ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022

Epidemiology and Predictors of Periodontal Disease at an Early Stage among Adolescents

Shweta Bali[1*], Amit Garg[2], Neeraj Grover[3], Sumita Giri[4], Shreya Singh[5], Mansi Singh[6]

[1] Professor & HOD, Department of Periodontics and Oral Implantology, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

[2] Professor, Department of Periodontics and Oral Implantology, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

[3] Professor & HOD, Department of Oral and Maxillofacial Pathology, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

[4] Professor & HOD, Department of Conservative Dentistry and Endodontics, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

[5] Reader, Department of Oral & Maxillofacial Pathology, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

[6] Senior Lecturer, Department of Prosthodontics and Crown & Bridge, Santosh Dental College & Hospital, Santosh Deemed to be University, Ghaziabad, Delhi NCR, India

Email- [1]shweta bali- balishweta@yahoo.com

ABSTRACT:

Background: Periodic estimate of periodontal disease burden is crucial for developing novel treatment options, evaluating prevention strategies, and devising new policies. The last national survey of adolescents was conducted 15 years ago. As part of an oral health assessment survey done. **Aim's & Objectives**: this study aimed to determine the prevalence of periodontal disease among older teenage pupils and investigate its determinants. **Materials and Methods**: Examining 1,065 individuals between the ages of 15 and 18 from government and private schools in chosen urban and rural areas of five districts of Kerala using a multistage cluster sampling technique. Sociodemographic and oral health behaviour information, the modified Community Periodontal Index, the Oral Hygiene Index Simplified, and the Dental Aesthetic Index were collected. To determine the predictors of gingival bleeding and periodontal pockets, descriptive statistics, bivariate and multivariate logistic regression analyses were conducted. **Results:** The prevalence of gingival bleeding, periodontal pockets, and loss of attachment were, respectively, 42%, 13.4%, and 2.7%. In the adjusted multivariate model for predictors of gingival bleeding, residing in a rural area, attending government schools, having a mother with a high level of education and their employment status, need for orthodontic treatment, oral hygiene frequency, and poor oral hygiene status emerged as significant predictors. In the multivariate model for periodontal pockets, bleeding upon probing emerged as the greatest predictor, with an odds ratio of 12.85 when oral hygiene was accounted for. **Conclusion:** Prevalence of periodontal disease in

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022

adolescents is substantial. Significant predictors of periodontal disease in teenagers include sociodemographic variables, poor dental hygiene, and malocclusion.

Keywords*:* Adolescent, gingivitis, periodontal disease, periodontitis, probing pocket depth (PD), clinical attachment level (CAL), radiographic , alveolar bone loss

INTRODUCTION:

Severe periodontitis, one of the most widespread disorders affecting around 11% of humans, is a public health concern. It is a concern since it leads to impairment and diminishes quality of life.[1,2] Age is a known risk factor for periodontitis in children, and teenagers are uniformly afflicted with milder forms of the disease and varied levels of gingival inflammation. Even though severe destructive periodontitis is less prevalent in teens, the inflammatory alterations linked with early periodontal disease manifest within this age group. Periodic assessment of disease burden is vital for assessing the efficacy of preventative measures, developing novel treatment methods, and devising new policies. Since the last national oral health survey (NOHS) was conducted in India over 15 years ago, there is a dearth of data regarding the prevalence of periodontal disease among teenagers. [3]

The clinical signs of periodontitis range from modest subclinical inflammation to advanced destructive types that result in tooth loss. Clinical assessment of surrogate markers, such as probing pocket depth (PD) and clinical attachment level (CAL), as well as radiographic evidence of alveolar bone loss, are the primary diagnostic tools. Exam protocol (whole mouth/partial mouth), age group, source population, and case definitions all influence the assessment of periodontitis prevalence. Community Periodontal Index (CPI) is recommended by the WHO for disease estimation. Currently, a modified CPI criterion is proposed, which involves inspection and reporting of all teeth for gingival bleeding and periodontal pockets, as well as six index teeth for loss of attachment (LoA), but does not take calculus into account. [5]

MATERIALS AND METHODS:

Permission (order No.M/02/2011/DCK) was granted by the ethics committee of Govt. Dental College, Ghaziabad, and the heads of the participating school study. From February 2016 to March 2017, oral exams and data collecting were performed. For dental examination and data recording, parental informed consent and student verbal consent were obtained. As indicated in a multistage cluster sampling strategy was applied in five districts. On the basis of the department of secondary education's list of schools in urban and rural areas, the schools were classified as either public or private. From each site, three schools were chosen at random, and the cluster consisted of 15–18-year-old adolescents in one class who were systemically healthy and willing to undertake a comprehensive oral examination.

The examination moved from one school to the next until the appropriate sample was obtained from the area. Excluded from the study were children with intellectual handicap or a

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved, UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022**

learning disorder, a history of scaling within 3 months, and active or previous fixed or removable orthodontic treatment. The data of 1080 pupils from 40 schools were collected; however, only 1065 were analysed due to missing information.

Collecting sociodemographic (location of residence, kind of school, family income, mother's education, and occupation) and oral health behavioural (brushing technique, frequency, and timing of last dental visit) data. For the diagnosis of periodontal disease, gingival bleeding (BoP), periodontal pockets (PD), and loss of attachment (LoA) around the six index teeth were used in accordance with the updated CPI criteria (WHO, 2013). Dental Aesthetic Index was used to establish the necessity for orthodontic treatment, and Oral Hygiene Index Simplified was used to assess oral hygiene. It was determined the mean and standard deviation for continuous variables and the proportions for categorical variables. Gingival bleeding and periodontal pockets were subjected to a bivariate predictor analysis. The significant factors were considered during the development of the multivariate logistic regression models for both scenarios. The final model's goodness-of-fit was evaluated using the Nagelkerke R2 and a nonsignificant (P > 0.05) Hosmer and Lemeshow statistic. P 0.05 was deemed statistically significant for all other comparisons.

RESULTS:

The population's characteristics are listed in Table 1. 42% of patients had gingival haemorrhage (39.2–44.9). Teenagers from rural areas had a higher proportion of comparatively more gingival bleeding than their urban counterparts.There was a statistically significant difference in the prevalence of gingival bleeding between pupils attending public and private schools [Table 2]. In the bivariate analysis, place of residence, type of school, orthodontic treatment requirement, oral hygiene status, and oral hygiene frequency were statistically significant [Table 2]. In the adjusted analysis, the sociodemographic factors – site of residence, type of school, and mother's education – and clinical variables – orthodontic treatment requirement, oral hygiene frequency, and oral hygiene status – emerged as significant predictors of gingival bleeding .The highest odds ratio (OR) was 3.34 for oral hygiene status (2.53–4.41).

13.4% (11.4–15.4) of teenagers in Kerala had at least one periodontal pocket deeper than 3 mm, but the frequency of LoA was significantly lower at 2.7% [Table 1].

Table 1: Predictors of gingival bleeding among adolescents unadjusted analysis

Predictor	Gingival bleeding	n (%)	Crude OR	95% CI	P-value
	Absent	Present			
Place of residence					
Urban	332 (61.8)	201 (38.2)	1.38	1.10-1.78	0.006*
Rural	265 (53.7)	227 (46.3)			
Socioeconomic status					

ISSN PRINT 2319 1775 Online 2320 7876

Research paper © 2012 IJFANS. All Rights Reserved, UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022

Low family income	269 (56.7)	203 (43.3)	1.07	0.86-1.40	0.453
High family income	328 (59)	225 (41)			
School Governmet/aided	331 (53.4)	288 (46.6)	1.57	1.25-2.07	<0.001*
Private	266 (64.8)	140 (35.2)			
Last dental visit (year)					
>1	480 (58.8)	334 (41.2)	1.16	0.87-1.16	0.306
Within 1	117 (55)	94 (45)			
Orthodontic treatment need					
Absent	478 (64.4)	260 (35.6)	2.48	1.90-3.27	<0.001*
Present	119 (42)	168 (58)			
Oral hygiene					
Good	330 (72.5)	119 (27.5)	3.01	2.34-3.93	<0.001*
Poor	267 (46.5)	309 (53.5)			
Oral hygiene frequency					
Once daily	238 (54)	201 (46)	0.73	0.59-0.96	0.026*
Twice or more	359 (60.9)	227 (39.1)			
Gender					
Male	254 (57.6)	184 (42.4)	0.96	0.76-1.25	0.858
Female	343 (58.2)	244 (41.8)			
Mother's education					
College	20 (50)	20(50)			
Higher secondary	120 (56.8)	89 (38.5	0.676	0.39	1.23
School	452 (58.8)	314 (41.2)	0.802	0.462	1.402

This difference was statistically significant : 16.2% of students from a rural background had periodontal pockets, while 11.6% of students from an urban background had pockets. There were no statistically significant differences. It compares the incidence of periodontal pockets between socioeconomic levels and school types. The difference between the prevalence of periodontal pockets among students with poor oral hygiene (18.8%) and those with good oral hygiene (7.5%) was statistically significant . The relationship between orthodontic treatment need and periodontal pockets was statistically significant, with more participants with PD requiring orthodontic treatment than those without PD .

The occurrence of gingival bleeding was highly related with periodontitis, since only 2.6% of individuals without BoP developed periodontal pockets. In the bivariate analysis, the presence of gingival bleeding and the requirement for orthodontic treatment were significant predictors of periodontal pockets. BoP emerged as the best predictor of PD in the final multivariate model, with an OR of 12.85 (7.46–22.14) when adjusted for poor oral hygiene .

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022

DISCUSSION:

Periodontal disease manifestations range from asymptomatic gingival discoloration to advanced loss of attachment and bone, resulting in tooth loss and edentulism. Various epidemiological Different diagnostic criteria, ranging from the mere presence of subgingival calculus to radiographic bone loss, have been utilised in various studies.

Consequently, prevalence estimates differ between investigations. The modified CPI criteria were used to evaluate BoP, PD, and LoA in this study. [5] The initial CPI criteria had several flaws, including the evaluation of periodontal pockets and the omission of LoA. The majority of pupils (56%) reported having poor dental health.

The majority, however, used toothbrushes (98.6%) and toothpaste (93.45%) to clean. This is consistent with the oral hygiene practises reported by adolescents in the city of Kozhikode in a previous study. [9] There were no statistically significant differences between groups with varied oral hygiene frequencies, different teeth-cleaning materials, and different oral hygiene methods. Das et al. reported comparable findings among adolescent students. [9] The presence of blood-on-pollutant (BoP) from at least one tooth site was regarded to indicate gingival bleeding in a pupil. In comparison to a recent report among 15–17 yearold students (72%) using the original CPI criteria, the BoP reported among Kerala adolescents in this study (42%) was significantly lower. [9] The observed prevalence is lower than that reported from other regions of the country, 84.3% in Rajasthan kids and 59% in Bhopal pupils. [10,11] Gingival bleeding was more prevalent among those from rural backgrounds and those attending public schools. Inadequate oral hygiene and the requirement for orthodontic treatment greatly predicted the prevalence of gingival bleeding in those with the issues. Lower anterior teeth were more usually related with gingival haemorrhage. Lower anterior crowding and calculus presence may have contributed to this connection.

Similar results were found by Lagana et al.[12] Several population-based studies have found that crowded and malpositioned teeth contribute to gingival inflammation and periodontal damage. [13-15] It has also been demonstrated that crowding therapy improves gingival and periodontal problems. [16] In the study, no gender disparity was discernible.

According to the updated CPI criteria, periodontitis was identified in at least one location with a LOA of 4 mm or greater in this investigation. [17-19] The observed prevalence of periodontitis (LoA) was 2.7%. Only 48 sites had attachment loss greater than 4–5 mm, and only 3 sites exhibited LoA between 6–8 mm. There were 12 locations surrounding the upper and lower incisors and 46 sites in the interproximal regions of the first molars. Das et al. found a 3% prevalence of periodontitis among Kozhikode schoolchildren aged 15–17. In the United States, 2.75 percent of 16- to 17-year-olds had chronic periodontitis. [20-21] Various research from other regions of the country found a significantly greater frequency among adolescents. In Kerala, the NOHS found a frequency of 9.7% among 15-year-olds. [3] Since the year 2000, surveys performed in India have often employed CPITN criteria to estimate

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved, UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022**

the prevalence of periodontitis. [22-24] The prevalence estimate ranged from 15% to 43.2%, and the severity ranged from 2.6% to 22.2%. According to our knowledge, this is the first report utilising the updated CPI criterion among Indian adolescents.

The initial stages of periodontal disease in teens are reversible if proper dental hygiene is practised.[30] Numerous epidemiological studies suggest a relationship between periodontal disease and numerous systemic disorders. Moreover, if young individuals exhibit higher prevalence estimates, it is cause for concern for the future, as the disease is irreversible and the burden will be carried forward into adulthood, resulting in early partial or complete edentulism that negatively impacts their oral and overall health and well-being. The ratio of dentists to teenagers in Kerala is comparable to that of the developed world; hence, periodic surveillance of periodontal disease will promote its early detection and rapid treatment.

CONCLUSION:

This is the first report of early periodontal disease among Indian adolescents using the WHO's modified CPI criteria (2013). Periodontal disease onset prevalence among adolescents in Kerala was notably high.

Significant predictors of periodontal disease in teenagers include sociodemographic variables, poor dental hygiene, and malocclusion.

Conflicts of interest

REFERENCE:

1. Needleman I, Garcia R, Gkranias N, Kirkwood KL, Kocher T, Iorio AD, et al. Mean annual attachment, bone level, and tooth loss: A systematic review. J Clin Periodontol 2018;45 Suppl 20:S11229.

2. Bali RK, Mathur VB, Talwar PP, Chanana HB. National Oral Health Survey & Fluoride Mapping, 2002 2003, India. New Delhi: Dental Council of India; 2004.

3. Shaju JP, Zade RM, Das M. Prevalence of periodontitis in the Indian population: A literature review. J Indian Soc Periodontol 2011;15:2934

4. World Health Organization. Oral Health Surveys Basic Methods. 5th ed. Geneva: World Health Organization; 2013.

5. Lewis JM, Morgan MV, Wright FA. The validity of the CPITN scoring and presentation method for measuring periodontal conditions. J Clin Periodontol 1994;21:16.

6. Benigeri M, Brodeur JM, Payette M, Charbonneau A, Ismaïl AI. Community periodontal index of treatment needs and prevalence of periodontal conditions. J Clin Periodontol 2000;27:308 12.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved, UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022**

7. Gjermo PE. Impact of periodontal preventive programmes on the data from epidemiologic studies. J Clin Periodontol 2005;32 Suppl 6:294-300.

8. Das UM, Vadakkekuttical RJ, Kanakkath H, Shankunni SP. Dental health awareness, attitude, and dental health-care seeking practices as risk indicators for the prevalence of periodontal disease among 15-17-year-old school children in Kozhikode district, Kerala, India. J Indian Soc Periodontol 2017;21:144-51.

9. Dhar V, Jain A, Van Dyke TE, Kohli A. Prevalence of gingival diseases, malocclusion and fluorosis in school going children of rural areas in Udaipur district. J Indian Soc Pedod Prev Dent 2007;25:103-5.

10. Geiger AM. Malocclusion as an etiologic factor in periodontal disease: A retrospective essay. Am J Orthod Dentofacial Orthop 2001;120:112-5.

11. Glans R, Larsson E, Øgaard B. Longitudinal changes in gingival condition in crowded and noncrowded dentitions subjected to fixed orthodontic treatment. Am J Orthod Dentofacial Orthop 2003;124:679-82.

12. Jordão LM, Vasconcelos DN, Moreira Rda S, Freire Mdo C. Individual and contextual determinants of malocclusion in 12-year-old schoolchildren in a Brazilian city. Braz Oral Res 2015;29. pii: S1806-83242015000100290.

13. Clerehugh V, Tugnait A. Diagnosis and management of periodontal diseases in children and adolescents. Periodontol 2000 2001;26:146-68.

14. Oh TJ, Eber R, Wang HL. Periodontal diseases in the child and adolescent. J Clin Periodontol 2002;29:400-10.

15. Duncan RP, Gilbert GH, Peek CW, Heft MW. The dynamics of toothache pain and dental services utilization: 24-month incidence. J Public Health Dent 2003;63:227-34.

16. Masalu JR, Kikwilu EN, Kahabuka FK, Mtaya M, Senkoro AR. Socio-demographic and behavioural correlates of oral health related quality of life among Tanzanian adults: A national pathfinder survey. Tanzan J Health Res 2012;14:212-9.

17. Monsantofils M, Bernabé E. Oral impacts on daily performances and recent use of dental services in schoolchildren. Int J Paediatr Dent 2014;24:417-23.

18. Bhandari B, Newton JT, Bernabé E. Income inequality and use of dental services in 66 countries. J Dent Res 2015;94:1048-54.

19. Krustrup U, Petersen PE. Dental caries prevalence among adults in Denmark – The impact of socio demographic factors and use of oral health services. Community Dent Health 2007;24:22532.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 4 ,2022

20. Castilho AR, Mialhe FL, Barbosa Tde S, Puppin Rontani RM. Influence of family environment on children's oral health: A systematic review. J Pediatr (Rio J) 2013;89:116 23.

21. Krüger MS, Casarin RP, Gonçalves LB, Pappen FG, Bello-Correa FO, Romano AR, et al. Periodontal health status and associated factors: Findings of a prenatal oral health program

in South Brazil. Int J Dent 2017;2017:3534048.

22. Lopez R, Fernández O, Baelum V. Social gradients in periodontal disease among adolescents. Community Dent Oral Epidemiol 2006;34:18496.

23. Albandar JM, Rams TE. Global epidemiology of periodontal diseases: An overview. Periodontol 2000 2002;29:710.

24. Sood M. A study of epidemiological factors influencing periodontal diseases in selected areas of district Ludhiana, Punjab. Indian J Community Med 2005;30:701.