

Pattern of Dental Caries among Adults in Purvanchal Region of Uttar Pradesh, India

H C Baranwal¹, Deepak Pandiar², T B Singh³

¹Associate Professor, Department of Dentistry, Faculty of Dental Sciences, IMS, BHU, Varanasi, India

²PhD Scholar, Department of Dentistry, Faculty of Dental Sciences, IMS, BHU, Varanasi, India

³Professor, Division of Biostatistics, Department of Community Medicine, IMS, BHU, Varanasi, India

Abstract: Background: Despite of advancements in treatment modalities, dental caries remains a serious health problem in human society. Reports on the pattern of dental caries in the Purvanchal region of Uttar Pradesh is lacking in English literature. The present study aimed to describe the pattern of caries among the patients attending the Conservative Dentistry and Endodontic Unit of Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi. Methodology: A total of 1516 cases were retrieved from the OPD records during a period of two years for the diagnosis of dental caries, age, gender, tooth types and tooth surfaces. The obtained data was entered in MS-Excel spreadsheet and analyzed using SPSS 10.0 software. Results: The results showed that mandibular first molars were more commonly affected. Irrespective of tooth type involved males were more commonly affected. Overall male to female ratio was 1.42:1. Young patients (<30 years) had more class I cavities while class V cavities were seen in patients elder than 60 years. Occlusal surface was most commonly affected. Conclusion: The present study provides a baseline data for planning intervention programs that will assist in reducing the occurrence of dental diseases.

Keywords: dental caries, mandibular first molar, occlusal, pattern, tooth surfaces

1. Introduction

Dental caries is defined as an irreversible microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth, which often leads to cavitation.¹ In defiance of the advancements in oral science, it continues to be a serious health problem which affects humans of all ages. Although acid generating bacteria are the etiologic agents, dental caries has been thought to be a multi-factorial disease since it is influenced by dietary and host factors as well.

India is a country where a wide diversity is seen in respect to culture, religion, language, food habits, caste and race.² As aforementioned, dental caries is not only affected by microbial factors but also by dietary and host factors. Thus, the pattern of caries is expected to vary drastically among the different states of India and amongst different region of any particular state. The prevalence of dental caries in India is reported to be 50-60%.³ Literature search reveals a limited sporadic data on the prevalence and patterns of dental caries from India. Out of these reported papers more emphasis has been made on the caries pattern in children.^{2,4-9} Only a few published reports are available on pattern of caries in adult and elderly patients in Indian Population.¹⁰⁻¹³

Thus the aim of the present paper was to establish the pattern of dental caries among age groups, gender, tooth types and tooth surfaces in patients attending the Conservative Dentistry and Endodontic Unit of Faculty of Dental Sciences, IMS, Banaras Hindu University (BHU), Varanasi which not only serves the population of Purvanchal region of Uttar Pradesh but also the people from the neighboring states mainly Bihar and Jharkhand.

Materials and Methods:

This was a retrospective, cross-sectional study where the OPD records of patients, who attended the Conservative Dentistry and Endodontic Unit, BHU, Varanasi, were retrieved over a period of two years (January 2013-December 2014). Data was analyzed for diagnosis of caries based on tooth and tooth surface affected, age and gender. Patients with incomplete information were excluded from the study. The maxilla and mandible were divided into four quadrants: 1) Right Upper (11-18), 2) Left Upper (21-28), 3) Left Lower (31-38); and 4) Right lower (41-48). FDI Notation was used for tooth numbering. Data that was obtained was entered in an MS-Excel spreadsheet and analyzed using SPSS 10.0 software.

2. Results

A total of 1516 cases were retrieved. We divided them into three age groups (<30 years, 30-60 years and >60 years); furthermore the cavities were classified into class I through class V. Table 1 shows distribution of caries according to age groups. Figure 1 shows distribution of subtypes of cavities in the three age groups. Patients of age less than 30 years showed more class I cavities (46.6%) as compared to class V (3.5%) while people of age greater than 60 years had more percentage of class V cavities (1.1%) as compared to class I (0.7%). Table 2 shows number and percentage of teeth affected by caries on the occlusal surface and among both genders. Mandibular right first molar was the most commonly affected tooth (9.8%). Irrespective of tooth involved males were most commonly affected than females. Over all male to female ratio was 1.42:1. Gender wise percentage distribution amongst three age groups is shown in Figure 2. In all the three age groups males were more commonly affected than females.

In age group I, occlusal surface was most commonly affected followed by mesial, distal and buccal. Same trend

was seen in age group II. However, buccal surface was most commonly affected past 60 years of age (Figure 3). Lower jaw was more commonly affected by class I and class II cavities (46% and 17.3% respectively) while class III and V cavities were frequently seen in maxilla (1.1 % and 4.3% respectively). Percentage distribution of different types of cavities amongst the four quadrants is shown in figure 4.

3. Discussion

The present study explains the pattern of dental caries in the Purvanchal region of Uttar Pradesh. In India only a handful of studies describe the pattern of dental caries especially among adults. We used the treatment records of the patients during a period of two years. Although this method is an inexpensive procedure of data collection, several points such as previous dietary habits and oral hygiene practices might be missed out.¹⁴

Akin to the reported papers of Kutesa et al¹⁴ and Manji et al¹⁵, occlusal surface was most commonly affected in the present study group (63.1%). This higher involvement of occlusal surface may be attributed to the anatomical morphology of the molars. The pit and fissures serve as retentive areas for food particles making them more prone to cariogenic attack. Lack of proper hygiene measures especially interproximal flossing can be the cause of higher caries attacks on mesial (14%) and distal (16.6%).

In accordance with the study of Maru et al¹¹ from western India we found a higher prevalence of caries among males. However, other studies show a female preponderance.^{10, 14, 16} This difference in pattern may be attributed to different attitudes of males and females towards dental treatment and also variegated dietary habits in different parts of the world or different regions of a particular country.

Unlike previous studies from Uganda, Zambia, Nigeria and India, mandibular first molar was most commonly affected in our population.^{9, 14, 17-19} This is due to its early eruption as compared to second and third molars which causes a longer exposure to cariogenic mechanisms in the oral cavity. Manji et al also reported first molar to be affected more commonly but their study group constituted children of 12 years of age.¹⁵

Despite of the fact that our study constituted of a large sample size, the results cannot be generalized to the whole population of Purvanchal region. Also, the number of patients in all the three groups was not equal. Furthermore, many patients are lost to private practitioners which also affect the results. These are the inherent limitations of any hospital based study. However, it does provide a baseline data for planning intervention programs that will assist in reducing the occurrence of dental diseases.

4. Conflict of Interest

None

5. Source of Support

Nil

References

- [1] Rajendran R, Shivapathasundharam B, Raghu AR. Shafer's Textbook of Oral Pathology. In: Shafer, Hine, Levy, editors. 6th ed. Noida, India: Elsevier; 2005.
- [2] Karunakaran R, Somasundaram S, Gawthaman M, Vinodh S, Manikandan S, Gokulnathan S. Prevalence of dental caries among school-going children in Namakkal district: A cross-sectional study. *Journal of Pharmacy & Bioallied Sciences*. 2014;6(Suppl 1):S160-S161. doi:10.4103/0975-7406.137432.
- [3] Naseem Shah. Oral and dental diseases: Causes, prevention and treatment strategies: Burden of disease, National Commission on Macroeconomics and Health; 2005. p. 275-98.
- [4] Arora SA, Sumeet S, Ahuja P, Singh D, Chandna A. Prevalence Of Dental Caries Among Pre-school Children of Greater Noida City, UP (India). *Indian Journal of Dental Sciences* 2012; 4(2): 4-6
- [5] Tyagi P. The prevalence and pattern of dental caries in pre-school children. *People's Journal of Scientific Research* 2009; 2(2): 1-4.
- [6] Chatterjee M, Bandyopadhyay AR. A Study on Nutritional Status and Dental Caries in Permanent Teeth among School Going Girl of Bengalee Population, India. *Advances in Anthropology*. 2012; 2(3): 112-116.
- [7] Bhatia HP, Srivastava B, Khatri S, Aggarwal A, Singh AK, Gupta N. Prevalence of Dental Caries Among 3-15 Year Old School Children in Ghaziabad City and its Adjoining Areas - A Correlated Survey. *J Oral Health Comm Dent* 2012;6(3)135-140
- [8] Sudha P, Bhasin S, Anegundi RT. Prevalence of dental caries among 513-year-old children of Mangalore city. *J Indian Soc Pedod Prev Dent* 2005; 23(2): 74-9.
- [9] Saravanan S, Madivanan I, Subashini B, Felix JW. Prevalence pattern of dental caries in the primary dentition among school children. *Indian J Dent Res* 2005, 16:140-146.
- [10] Patro BK, Ravi Kumar B, Goswami A, Mathur VP, Nongkynrih B: Prevalence of dental caries among adults and elderly in an urban resettlement colony of New Delhi. *Indian J Dent Res* 2008, 19:95-98
- [11] Maru AM, Narendran S. Epidemiology of dental caries among adults in a rural area in Indian. *J Contemp Dent Pract*. 2012;13:382-8.
- [12] Shah N, Sundaram KR. Impact of socio-demographic variables oral hygiene practices oral habits and diet on dental caries experience of Indian elderly: A community-based study. *Gerodontology* 2004;21:43-50.
- [13] Thomas S, Raja RV, Kutty R, Strayer MS. Pattern of caries experience among an elderly population in south India. *Int Dent J* 1994;44:617-22.
- [14] Kutesa A, Mwanika A, Wandera M. Pattern of dental caries in Mulago Dental School clinic, Uganda. *African Health Sciences*. 2005;5(1):65-68.
- [15] Manji F, Moshia H, Frencken J. Tooth and surface patterns of dental caries in 12-year-old urban children in East Africa. *Community Dent Oral Epidemiol* 1986; 14: 99-110

[16] Singh SK, Stanslaus OS, Aroon HV. Occurrence of dental caries among the adults attending a regional referral center in Tanzania. *J Orofac Res* 2014; 4: 30-34

[17] Westwater K. A study of the relative caries prevalence in the first and second permanent molars of rural Zambian school children. *J Dent* 1977; 5: 42-46

[18] Akpata ES, Jackson D. Caries vulnerability of the first and second molars in Urban Nigerians. *Arch Oral Biol* 1978; 23: 795-800

[19] Bhardwaj VK, Vaid S, Chug A, Jhingta P, Negi N, Sharma D. Prevalence of dental caries among five-year-old school children in Shimla city, Himachal Pradesh. *Eur J Gen Dent* 2012;1:34-8.

Table 1: Percent distribution of cases amongst different age groups

Age group	Number	Percentage
Group I (<30)	996	65.7
Group I (30-60)	478	31.5
Group I (>60)	42	2.8
Total	1516	100

Table 2: Number and percentage of teeth affected by caries on the occlusal surface and among both genders

Tooth Number*	Occlusal Surface Involved		Gender	
	Number	Percentage	Female	Male
46	149	9.8	6.9	8.4
37	141	9.3	4.4	7.8
47	137	9.0	5.0	5.9
36	130	8.6	5.1	7.8
16	69	4.55	2.8	4.9
26	68	4.5	3.2	4.1
38	39	2.6	1.2	1.6
48	39	2.6	1.5	1.5
17	37	2.4	1.4	2.2
27	32	2.1	1.3	2.4
28	12	0.8	0.3	0.5
18	9	0.6	0.6	0.1
Others#	94	6.25	6.0	8.8
Total	956	63.1	39.7	56

*teeth number in FDI system
 #include premolars

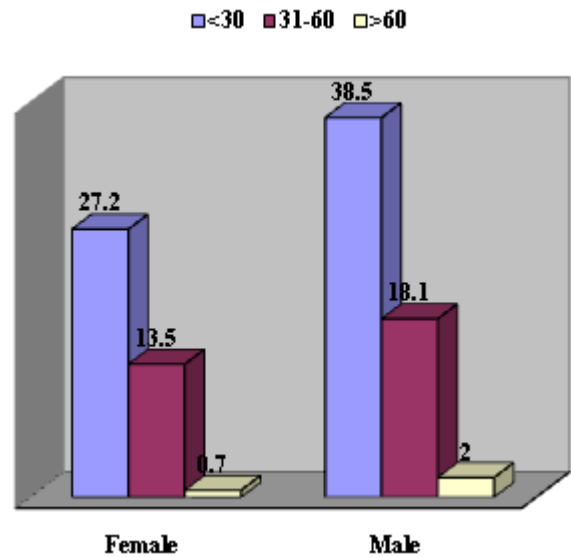


Figure 2: Gender distribution amongst different age groups

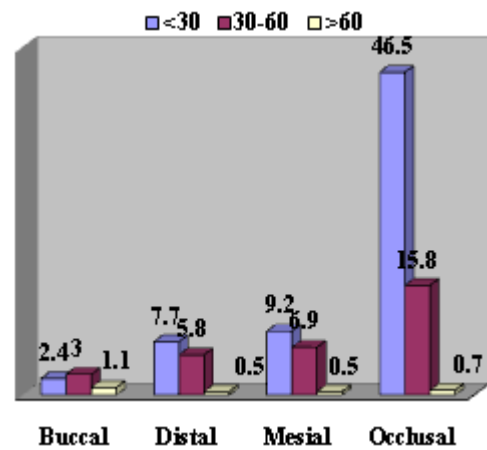


Figure 3: Distribution of different surfaces involved in different age groups

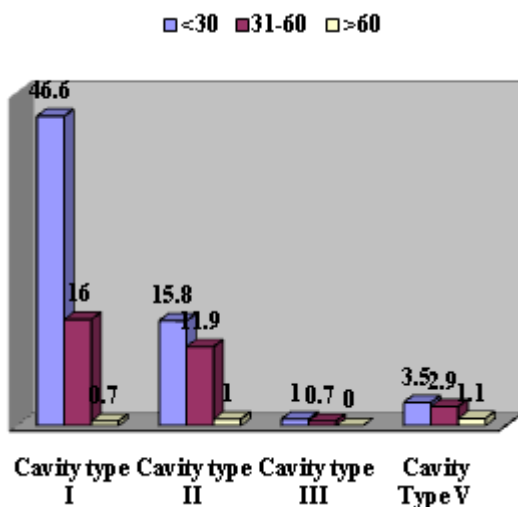


Figure 1: Percentage distribution of various cavities in three age groups

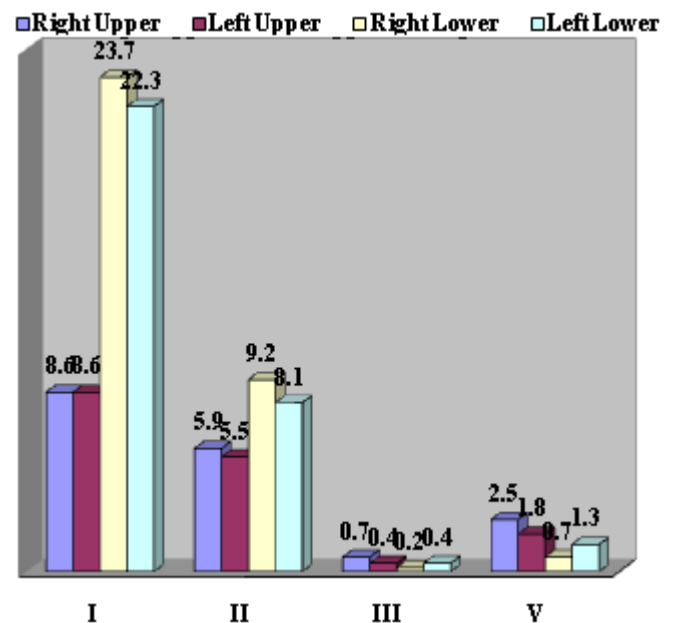


Figure 4: Percentage distribution of different types of cavities amongst the four quadrants

Legends

- 1) Table 1: Percent distribution of cases amongst different age groups
- 2) Table 2: Number and percentage of teeth affected by caries on the occlusal surface and among both genders
- 3) Figure 1: Percentage distribution of various cavities in three age groups
- 4) Figure 2: Gender distribution amongst different age groups
- 5) Figure 3: Distribution of different surfaces involved in different age groups
- 6) Figure 4: Percentage distribution of different types of cavities amongst the four quadrants