

**Review article**

**Periodontitis in India and Bangladesh. Need for a population based approach in epidemiological surveys. A Literature review.**

*P Shaju Jacob\**

**Abstract**

**Background:** Early surveys showed people of India and its neighbors to be highly susceptible to periodontitis. This was based on the early surveys which estimated a higher prevalence. **Aim:** This paper reviews the prevalence of periodontitis in India and Bangladesh and attempts to find out why the populations of the Indian subcontinent were considered more susceptible to periodontitis. **Settings and design:** Review of periodontitis prevalence studies on the Indian and Bangladeshi population. **Methods and material:** After identifying articles from Pub Med, DAJ and hand searching, the epidemiology of periodontitis is reviewed. **Results and conclusion:** This review identifies that very few studies have been done on representative population. Yet it can be certainly concluded that there is a high prevalence of periodontitis in the adults and the economically weak population which can be reduced by adopting preventive public health strategies. **Conclusions:** Standardized population based studies in a representative population with a robust design to identify the true prevalence of periodontitis is needed.

**Keywords:** Periodontitis, India, Bangladesh, epidemiology, prevalence.

---

**Introduction**

India and Bangladesh share more in common than being two of the most populous nations in terms of population density. Culture, trade, security are some of the areas where the two countries meet. The two countries are also considered to be affected by periodontitis, the major reason for tooth loss in adults, which is higher than the western nations.

Oral health has been neglected for long in India. With the formulation of the Oral health policy India has started recognizing the benefits of having a healthy population including in oral health. In India, dental care scenario is unique<sup>1</sup>. At present there are more than 267 dental schools, producing approximately 19,000 dental graduates/year and almost 3000 specialists. Bangladesh has 14 dental schools (Bangladesh Medical and Dental Council). The dental schools are major players for inexpensive oral care and also offer excellent tertiary care. On the other hand, even the most basic oral health education, simple interventions like pain relief,

emergency care for acute infection and trauma are not available to the vast majority of population, especially in rural area. There is variation in the periodontitis prevalence as reflected in the two major surveys conducted<sup>1, 2</sup>. Lack of epidemiological data on representative rural population compounds the problem further. Albandar<sup>3</sup> in an overview concluded that subjects of Asian ethnicity had the third highest prevalence of periodontitis. The aim of this review is to find the prevalence of periodontitis in India and Bangladesh.

**Method**

Using keywords "Periodontitis" and "India", "Periodontal" and "India" and "Periodontitis" and "Bangladesh", "Periodontal" and "Bangladesh" various index were searched including PubMed and medIND. Search for India gave 163 articles while Bangladesh had 12 articles. Studies which gave prevalence data on

---

\***Corresponds to:** Dr. Shaju Jacob P, Department of Periodontics and Oral Implantology, Chhattisgarh Dental College and Research Institute, Sundara, Rajnandgaon, Chhattisgarh 491441, India. **Fax no:** 00917744-281930. **Email:** [shajujacob@yahoo.com](mailto:shajujacob@yahoo.com).

periodontitis were selected and thus 13 articles were selected for the review.

In this review moderate periodontitis is considered if a person has at least one site  $\geq 4$ mm and severe periodontitis at least one site  $\geq 6$ mm of probing depth.

Greene<sup>4</sup> conducted one of the very earliest prevalence studies in India. The periodontal index (Russell, 1956) was used. The survey was on the school population in a low socio economic area. Ninety-seven per cent of the 11-17 year old persons examined had overt evidence of periodontal disease, while fewer than 2 per cent of the total had obvious periodontal pockets. All the 63 persons over 17 years of age had overt gingival inflammation, and 19 persons (30.2%) per cent, had obvious periodontal pockets. Persons with obvious periodontal pocket (periodontitis) were 0.2% in 11 yrs, 0.4 in 13 years, 1% in 15 and 6% in 17 years group.

Ramfjord<sup>5</sup> observed that there is 100% prevalence of periodontal disease (including gingivitis) in India. At 17 years 10% of Indian boys had periodontitis. This periodontitis was due to accumulation of calculus, plaque and debris rather than due to age, sex, geography, economic status or nutrition.

Sanjana et. al<sup>6</sup> did a study on Bombay residents in 1956. 83.2% had signs of periodontal disease.

**National Oral Health Survey and Flouride Mapping, 2002-2003**, Dental Council of India, New Delhi, 2004: this is the first ever national level epidemiological survey done in India. The survey was to collect information covering various dimensions of oral health including prevalence of oral health problems. Community Periodontal Index (CPI) was used for disease assessment. The prevalence of periodontal disease increased with age. Moderate periodontitis was seen

in 17.5% of 35-44yr old, and 21.4% in 65-74 yr old, whereas severe disease defined as at least one tooth with  $>6$ mm probing depth was 7.8% in 35-44yr old, and 18.1% in 65-74 yr old. No marked gender differentials were observed and marginally higher prevalence seen in rural subjects. This survey gave a reliable baseline data at a national and state level.

**Oral Health in India:** A report of the multicentric study<sup>1</sup>, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India & World Health Organisation Collaborative Program.

Under the Government of India and World Health Organization collaborative program on oral health, a Multicentric oral health survey was envisaged in the year 2004, in order to have a baseline data of the oral diseases burden and associated risk profile of the population for four index age group i.e 12, 15, 35-44 and 65-74 years. This survey was conducted in seven different geographical locations in India i.e. Arunachal Pradesh, Delhi, Maharashtra, Puducherry, Rajasthan, Orissa and Uttar Pradesh. The loss of attachment (3 mm or more) was 77% in 35-44 year age group and 96% in 65-74 years olds in Maharashtra in the present study. Attachment loss of  $>3$ mm in 35 -44 years was highest in Maharashtra (78%) followed by Orissa 68% and Delhi 46%. The rest of the centers had the prevalence ranging between 15-33%. The prevalence of Loss of attachment was significantly higher in 65-74 years age group compared to 35-44 yrs. group. The highest prevalence in 65-74 years group was recorded from Maharashtra (96%), followed by Orissa (90%), Delhi (85.5%), Rajasthan (75%), Uttar Pradesh (68%) and Puducherry (55%). Arunachal Pradesh recorded the lowest prevalence of 20%. The general trend for loss of attachment observed was that it was higher in rural than in urban

## Periodontitis in India and Bangladesh

population and was higher in males compared to females.

Naseem Shah<sup>7</sup> in her report for the National Commission on Macroeconomics observed more advanced periodontal disease affecting 40%–45% of the population of India.

M Sood<sup>8</sup> in a field survey in Punjab found 29.1% having shallow pockets (moderate periodontitis) and 12.5% deep pockets ( $\geq 6$ mm severe periodontitis), assessed by WHO recommended methods.

GPI Singh<sup>9</sup> did a prevalence study in the rural and urban subjects of Ludhiana, Punjab. He found that the urban subjects had more prevalence of moderate and severe periodontitis than rural subjects.

Jagadeesan<sup>10</sup> did a systematic random sampling of rural women in Pondichery. The prevalence of moderate periodontitis increased with age; there was a risk of 2.3 times for persons above 35 years to get periodontitis.

Doifode<sup>11</sup> in a field survey of two randomly selected nagars of Nagpur,

Maharashtra found 34.8% periodontal disease.

Vandana K.L<sup>12</sup> found 27% periodontitis in flourosis affected patients attending Periodontics OPD. Prevalence increased with age and was significantly more in females.

Helderman<sup>13</sup> in a review observed the prevalence of subjects with deep periodontal pockets in Bangladesh was 26 per cent and it can tentatively be concluded that Bangladesh belongs to the 20 per cent of countries in the world where periodontal conditions of the population are among the worst.

Akhter<sup>14</sup> found that of the 582 patients attending Dhaka Dental College Hospital who underwent extractions of their teeth, 18.5% was due to periodontal reasons.

Arvidson-Bufano<sup>15</sup> found shallow pockets in 34% of the urban slum group and in 42% of the rural group, in a survey of 826 individuals residing in Central and Western Bangladesh.

**Table 1:** Prevalence data of periodontitis

Year	Author	Country	Sample size	Population	Age range	Prevalence
1956	M.K. Sanjana <sup>6</sup>	India	1445	Urban	16-50	N.A
1957	Ramfjord <sup>5</sup>	India	1677	Urban + Rural	11-17, 19-30.	10% at age 17
1960	Greene <sup>4</sup>	India	802	Urban males	11-17	<2%
1960	Greene <sup>4</sup>	India	748	Rural males	11-17	<2%
1960	Greene <sup>4</sup>	India	63	Rural males	18-30	30.2%
2000	Doifode <sup>11</sup>	India	5061	Urban, Representative population	0-60+	34.8% (31.7M, 32.5F )
2000	M Jagadeesan <sup>10</sup>	India	912	Field survey, rural women	>15 years	20.63% Moderate, 25.6% (severe periodontitis.)

Year	Author	Country	Sample size	Population	Age range	Prevalence
2004	Bali et al <sup>2</sup>	India	310 per region	Urban and rural	5,12,35-44,65-74 groups	17.5% moderate & 7.8% severe periodontitis (35-44 years) 21.4% moderate and 18.1% severe periodontitis (65-74 years)
2005	M. Sood <sup>8</sup>	India	1000	Field survey	N.A	29.1% Moderate, 12.5% severe periodontitis.
2005	GPI Singh <sup>9</sup>	India	1000	Field survey	>15 years	39.4% Moderate, 16.9% severe periodontitis.
2005	GPI Singh <sup>9</sup>	India	500 urban	Field survey	>15 years	43.2% Moderate, 22.9% severe periodontitis
2005	GPI Singh <sup>9</sup>	India	500 rural	Field survey	>15 years	31.7% Moderate, 11.0% severe periodontitis.
2007	Vandana KL <sup>12</sup>	India	1029	Periodontics OPD	15-74 years.	27% (24.2M, 32.8F)
2007	WHO <sup>1</sup> Arunachal pradesh	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	15% moderate and 2.6% severe periodontitis (35-44 years), 18% moderate and 0.6% severe periodontitis (65-74 years)
2007	WHO <sup>1</sup> Delhi	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	34% mod and 1.0% severe in 35-44, 1.7% mod and 1.7% sev in 65-74 age groups.
2007	WHO <sup>1</sup> Maharashtra	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	48% moderate and 2.9% severe periodontitis (35-44 years), 55.2% moderate and 4.5% severe periodontitis (65-74 years)
2007	WHO <sup>1</sup> Orissa	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	35.7% moderate and 9.7% severe periodontitis (35-44 years), 42% moderate and 15.6% severe periodontitis (65-74 years)
2007	WHO <sup>1</sup> Puduchery	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	26.3% moderate and 4.7% severe periodontitis (35-44 years)

## Periodontitis in India and Bangladesh

Year	Author	Country	Sample size	Population	Age range	Prevalence
2007	WHO <sup>1</sup> Rajasthan	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	48% moderate and 2% severe periodontitis (35-44 years)
2007	WHO <sup>1</sup> Uttar Pradesh	India	3200	Field survey	12, 15, 35-44, 65-74 age group.	23.5% moderate periodontitis (35-44 years), 34.5% moderate and 14% severe (65-74 years).
1990	Arvidson-Bufano <sup>15</sup>	Bangladesh		Hospital, urban slums		34%
1990	Arvidson-Bufano <sup>15</sup>	Bangladesh		Hospital, rural		42%
1996	Helderman <sup>13</sup>	Bangladesh		review		26% (severe periodontitis)
2008	Akhter <sup>14</sup>	Bangladesh	582	Hospital		18.5%

### **Discussion**

School and hospital population are easy to access and study. But they are convenient samples which cannot be generalized to the target population. There is an increase of about 10% between the prevalence in general population and hospital based population. The early studies<sup>4,5</sup> were done on school population. The school population will be a young population and only persons affordable to attend the schools will be represented. And the school population is least representative of the periodontitis susceptible population. But if young persons show levels of periodontitis as seen in Ramfjord<sup>5</sup> surveys, it is a cause for alarm as it reflects a poor hygiene status and dental service utilization by the population.

Another limitation observed was the use of CPITN as a case definition for periodontitis. CPITN is a treatment need index to find the prevalence of persons requiring treatment. It does not give true prevalence in terms of severity and extent. Further the prevalence data should correlate with tooth loss to find if the

increased prevalence of periodontitis is reflected in increased tooth mortality. This will also help us to find at what level of severity of periodontitis is tooth loss a consequence. Abnormal Probing depth is a cause for concern if it leads to increased risk for tooth loss and its threshold should be identified based on its consequence. Yet very little data are available on tooth loss.<sup>7</sup>

The WHO Global Oral Health Programme<sup>16</sup> formulated the policies and the necessary actions for the improvement of oral health. The strategy is that oral disease prevention and the promotion of oral health needs to be integrated with chronic disease prevention and general health promotion as the risks to health are linked (like tobacco consumption and the standard of hygiene). Yet for effective integration of oral disease management with other chronic diseases, prevalence data along with risk due to various factors should be available. Oral disease including periodontal disease and tooth loss is a serious public-health problem. Its impact on individuals and communities in terms of pain and suffering, impairment of function

and reduced quality of life, is considerable. With the growing consumption of tobacco in many low and middle income countries, the risk of periodontal disease, tooth loss and oral-cavity cancer is likely to increase.

Naseem Shah<sup>7</sup> in her report for the National Commission on Macroeconomics and Health (NCMH) observed that for periodontal diseases the projection is alarming with prevalence at present being 45% for 15+ years, and the actual prevalence in lakhs will be 2957.6 (year 2000), 3190.2(year 2005), 3413.8(year 2010) and 3624.8(year 2015). Due to the rampant use of paan masala and gutka by persons of all age groups and both the sexes' periodontal disease prevalence will increase than projected. If minor periodontal diseases are included, the proportion of population above the age of

15 years with this disease could be 80%–90%. Concerned<sup>11</sup> with the urgent need for action in promoting sound oral health, prevention of dental caries and periodontal diseases and to give impetus to activities to promote oral health, WHO had dedicated World Health Day 1994 to oral health.

### **Conclusion**

There is a lack of prevalence data of the Indian and Bangladesh population. Case definitions have to be formed with the local population in mind. As Bangladesh and India share more in common, a common approach can be developed to study periodontal diseases with the subcontinent's uniqueness in mind. This will help us utilizing the scarce resources available to combat and prevent periodontitis and its related tooth loss.

**Reference**

1. Naseem Shah, Pandey R.M. et al., Oral Health in India: A report of the multi centric study, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India & World Health Organisation Collaborative Program, December 2007.
2. Bali, Mathur, Talwar, Chanana. National Oral Health Survey and Flouride Mapping 2002-2003. India. Dental Council of India, New Delhi, 2004.
3. Albandar & Rams. Global epidemiology of periodontal diseases: an overview. *Periodontology* 2000 2002; 29:7-10.
4. Greene. J.C. Periodontal Disease in India: Report of an Epidemiological Study. *Journal of Dental Research* 1960; 39:302-312.
5. Ramfjord.S.P, Emslie, Greene J.C, Held and Waerhaug.J. Epidemiological Studies Of Periodontal Diseases. *American Journal of Public Health* 1968; 58(9):17-22.
6. Sanjana M.K., Mehta F.S., Doctor R.H. and Baretto M.A. Mouth Hygiene Habits and Their Relation To Periodontal Disease *Journal of Dental Research* 1956; 35:645-47.
7. Naseem Shah. Oral and dental diseases: Causes, prevention and treatment strategies In NCMH Background Papers—Burden of Disease in India (New Delhi, India), September 2005, National Commission on Macroeconomics and Health, Ministry of Health & Family Welfare, Government of India, New Delhi September 2005, 275-298
8. Sood M. A Study of Epidemiological Factors Influencing Periodontal Diseases in selected Areas of District Ludhiana, Punjab. *Indian Journal of Community Medicine* 2005; 30(2):70-71.
9. Singh GPI, Bindra J, Soni. Prevalence of Periodontal diseases in urban and rural areas of Ludhiana, Punjab. *Indian Journal of Community Medicine* 2005; 30(4):128-9
10. Jagadeesan M, Rotti SB, Dananbalan M. Oral Health status and risk factors for dental and periodontal diseases among rural women in Pondicherry. *Indian Journal of Community Medicine* 2000; XXV(1):31-38
11. Doifode VV, Ambadekar NN, Lanewar AG. Assessment of oral health status and its association with some epidemiological factors in population of Nagpur, India. *Indian J Med Sci.* 2000; 54(7):261-9
12. Vandana KL, Reddy SM, Assessment of periodontal status in dental fluorosis subjects using community periodontal index of treatment needs. *Indian Journal of Dental Research* 2007; 18:67-71
13. Van Palenstein Helderma WH, Joarder MA, Begum A. Prevalence and severity of periodontal diseases and dental caries in Bangladesh. *Int Dent J.* 1996 Apr;46(2):76-81.
14. Akhter R, Hassan NM, Aida J, Zaman KU, Morita M. Risk indicators for tooth loss due to caries and periodontal disease in recipients of free dental treatment in an adult population in Bangladesh. *Oral Health Prev Dent.* 2008;6(3):199-207.
15. Arvidson-Bufano UB, Holm AK. Dental health in urban and rural areas of central and western Bangladesh. *Odontostomatol Trop.* 1990 Sep;13(3):81-6.
16. Poul Erik Petersen, World Health Organization, Geneva, Switzerland. World Health Organization global policy for improvement of oral health – World Health Assembly 2007. *International Dental Journal* 2008; 58:115-121.