was to determine the prevalence of dental anxiety of the orthodontic patients attending at tertiary level hospitals. Outcomes will create awareness among the dental practitioners and help orthodontists identify patients who are dentally anxious and facilitate appropriate management and treatment of the patients leading to symbiotic benefit of dental practitioners and orthodontic patients.

Materials and Methods

A cross sectional study was carried out in the Orthodontia department of Dhaka Dental College Hospital, Dhaka and Bangabandhu Sheikh Mujib Medical University, Dhaka over a period of one year extending from July 2014 to June 2015. Total 220 adult orthodontic patients, 110 respondents from each above mentioned study places, fulfilling the selecting criteria were enrolled in the study following convenient method of sampling. Research instruments were Interviewer questionnaire, Modified Dental Anxiety Scale (MDAS)[19] and Modified Dental Anxiety Scale adapted to Orthodontics (MDASO).[22] Research instruments were prepared and pretested in a private dental college hospital and finalized after necessary modification.

The Modified Dental Anxiety scale (MDAS) was used to assess dental anxiety about specifics dental procedures. The MDAS consisted of 5 questions with a standardized answer scheme for each question ranging from 1 (not anxious) to 5 (extremely anxious), with a sum score ranging from 5 to 25. A score equal or higher than 15 was identified an individual as dentally anxious. Respondent was considered as extremely anxious if the sum score was 19 or higher. A modified version of the Modified Dental Anxiety Scale adapted to Orthodontics (MDASO) was used to assess dental anxiety related to orthodontic procedures. The intent of modifying the MDAS was to allow patients to clearly distinguish a visit to the general dentistry from a visit to the orthodontist. The MDASO consisted of 5 questions related to orthodontic treatment. The same answer scheme and scoring was used for the MDASO, including 1(not anxious) to 5(extremely anxious) with a sum score ranging from 5 to 25.

Data was collected in maintaining confidentiality and privacy of the respondents by face to face interview and recorded in a semi-structured questionnaire by the researcher.

Dental anxiety was assessed by the researcher using the MDAS and MDASO scales. Data was checked and edited after collection. Statistical analyses of the results obtained by Statistical Packages for Social Sciences (SPSS-21) software (SPSS Inc, Chicago, IL, USA). The results were presented in tables and figures. The statistical terms included in the study were mean, standard deviation, frequency and percentage. The relationships between different variables were analyzed using the Pearson's Chi-square test. Statistical significance was set at $p<0.05$ and confidence interval at 95% level, all p value were two tailed.

Results

Dental anxiety score of the respondents was presented in the Table-1. According to MDAS, nearly one fourth (22.2%, n=49) respondents were dentally anxious and only 0.5%(n=1) extremely anxious. More than three fourth (77.3%, n=170) respondents were not anxious. According to MDASO, more than one fourth (28.6%, n=63) respondents were dentally anxious and 3.7% (n=8) extremely anxious. Less than three fourth (67.7%, n=149) respondents were not anxious.

Table 1: Dental anxiety score of the respondents according to MDAS and MDASO (n=220)

Dental anxiety score	Frequency (n)	Percentage (%)
Modified dental anxiety scale (MDAS)		
14 (Not anxious)	170	77.3
15-18 (Dentally anxious)	49	22.2
19 (Extremely anxious)	1	0.5
Modified dental anxiety scale for orthodontics (MDASO)		
14 (Not anxious)	149	67.7
15-18 (Dentally anxious)	63	28.6
19 (Extremely anxious)	8	3.7

Contributing factors for dental anxiety was presented in the Table-2. More than half (57.6%, n=99) of the respondents stated costly and extensive treatment was contributing factor for dental anxiety among them 44.8 %(n=77) were female and 12.8%(n=22) male. Doubt about proper treatment was contributing factor for 35.5 %(n=61) respondents among them 26.8 %(n=46) were female and 8.7 %(n=15) male. Hopeless/too late to do was contributing factor for 33.1 %(n=57) respondents among them 22.1 %(n=38) were female and 11.0%(n=19) male. Fear of pain was contributing factor for 23.8%(n=41) respondents among them 19.2%(n=33) were female and 4.6%(n=8) male. Evoking stimuli, lack of proper information was contributing factor for dental anxiety stated by 12.8%(n=22) and 11.6%(n=20) respondents respectively.

Table 2: Contributing factors for dental anxiety of the respondents (n=172)

Contributing factors	Male % (n)	Female % (n)	Total % (n)
Fear of pain	4.6%(8)	19.2%(33)	23.8%(41)
Past bad experience	0.6%(1)	7.0%(12)	7.6%(13)
Uncaring professional	0.0%(0)	2.3%(4)	2.3%(4)
Vicarious learning	1.8%(3)	5.2%(9)	7.0%(12)
Evoking stimuli (injection/needle/drill)	2.9%(5)	9.9%(17)	12.8%(22)
Costly and extensive treatment	12.8%(22)	44.8%(77)	57.6%(99)
Hopeless/Too late to do	11.0%(19)	22.1%(38)	33.1%(57)
Doubt about proper treatment	8.7%(15)	26.8%(46)	35.5%(61)
Lack of proper information	3.5%(6)	8.1%(14)	11.6%(20)
Others[1]	2.9%(5)	5.2%(9)	8.1%(14)

1 Others: Non cooperation of family, Side effect (adverse effect) of treatment

Association of dental anxiety according to MDAS and MDASO with socioeconomic status of the respondents was summarized in the Table-3. According to MDAS, dental anxiety was found to be significantly ($p<0.05$) associated with sex, age, marital status, occupation, self income and family income of the respondents. Dental anxiety was more common in female (20.5%, n=45), 25-29 years age group (10.0%, n=22), unmarried (15.9%, n=35), student (14.1%, n=31), nil self income group (11.4%, n=25) and 1-20000 taka family income group (10.0%, n=22). No significant ($p>0.05$) association was found in education of the respondents. According to MDASO, dental anxiety was found to be significantly ($p<0.05$) associated with sex, age, marital status and self income of the respondents. Dental anxiety was more common in female (27.3%, n=60), 25-29 years age group (12.3%, n=27), unmarried (23.6%, n=52) and nil self income group (15.9%, n=35). No significant ($p>0.05$) association was found in education, occupation and family monthly income of the respondents.

Table 3: Comparative association of (P <0.05) dental anxiety according to MDAS and MDASO with socioeconomic status of the respondents (n=220)

Variables	MDAS	MDASO
Gender (Male, Female)	*P =0.003	*P =0.012
Age group in yrs (18-20, 21-24, 25-29)	*P =0.010	*P =0.044
Marital status (Married, Unmarried, Divorced/ Separated)	*P =0.007	*P =0.010
Education level (SSC, HSC, Graduate, Masters)	P =0.712	P =0.750
Occupation (Student, Service, Business, Unemployed, Housewife, Others[1])	*P =0.001	P =0.097
Self income in taka Nil, 1-10000, >10000	*P =0.009	*P =0.001
Family income in taka 1-20000, 20000-40000, >40000	*P =0.030	P =0.096

1. Others: Tuition, Hand work 2. *P < 0.05 significant

Association of dental anxiety according to MDAS and MDASO with self stated dental anxiety was summarized in the Table-4 and Table-5. More than three fourth (78.2%, n=172) respondents stated that they were anxious about their orthodontic problem. In Table-4, dental anxiety was found to be significantly (p<0.05) associated with presence and duration of self stated dental anxiety of the respondents. Dental anxiety was more common in respondents who were anxious about orthodontic problem (22.7%, n=50) and in >24 months duration of anxiety (8.6%, n=19). In Table-5, dental anxiety was found to be significantly (p<0.05) associated with presence and duration of self stated dental anxiety of the respondents. Dental anxiety was more common in respondents who were anxious about orthodontic problem (31.8%, n=70) and in >24 months duration of anxiety (12.3%, n=27).

Association of dental anxiety according to MDASO with dental anxiety according to MDAS of the respondents was presented in the Table-6. Dental anxiety assessed by MDASO was found to be significantly (p<0.05) associated with dental anxiety assessed by MDAS of the respondents. 21.4% (n=47) respondents were dentally anxious in both MDAS and MDASO.

Table 4: Association of dental anxiety according to MDAS with self stated dental anxiety of the respondents (n=220)

Variables	MDAS			Comment
	Not anxious (Score 14) % (n)	Anxious (Score 15) % (n)	Total % (n)	
Anxious about orthodontic problem				P =0.001
Yes	55.5%(122)	22.7%(50)	78.2%(172)	
No	21.8%(48)	0(0)	21.8%(48)	
Duration of dental anxiety				P =0.001
< 6 months	28.6%(63)	2.7%(6)	31.4%(69)	
6-12 months	16.8%(37)	4.5%(10)	21.4%(47)	
12-24 months	19.5%(43)	6.8%(15)	26.4%(58)	
> 24 months	12.3%(27)	8.6%(19)	20.9%(46)	

Table 5: Association of dental anxiety according to MDASO with self stated dental anxiety of the respondents (n=220)

Variables	MDASO			Comment
	Not anxious (Score 14) % (n)	Anxious (Score 15) % (n)	Total % (n)	
Anxious about orthodontic problem				P =0.001
Yes	46.4%(102)	31.8%(70)	78.2%(172)	
No	21.4%(48)	0.5%(1)	21.8%(48)	
Duration of dental anxiety				P =0.001
< 6 months	27.7%(61)	3.6%(8)	31.4%(69)	
6-12 months	13.6%(30)	7.7%(17)	21.4%(47)	
12-24 months	17.7%(39)	8.6%(19)	26.4%(58)	
> 24 months	8.6%(19)	12.3%(27)	20.9%(46)	

Table 6: Association of dental anxiety according to MDASO with dental anxiety according to MDAS of the respondents (n=220)

		Modified Dental Anxiety Scale for Orthodontics (MDASO)		
		Not anxious (Score 14) % (n)	Anxious (Score 15) % (n)	Total % (n)
Modified Dental Anxiety Scale (MDAS)	Not anxious (Score 14) % (n)	66.4%(146)	10.9%(24)	77.3%(170)
	Anxious (Score 15) % (n)	1.4%(3)	21.4%(47)	22.7%(50)
	Total % (n)	67.7%(149)	32.3%(71)	100.0%(220)
Chi-square = 112.797, df = 01, p value = 0.00 1				

Discussion

Respondents were predominantly female (73.6%, n=162), perhaps more females were seeking orthodontic treatment. In our study females were more likely than males to experience dental anxiety. Armfield et al[23] research showed that 12% of males reported dental anxiety in comparison to 20% of females. Several other studies support the finding that women report more dental anxiety than men.[2,15,24,25] In our study dental anxiety increased gradually with age. Marya et al[25] study showed that prevalence of dental anxiety was seen mostly in the 20-30 year age group (37.3%). Armfield et al[23] also reported that the prevalence of dental anxiety increased gradually with age. In our study lower income was associated with dental anxiety. Armfield et al,[23] Doerr et al[26] and Roy[22] also supported this finding and concluded that higher income households had a lower incidence of anxiety while lower income households had a higher incidence of anxiety. In our study student were more dentally anxious than others. The possible explanation was that more than two third (n=153) of the respondents were student and a large portion (n=117) of them had no self income. In our study no difference observed in educational level. Hakeberg et al[27] also did not find any difference between high and low educated individuals.

Concerning contributing factors for dental anxiety, more than half (57.6%, n=99) of the respondents stated that costly and extensive treatment was contributing factor. Doubt about proper treatment was contributing factor for 35.5%(n=61) respondents. Hopeless/too late to do was contributing factor for 33.1%(n=57) respondents. Fear of pain (23.8%, n=41), evoking stimuli (12.8%, n=22) and lack of proper information (11.6%, n=20) was other contributing factors for dental anxiety. In Rajagopal et al17 study most of the patients felt that long duration of treatment (61.8%), lack of information (12.7%) and fear of pain (11.2%) was the important contributing factor for dental anxiety followed by embarrassment, expensive etc. Roy22 found a positive correlation between dental anxiety and patients' reported pain. Fear of pain associated with dental treatment has been identified as a major component of dental anxiety.[13]

From the study it was revealed that respondents were more anxious about their orthodontic problem than other dental problems. Average MDAS and MDASO score of the respondents was 12.98 2.445 and 13.55 2.563. In our study prevalence of dental anxiety was 22.7% (using MDAS) and 32.3% (using MDASO). In Roy[22] study reported prevalence was 22.8% (using MDAS) and 18.7% (using MDASO). The prevalence varies among the different studies depending on population sampled and dental anxiety scales used. Klingberg and Broberg15 published a review about prevalence of dental anxiety ranging from 5.7% to 19.5% according to the different studies. According to review of adult dental anxiety by Heaton et al,[28] six studies using the Dental Anxiety Scale reported prevalence between 10.2% and 16.2%. Other studies showed that prevalence of dental anxiety was ranges from 10% to 20%.[4,5] So far known, it was the first attempt to address dental anxiety in orthodontic treatment in Bangladesh. More studies need to be done to explore the prevalence of dental anxiety and exact situation of the whole country.

Conclusion

Dental anxiety was more prevalent among patients seeking orthodontic treatment, based on the percentage of respondents being dentally anxious (22.7%) using the MDAS and anxious about going to the orthodontist (32.3%) using the MDASO. Socioeconomic characteristics such as female sex, increased age group, unmarried and low economic condition had significant ($p<0.05$) influence on dental anxiety. Respondents' self reported long duration dental anxiety was a contributor ($p<0.05$) to dental anxiety.

References

1. Chanpong B, Haas DA, Locker D. Need and demand for sedation or general anaesthesia in dentistry: A national survey of the Canadian population. Anaesthesia Progress, 2005; 52: 3-11.
2. Locker D. Psychological consequences of dental fear and anxiety. Community Dentistry and Oral Epidemiology 2003; 31: 144-51.
3. Schuller AA, Willumsen T, Holst D. Are there differences in oral health and oral health behavior between individuals with high and low dental fear? Community Dentistry and Oral Epidemiology, 2003; 31: 116-21.
4. Dempster LJ. Measurement and characterization of fear and avoidance in dental anxiety. PhD Thesis, Institute of Medical Science, University of Toronto, 2007.
5. Locker D, Poulton R, Thomson WM. Psychological disorders and dental anxiety in a young adult population. Community Dentistry and Oral Epidemiology, 2001; 29: 456-63.
6. Cohen SM, Fiske J, Newton JT. The impact of dental anxiety on daily living. Br Dent J, 2000; 189: 385-90.

7. Armfield JM, Slade GD, Spencer AJ. Dental fear and adult oral health in Australia. Community Dentistry and Oral Epidemiology, 2009; 37: 220-30.8. Enkling N, Marwinski G, Johren P. Dental anxiety in a representative sample of residents of a large German city. Clinical Oral Investigation, 2006; 10: 84-91.
9. Mehrstedt M, John MT, Tonnies S, Micheelis W. Oral health-related quality of life in patients with dental anxiety. Community Dentistry and Oral Epidemiology, 2007; 35: 357-63.
10. Moore R and Brodsgaard I. Dentists' perceived stress and its relation to perceptions about anxious patients. Community Dentistry and Oral Epidemiology, 2001; 29: 73-80.
11. De Jongh A, Muris P, Ter Horst G, Duyx M. Acquisition and maintenance of dental anxiety: the role of the conditioning experiences and cognitive factors. Behavioural Research and Therapy, 1995; 33: 205-10.
12. Locker D, Shapiro D, Liddell A. Concordance between measures of dental anxiety. Community Dentistry and Oral Epidemiology, 1996; 24: 346-50.
13. Maggirias J and Locker D. Psychological factors and perceptions of pain associated with dental treatment. Community Dentistry and Oral Epidemiology, 2002; 30: 151-59.
14. Weiner AA and Weinstein P. Dentists' knowledge, attitudes, and assessment practices in relation to fearful dental patients: a pilot study. General Dentistry, 1995; 43: 164-68.
15. Klinberg G and Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. International Journal of Paediatric Dentistry, 2007; 17: 391-406.
16. Pinkham J, Casamassimo P, Fields J, Me Tigue D, Nowak A. In: Pediatric Dentistry: Infancy through Adolescence 4th Edition. Elsevier, Philadelphia, 2005.
17. Rajagopal B, Varalakshmi S, Vijai S, Arun R, Bhat M. Perception towards Orthodontic Treatment of Patients Suffering from Malocclusion: A Cross Sectional Survey. Journal of Oral Health Community Dentistry, 2011; 5(3): 132-35.
18. Newton J and Buck D. Anxiety and pain measures in dentistry: a guide to their quality and application. Journal of American Dental Association, 2000; 131: 1449-57.
19. Humphris GM, Morrison T, Lindsay SJ. The Modified Dental Anxiety Scale: validation and United Kingdom norms. Community Dental Health, 1995; 12: 143-50.
20. Haugejorden O and Klock KS. Avoidance of dental visits: the predictive validity of three dental anxiety scales. Acta Odontologica Scandinavica, 2000; 58: 255-59.
21. Humphris GM, Clarke HMM, Freeman R. Does completing a dental anxiety questionnaire increase anxiety? A randomised controlled trial with adults in general dental practice. British Dental Journal, 2006; 201(1): 33-5.
22. Roy j. Dental Anxiety in Future and Current Orthodontic Patients. MSc Thesis, University of Toronto, Canada, 2011.
23. Armfield JM, Spencer AJ, Steward JF. Dental fear in Australia: Who's afraid of the dentist? Australian Dental Journal, 2006; 51(1): 78-85.
24. Heft MW, Meng X, Bradley MM, Lang PJ. Gender differences in reported dental fear and fear of dental pain. Community Dentistry Oral Epidemiology, 2007; 35: 421-28.
25. Marya CM, Grover S, Jnaneshwar A, Pruthi N. Dental anxiety among patients visiting a dental institute in Faridabad, India. West Indian Medical Journal, 2012; 61: 2.
26. Doerr PA, Lang WP, Nyquist LV, Ronis DL. Factors associated with dental anxiety. Journal of American Dental Association, 1998; 129: 1111-19.
27. Hakeberg M, Bergren U, Carlsson SG. Prevalence of anxiety in an adult population in a major urban area in Sweden. Community Dentistry Oral Epidemiology, 1992; 20: 97-101.
28. Heaton LJ, Carlson CR, Smith TA, Baer RA, De Leeuw R. Predicting anxiety during dental treatment using patients' self-reports: Less is more. Journal of American Dental Association, 2007; 138: 188-95.

Oral Health Related Quality of Life among rural Adults in Bangladesh

S Shahan[1], MBM Haque[2], MR Karim[3], N Amin[4]

Abstract

Purpose: *Currently there is a growing interest in oral health outcomes in how oral health affects quality of life. The aim of the study was to describe oral health related quality of life among adult population living in a rural community.* ***Methods:*** *A cross sectional study was carried out at Gafargoan upazila of Mymansingh district for a period of January 2014 to December 2014. A total of 600 respondents were selected following purposive sampling method on the basis of defined selection criteria. The research instrument was a pretested interviewer administrative questionnaire and quality of life measuring scale.* ***Results:*** *Among the study population, 52.8% (n=317) were female and 47.2% (n=273) were male. The mean oral health impact profile-14 (OHIP-14) added score was 10.87'6.63.Several of the socio-economic characteristics like age, educational status, occupation and income of the respondents were statistically significantly associated with inferior oral health related quality of life (at p value <0.05). The explanatory variables of oral health status like uses of tooth brush and fluoride containing paste, sugar containing tea and health risk behavior were highly statistically significant (p<0.0001). Binary logistic regression model was used to identify the important predictors (at p value <0.05). Regular consumption of sweeten foods (AOR .085; 95% CI 0.01 to 0.5) and sugar containing tea (AOR 0.12; 95% CI 0.21 to 0.64) and Uses of smokeless tobacco (AOR 13.5; 95% CI 3.22 to 56.48) had more likely to develop poorer quality of life (QoL).*
Conclusion: *To ensure easy access of community people to receives dental care services from community health center. Behavioral change motivation programs and health education programs among the community people must be given regularly.*

Keywords: Quality of life, Oral Health Status and OHIP-14

J Con Dent Sci 2016;4(2):12-18

Introduction

The World Health Organization (WHO) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). But the present concept of health requires the inclusion of psychosocial aspects, such as issues related to quality of life. The idea of "quality of life" has been expanded recently, and its improvement has also become a goal of the good practices for health promotion and prevention of disease.[1] Health related quality of life (HRQoL) is considered a multidimensional concept; it refers not only to individuals' physical well being but also to their psychological and social well being.[2] The impact of an individual's health on his/her daily activities can be significant. Actions and interactions can be greatly affected which in turn may further reduce the individual's functionality and psychological well being.[3] It is an emerging subject of importance during recent years. Oral health status is the combination of teeth status and supporting tissues and structures status. The oral cavity is a portal of entry and the site for microbial infections that affect overall health status. Oral health is integral part of overall health.[4]

Oral disease creates a major public health burden worldwide and receives inadequate attention in many low and middle income countries.[5] Oral diseases particularly oral cancers, periodontal disease, dental caries, and tooth loss are linked to emerging chronic non-communicable diseases primarily because of common risk factors.[3] It has considerable impact on individuals and communities in terms of pain and suffering, impairment of function and reduced quality of life. Thus the individuals' oral health has significant effect on overall health related quality of life, it is important to measure oral health related quality of life.[6] The term Oral health-related Quality of Life (OHRQoL) is defined by individual assessment of several oral health dimensions including physical, dental function, tooth pain, psychological discomfort and social impacts-all of which affect overall well-being.[3]

1. Dr. Sayeda Shahan,BDS, MPH (NIPSOM) MSS in Clinical social Work (DU), Consultant Dental surgeon, Crescent Dental and Medical Services, Mirpur- 10. Dhaka
2. Dr. Mehra Binta Moainul Haque, BDS, MPH (NIPSOM), Consultant Dental surgeon, Dental Aid
3. Dr. Md. Rizwanul Karim, Asst. Professor, Epidemiology, National Institute of Preventive and Social Medicine (NIPSOM)
4. Prof. Dr. Nurul Amin, BDS, PhD, Professor and Head, Dept. of Oral and Maxillofacial Surgery,Sapporo Dental College and Hospital, Dhaka

Address of Correspondence

Dr. Sayeda Shahan, BDS, MPH (NIPSOM) MSS in Clinical social Work (DU),Consultant Dental surgeon, Crescent Dental and Medical Services, Mirpur- 10, Contact no: 01678703065, Fax: 02-55077947, Email: dr.mithela9586@gmail.com

It has considerable impact on individuals and communities in terms of pain and suffering, impairment of function and reduced quality of life. Thus the individuals' oral health has significant effect on overall health related quality of life, it is important to measure oral health related quality of life.[6] The term Oral health-related Quality of Life (OHRQoL) is defined by individual assessment of several oral health dimensions including physical dental function, tooth pain, psychological discomfort, and social impacts-all of which affect overall well-being.[3] Any oral health related disorders/disease that could interfere with the activities of daily life may have an adverse effect on the overall health related quality of life.[7] Moreover, oral-related behavior such as practicing good oral hygiene, having regular check-ups, and spending more money on aesthetic dental care are motivated by OHRQoL concerns.[8]

OHRQoL is a relatively new but rapidly growing phenomenon. Over the past two decades several authors have explored the evolution of OHRQoL and documented the circumstances that have led to its importance. The concept of OHRQoL is especially vital to promote oral health care and access to care.[9] As a developing country Bangladesh, is not free from the burden of oral diseases. Most of the people of this country are not in a good socio-economic condition due to various problems such as poverty, wages, discrimination, want of essential goods and commodities. So they are not concerned about their oral diseases and effects of oral health problems in their health related quality of life. The majority of oral diseases can give rise to significant morbidity, resulting in physical, social and psychological consequences which affect patients' QoL.[10]

Studies have shown that poor oral health has negative impact on daily life for substantial proportions of older people.[11] The negative impacts have been shown to be particularly evident among elderly individuals who did not use dental services on a regular basis.[12] In contrast, Swedish studies have found that young women reported the poorest OHRQoL.[13] In Finland, Lahti and co-workers found that older individuals reported poorer OHRQoL, but young people with low education and those with missing teeth that had been replaced by removable dentures rated their OHRQoL as poor.[12] There is limited knowledge of OHRQoL in Bangladesh.

In Bangladesh, epidemiological studies of oral health in adults are scarce, and there is a single published article about teeth status and oral health and oral-health-related quality of life (OHRQoL) among elderly. No published article on OHRQoL among adults in this country. According to UN estimate in 2010, in total 166,280,712 populations, main bulk of that population are adult 64.1%. If the proper care of oral health is not taken in adults, in future they will lead inferior quality of life. Therefore a study is planned to describe the oral health related quality of life, to assess the effect of socio-economic factors on oral health related quality of life, to find out the behavioral and lifestyle characteristics related to quality of life in adult population. This study will help the policy makers and implementers to know about the socio-economic factors and oral health problems which are related to QoL.

Materials and Methods

A cross sectional study was carried out in three union of Gafargoan upazila, namely Char Algi, Gafargoan and Datter Bazar, a sub district (upazila) of Mymensingh is situated at the northern part of the country. The study area was chosen purposively in terms of accessibility to the respondents. Every household was chosen in that selected area and adults (19 to 65 years) by using purposive sampling method. Respondents, who were present in the house during data collection included as the participants of the study but who were mentally and physically disabled, suffered from chronic diseases, used illicit substances and unwilling to participate excluded from the study. The estimated sample size was 600 and period of study was six months.

After giving complete description of the study to the respondents, written consent in Bengali were taken from the interested respondents. For those who could not sign the consent form was read out and their thumb prints were taken. They were informed of their full right to participate and to refuse from the study. It was assured to the respondents that no invasive procedures will be employed on them. Prior to commencement of the study, the research protocol was approved by the ethical committee of the National Institute of Preventive and Social Medicine, Dhaka, Bangladesh.

Data were collected using pre-tested questionnaire, consisted of socio-economic characteristics, oral hygiene practice, health risk behavior, perception of dental problems and oral health related quality of life. OHRQL was assessed using the 14-item OHIP.10 It comprises 14 items which were derived from the original extended version of 49-items, these items are subsequently transformed into seven dimensions based on a conceptual oral health framework and derived from the World Health Organization (1980).13 The Cronbach`s alpha values of the subscales were between 0.75 and 0.90 indicating the high internal consistency reliability of the Oral Health Impact Profile.14 Five points [5 points] Likert's Scale was used to measure the responses to the OHIP-14 items with the possible score range. Five points are Very often = 4, Fairly often = 3, Occasionally = 2, Hardly ever = 1, Never = 0. Lowest score of OHIP-14 is 0 and highest score 56. Within each dimension, coded response can be multiplied by weights to yield a subscale scores.15

Data were cleaned and edited. Analysis was done using Statistical Package for Social Sciences (SPSS) version 20.0. Respondents were divided into two groups by dichotomized OHIP-ADD score; according to cut off score which was set at 10 on the basis of the median to identify a target group with inferior OHRQoL. Statistical tests (Chi-Square) were performed to determine the association between the socio-economic characteristics and oral health related quality of life. Association was also seen between oral hygiene practices, health risk behavior, and perception of dental problems factors with OHRQoL. To control the confounder and to identify the important predictors, all variable that were found significant in univariate analysis (at $p<0.05$) were included in binary logistic regression model and association was reported with Adjusted Odds Ratio (AOR) with 95% CI, with p value.

Results

The target was to collect data from the equal number of male and female in total 600 respondents, but the male (n=283) respondents were slightly less than half in comparison to the female (n=317) respondents. The mean age of the respondents both male and female was 39.92 years with standard deviation 13.27 years. Majority of the respondents income were in between 10000 to 19000 taka, 37.17% (n=223) and 9000 taka and below incoming respondents were 35.33% (n=212).least group of respondents 27.50% (n=165) income were 20,000 taka and above. As the selected population for research were adults, so (Table 1) the percentage of the respondents having number of natural teeth were 96.5% (n=579). Majority of them were not using denture 97.3% (n=584). Almost 83% (498) respondents had suffered from pain or discomfort within last 12 months and 17% (n=102) were free from any types of complain regarding teeth or mouth. 73.5% (n=441) respondents had rated the poor condition of teeth and 76.3% (n=458) had rated the poor condition of gum. Only 13.2% (n=79) were rated good condition of teeth and in case of gum rating 11.2% (n=67) respondents were rated as good condition (Table 1).

Table 1: Distribution of the respondents oral health condition (n=600)

Variables	Distribution	Number of the respondents(n)	Percentage (%)
Number of natural teeth	Less than 20 teeth	21	3.5
	20 teeth and more	579	96.5
Uses of dentures	Present	16	2.7
	Absent	584	97.3
Teeth or mouth causes any pain or discomfort during past 12 months	Present	498	83.0
	Absent	102	17.0
Self rating teeth status	Good/very good	79	13.2
	Fair	80	13.3
	Bad/very bad	441	73.5
Self rating gum condition	Good/very good	67	11.2
	Fair	75	12.5
	Bad/very bad	458	76.3

Table 2: Distribution of the respondents eating behavior (n=600)

	Number of the respondents (n) and percentage (%)		
Variables	Several times a day/once a day(everyday)	Several times a week/once a week (weekly)	Seldom/several times a month (monthly)
Fresh fruits and vegetable	464 (77.3%)	124 (20.7%)	12 (2.0%)
Bakery foods	192 (32.0%)	199 (33.2%)	209 (34.8%)
Sweet or sugar containing foods	143 (23.8%)	209 (34.8%)	248 (41.3%)
Cold drinks/juice	40 (6.7%)	96 (16.0%)	464 (77.3%)
Sugar added tea/coffee	213 (35.5%)	78 (13.0%)	309 (51.5%)

Table 2 shows the percentages of having fresh fruits and vegetables everyday or several times a day were two third of the total respondents 464 (77.3%), least them were never had vegetables 12(2.0%) and 124 (20.7) participants were having once or several times a week. In total 391 (58.7%) respondents were taking bakery foods regularly or several times a week and 209 (34.8%) of the respondents never or seldom had bakery foods. Sweet or sugar containing foods were taken by 352 (58.6%) respondents and 248 (41.3%) did not like to have or could not afford sweet or sugar containing foods. In my respondents almost half of them were taking sugar containing tea regularly or occasionally 291 (48.5%). But rests of the respondents were not taking sugar containing tea 309 (51.5%).

Table 3: Association of socio-economic characteristics with Oral Health Related Quality of Life (OHRQoL)

Socio economic characteristics	**Respondents with inferior OHRQoL**		Chi-Square	**P-value**	**Crude OR with 95%CI**
	No (N %)	**Yes (N %)**			
Sex:					
Male	137(48.4%)	146(51.6%)	0.54	0.46	0.89 (0.64-1.22)
Female	163(51.4%)	154(48.6%)			
Education:					
Illiterate	71(29.5%)	170(70.5%)			
Below S.S.C	106(54.1%)	90(45.9%)	26.53	0.000*	0.35 (0.24-0.53)
S.S.C and above	123(75.5%)	40(24.5%)	75.07	0.000*	0.14 (0.09-0.21)
Occupation:					
Unemployed	158(53.2%)	139(46.8%)			
Day labourer	64(36.6%)	111(63.4%)	12.07	0.000*	1.97 (1.34-2.89)
Service	78(60.9%)	50(39.1%)	2.16	0.141	0.73 (0.48-1.11)
Marital status:					
Single	26(76.5%)	8(23.5%)			
Married	263(50.8%)	255(49.2%)	7.70	0.006*	3.15 (1.40-7.09)
Widow/widower	11(22.9%)	37(77.1%)	20.33	0.000*	10.93(3.87-30.92)
Family type:					
Nuclear	178(48.9%)	186(51.1%)	0.45	0.504	0.89 (0.64-1.24)
Joint	122(51.7%)	114(48.3%)			
Characteristics	**Mean (SD)**		**F**		**P value**
Age:					
Below 30 years 30-49 years 50 years and above	17.66 (10.49) 23.04 (3.77) 31.82 (12.86)		66.364		0.000*
Income:					
9000 and below	31.58 (12.53)		79.480		0.000*
10000-19000	24.07 (11.28)				
20000 and above	16.24 (10.75)				

*Significant at p value <0.05; OR= odds ratio; CI=confidence interval

Table 3 shows association between socio-economic factors included age, sex, education, occupation, marital status and income with oral health related quality of life (OHRQoL). Chi-square test was done to see the association but no association was observed between sex and family type with inferior oral health related quality of life.

Result showed that there was highly significant difference between the illiterate and below S.S.C respondents (p= 0.000) and the married and widow/widower group as well as labourer respondents with inferior oral health related quality of life (p=0.000). These differences were found to be statistically significantly associated (p< 0.05). One way ANOVA test was conducted to compare differences in the mean values of the age and income of the respondents with Oral health related quality of life score. There was a statistically significant difference at the p < 0.05 level in the OHRQoL score with the three age groups [F (2,597) =66.36, p= 0.000]. Three income groups of the respondents were statistically significant at the p < 0.05 level with the OHRQoL score [F (2,597) =79.48, p=0.000] and each group differ significantly with one another group.

Table 4: Association of Oral hygiene maintenance with Oral Health Related Quality of Life (OHRQoL)

Oral hygiene maintenance	Respondents with inferior OHRQoL		Chi-Square	P-value	Crude OR with 95%CI
	No (N %)	Yes (N %)			
Cleaning of teeth					
Once daily or less	92(32.5%)	191(67.5%)	65.55	0.000*	0.252 0.180-0.355
Twice daily or more	208(65.6%)	109(34.4%)			
Tooth brush use for cleaning					
Yes	213(72.7%)	80(27.3%)	117.99	0.000*	6.733 4.710-9.624
No	87(28.3%)	220(71.7%)			
Fluoride containing tooth paste use for cleaning teeth					
Yes	167(77.7%)	48(22.3%)	102.65	0.000*	6.592 4.492-9.674
No	133(34.5%)	252(65.5%)			

*Significant at p value <0.05; COR= Crude Odds Ratio; CI= Confidence interval

Table 5: Important factors that contribute to oral health related quality of life from the binary logistic regression model

Characteristics	Wald's Chi-Square	p value	AOR	95% CI for Adjusted Odds Ratio	
				Lower	Upper
30-49 years age of the respondents	3.882	.049	0.244	0.060	0.993
Regular consumption of bakery foods	5.207	.023	6.437	1.300	31.862
Regular consumption of sweeten foods	7.472	.006	0.085	0.014	0.498
Weekly consumption of sweeten foods	5.786	.016	0.124	0.023	0.680
Regular consumption of sugar containing tea/coffee	6.087	.014	0.116	0.210	0.642
Uses of smokeless tobacco	12.706	.000	13.502	3.227	56.487

AOR= Adjusted Odds Ratio; CI= Confidence Interval; Logistic regression: Cox & Snell R^2= 0.61, Nagelkerke R^2= 0.82, model Chi-Square = 1.80, p < 0.05 (df8)

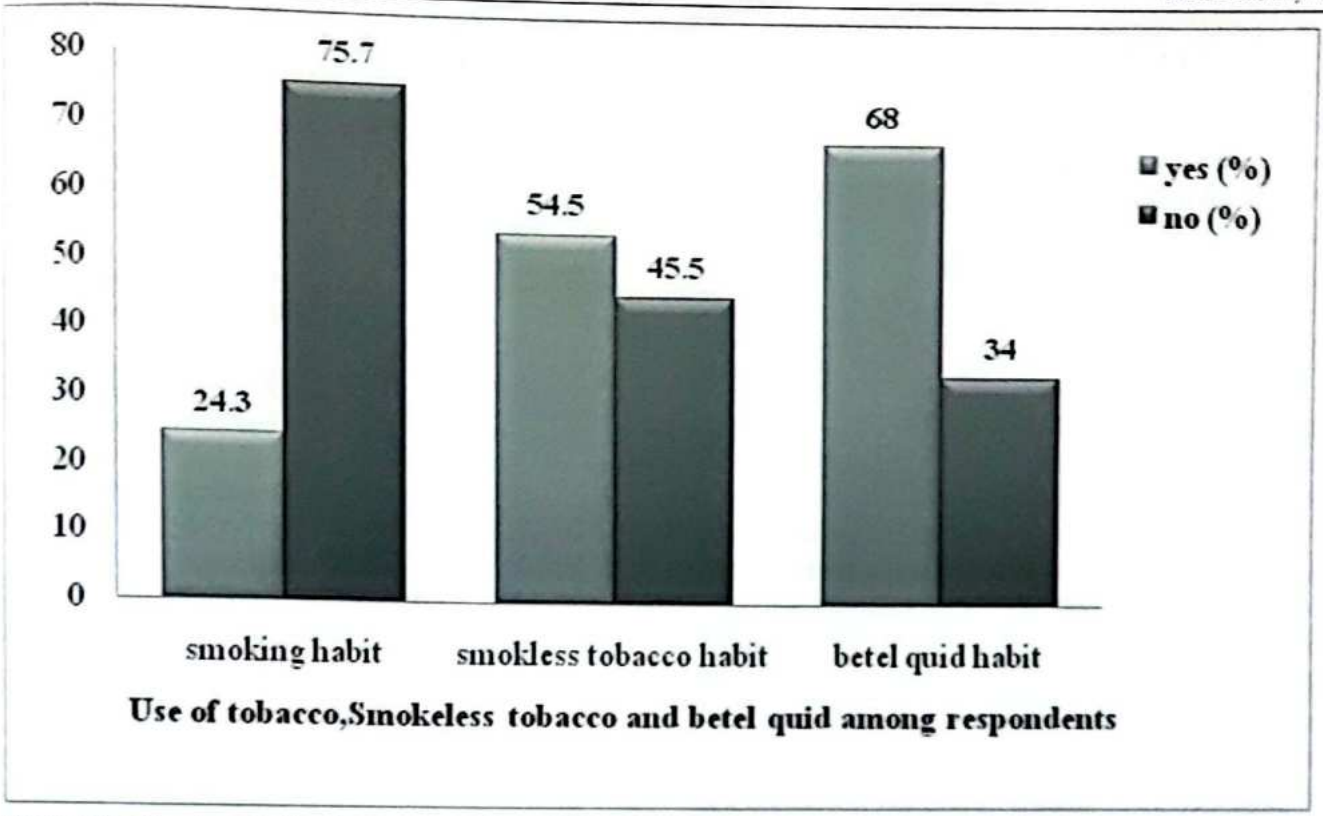

Fig1: Distribution of the frequency of harmful habits (Smoking, Smokeless tobacco and Betel quid) among respondents (n=600)

Two-third of the total respondents were not smoker 456 (75.7%) and rest of the one-third were regular or occasional smokers. 327 (54.5%) respondents were using smokeless tobacco and rest of them 273 (45.5%) were not using. Among all these harmful habits, betel quid regular or occasional users were more 408 (68%) and never used 192 (34%) of total 600 respondents (Figure 1).

On univariate analysis, the oral hygiene maintenance factors like, frequency of cleaning tooth, tooth brushing apparatus and uses of fluoride containing toothpaste of respondents were statistically significantly associated with inferior quality of life ($p < 0.05$) (Table 4).

Several of the socio-economic, oral health status, oral hygiene maintenance and health risk behavior related variables were associated with inferior OHRQoL in the univariate analysis. Hence a binary logistic regression model was constructed to find out the important predictors for OHRQoL adjusting the other factors. The model was good at classifying correctly the inferior quality of life (90.7%) and the not poorer OHRQoL of the respondents (93.0%). The predictors in the model showed that respondents who were regular consumping bakery foods almost six times likely to be inferior OHRQoL than the respondents who were not and those who had weekly consumption of sweeten foods were five times less likely to develop poorer QoL. Uses of smokeless tobacco had a positive association with inferior QoL (Adjusted OR= 13.5; 95% CI= 3.2 to 56.5) (Table 5).

Discussion

In the current study, the oral health related quality of life among females (52.8%) and males (47.2%) has no a significant difference but the association between sex and OHRQoL varied. Men reported poorer OHRQoL than women in the representative sample. But a study conducted in Bangladesh showed that male had lowest means score of OHIP-14 with best quality of life related to the oral health compare to female respondents.[5] A study conducted in Norwegian also showed that Women reported poorer OHRQoL than men in the representative sample.[2] Individuals with higher education (S.S.C and above) was reported better OHRQoL (75.5%). The tendency was not the same for illiterate and below S.S.C level respondents, even though the difference was statistically significant. The present results are in line with those of previous studies

and confirm that level of education is associated with OHRQoL.[14] Inferior OHRQoL was more common among the day labourer group (63.4%) than the group of the unemployment respondents (46.8%). This was finding is dissimilar among those Bangladeshi elderly, where the poorer QoL was common in the unemployment groups.[5] The important predictors for inferior OHRQoL found in this study by the binary logistic model is consistent with other studies. As the study participants were adult, so majority of the respondents had tendency of having regularly sugar containing tea/coffee, almost 57.7% respondents were showed poorer QoL. There is association between smoking habit, smokeless tobacco habit and betel quid consumption with inferior OHRQoL. In this study 67.4% of the smoker, 71.9% smokeless tobacco consumer and 61.3% betel quid users were reported with poor QoL. But the study was done in Bangladesh reported that 50.9 % of elderly were taking betel quid regularly which was less than this study.[17]

The most important finding is the inferior OHRQoL associated with oral health status and health risk behavior. This might be due to availability, decrease price of betel quid and increase the dependency level towards these harmful habits. Although due to gradually loss of teeth, some of the respondents started avoiding betel quid. Therefore, educating these patients about promoting good oral health and preventive care will be crucial. Research also shows that certain population segments are drastically underserved. This study has some limitations. The respondents were selected conveniently which may not be representative of the whole population. Moreover, this study was done in six months; usually more time is required to explore inferior oral health related quality of life. Further research and understanding of the psychological and behavioral aspects of the Bangladeshi respondents are required for developing behavioral change motivation programs.

Acknowledgement

We are grateful to Almighty Allah, the most Gracious and most Merciful, for enabling us to complete and submit this article. We are thankful to the people of Gafforgaon sub-district who were respondent of this study and the personnel who helped in this research.

References

1. Cornejo M, P rez G, Lima K, Casals-Peidro E, Borrell C. Oral Health-RelatedQuality of Life in institutionalized elderly in Barcelona (Spain). Medicinal Oral Journal. 2013;18 (2):e285-92.
2. Papaioannou W, Oulis C J, Latsou D and Yfantopoulos J.Oral Health-Related Quality of Life of Greek Adults: A Cross-Sectional Study. International Journal of Dentistry. 2011; 1:1-7.
3. Yiengprugsawan V ,Tewarit S, Seubsman S, Adrian C Sleigh and The Thai Cohort Study Team.Oral Health-Related Quality of Life among a largenational cohort of 87,134 Thai adults. Health and Quality of Life Outcomes. 2011; 9(42):1-8.
4. Khan A M and Ahmed S M. "Why do I have to Clean Teeth Regularly?" Perceptions and State of Oral and Dental Health in a Low-income Rural Community in Bangladesh. MPH (thesis). BRAC University, Dhaka, Bangladesh. 2011.
5. Eusuf Zia S Z, Jamayet N, Alam M K.A Study of Teeth Status and Oral Health Related Quality of Life among Elderly in Bangladesh. International Medical Journal. 2013; 20(5): 610 - 14.
6. Walter M H, Woronuk J I, Tan H K et al 2007.Oral Health Related Quality of Life and its Association with Socio-demographic and Clinical Findings in 3 Northern Outreach Clinics. Journal of Canadian Association, 73(2):153a-53e.
7. Ingle N A, Preetha.E.C & Zohara C.K.Oral health related quality of life in adult population attending the outpatient department of a hospital in Chennai, India. Journal of International Oral Health. 2010; 2(4):45-55.
8. M. Al Shamrany. Oral health-related quality of life: a broader perspective. Eastern Mediterranean Health Journal. 2006; 12(6):894-901.
9. Acharya S. Oral health-related quality of life and its associated factors in an Indian adult population. Oral Health Preventive Dentistry. 2008; 6:175-84.
10. Locker D, Jokobic A, Clarke M. Assessing the responsiveness of measures of oral health related quality of life. Community Dentistry and Oral Epidemiology. 2004; 32: 10-8.
11. Gary D. Slade. Measuring Oral Health and Quality of Life. Chapel Hill: University of North Carolina, United State of America. 1997
12. Allen P F. Assessment of oral health related quality of life. Health and Quality of Life Outcomes. 2003;1:40-48.
13. WHO (2003). The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century - the approach of the WHO Global Oral Health Programme. Geneva.
14. Espinoza I , Thomson WM , Gamonal J , Arteaga O. Disparities in aspects of oral-health-related quality of life among Chilean adults. Community Dentistry and Oral Epidemiology.2012 41: 242-50.
15. Mumcu G, Hayran O, Ozalp D. O., Inanc N, Yavuz S, Ergun T, Direskeneli H. The assessment of oral health-related quality of life by factor analysis in patients with Behcet's disease and recurrent aphthous stomatitis. Journal of Oral Pathological Medicine. 2007;36: 147-52.
16. Uliniski K, Nascimento M, Lima A, Benetti A & Fracasso M. Factors related to oral health related quality of life of independent Brazilian elderly. International journal of dentistry. 2013; 5: 1-8.
17. Siddiqui T M, Wali A, Siddiqui S H, Heyat U, Nadeem M, Shamim M. An Epidemiological Study of Prevalence of Dental Caries and Periodontal Disease among Adults in Deprived Areas- Karachi. Journal of Oral Health & Research. 2013;4(1): 3-7.

Tobacco Use and Betel Quid Dependence among Bangladeshi Rural Adults

MBM Haque,[1] S Shahan[2], MR Karim[3], N Amin[4]

Abstract

Purpose: *The use of areca nut (psychoactive substance) in betel quid is a common practice in the South-East Asian Region. The assessment of betel quid dependence has become a global public health issue because of its adverse health consequences. The aim of this study was to assess betel quid dependence among the users (with and without tobacco additives) using the Betel Quid Dependence Scale (BQDS).* ***Methods:*** *A cross-sectional study was conducted among 400 adult betel quid users, selected by purposive sampling method on the basis of defined selection criteria. Data were collected using a pre-tested interview administered questionnaire.* ***Results:*** *Overall 88.25% of the study respondents were dependent. Of them, 90.2% of the respondents used tobacco and 72.1% did not use tobacco. Female respondents had greater likelihood of dependence [Adjusted odds ratio (AOR) 4.32; 95% confidence interval (CI) 1.65 to 11.33]. The respondents who passed secondary or had higher level of education (AOR 0.13; 95% CI 0.04 to 0.45) were less likely to develop dependence while those who used betel quid for a longer duration (AOR 1.12; 95% CI 1.05 to 1.18) and increased quantity (AOR 3.07; 95% CI 1.89 to 5.00) had more chance of developing dependence.* ***Conclusion:*** *In this study, betel quid users with and without tobacco additives were highly statistically significantly associated with dependence ($p=0.0001$). Betel quid dependence was statistically significantly associated with gender of the respondents, level of education, amount of betel quid consumed daily and duration of use ($p<0.05$).*

Keywords: Betel quid, areca nut, tobacco, dependence, Bangladesh. ***J Con Dent Sci 2016; 4(2):19-23***

Introduction

Areca nut is ranked as the fourth most commonly consumed psychoactive substance after tobacco, alcohol and caffeine.[1] Almost 10% to 20% of the people worldwide chew areca nut with betel quid.[2] Betel quid is found to be practiced among the migrated communities of Africa, North America and Europe but it is commonly consumed in the South, Southeast Asia and Asia Pacific regions.[3] In Bangladesh, betel quid is traditionally used in social customs and cultural rituals. Betel quid is a mixture of thin slices of areca nut (supari) and slaked lime (calcium hydroxide) rolled in a betel leaf.[2] The prevalence of chewing betel quid in Bangladesh is almost twice as more in the rural than in the urban areas and three-fourths of the users like to use tobacco in the form of zarda, gul, etc.[4]

Over 250 million people are smokeless tobacco users in the South-East Asia region.[5] In Bangladesh, men use both smoke and smokeless form of tobacco like cigarette, bidi, zarda, sadapata, gul and khoinee but women usually do not smoke but use smokeless tobacco with betel quid.[6] More than six million people are dying each year globally due to tobacco related diseases.[7]

Areca nut contains different alkaloids of which arecoline is the principal alkaloid responsible for the dependence.[8] Some of the essential components for the diagnosis of dependence are tolerance, withdrawal, loss of control and craving.[9] The arecoline acts as an agonist and a stimulant for the central and the autonomic nervous system, increasing the level of noradrenaline and acetylcholine.[10] The symptoms of tolerance and withdrawal found among regular betel quid chewers can be comparable to nicotine dependence among smokers.[11] The immediate effects are rapid increase of facial skin temperature, palpitation and sweating.[1]

Betel quid chewed without tobacco or lime has adverse effects on both the hard and soft tissues of the oral cavity, like attrition, damage to periodontal ligaments and tooth mobility.[12] Many lesions (betel chewer's mucosa, areca nut related lesion, quid induced lesion and betel quid lichenoid lesion) and conditions (oral leukoplakia, oral submucous fibrosis) are associated with regular betel quid chewing with or without tobacco which precede the development of oral cancer.[13]

1. Dr. Mehra Binta Moainul Haque, B.D.S. (DU), MPH (NIPSOM), Consultant Surgeon, Dental Aid.
2. Dr. Sayeda Shahan, B.D.S. (DU), MPH (NIPSOM), MCSW (DU),Consultant Surgeon, Crescent Dental and Medical Services.
3. Dr. Md. Rizwanul Karim, M.B.B.S., MPH (NIPSOM), Assistant Professor, Department of Epidemiology, NIPSOM
4. Professor Dr. Nurul Amin, PhD., Professor and Head of the Department of Oral and Maxillofacial Surgery, Sapporo Dental College

Address of Correspondence

Dr. Mehra Binta Moainul Haque, 7/1 Block-C, Lalmatia, Mohammadpur, Dhaka-1207, Email: mehra.moain@gmail.com, Contact no.: 01715227244

The International Agency for Research on Cancer, classified areca nut alone as a Group 1 carcinogen (carcinogenic to humans).[14] Combining tobacco (another carcinogen) with betel quid increases its risk further for premature death and illness, so chewing betel quid and tobacco has become an important public health problem.[15] The areca nut alkaloids are converted into areca nut specific N-nitroso compounds which are responsible for oral cancer, its precursors leukoplakia, lichen planus and oral submucous fibrosis, other cancers of pharynx and esophagus.[16] Oral cancer is the second most form of cancer and cause of death among men living in South-East Asia. Globally one third of cancer cases are of oral cancer and one half from the South-East Asian region. One of the important factors contributing to this is the use of betel quid and tobacco.[17]

There has many researches on the epidemiological aspect in the South-Asian countries but very few studies focused on the behavioral and psychological issues. Further researches in this field are required to reduce the burden of oral health related diseases arising due to betel quid use. Therefore the present study aims to assess betel quid dependence among the users (with and without tobacco additives) using the BQDS.

Materials and Methods

A cross sectional study was conducted in a selected rural community of the Gaffargaon sub-district for a period of six months. At 95% confidence interval with 5% precision and taking the prevalence of betel quid dependence to be 40.5%, 8 the estimated sample size was 370. Considering non-response rate and missing data the targeted sample size was 400 respondents.

Prior to commencement of the study, the research protocol was approved by the ethical committee of the National Institute of Preventive and Social Medicine, Dhaka, Bangladesh.

The respondents were selected by purposive sampling method. After giving complete description of the study to the respondents, written consent in Bengali were taken from the interested respondents. For those who could not sign the consent form was read out and their thumb prints were taken. They were informed of their full right to participate and to refuse from the study. It was assured to the respondents that no invasive procedures will be employed on them. Data were collected using pre-tested questionnaire and by visiting households, having male and female respondents aged from 18 years to 60 years and those who used at least one betel quid daily in the last one year were included provided they gave their consent to participate in the study. Respondents, who were mentally and physically disabled, suffered from chronic diseases, used illicit substances and who were unwilling to participate were excluded from the study.

The questionnaire consisted of socio-economic characteristics, pattern of betel quid use and use of different forms of tobacco. Betel quid dependence was assessed using the 16-item BQDS. The question of each item had a dichotomous answer that is "yes" or "no". For the answer "yes" the score was 1 and for the answer "no" the score was 0. The total score ranged from 0 to 16. The respondents whose total score was above 3 were defined as dependent.[18]

Data were cleaned and edited. Analysis was done using Statistical Package for Social Sciences (SPSS) version 20.0. Respondents were divided into two groups: betel quid users with tobacco and betel quid users without tobacco. Statistical tests (2) were performed to determine the association between the socio-economic characteristics and the pattern of use with the two groups of users. Association was also seen between these factors with betel quid dependence. To control the confounder and to identify the important predictors, all variable that were found significant in univariate analysis (at $p<0.05$) were included in binary logistic regression model and association was reported with Adjusted Odds Ratio (AOR) with 95% CI, with p value.

Results

More than half of the total respondents were females i.e. 224 (56%) and the male respondents were 177 (44%). The average age of the female respondents was 41.21 10.76 years and the male was 43.47'11.74 years.

About 353 (88.25%) of the total respondents were found to be dependent. Of them, 90.2% of the respondents used tobacco and 72.1% did not use tobacco.

Out of the 400 respondents, 357 (89.25%) used tobacco in different forms with their betel quid and 43 (10.75%) did not use tobacco.

of these tobacco users, 281 (70.25%) of the respondents used only smokeless form of tobacco with their betel quid and 27(6.75%) only smoked but did not use smokeless tobacco and 49 (12.25%) of the respondents used both forms of tobacco (Figure1).

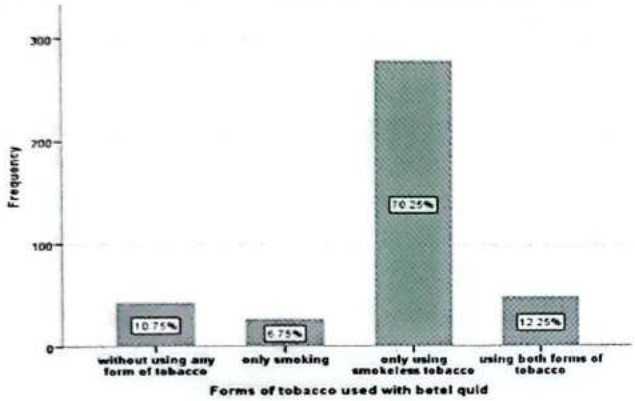

Fig.1: Distribution of the forms of tobacco used with betel quid by the respondents

Table 1 shows pattern of betel quid used by the two groups of betel quid users. There was a significant difference with frequency and quantity of betel quid used daily between these two groups ($p<0.05$). However, there was no statistically significant difference with the socio-economic characteristics between the two groups ($p<0.05$).

Table-1: Association of pattern of betel quid use between the two groups of the respondents (n=400)

Characteristics	Groups of the respondents		Chi^2	p value
	Betel quid without tobacco n(%)	Betel quid with tobacco n(%)		
Duration of use (in years)				
Less than 10	17 (10.8%)	140 (89.2%)	0.60	0.74
10-29	15 (9.6%)	142 (90.4%)		
30 and above	11 (12.8%)	75 (87.2%)		
Age at initiation (in years)				
Less than 20	9 (8.3%)	99 (91.7%)	1.42	0.50
20-29	15 (10.3%)	130 (89.7%)		
30 and above	19 (12.9%)	128 (87.1%)		
Frequency of use				
3 times	29 (20.3%)	114 (79.7%)	22.26	0.000*
>3 times	6 (9.2%)	59 (90.8%)		
All day	8 (4.2%)	184 (95.8%)		
Quantity of quid (quid/day)				
Less than 3	17 (26.2%)	48 (73.8%)	19.19	0.000*
3and above	26 (7.8%)	309 (92.2%)		

* = statistically significant at p value <0.05

Table-2: Association of socio-economic characteristics with betel quid dependence score (n=400)

Characteristics	Total betel quid dependence score		Chi^2	p value	COR with 95% CI
	Score 3points n (%)	Score 4 and above n (%)			
Sex					
†Male	28 (15.9%)	148 (84.1%)	5.24	0.02*	2.04 (1.1-3.79)
Female	19 (8.5%)	205 (91.5%)			
Age (in years)					
†Less than 35	17 (15.5%)	93 (84.5%)	4.33		
35-49	19 (13.4%)	123 (86.6%)	0.22	0.64	1.18(0.58-2.40)
50 and above	11(7.4%)	137 (92.6%)	4.03	0.04*	2.28(1.02-5.08)
Education					
† Illiterate	18 (8.2%)	201 (91.8%)	17.64		
Below Secondary	11 (9.4%)	106 (90.6%)	0.14	0.71	0.86 (0.39-1.9)
Secondary and above	18 (28.1%)	46 (71.9%)	15.78	0.000*	0.23 (0.11-0.47)
Occupation					
† Unemployed	17 (8.0%)	196(92.0%)	7.05		
Day labourer	17 (14.2%)	103(85.5%)	3.13	0.08	0.53 (0.39-1.9)
Service	13 (19.4%)	54 (80.6%)	6.54	0.01*	0.36 (0.11-0.47)

Chi^2= reference category; *=Significant at p value <0.05; COR= Crude Odds Ratio; CI= Confidence interval

Table-3: Association of the pattern of betel quid use with betel quid dependence score (n=400)

Characteristics	Total betel quid dependence score		Chi^2	p value	COR with 95% CI
	Score 3points n(%)	Score 4 and above n (%)			
Tobacco use status					
†Without tobacco	12 (27.9%)	31 (72.1%)	12.13	0.000*	3.56 (1.68-7.56)
With tobacco	35 (9.8%)	322 (90.2%)			
Type of ingredients					
Zarda used:					
†No	23(23.7%)	74 (76.3%)	17.67	0.000*	3.61 (1.93-6.76)
Yes	24 (7.9%)	279(92.1%)			
Frequency of use					
† 3times or less	40(28.0%)	103(72.0%)	24.42		
More than 3 times	6 (9.2%)	59 (90.8%)	8.22	0.004*	3.82 (1.53-9.54)
All day	1 (0.5%)	191(99.5%)	17.83	0.000*	74.16 (10.05-547.4)
Duration of use (in years)					
†Less than 10	37(23.6%)	120(76.4%)	27.78		
10-29	7 (4.5%)	150 (95.5%)	19.28	0.000*	6.61(2.85-15.35)
30 and above	3 (3.5%)	83 (96.5%)	12.07	0.001*	8.53(2.55-28.59)
Age at initiation of use(in years)					
†Less than 20	0 (0.0%)	108 (100%)	0.18		
20-29	22(15.2%)	123 (84.8%)	0.00	0.99	0.00
30 and above	25 (17%)	122 (83%)	0.00	0.99	0.00
Quantity of quid (quid/day)					
†Less than 3	30(46.2%)	35 (53.8%)	88.59	0.000*	16.03
3 and above	17 (5.1%)	318 (94.9%)			(8.04-31.96)

Chi^2= reference category; *=Significant at p value <0.05; COR= Crude Odds Ratio; CI= Confidence interval

On univariate analysis, the socio-economic characteristics: gender, age, educational level and occupation of the respondents were statistically significantly associated with betel dependence ($p<0.05$) (Table 2).

Table-4: Predictors for betel quid dependence from the binary logistic regression model

Predictors	Wald Chi^2	p value	AOR (95% CI)
Sex	8.85	0.003	4.32(1.65-11.33)
Education (Secondary and above)	9.03	0.003	0.13(0.04-0.45)
Duration of use	13.11	0.0001	1.12(1.05-1.18)
Quantity of quid used	20.36	0.0001	3.07(1.89-5.00)

AOR= Adjusted odds ratio; CI= Confidenc interval; Logistic regression: Cox & Snell R^2= 0.30, Nagelkerke R^2= 0.58, model Chi-Square = 1.80, $p < 0.05$ (df8)

Moreover, pattern of use related variables: type of ingredients used, duration of use, frequency and quantity of betel quid use were statistically significantly associated with betel quid dependence. The betel quid dependence was significantly different between the two groups of tobacco users. Comparison between the two groups showed that betel quid users with tobacco were more likely to be dependent than those who did not use tobacco additives. Among the betel quid users, 322 (90.2%) were dependent taking tobacco in either smoke or smokeless forms or both. Whereas, the betel quid users 31 (72.1%), did not take tobacco were found to be dependent (Table 3).

Several of the socio-economic and pattern of betel quid use related variables were associated with betel quid dependence in the univariate analysis. Hence a binary logistic regression model was constructed to find out the important predictors for betel quid dependence adjusting the other factors. The model was good at classifying correctly the betel quid dependent respondents (97.2%) and the not dependent respondents (48.9%). The predictors in the model showed that female respondents were almost four times likely to be dependent than male respondents and those who had higher level of education (secondary and above) were eight times less likely to develop dependence. Increased duration of use had a positive association with dependence (Adjusted OR= 1.12; 95% CI= 1.05 to 1.18). Those who used greater quantity of betel quid, they were three times more likely to be dependent than others (Table 4).

Discussion

The most important finding is the high levels of betel quid dependence in our sample of betel quid users. In this study, 353 (88.2%) of the respondents scored 4 points and above in the BQDS. This result is dissimilar with the study conducted among male prisoners (40.5%) in Taiwan using the BQDS.[18] The inconsistency could be that the sample in this study consisted of incarcerated male prisoners with previous experience of using betel quid. Respondents using tobacco with betel quid (90.2%) showed higher dependence in comparison to users without tobacco (72.1%). This finding is similar to study done in Pakistan where 78.1% 'areca and tobacco' users and 67.2% 'areca' users showed depenpence.[19] The important predictors for dependence found in this study by the binary logistic model is consistent with other studies. Female respondents had more chance of developing dependence than male respondents which is similar to the study conducted in the South, South-east and East Asia region.[8] Higher the level of education lowered the likelihood of dependence. This means by creating awareness and health education programs, people will be less inclined to chewing betel quid. Increasing duration and amount of quid used were more likely to result in dependence. These factors are similar to the study conducted in India among patients having non-substance abuse related psychiatric disorders.[11] The possible explanation is that there is an association of betel quid chewing for a longer period of time and the use of increased quantity of betel quid with dependency. This study has some limitations. The respondents were selected conveniently which may not be representative of the whole population. Moreover, this study was done in six months, usually more time is required to explore dependence syndrome. Further research and understanding of the psychological and behavioral aspects of the Bangladeshi betel quid users is required for developing behavioral change motivation programs.

Acknowledgement

We are indebted to the people of Gafforgaon sub-district who took part in this study. We are also thankful to the personnel who helped in this research.

References

1. Boucher BJ and Mannan N, Metabolic effects of the consumption of Areca catechu, Addiction Biology 2002; 7:103-110.
2. Gupta PC and Warnakulasuriya S, Global epidemiology of areca nut usage, Addiction Biology 2002; 7:77-83.
3. Gupta PC and Ray CS, Epidemiology of betel quid usage, Annals Academy of Medicine Singapore 2004; 33 (Supplementary):31-36.
4. Flora MS, Mascie-Taylor CGN, Rahman M, Betel quid chewing and its risk factors in Bangladeshi adults, WHO South -East Asia Journal of Public Health 2012; 1(2):169-181.
5. Lee CH, Ko AMS, Yen CF, Chu KS, Gao YJ, Warnakalasurya S, Sunarjo, Ibrahim SO, Zain RS, Patrik WK, Ko YC, Population Burden of Betel Quid Abuse and Its Relation to Oral Premalignant Disorders in South, Southeast, and East Asia: An Asian Betel-Quid Consortium Study, American Journal of Public Health 2012; 102 (3):17-23
6. Sinha DN, Gupta PC, Ray C, Singh PK, Prevalence of Smokeless Tobacco Use among Adults in WHO South-East Asia, Indian Journal of Cancer 2012; 49 (4): 342-346.
7. WHO (World Health Organization), Global Adult Tobacco Survey: Bangladesh Report 2009; 1-120.
8. Hossain MS, Kypros K, Rahman B, Arslan I, Akter S and Milton AH, Prevalence and Correlates of Smokeless Tobacco Consumption among Married Women in Rural Bangladesh, Plos One 2014; 9 (1):1-6.
9. World Health Organization (WHO), Lexicon of alcohol and drug terms. WHO Geneva, Switzerland 1994;1-65.
10. Lee CH, Ko AMS, Yen CF, Chu KS, Gao YJ, Warnakalasuriya S, Sunarjo, Ibrahim SO, Zain RS, Patrik WK, Ko YC, Betel-quid dependence and oral potentially malignant disorders in six Asian countries, The British Journal of Psychiatry 2012; 201:383-91.
11. Benegal V, Rajkumar RP and Muralidharan K, Does areca nut use lead to dependence? Drug and Alcohol Dependence 2008; 97:114-121.
12. Trivedy CR, Craig C and Warnakulasuriya S, The oral health consequences of chewing areca nut, Addiction Biology 2002; 7:115-125.
13. Avon SL, Oral Mucosal Lesions Associated with Use of Quid, Journal of the Canadian Dental Association 2004; 70(4): 244-248.
14. International Agency for Research on Cancer (IARC) Working Group on the Evaluation of Carcinogenic Risks to Humans. Betel quid and areca-nut chewing and some areca-nut derived nitrosamines, IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 2004; 85:1-334.
15. WHO (World Health Organization), Review of areca (betel) nut and tobacco use in the Pacific: a technical report, WM 290. Western Pacific Region. Manilla, Philippines 2012; 1-66.
16. Pankaj C, Areca Nut or Betel Nut Control is Mandatory if India Wants to Reduce the Burden of Cancer Especially Cancer of the Oral Cavity, International Journal of Head and Neck Surgery 2010; 1(1):17-20.
17. Petti S, Masood M and Skully C, The Magnitude of Tobacco Smoking-Betel Quid Chewing-Alcohol Drinking Interaction Effect on Oral Cancer in South-East Asia, A Meta-Analysis of Observational Studies, Plos One 2013; 8 (11): 1-8.
18. Lee CY, Chang CS, Shieh TY and Chang YY, Development and validation of a self-rating scale for betel quid chewers based on a male-prisoner population in Taiwan: The Betel Quid Dependence Scale, Drug and Alcohol Dependence 2012; 121:18-22.
19. Mirza SS, Shafique K, Vart P and Arian MI, Areca nut chewing and dependency syndrome: Is the dependence comparable to smoking? Substance Abuse Treatment, Prevention, and Policy 2011; 6(23): 1-6

Status and determinants of dental caries among urban and rural school children - a comparative study

A Suraiya,[1] F Sirazee,[2] AKM Shalauddin,[3] MASI Harun,[4]

Abstract

Purpose: *Dental caries is the most prevalent and complex chronic oral disease but yet oral health is often neglected within the health care system. This cross sectional comparative study was carried out to determine the status of dental caries between urban and rural children at the age of 15 years.* ***Methods:*** *Data was collected by face to face interview and clinical examination by using semi-structured questionnaire and check list among conveniently selected 225 respondents from selected urban place and rural place of Bangladesh.* ***Results:*** *By the study result it was found that socio-economic status of urban was higher than rural. The extra oral condition of urban respondents was normal but 8.3% from rural have swelling of face and jaw. Gingivitis was common problem in both urban (36.2%) and rural (52.5%) respondents'. It was found that decayed upper teeth 95.8% in rural whether 88.6% decayed in urban. Most of the urban respondents' required restorative treatment and very few pulp care but rural respondents require both treatments including extraction. Sweetmeat and chocolates were more consumed by urban respondents (46.7%) but they have good knowledge (88.6%) and hygienic practice than rural respondents. Majority of urban people had visited dentist at any time but 98.3% respondents from rural never visited.* ***Conclusion:*** *Awareness programme should be conducted on dental diseases for improvement of knowledge among the target population. Maintenance of oral hygiene by using tooth paste and brush twice daily.*

Keywords: Caries, urban, rural, 15 years children

J Cont Dent Sci 2016;4(2):24-29

Introduction

Dental caries is one of the most prevalent oral diseases of public health concern affecting adolescents. This disease is ubiquitous in nature and progresses over time in those affected, if timely preventive measures are not undertaken. Untreated caries can result in pain and adversely affect the individual's quality of life.[1] Dental caries is a multifactor disease, caused by a web of factors like micro-organisms, substrate, host, factors related to the teeth and time. In addition, socio behavioral and environmental factors have been shown to be risk indicators for dental caries among adolescents in both developing and developed countries.

1. Suraiya Ahmed, Department of Dental Public Health, Chattagram International Dental College.
2. Faisal Sirazee, Conservative Dentistry & Dental radiology, Chattagram International Dental College.
3. AKM Shalauddin, Department of Science of Dental Materials, Chattagram International Dental College.
4. MASI Harun, Department of Conservative Dentistry and Dental Radiology, Chattagram International Dental College

Address of correspondense

Suraiya Ahmed, Department of Dental Public Health, Chattagram International Dental College, Shamsher Para, Chattagram, Email: sdch@bol-online.com, Mob: 01721141010

The theme of the world health day of 1994, 1997, and 1998 were respectively, "Oral health for healthy life", Healthy teeth for your life time" and "Healthy teeth, bright smile". Moreover it is also said that "Mouth is the gate way of health". So if we cannot take care of oral cavity and its contents we cannot have a good health. Tooth is one of the most important parts of the oral cavity. It maintains the beauty of the face, helps in mastication, chewing and digestion of food and it also helps to speech. But no one can be sure of the real value of the dentition to an individual since different people have different attitudes towards their teeth, both in terms of appearance and function.[2]

Dental caries is still the most common infectious disease. In the United States, its prevalence is estimated to be 5 times higher than that of asthma and 7 times higher than that of allergic rhinitis. There has been remarkable progress in the reduction of tooth decay (dental caries) in the U.S. over the past 30 years. Nevertheless, dental caries continues to be a significant problem. During the past few decades, changes have been observed in the prevalence and distribution of dental caries in the population. This disease is endemic in specific sectors of the population, especially the economically disadvantaged.[3,4]

In developing countries, migration of people from rural areas and urbanization brings about changes in lifestyle and dietary habits which in turn can affect the oral health status adversely.

From the available studies, it can be estimated that a large number of population ranging from 31.5 to 89% were affected by dental caries in different parts of the country. According to National Oral Health Survey caries prevalence in India is 51.9, 53.8 and 63.1% at ages 5, 12 and 15 years respectively.[5]

The four most prominent noncommunicable diseases (NCDs) - cardiovascular diseases, diabetes, cancer and chronic obstructive pulmonary diseases - share common risk factors with oral diseases, preventable risk factors that are related to lifestyle. For example, dietary habits are significant to the development of NCDs and influence the development of dental caries. Tobacco use has been estimated to account for over 90% of cancers in the oral cavity, and is associated with aggravated periodontal breakdown, poorer standards of oral hygiene and thus premature tooth loss.[6]

Dental caries is one of the most common disorder affecting humans, with highest priority risk group between 12 to 50 year of age. Environmental factors such as education, socioeconomic status, life style and dietary pattern can have a greater impact on caries resistance or development.[7]

Dental caries and periodontal diseases have historically been considered the most important global oral health burdens. At present, the distribution and severity of oral diseases vary among different parts of the world and within the same country or region. The significant role of socio-behavioural and environmental factors in oral disease and health is evidenced in an extensive number of epidemiological surveys. Dental caries is still a major oral health problem in most industrialized countries, affecting 60-90% of schoolchildren and the vast majority of adults. It is also a most prevalent oral disease in several Asian and Latin-American countries, while it appears to be less common and less severe in most African countries.[6]

Dental problems are a public health problem in Bangladesh. Therefore, the dental caries status needs to be identified by valid studies to assess the actual distribution of the problem in the community. Because of lack of awareness of the people the dental diseases are increasing day by day.[8]

In Bangladesh, no study has been done on dental caries among urban and rural children at the age of 15 years. So it is the crying need of the country to have adequate information on the status of dental caries among the urban and rural children and to take necessary prevention program to fight against the dental caries. Therefore, the proposed study has the importance to identify status of dental caries among urban and rural. The objective of the study was to determine the status of dental caries among urban and rural school children.

Materials and Methods

This was an comparative type of cross-sectional study. Khaja Ajmeri High school from Chittagong city and Manikgonj Model High School at Manikgonj District were study area. Both were Bangla medium school.Gender, parents education, geogrtaphic location,kowledge on dental caries, food habits, cleaning practice of teeth, care seeking practice were conceptual frame work of this study. 225 study population were age of 15 with carious lesion of urban and rural school student from selected High school selected for this study. Respondents those who suffered with physically and mentally illness and individual respondents denying providing information were excluded from study. Semi structured questionnaire Observational checklist were used as data collection tool. Questionnaire was finalized after pre-test which included both closed and open ended questions. Instrument was used (Dental mirror, Caries probe, cotton, antiseptic solution) to asses the dental status of respondents. After collection of data, all questionnaires were coded and checked for completeness, correctness and internal consistency to exclude missing or inconsistence data. Data was entered in SPSS data view and Data analysis was done through SPSS 16 and EXCEL.

Results

The study showed that 41.9% male and 58.1% female were living urban area on the other hand 42.5% male and 57.5% female were living rural area.(fig-1). Majority of respondents' fathers education level graduate 74.3%, HSC 15.2% in urban but 60% father's were illiterate in rural(table-1). Mother's education level were graduate (63.8%) and HSC (24.8%) found in urban and majority were illiterate (80.8%) and only 17.5% have primary school education in rural(table-2).Majority of the respondents from rural (58.3%) like rice and bread but majority (46.7%) from urban like sweatmeat and chocolate

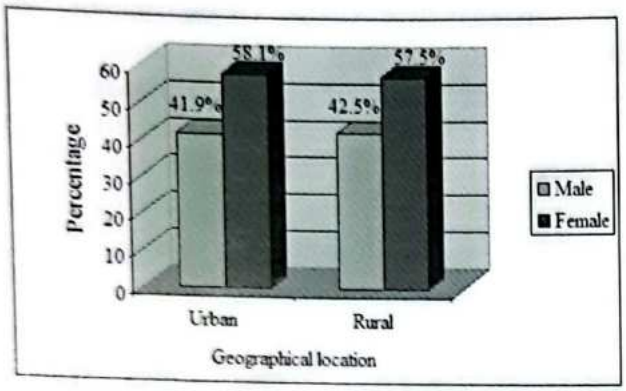

Fig.-1: Distribution of the respondents' gender by geographical location (n=225)

Table-1: Father's Education Level of the respondents (n=225)

Father's Education Level	Urban*	Rural*
Graduate	88 (83.8)	00
HSC	11 (10.5)	00
SSC	0 (0.0)	4 (3.3)
High school	2 (1.9)	20 (16.7)
Primary School	2 (1.9)	24 (20.0)
Illiterate	2 (1.9)	72 (60.0)

Table-2: Mother's Education of the respondents (n=225)

Mother's Education level	Urban*	Rural*
Graduate	67 (63.8)	00
HSC	26 (24.8)	00
High School	1 (1.0)	2 (1.7)
Primary school	1 (1.0)	21 (17.5)
Illiterate	10 (9.5)	97 (80.8)

Table-3: Type of food most like by the respondents (n=225)

Type of food most like	Urban*	Rural*	Chi² and P value
Rice, bread	7(6.7)	70 (58.3)	Chi² = 1.769 P = 0.000 df = 4
Fish, Meat	2 (1.9)	23 (19.2)	
Vegetable, Fruits	2 (1.9)	25 (20.8)	
Dairy product, Juice, Soft drinks	45 (42.9)	2 (1.7)	
Sweetmeat, Chocolates	49 (46.7)	00	

Table-4: Materials and tools used to clean the teeth by the respondents (n=225)

Geographical location	Tools used to clean the teeth*			Materials used for cleaning*		
	Brush	Finger	Others	Tooth paste	Tooth powder	Ash
Urban	103 (98.1)	2 (1.9)	00	101 (96.2)	3 (2.9)	1 (1.0)
Rural	41 (34.2)	73(60.8)	6 (5.0)	23 (19.2)	61(50.8)	36(30.0)
	Chi² = 99.349 P value 0.000 df (2)			Chi²= 1.343 P value 0.000 df (2)		

Table-5: Action taken by the respondent during toothache (n=225)

Action taken by the respondent during toothache	Urban*	Rural*	Chi² and P value
Go to a dentist	59 (56.2)	0 (0.0)	Chi² = 1.880 P = 0.000 df = 4
Mouth ringing with warm saline	38 (36.2)	2 (1.7)	
Take medicine from the Pharmacy	7 (6.7)	66 (55.0)	
Go to a Quack	1 (1.0)	45 (37.5)	
Others	0 (0.0)	7 (5.8)	

Table-6: knowledge on dental caries.

Knowledge on dental caries	Urban*	Rural*	Chi² and P value
Yes	93 (88.6)	2 (1.7)	Chi² = 1.734 P = 0.000 df = 1
No	12 (11.4)	118 (98.3)	

urban like sweetmeat and chocolates. Meanwhile, Dairy product, juice, soft drinks were liked by 42.9% respondents from urban, while, fish/meat (19.2%) and vegetable/fruits (20.8%) were liked in rural. A statistically significant relation was found between types of food and geographical location ($p<0.05$). (Table-3)Maximum respondents from urban (98.1%) used brush and (96.2%) tooth paste while respondents from rural used finger (60.8%) and tooth powder

(50.8%) for cleaning teeth. It was found to be statistically significant (P <0.05). (Table-4)

In case of action taken by the respondent during toothache, (56.2%) in urban area went to a dentist and 55.0% of respondents in rural area took medicine from the pharmacy and (1.7%) used mouth ringing with warm saline water in rural area as well as 1.0% respondents went to a Quack in urban area. It was found to be statistically significant (P <0.05) (Table-5).

Incase of knowledge on dental caries among respondents, (88.6%) of respondents had known about it in urban area but only (1.7%) knew in rural area. Majority (98.3%) from rural area did not know about the dental caries. It was found to be statistically significant (P <0.05)(table-6).

Table-7: Condition of gum between urban and rural area (n=225)

Condition of gum	Urban*	Rural*	Chi² and P value
No abnormal	67 (63.8)	14 (11.7)	Chi² = 83.237 P = 0.000 df = 4
Ulceration	00	7 (5.8)	
Acute necrotizing gingivitis	00	12 (10.0)	
Abscess	00	24 (20.0)	
Gingivitis	38 (36.2)	63 (52.5)	

Table-8: Distribution of respondents according to number of affected teeth (n=225)

No. of affected teeth	Upper right segment	Upper left segment	Lower right segment	Lower left segment
1 (incisor teeth)	00	00	00	2 (0.8)
4 (1st pre molar)	3 (1.7)	00	00	00
5 (2nd pre molar)	12 (6.8)	3 (1.3)	1 (5.8)	15 (5.6%)
6 (1st Molar)	104 (58.8)	142 (59.9)	166 (60.4)	165 (62.0)
7 (2nd Molar)	58 (32.8)	92 (38.8)	93 (33.8)	84 (31.6)

The condition of gum of the respondents in urban and rural area that include maximum respondents (63.8%) from urban and 11.7% from rural have no abnormality in the gum but Gingivitis was common problem in both urban (36.2%) and rural (52.5%) respondents. Rural areas respondents also suffered from ulceration (5.8%), Acute necrotizing gingivitis (10.0%), Abscess (20.0%). It was found to be statistically significant (P <0.05). (Table-7) maximum respondents had problems on 1st Molar teeth of all four segments such as 58.8% Upper right, 59.9% Upper left, 60.4% Lower right, 62.0% Lower left and similarly, 32.8%, 38.8%, 33.8%, 31.6% in 2nd Molar teeth from all segments were affected. Least of them have 1st pre molar and incisor teeth problems.

Discussion

The cross sectional comparative study was carried out to identify the prevalence of dental caries among 15 years school children. Due to time constraint and according to selection criteria, 225 respondents were selected which was less than calculated sample size 384.The present study found that percentage of female respondents were higher than male in both Urban and Rural area. Regarding education level of parents, majority of respondents fathers education level graduate 74.3%, HSC 15.2% in urban but 60% fathers were uneducated in rural. The association between fathers education level in urban and rural found to be highly significant. Meanwhile, Mothers education level was graduate (63.8%) and HSC (24.8%) level educated mothers were found in urban and majority were uneducated (80.8%) in rural. All of the respondents from urban had normal appearance of the extra oral and 91.7% in rural area had normal appearance of the extra oral condition but 8.3% respondents of rural had swelling of face and jaw.

In case of the the condition of gum of the respondents in urban and rural areas, maximum respondents (63.8%) from urban and 11.7% from rural had no abnormality in the gum but Gingivitis was common problem in both urban (36.2%) and rural (52.5%) respondents. Rural areas respondents were also suffered from ulceration (5.8%), Acute necrotizing gingivitis (10.0%), Abscess (20.0%).

Present study found more affected teeth among rural respondents than urban. 1st Molar teeth of all four segment were affected and 7th (2nd Molar) teeth from all segments were similarly affected. In majority of the respondents had 4th (1st pre molar) and incisor teeth problems.

Dental status found that decayed was more prevalent dental problems which was found more in rural than urban. Similarly, filled with decay, fissure sealent missing teeth due to caries were prevalent problems. Mean DMFT was 0.85 ±1.50. Girls had significantly higher Decayed Missing and Filled Teeth (DMFT) than boys at ages 12 and 16 years (P = 0.027 and P<0.0001 respectively).

Therefore, types of treatment required also high among rural respondents. The types of treatment required for lower teeth in urban area, the maximum number (44.10%) required Fissure sealent in urban but 33.3% were from rural need to one surface filling. Similar number (33.3%) of respondents required extraction and Fissure sealent in rural area. The considerable number of respondents (10.8%) required extraction. As a whole, more treatment required for rural than urban areas respondents. In the rural zone there were around twice as many teeth needing treatment as in the urban zone.[9]

A statically significant was found between types of food and geographical location. Another study found that fee paying subjects in India are having more dental caries prevalence as compared to non fee-paying because fee-paying subjects are consuming more sweets, more in between sugary meal, bakery products as they belong to high socio-economic status.[10]

Respondents from urban area Swish & Spit after and brush teeth but all respondents from rural area do nothing after taking chocolates. Respondents from urban used brush (98.1%) and tooth paste (96.2%) whether respondents from rural used finger (60.8%) and tooth powder (50.8%) for cleaning teeth. Another study mentioned students who used fluoridated toothpaste were found to have less caries. Boys who cleaned their teeth with chewing sticks had more caries than boys who used toothbrush and paste.[11]

The action taken by the respondent during toothache by where maximum number (56.2%) in urban area went to a dentist and 55.0% of respondents in rural area took medicine from the pharmacy and only (1.7%) Swish and split with warm saline water in rural area as well as 1.0% respondents went to a Quack in urban area.

Regarding knowledge on dental caries among respondents, (88.6%) of respondents known about it in urban area but the least number (1.7%) known in rural area. Majority (98.3%) from rural area knew nothing about dental caries. The level of knowledge had a positive correlation with the caries levels amongst this cohorts.

The respondents of urban area had visited dentist at any time but almost total (98.3%) number of respondents had never visited dentist any time. Similar finding on another study shows children who had received advice regarding oral hygiene from a dentist or parent had more sound FPMs compared to the children who did not receive any advice.

Conclusion

Affected teeth due to dental caries were higher among the respondents of rural area than urban area. Because of their lack of knowledge (1.7%), poor oral hygiene practice like only 19.2% used tooth paste and 34.2% used brush and lower socio-economic status.

Though sweetmeat, chocolates are cariogenic food and more consumed by urban respondents (46.7%) but they had lower percentage of affected teeth due to caries due to their knowledge was good on dental caries (88.6%), good oral hygienic practice such as 96.2% used tooth paste and 98.1% used tooth brush and higher socio-economic status.

References

1. David J. Dental caries among adolescents Implications for planning oral health services in India and Norway Department of Oral Sciences' Pedodontics Faculty of Dentistry and Centre for International Health University of Bergen, Norway; 2006. ISBN 82-308-0275-0
2. Curzon M.E.J. Kennedy's Pediatric operative Dentistry;1976:4-11.
3. Pierce KM, Rozier RG, Vann WF. Accuracy of pediatric primary Care providers. Screening and referral for early childhood caries. Pediatrics. 2002; 109(5):82-92.
4. American Academy of Pediatrics. Oral health risk assessment timing and establishment of the dental home. Pediatrics; 2003:111-113
5. Sujatha B, Sai Sankar AJ, Manoj Kumar MG, Sridhar M. Prevalence of dental caries and treatment needs for the school going children of Guntur district, Andhra Pradesh.Department of Pedodontics & Preventive Dentistry, SIBAR Institute of Dental Sciences, Guntur. Andhra Pradesh, India. 5 May, 2011.

6. WHO. Oral Health. What is the burden of oral disease? Oral disease burdens and common risk factors. WHO 2012. http://www.who.int/oral_health/disease_burden/global/en/

7. Alam R, Chowdhury AB, Islam N. Ahsan GU, Khan NA. Oral health edification and changing behaviour to eradicate the dental caries in Bangladesh. Uttara Adhunik Med Coll. 2011;1(2): 56-60.

8. Alam A, Bachchu MA. Prevention of dental caries and the science of nutrition. Bangladesh Dental Journal.1989-90; 6(1): 5-9.

9. Tobias R, Pereira Parente RC, Bessa Rebelo MA. Prevalence of dental caries and treatment needs among 12-year-old children in a small-sized municipality in the Amazon region. Rev Bras Epidemiol. 2008; 11(4): 1-10

10. Jain M, Jain L. Mathur A. Paiwal K. D, Prabu K. Pradeep S. etal. Effect of Cariogenic Food Exposure on Prevalence of Dental Caries among Fee and non-fee Paying School Children, Udaipur, India. 2010; 10(3): 331-336

11. Okoye LO, Ekwueme OC. Prevalence of dental caries in a Nigerian rural community: A preliminary local survey. Academia. 2011;1(2):187-195

Management of intraoral sinus by single visit endodontic treatment : A case report

MAH Sheikh[1], MMR Howlader[2], AK Sheikh[3], K Nahar[4], SN Islam[5]

Abstract

Single visit endodontic treatment is one of the most advancing branch of Endodontics. It implies to cleaning, shaping and disinfection of a root canal system followed by obturation at the same appointment. It is now a day's very popular among Dental Surgeons as well as patients. Previously, it was considered to be painful after obturation especially in non-vital tooth. But now, with revolutionary changes in concepts, it is considered as a routine & painless procedure even in non-vital tooth cases. This case report deals with management of intraoral sinus tract which was associated with upper right lateral incisor. After 7days follow-up the patient showed relief from the complication and 6 months follow up x ray showed healing of periapical lesion.

Key words: Intraoral sinus tract, Single visit endodontic (SVE) treatment ***(J Cont Dent Sci 2016; 4(2):30-33)***

Introduction

Odontogenic sinus tract is one of the manifestations of chronic dental infections which provides a path for drainage of pus and infection. The opening of an odontogenic sinus tract can be located either intraorally or extraorally . It depends on the location of the perforation in the cortical plate by the inflammatory process and its relationship to facial muscle attachments . The majority of sinuses that arise are intraoral.[1-3] An intraoral opening usually indicates presence of a nectrotic pulp or chronic apical abscess and sometimes periodontal abscess. Necrotic dental pulp is usually due to caries ,trauma, deep restoration and other causes. Large unlined metal restoration allows continuous low grade thermal stimuli to damage the pulp over a longer period. If the treatment is not initiated at initial stage the pulp becomes necrotic and infection spreads beyond the confines of the tooth into the periradicular area resulting in apical periodontitis. The inflammatory and immunological processes then induce bone resorption. The marrow spaces are involved, resulting in the formation of a localized abscess,the suppurative osteitis.

The inflammation then spreads peripherally until the cortex of the bone is destroyed and a subperiosteal abscess forms.4 Depending on factors like gravity,virulence of microorganisms and most importantly anatomic arrangement of adjacent mucles and fasciae,either a cutaneous sinus or an intraoral sinus forms.[5] The recognition of this entity leads to effective treatment.

It has been suggested that the teeth with chronic apical periodontitis and a draining sinus tract can be endodontically treated by a single visit procedure. This sinus tract may act as a safety valve for the residual inflammatory exudate. In this case , presented with a persistent intra-oral sinus tract which originated from a necrotic pulp showing complete healing following a single visit procedure. Elimation of micro-organism from the root canal system is essential for successful root canal treatment. Various measures have been introduced to reduce the number of micro-organisms in the root can al system for various instrumentation technique,irrigation and intracanal medicaments.[6] Calcium hydroxide[7] is a very effective endodontic therapeutic dressing in single visit root canal therapy because theendopathogens are unable to survive

1. Dr (Major) Md Abdul Hannan Sheikh, BDS, MCPS, D. Conservative, FCPS. Classified Specialist in Conservative Dentistry & Endodontics, CMH, Savar Cantt.
2. Dr Md Mujibor Rahman Howlader, BDS, DDS, FCPS, MS. Asso Prof , Conservative Dentistry& Endodontics, BSMMU, Dhaka
3. Dr. Abdul Kader Sheikh, MBBS, FCPS, MD (Neurology) Asso Prof, Dept of Neurology, BSMMU, Dhaka
4. Dr. Kamrun Nahar, BDS, FCPS, Asst Prof . MH Somorita Medical College & Hospital, Dhaka
5. Dr. Sk Nazibul Islam, Medical Officer, Mongla Upazila Health Complex, Bagerhat

Address of Correspondence

Dr.(Major) Md Abdul Hannan Sheikh, BDS, MCPS, D. Conservative, FCPS. Classified Specialist in Conservative Dentistry & Endodontics, CMH Savar Cantt. E-mail: drhannan65@gmail.com Mob no- 01712202400

in the highly alkaline environment provided by $Ca(OH)^2$.It neutralizes the biological activity of bacterial lipopolysaccharide. [8,9]

Case Report

A 25 years old female patient from Mirpur reported to department of Conservative Dentistry and Endodontics, BSMMU with complaints of mild pain and discomfort in maxillary anterior region for last 4 months.There was a history of restoration in that tooth for last 2 years.Her medical history was non contributory.Extraoral examination revealed no significant findings.Intraoral sinus was located in the buccal mucosa of maxillary right lateral incisor. The tooth was sensitive to percussion and by pulp vitality test it failed to respond. No mobility was present. An intraoral periapical radiograph showed loss of lamina dura in apical area.There was periapical radiolucency in that tooth. The sinus tract was traced with guttapercha point(No.25)and pointed towards the apex. Considering the history,clinical and radiological examination it was diagnosed as a case of chronic apical periodontitis with intraoral sinus tract.

Treatment plan

Single Visit Endodontic treatment of maxillary right lateral incisor followed by permanent restoration.

Treatment Procedure

The whole treatment procedure was explained to the patient and consent was taken. After mouth preparation a straight line access cavity was done.The necrotic pulp remnants were removed and washed out by 2.5% sodium hypochlorite solution and normal saline. Working length measuring radiograph was taken and working length was established 21mm. Then the canal was prepared by standardized rechnique along with copious irrigation with normal saline and sodium hypochloride. Then $Ca(OH)^2$ mixed with normal saline and placed into the canal using lentulo spiral just for 20 minutes. Then the canal was again irrigated with sodium hypochloride and EDTA alternatively.Canal was dried using paper point.Before obturation a master point was tried into the canal until tug back was felt. Then the tooth was obturate with gutta percha point and zinc oxide eugenol sealer using lateral condensation technique and final restoration was made with giomer filling materials. A radiograph was taken at the same visit for obturation evaluation. After seven (7) days follow up the tooth was found sound,the sinus lesion became smaller in diameter.The patient was advised for follow up at 1,3,6 months and 1 year.

Fig-1: Location of sinus tract

Fig-2: Initial radiograph

Fig-3: Tracing of sinus tract by GP point

Fig-4: Working length determination

Fig-5: X ray after obturation

Fig-6: X ray after six months

Discussion

The site of dental sinuses is usually anatomically close to the causative tooth. An odontogenic sinus usually drains along a pathway of least resistance, resulting in an intraoral or extra oral sinus tract, where the location of the perforation in the cortical plate and its association with facial-muscle attachment is a critical factor.[10,11] A sinus tract may drain into the labial/buccal mucosa, palatal side, and gingival sulcus. The palatal and lingual cortical bones are possibly more compact or thicker than the labial/buccal cortical bone. Thus bone destruction often leads to sinus tract formation on the labial/buccal side. In this case report, opening of the sinus tract is into the buccal mucosa.

Occasionally, the opening of the sinus tract may be found at a far distance from the dental infection, which makes the diagnosis challenging. Antibiotics may be used as an adjunct to conventional treatment; when the patient is in the setting of diabetes, immune suppression, or systemic signs of infections such as fever. An antibiotic therapy alone will not be effective in these cases, because of the absence of adequate circulation in a necrotic pulp system and abscess. Adequate treatment planning should rely on accurate history taking, and clinical and radiographic examinations to avoid possible errors.

Traditionally , endodontic treatment of a tooth involving chronic periodontitis aims at the complete elimination of microbial invaders of the root canal system. Studies have shown that instrumentation and irrigation of the root canal system substantially reduce the number of cultivable micro-organisms but rarely lead to a total eradication.[12,13] For this purpose intra canal dressing such as calcium hydroxide is recommended.[14,15,16] But it has obvious disadvantages i.e. it does not repeatedly kill the intra-canal flora[17,18,19,20], it needs multiple visits to be optimally potent.[21] In this case, calcium hydroxide was applied in to the affected tooth only for 20mins just for creating an environment as because of its high alkalinity and bactericidal effects. Also used EDTA to remove smear layer and sodium hypochlorite as an irrigation solution. This solution presents several important properties: antimicrobial effect, tissue solution capacity and acceptable biologic compatibility in less concentrated solutions. It is considered that, the success of single visit RCT depends: on radiograph a preexisting lesion had gotten smaller or healed completely, no new lesion had formed where there was no lesion before, the patient is asymptomatic and the patient is functioning well with the tooth.

Numerous studies evaluating the effectiveness of single versus multiple appointment root canal treatment have been published, which reported no significant difference in effectiveness (healing rates) between these two treatment regimens.[22]

Conclusion

Single visit root canal treatment is found to be safe and effective method of treatment which is gaining popularity because of its less time consumption, apparently same result and better patient compliance. Long term clinical observation are necessary for the confirming a good patient response in favor of single visit endodontics (SVE).

References

1. Barrowman RA, Rahimi M, Evans MD, Chandu A, Parashos P. Cutaneous sinus tracts of dental origin. Medical Journal of Australia 2007; 186: 264-265.
2. Johnson BR, Remeikis NA, Van Cura J. Diagnosis and treatment of cutaneous facial sinus tracts of dental origin. Journal of the American Dental Association 1999; 130: 832-836.
3. Pasternak-Junior B, Teixeira CS, Silva-Sousa YTC, Sousa-Neto MD. Diagnosis and treatment of odontogenic cutaneous sinus tracts of endodontic origin: three case studies. International Endodontic Journal 2009; 42: 271 276.
4. Laskin DM.Anatomic considerations in diagnosis and treatment of odontogenic infections.J Am Dent Assoc1964;69:308-16.
5. Wood G.Pitts,fistulas,and draining lessons (H.M.Cherrick, chaptered): Differential diagnosis of oral lesions. 3rded. St.Louis, MO: CV Mosby Co,1985:199-201.
6. Trope M, Delano EO, Orstavik D. Endodontic treatment of teeth withapical periodontitis: single vs. multivisit treatment. J Endod. 1999; 25:345-50.
7. Weiger R, Rosendahl R, L st C. Influence of calcium hydroxide intracanal dressings on the prognosis of teeth with endodonticallyinduced periapical lesions. IntEndod J. 2000; 33: 219-26.
8. Su Y, Wang C, Ye L. Healing rate and post-obturation pain of single versus multiple-visit endodontic treatment for infected root canals: A systematic review. J Endod. 2011; 37: 125-32.
9. Peters LB, Wesselink PR. Periapical healing of endodontically treated teeth in one and two visits obturated in the presence or absence of detectable microorganisms. Int Endod J. 2002; 35: 660-67.
10. Cohen S. Pathways of the pulp, 6th edn. St. Louis, Missouri: Samuel O. Dorn, Arnold H. Gartner, 72.
11. Figini L, Lodi G, Gorni F, Gagliani M. Single versus multiple visits for endodontic treatment of permanent teeth: A Cochrane systematicreview. J Endod. 2008; 34: 1041-47.
12. Mc Walters GM, Alexander JB, del Rio CE, Knott JW. Cutaneous sinus tracts of dental etiology. Oral Surg Oral Med Oral pathol. 1988; 66: 608-14.
13. Kotecha M, Browne MK. Mandibular sinuses of dental origin. Practitioner. 198; 225: 910-15.
14. Thoma KH. Oral Surgery, 4th edn. St Louis, USA: Mosby; 1963; 733.
15. Harrison JW, Larson WJ. The epithelized oral sinus tract. Oral SurgOral Med Oral Pathol1976; 42: 511-17.
16. Grossman LI. Endodontic Practice, 10th edn. Philadelphia, PA: Lea and Febiger; 1981; 84-111.
17. Siqueira JF Jr, Batista MM, Fraga RC, de Uzeda M. Antibacterial effects of endodontic irrigants on black pigmented Gram-negativeanaerobes & facultative bacteria. J Endod. 1998; 24: 414-16.
18. Jeansonne MJ, White RR. A comparison of 2.0% chlorhexidinegluconate and 5.25% sodium hypochlorite as antimicrobial endodontic irrigants. J Endod. 1994; 20:276-78.
19. Sheehan DJ, Potter BJ, Davis LS. Cutaneous Draining Sinus Tract of Odontogenic Origin: Unusual Presentation of a Challenge Diagnosis. South Med J. 2005;98(2):250'2.e
20. Mittal N, Gupta P. Management of Extra Oral Sinus Cases: A clinical Dilemma. J Endod. 2004;30(7):541'7.
21. Gandhi A, Kathuria A, Gandhi T. Endodontic-periodontal management of two rooted maxillary lateral incisor associated with complex radicular lingual groove by using spiral computed tomography as a diagnostic aid: a case report. Int Endod J. 2011;44(6):574'82.
22. Wood G. Pits, Fistula, and draining lesions (H. M. cherrick, chaptered.): Differential diagnosis of oral lesions. 3rd ed. St. Louis, MO: CV Mosby Co; 1985. pp. 199'201.

Bi-maxillary midline diastema: An interdisciplinary approach for closure and prevention of relapse. A Case Report

M M Bhuiyan[1]

Abstract

Bi-maxillary midline diastema is a very uncommon situation and can represent negative impact on esthetics and phonetics, especially in adults. The purpose of this article is to describe a case report of 29 years old male with a 5mm midline diastema on upper arch and 8.5mm midline diastema on lower arch. Main etiological factors such as proclination, abnormal frenal attachment, midline pathology, pathologic migration of teeth, tooth size arch length discrepancy [TSALD] etc are considered to develop spaces between central incisors. After orthodontic diagnosis, treatment undertaken was the fixed braces therapy to close the diastema. Due to significant supporting structure damage around the lower central incisors teeth, special attention was taken during space closing procedures. Spaces are closed by bodily movement of teeth to prevent space reopening. After completion of treatment, long term-fixed bonded retainers were placed on upper and lower arch to maintain and prevention of relapse of closing spaces.

Keywords: Bimaxillary midline diastema, fixed orthodontics

J Cont Dent Sci 2016; 4(2):34-37

Introduction

The term midline diastema refers to any spaces or gaps existing in the midline of dental arch. It is generally used in reference to maxillary arch, even though midline space is present in mandibular arch. However the continuing presence of diastema between the maxillary central incisors often considered an esthetic or malocclusion problem of patients which adversely effect body image and self-esteem specially in adults.[1]

The presence of midline diastema usually distorts a pleasing smile. For this reason many patients seek closure of a diastema mainly for esthetic and physiological reasons rather than functional.[2]

The mandibular diastema is not a normal growth characteristic.The spacing though seen less frequently than maxillary diastema often is mere dramatic. No epidemiological data have been published on its prevalance. The primary etiologic factor in mandibular diastema is tongue thrust in low rest position and periodontal disease.[1,3,4] Midline diastema could be transient, created by developmental, pathological or iatrogenic factors such as mesodens, microdontia, hypodontia, abnormal oral habits, enlarge frenum etc.[3,4] In addition, peg-shaped lateral incisor has also been regarded as a potential cause of diastema due to digital movement of the central incisor.Treatment involves correct diagnosis and an early intervention relavant to its specific etiology. Different treatment modalities include orthodontics, prosthodontics, restoration, surgery and various combination of the above. In the following case, treatment options for bi-maxillary midline diastema covered fixed braces therapy followed by fixed bonded retainers to alleviate relapse after complete closure of diastema. [2,5,6] Meticulous care was taken for complete closure of diastema because of significant alveolar bone resorption in the lower central incisors.

Case Report

A healthy 29 year old adult patient with non-contributary medical history presented to Bhuiyan Dental Clinic with the chief complaint of severe spacing in the anterior region of both arches. Clinical examination showed the spaces between the central incisors in the maxillary and mandibular arch with excessive midline diastema of 5mm and 8.5mm respectively (fig.1 and fig.2).

1. Md Mohashine Bhuiyan, BDS, PhD (Japan) Former Associate Professor, City Dental College, Private Practitioner, Bhuiyan Dental Care.

Address of Coresspondence

Md Mohashine Bhuiyan, BDS, PhD (Japan) Bhuiyan Dental Care, Navana Tower Shopping Complex, Gulshan-1, Dhaka, Bangladesh, Email:sdch@bol-online.com

Gingival recession was found on anterior region of lower arch.The patient had well-balanmced face with no apparent asymmetry. Overall oral hygiene was satisfactory but lower central incisors found to be periodontally compromised(fig.1).

Analysis of all records i.e. photograph, study model, lateral cephalugram, orthopantomograph were done and problem list was made. The arch form was avoid and 2mm shift of midline to right side was recorded.The amount of over bite and overjet were 2mm, each of them.

Orthomentumograph presence of vertical bone loss around lower central incisors teeth[fig.3 and fig.4]. The patient had tooth size arch length discrepancy [TSALD] and the cause of the malocclusion was considered developmental.

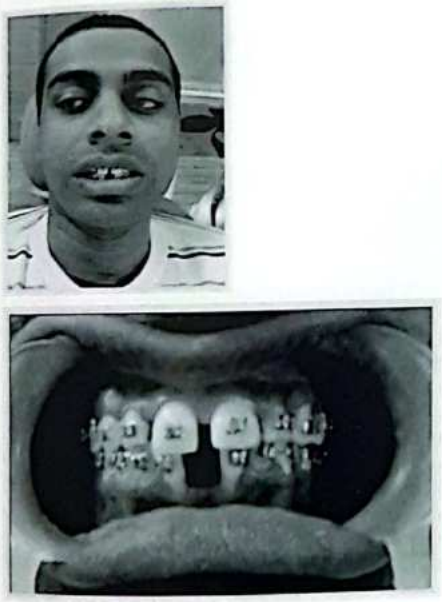

Fig.1. Pretreatment Facial Photograph [extra-oral & intra-oral]

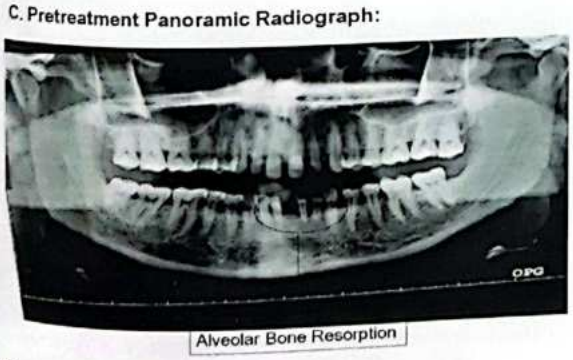

Fig.2. Pretreatment Panoramic Radiograph

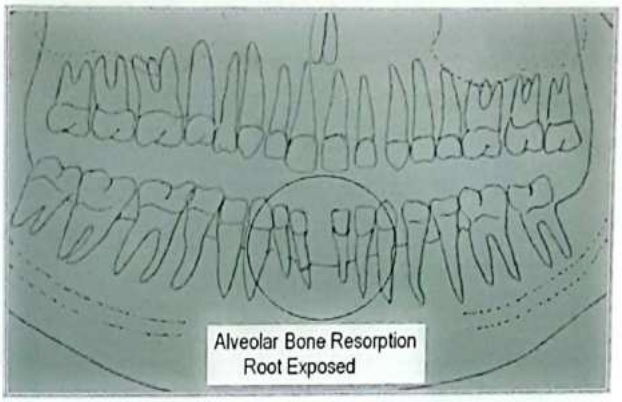

Fig.3. Pretreatment Panoramic Radiograph and tracing

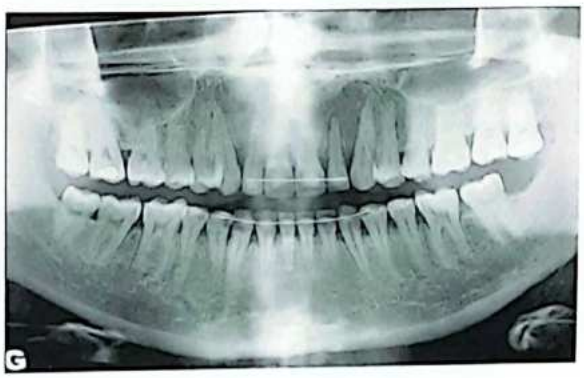

Fig.4. Post treatment Panoramic Radiograph

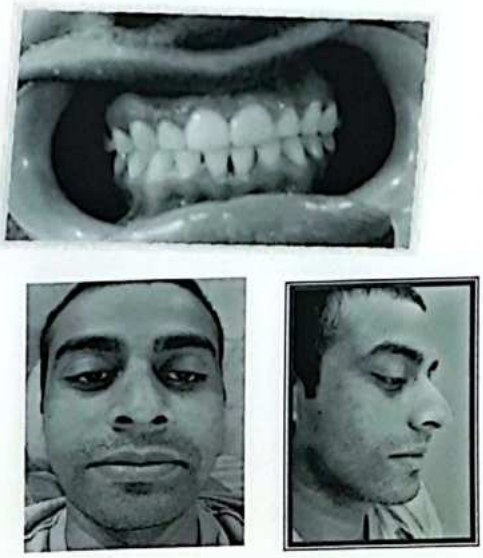

Fig. 5. Post treatment facial photograph [extra-oral & intra-oral]

Treatment Goal

- Elemination of space from both jaws.
- Align the teeth in both arches and achieve good inter-cuspation.
- Maintain normal lower facial height.
- Correction 0f midline discrepancy.
- Maintain normal OJ/OB. Try to move teeth biologically and bodily
- Strictly maintain facial profile.
- Build a stable and functional occlusion and establish esthetically pleasing smile
- Try to achieve Andrew's six keys to normal occlusion.
- Fixed bonded retainers in both upper and lower jaws

Treatment Plan

Once the causative factors have been established, treatment planning can be undertaken.

- Use Roth 0.022 inch-slot pre-adjusted edge wise appliance
- Align the teeth in both arches and space close by gentle force
- Biological and bodily movement of teeth
- Maintain minimum anchorage in both arches
- Maintain normal lower facial height
- Strictly maintain facial profile
- Correction midline discrepancy by elastic traction
- Maintain normal OJ/OB
- Build a stable and functional occlusion and establish esthetically pleasing smile
- Retainers: upper bonded and Begg retainer and lower bonded retainer

Treatment Progress

Treatment was started at the mandibular arch first, then the maxillary arch with pre-adjusted Roth (0.022x 0.028) bracket. A 0.014, 0.016 and 0.016x0.022 inch niti archwire were used for leveling and alignment of anterior teeth. After leveling and alignment 0.018 stanless steel wire with stop loop was inserted. Power chain was used for closing the space. During space closing procedure, teeth are moved bodily by gentle pressure to prevent post treatment relapse. Spaces are gathered distal to lateral incisors and closing loop arch wire [16x22 ss] was used to retract the anterior segment. A 16x22 nitinol arch was inserted for the final alignment and detailing. Lastly a 0.016x0.022 inch stainless steel arch wire was used for the alignment stabilization. Intermaxillary elastics (5/16-inch medium) were used to correct midline discrepancy. After one and half years, all the appliances were removed. The patient was retained with removable Begg Retainer and Fixed Bonded Retainers for the prevention of relapse.

Results

Post treatment photographic analysis showed (fig-5),

A.Closure of spaces in the both arches

B.Excellent alignment and established competent lip.

C.Attractive facial profile.

D.Establishment of facial symmetry.

E.Esthetically pleasing smile.

Post treatment panoramic radiograph showed the formation of bone around lower central incisors (fig.4).

Discussion

Effective treatment of midline Diastema requires accurate diagnosis of its etiology and intervention relevant to the specific etiology. Detailed medical and dental history, clinical and radiograph examination of both jaws and tooth size arch length evaluation bring us to a correct diagnosis. A midline diastema usually is a part of normal dental development during the mixed dentition stage. However, several factors can cause a diastema that may require intervention. The etiologies associated with diastemas include, Abnormal frenum,TSALD, Periodontal disease, oral results.)habits etc. Cooperation in both orthodontic and periodontic discipline may help in solving various periodontal abnormalities encounted before orthodontic treatment. The success in closing diastema depends upon the following treatment phases:

1. Accurate diagnosis of the specific etiology.
2. Pretreatment consideration of appropriate orthodontic objectives.
3. Treatment of specific etiology.
4. Long-term retention and stability.

In our case, the midline diastema caused by TSALD & pathologic migration of teeth, the spaces can be closed by orthodontic treatment following above mentioned four treatment phases.[3]

There are several options to correct midline diastema. For this case stepwise technique was applied in the orthodontic treatment. After alignment of teeth with Nickel Titenium wire, power chain was used to close the incisors spaces.

And then en-mass retraction was done with closing loop arch wire. Meticulous care was taken by applying mild and gentle pressure to close the spaces by power chain particularly on the periodontally compromise lower anterior teeth. As a result, new bone formation occured and height of the alveolar bone increased around these teeth(fig.4). Minimum anchorage was maintained during retraction considering patient's profile as well as asthetic and functional aspects.

In addition, patient was presented with midline discrepancy. To counter this situation, intermaxillary elastic traction was used and satisfactory result was obtained [fig.5]. Andrew's Six Key's to normal occlusion was established which is the most fundamental criteria of a succesful orthodontic treatment. Since most midline diastema recur after treatment, spaces are closed by bodily movement of teeth and permanent retention is needed in most cases. Inability to provide retainer lead to a tendency for the teeth to return towards their initial position. Rellapse is a major concern in the correction of midline diastema. Exact diagnosis and removal of the aetiology is the key to obtaining a stable result. Long-term use of lingually bonded fixed retainers are recommended to prevent relapse, especially in cases with large diastema. In our patient, with large diastema, lingual fixed retainer as well as removable Begg retainer are used to ensure stability of the orthodontic closure.

Conclusion

1. The treatment of midline Diastema with fixed orthodontic appliance, improves the self-esteem and esthetics of the patient. It helps normal alignment of teeth which contributes not only to the oral health but also goes a long way in the overall well-being and personality of an individual.
2. The result achieved in the case fulfill the initial treatment goals, which may be considered a successful treatment.
3. Attractive facial profile and beautiful smile were achieved after treatment.
4. This case highlights the use of fixed bonded retainer and removable Begg retainers in preventing relapse after the completion of orthodontic treatment.

References

1. U Hussain, A Ayub, M Farhan. Etiology and treatment of midline diastema: A review of literature. Pak Ortho.J 2013:5(1)27-33
2. AW Machado, AR Ambrosio, SGF Rabelo Caldas, LG Gandini Junior. Orthodontic treatment of a midline diastema related to mesodens and thumb-sucking habit. Revista Odonto Ciencia. Journal of Dental Science. 2010:25(3)
3. WJ Huang , CJ.Creath. The midline diastema: a review of its etiology and treatment. Pediatric Dentistry-17:3,1995
4. R Abraham,G Kamath. Midline Diastema and its Aetiology-A Review. Dent Update 2014; 41:457-464
5. PR.Chalifoux. Diastema closure-Using orthodontics,composite bonding,or porcelain veneers for optimal esthetic results. J. Inside Dentistry. September 2010:6(8)
6. (Lt Col) G Prasada, (Lt Col) O Nakra, (Col) M Gowda E, (Maj) A Kumar S. Clinical Management of Midline Diastema. Indian J Dent Adv 2014; 6(1): 1479-1483

Surgical Management of Verrucous Carcinoma: A Case Report

SM.Omar,[1] MT Islam,[2] Z Hossain,[3] N Amin,[4]

Abstract

Verrucous carcinoma is a variant of well differentiated, low-grade squamous cell carcinoma. VC grows gradually and it has a tendency of local invasion but rarely metastasizes. Clinically it resembles proliferative finger like projections or a cauliflower like appearance. It is more common in betel nut and tobacco user specially in Bangladesh. The histopathological diagnosis of verrucous carcinoma is difficult and requires immense of experience to report a case of verrucous carcinoma. Though verrucous carcinoma is described as a benign lesion with minimum aggressive potential but long standing cases have shown transformation into squamous cell carcinoma. Therefore early diagnosis and surgical excision of the lesion is the most appropriate treatment modality of verrucous carcinoma. In this article we discuss a case of 62 years old male with verrucous carcinoma of left buccal mucosa.

J Cont Dent Sci 2016;4(2):38-42

Keywords: Male, Oral Cavity, Verrucous Carcinoma

Introduction

Oral Verrucous Carcinoma (OVC), a variant of Squamous Cell carcinoma (SCC), was first described by Lauren V Ackermann in 1948 so it was known as Verrucous Carcinoma of Ackermann or Ackermanns Tumor.[1] Three major locations of verrucous carcinoma are 1.oral cavity (oral florid papillomatosis), 2. anogenital region (giant condyloma of Buschke and Lowenstein), and 3. plantar surface of foot (epithelioma cuniculatum).[2] The most common site of occurrence is buccal mucosa of the oral cavity, other sites being tongue larynx, pyriform sinus, esophagus, nasal cavity and paranasal sinuses, external auditory meatus, lacrimal duct, skin, scrotum, penis, vulva, vagina, uterine cervix, perineum.[3-4] OVC has a predilection for male in sixth decade with a slow growing rate and becomes locally invasive if not treated properly. But, distant metastasis is rare.[5] Clinically, it presents as a plaque like lesion with finger like projections resembling cauliflower,[6] Tobacco in both smoking and smokeless form, betel nut and betel quid, alcohol and opportunist viral infections are the most associated etiologies with OVC.[5-10] We report a case of a male patient with oral verrucous carcinoma in buccal mucosa with differential diagnosis of the lesion and its management.

1. Shah Md Omar Sharif, BDS, MS (in course) in Clinical Social Work, Dhaka University. Dhaka
2. Md Touhidul Islam, BDS, Lecturer, Dept. of Oral and Maxillofacial Surgery, Sapporo Dental College & Hospital, Uttara, Dhaka
3. Md Zakir Hossain, BDS, Asst. Prof., Dept. of Oral and Maxillofacial Surgery, Sapporo Dental College & Hospital, Uttara, Dhaka
4. Professor Dr. Nurul Amin, BDS, PhD, Head & Professor, Dept. of Oral and Maxillofacial Surgery, Sapporo Dental College & Hospital, Uttara, Dhaka

Address of Correspondence

Shah Md Omar Sharif, BDS, MS (in course) in Clinical Social Work, Dhaka University. Dhaka, Email:shaonshaon1608@yahoo.com, Mob: 0191890027

Case Report

A male patient of 62years old(Figure No. 1) reported to Sapporo Denal College with a chief complaint of burning sensation and pain in the left side of mouth since 6 months. Patient noticed a small, painless growth over the left buccal mucosa 1 year back, which gradually grew to the present size. Patient developed pain 6 months back which was initially mild and intermittent. He visited government hospital 2 weeks back with the same complain and was prescribed a course of antibiotic, analgesics and steroid gel. This patient had a history of chewing betel nut and betel quid since 15 years, 7-8 times/day in the lower left buccal vestibule for 10 minutes following which he used to spit out the contents. He gave no relevant medical or family history. On general examination patient had normal gait and posture and was well oriented, conscious and moderately built. No evidence of pallor, cyanosis and clubbing was present. Single left submandibular lymph node was palpable of approximately 1.5 cm by1 cm in size, ovoid in shape, tender on palpation, mobile and firm in consistency. There was a presence of restricted mouth opening was seen on extra oral examination also.

On local examination, on inspection - intraorally there was presence of solitary proliferative verrucous growth over the left buccal mucosa (Figure No. 2), extending anteroposteriorly from retrocommissural area to posterior buccal mucosa and superoinferiorly from upper buccal vestibule to approximately 1cm above the lower vestibule. The lesion was approximately 4x3 cm in size, well defined with irregular margins. Surface of the lesion was irregular at the periphery with cauliflower like projections in the centre.

Color of the lesion varied from pink in periphery to frank white in the centre. On palpation, inspectory findings of size, site, surface, shape were confirmed. Lesion was tender and elevated from adjacent mucosa with irregular and firm margins. His right buccal mucosa revealed presence of fibrous band with diffuse, irregular erythematous area extending anteroposteriorly from retrocommissure area to posterior buccal mucosa. Hard tissue examination revealed broken down root and missing some teeth with poor oral hygiene.

Based on the clinical examination a provisional diagnosis of verrucous carcinoma, of left buccal mucosa was given. Differential diagnosis of Squamous cell carcinoma, verrucous leukoplakia, hyperplasia, was given. Complete blood count revealed no abnormality but random blood sugar level 18milimol/L so he was prescribed tab. GLIMEPIRIDE (Amaryle) 3mg once daily and tab. METFORMIN (Comet)750mg once daily to control the blood sugar. Then he was advised for checking up the fasting blood sugar and 2hours after breakfast after 7 days. This time after 7 days his random blood sugar level resembles normal so an incisional biopsy of the lesion was done.

Histopathology Report

Section of the submitted tissue showed that the surface of the specimen is lined by stratified squamous parakeratinized epithelium which was hyperkeratosis. The epithelium displaypapillary histoarchiteture with broad, elongated rete ridges. Mild atypical cells can be in the seen at the basal cell area. The Basement membrane is intact and adjacent connective tissue is infiltrated with variable inflammatory cells. Overall features suggestive of Verrucous carcinoma.

Operation procedure

Under all aseptic precaution general anesthesia was given. After confirmation of Anesthesia then the left side submandibular incision was given to reflect the skin, fascia and muscle(Figure3). Then left submandibular salivary gland along with palpable lymph nodes are removed(Figure 4) with preserving the mental nerve. Then lip splinting was done and the lesion of cheek was excised with surrounding 2cm of normal healthy tissue (Fig.5) Extraction of upper right 2,1and left 1,2,6,7 lower left 6,7,8 teeth was done. Skin flap was taken from left thigh (Figure16) and intraoral wound was performed.(Figure11) A drain tube was given to maintain the dead space. After that extra oral wound was closed muscle and fascia by 3-0 vicryl and skin by 5-0 proline. (Figure12) The margins of excised tissue is send for histopathological examination again.

Fig. 1 Patient showing swelling on the left side of mouth

Fig. 2 Verrucous growth on left buccal mucosa

Fig. 3 Left submandibular incision given to reflect skin

Fig. 4 Left submandibular salivary gland along with papable lymph node removed

Fig. 5 The lesion in cheek excised with 2 cm normal tissue

Fig. 6 Skin flap from left thigh preserved

Fig 7 Closure of the wound, Extra oral view

Fig 8. Pt. followup after 1 month after surgery

Excisional Biopsy Report
All margins are free from tumor tissue.

Discussion

OVC, as mentioned most commonly affects elderly male with adverse habits of tobacco and alcohol.[5] But the present case is of middle aged male with a thick cauliflower like growth in his left buccal mucosa histologically proved to be a verrucous carcinoma. OVC or Ackermanns tumor though has a predilection for oral cavity but cases affecting esophagus have also been reported.[11] Lesions often develop at the site where the tobacco was placed habitually.[12] In Ackermans study, 11 out of 18 patients (61%) with buccal cancers were tobacco chewers. Majority of patients (76.2%) chewed tobacco and had buccal cancer.[13]

Association of Human Papilloma Virus infection and verrucous carcinoma has also been proved in various studies.[9]

Other etiologic factors like poor dental hygiene, ill-fitting dentures, low socioeconomic status, tobacco chewing, snuff and alcohol use, and smoking.[5,8,14] These are the same factors that predispose individuals to the development of premalignant lesions such as, leukoplakia, submucous fibrosis (SMF), and erythroplakia.[15] Rajendran et al. recorded leukoplakia in association with OVC in 48% of their patients.[10,12] Untreated long standing leukoplakia has been reported to change into OVC.16 Most common site in oral cavity is buccal mucosa(61.4%) followed by (11.9%).[13] OVCs are mostly large, exophytic, soft, fungating growth with pebbly surface having locally aggressive nature. Enlarge lymph nodes are often palpable but are often reactive.[7,8] Histopathological diagnosis of verrucous carcinoma is difficult and reporting needs experience.[17,18] The histological features of VC, for example, verrucous surface and elephant feet like down growth seeming to compress the underlying connective tissue and typically showing minimal or absent cytological atypia, are widely known.[19] By flow cytometry, VC is a diploid lesion; on the contrary, the conventional squamous cancer often shows aneuploidy and genomic instability.[20]

Because it is cytologically benign, besides the focal basal cell nuclear hyperchromatism, distinction from VC and verrucous hyperplasia (VH) cannot be based only on cytologic features.[19,21] Differential diagnosis of verrucous carcinoma includes: (i) squamous cell carcinoma showing verrucoid features, (ii) Proliferative verrucous leukoplakia, (iii) epithelial hyperplasia, (iv) pseudoepitheliomatous hyperplasia, (v) verruca vulgaris, (vi) keratoacanthoma.[22] As per literature, the best treatment modality of OVC is surgical resection of the tumor.[13] So, this patient was also advised for surgical removal of the lesion and regular follow up. Though OVC does not show distant metastasis and mostly associated with reactive lymphadenopathy so supra omohyoid neck dissection is sometimes considered.[23] OVC has been reported to erode the margin of mandible but marrow infiltration is extremely rare.[12] Rajendran et al., in their study of 426 cases of OVC, found the incidence of bone invasion to be 1.2%.10 Oliveira et al. did not find bone invasion in their series.[5] Recurrence of lesion can be due to improper section, false negative frozen section report and sometimes due to the slow growth pattern surgical margins are compromised.[7,8,24] Slaughter et al. emphasized the fact that in situ carcinoma involves the mucosa over wide surface area than in depth. The presence of carcinoma in situ microscopically in clinically negative resections can explain the phenomenon of recurrence of invasive cancer in apparently normal epithelium or previous excision sites.[25] Radiotherapy is contraindicated in treatment of OVC as radiation induced anaplastic transformation.[15] As the literature is confusing, it is retained that radiotherapy could be used only in selected clinical settings, when surgery is not possible.[23]

Conclusion

In most of the cases Verrucous carcinoma, verrucous hyperplasia, verrucous keratosis are clinically indistinguishable from each other so histopathological evidence is necessary to give an appropriate diagnosis. Verrucous carcinoma presents as thick warty keratotic lesion which is more common in males and is usually painless or asymptomatic. In our case we present a male with painful, warty, exophytic lesion of left buccal mucosa histopathologically proved to be verrucous carcinoma. OVC associated with leukoplakia or submucous fibrosis may be an indication of field cancerization and can lead to multiple recurrences, so it is highly suggestive, that such patients be kept under regular follow up.

References

1. Ackerman LV. Verrucous carcinoma of the oral cavity. Surgery 1948;23(4):670 8.
2. Schwartz RA. Verrucous carcinoma of the skin and mucosa. J Am Acad Dermatol. 1995;32(1):1-21.
3. Spiro RH. Verrucous carcinoma, then and now. Am J Surg 1998;176(5):393'7.
4. Ferlito A, Recher G. Ackerman's tumor
5. Verrucous carcinoma of the larynx: a clinicopathologic study of 77 cases. Cancer 1980;46(7):1617-30.
6. Oliveira DT, Moraes RV, FiamenguiFilho JF, FantonNeto J,Landman G, Kowalski LP. Oral verrucous carcinoma: a retrospectivestudy in Sao Paulo Region, Brazil. Clin Oral Invest 2006;10(3):205 9.
7. Alkan A, Bulut E, Gunhan O, Ozden B. Oral Verrucous Carcinoma: A Study of 12 Cases Eur J Dent 2010;4(1):202-207.
8. Tornes K, Bang G, Stromme KH, Pedersen KN. Oral verrucous carcinoma. Int J Oral Surg 1985;14(6):485-92.
9. Jacobson S, Shear M. Verrucous carcinoma of the mouth. J Oral Pathol 1972;1(2):66-75.
10. Sundstrom B, Mornstad H, Axell T. Oral carcinomas associated with snuff dipping. Some clinical and histological characteristics of 23 tumours in Swedish males. J Oral Pathol 1982;11(3):245-51.
11. Rajendran R, Sugathan CK, Augustine J,
12. Vasudevan DM, Vijayakumar T. Ackerman's tumour (verrucous carcinoma) of theoral cavity: a histopathologic study of 426 cases. Singapore Dent J 1989;14(1):48-53.
13. Imai H, Yoshihara T. Verrucous Carcinoma of theTongue; Report of a Case. Otolaryngol Head neck Surg 1995;67(1):1165-1169.
14. Shear M, Pindborg JJ. Verrucous hyperplasia of the oral mucosa. Cancer 1980;46(8):1855'1862.
15. Walvekar RR, Chaukar DA, Deshpande MS, Pai PS, Chaturvedi P, KakadeAet al. Verrucous carcinoma of the oral cavity: A clinical and pathological study of 101 cases. Oral Oncol 2009;45:47-51
16. Kraus FT, Perezmesa C. Verrucous carcinoma. Clinical and pathologic study of 105 cases involving oral cavity, larynx and genitalia. Cancer 1966;19(1):26-38.
17. Tharp ME, Shidnia H. Radiotherapy in the treatment of verrucous carcinoma of the head and neck. Laryngoscope 1995;105(4):391-6.
18. Demian SD, Bushkin FL, Echevarria RA. Perineural invasion and anaplastic transformation of verrucous carcinoma. Cancer 1973;32(2):395-401.
19. Rekha KP, Angadi PV, Verrucous carcinoma of the oralcavity; a clinico-pathologic appraisal of 133 case in Indians. Oral and Maxillofacial Surg. In press.

20. Weng BM. Atlas of Head and Neck Pathology. Saunders, Elsevier, Amsterdam, The Netherlands, 2nd Edn, 2008.

21. Woolgar JA, Triantafyllou A. Pitfalls and procedures in the histopathological diagnosis of oral and oropharyngeal squamous cell carcinoma and a review of the role of pathology in prognosis. Oral Oncol 2009;45(4-5):361-385.

22. Ferlito A, Antonutto G, Silvestri F. Histological appearances and nuclear DNA content of verrucous squamous cell carcinoma of the larynx. J Oto-Rhino-Laryngol Its Related Special 1976;38(2):65-85.

23. Eversole LR, Papanicolaou SJ. Papillary and verrucous lesions of oral mucous membranes. J Oral Med 1983;38(1):3-13.

24. Santoro A, Pannone G, Contaldo M, Sanguedolce F, Esposito V, Serpico IR et al. A Troubling Diagnosis of Verrucous Squamous

25. Cell Carcinoma ('the Bad Kind' of Keratosis) and the Need of Clinical and Pathological Correlations: A Review of the Literature with a Case Report. J Skin Cancer doi:10.1155/2011/370605.