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Gingival Diseases: World and Indian Scenario a Background Check

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Abstract- Gingivitis is nothing but the inflammation of gingival soft tissue. Various forms of gingivitis have been described in various literatures. Although the clinical signs of gingivitis are easy to detect, it is not clear how much inflammation a person must have to be considered a gingivitis case. The prevalence and incidence of gingival diseases in individuals of different ages and socio-economic strata gives us a clear view of the association and distribution of etiological factors causing gingival and periodontal diseases.

Current article summarizes the present World and Indian scenario of gingival diseases that will definitely help the dental professionals in their future diagnosis and treatment plan of periodontally compromised patients.

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Gingival Diseases: World and Indian Scenario a Background Check

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Abstract- Gingivitis is nothing but the inflammation of gingival soft tissue. Various forms of gingivitis have been described in various literatures. Although the clinical signs of gingivitis are easy to detect, it is not clear how much inflammation a person must have to be considered a gingivitis case. The prevalence and incidence of gingival diseases in individuals of different ages and socio-economic strata gives us a clear view of the association and distribution of etiological factors causing gingival and periodontal diseases.

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I. INTRODUCTION

Epidemiology is the basic science of preventive and social medicine. Epidemiology has evolved rapidly during the past three decades.

Modern epidemiology has entered the most exciting phase of its evolution. By identifying risk factors of chronic disease, evaluating treatment modalities and health services, it has provided new opportunities for prevention, treatment, planning and improving the effectiveness and efficiency of health services. This trend is bound to increase in view of the increasing importance given to the pursuit of epidemiological studies.

Epidemiology is derived from the word epidemic (epi=among; demos=people; logos=study), which is an old word dating back to the 3rd century B.C. In the United States, Winslow and Sedgwick both lectured on epidemiology in the early 1920s. In 1927, W.H.Frost became the first professor of epidemiology in US. The science of epidemiology originally referred to the study of epidemics. And epidemic is a frequency of case occurrence beyond that which is usual for the particular season, place, and population group (Santwell, 1973).

Parkin (1873) defined epidemiology as that branch of medical science which treats epidemics and McMahon (1960) defined it as the study of the distribution and determinants of disease frequency in man. John M.Last in 1988 defined it as the study of the distribution and determinants of health related states or

events in specified populations, and the application of this study to the control of health problems.

According to the International Epidemiological Association, epidemiology has three main aims i.e., to describe the distribution and magnitude of health and disease problems in human populations; to identify etiological factors (risk factors) in the pathogenesis of disease and to provide the data essential to the planning, implementation and evaluation of services for the prevention, control and treatment of disease and to the setting up of priorities among those services. But the ultimate aim of epidemiology is to lead to effective action in order to eliminate or reduce the health problem or its consequences and to promote the health and well-being of society as a whole.

It helps to channelize the public health policies to serve the various groups of population, age, sex, occupation, rural and urban and to meet the felt needs of these groups in society they serve and to appraise their action and finally evaluate periodically to improve their social policy from time to time.

Epidemiology of Gingival Disease: A gingivitis case clearly involves a person with gingivitis. The more difficult part involves deciding when a person has gingivitis. Although the clinical signs of gingivitis are easy to detect, it is not clear how much inflammation a person must have to be considered a gingivitis case. An universally accepted threshold for the amount or severity of gingival inflammation that must be present in an individual does not exist. So the next question arises that "HOW MUCH GINGIVITIS IS PRESENT?"²

According to data from NHANES III,¹ 54% of the non institutionalized civilian U.S population of age 13 years and older had gingival bleeding in at least one gingival site. Gingival bleeding was most prevalent in the 13 to 17 year old age group (63%) and declined gradually through the 35 to 44 year old group. The prevalence increased again at the 45 to 54 year old group but remained fairly constant in older groups. On an average per person, 10% of all sites had gingival bleeding. A study of U.S school children of age 14 to 17 years reported that the prevalence of gingival bleeding was 61.5%, essentially identical to the prevalence reported by NHANES III study. Both surveys used the NIDCR gingival sweep method for eliciting gingival bleeding. If the prevalence of gingival bleeding from NHANES III data is recalculated using only periodontal sites without attachment loss (<1 mm), the prevalence

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of one or more sites per person with gingival bleeding decreases from 54% to 47%. This indicates that about 7% of the people had bleeding only in sites with attachment loss. Throughout the globe, dental plaque growth and inflammation of gingival tissues are ubiquitous and strongly linked, irrespective of age, gender (or) racial / ethnic identification. More than 82% of US adolescents have overt gingivitis and signs of gingival bleeding with similar (or) higher prevalence of gingivitis being reported for children and adolescents in other parts of the world.

Various epidemiological studies have been conducted among school going children in India. **Mehta and Sanjana (1956)²** and **Sanjana et al (1956)³** examined and re-examined about 1640 school children of Bombay city in the age group of 11-17 years using Russell's index to study the prevalence of gingivitis. They reported that prevalence of gingivitis was 93.7% and it increased with age and a marked increase in intensity of gingival disease in the age group 6-7 years. There was no change noticed in 10-18 years age group. **Shick H.S. (1960)⁴** conducted a study to evaluate the prevalence of gingivitis in two municipal schools in Bombay examined 807 children-age group 5-19 years (lower middle class) using PMA index. He reported 74.59% of gingivitis. 12.26% of the study population had mild gingivitis and 62.32% had severe gingivitis. In the study conducted by **Nanda R.S. et al (1969)⁵** where they used the Ramfjord's method of periodontal examination and examined 1253 school children aged between 4-17 years in Lucknow, they concluded that male children had more gingivitis than female children and the prevalence of gingivitis increased with age. They also evaluated that the highest prevalence was found in the 12-14 years age group. **Nagaraj Rao et al (1980)⁶** conducted a study among 500 school children of 5 - 10 years of age in Udupi and reported that oral hygiene status was poor in all children and 28% of the study population had marginal gingivitis and 7.2% had chronic generalized gingivitis. Poor oral hygiene was found to be main factor for the increase in prevalence of gingivitis. **Mathur SK and Roy RK (1981)⁷** examined 1200 children aged 3-14 years from urban and rural Lucknow and reported that 100% of children had plaque and gingivitis and that the rural children had more severe gingivitis when compared to that of the urban children.

a) *Epidemiological Studies Conducted Among Pregnant Women*

Samant Asha (1976)⁸ conducted a study in Chandigarh on 40 women in each of the three trimester of pregnancy, and on 40 non-pregnant women of comparable age, socio-economic status and dietary habits and concluded that the severity of gingivitis increased in significant proportion during pregnancy.

Dixit J et al (1980)⁹ studied the occurrence and severity of gingivitis in 80 pregnant and 40 non-pregnant

women in the age group 20 - 40 years in Lucknow. They found a significantly higher severity of gingivitis in pregnant subjects as compared to non-pregnant and also noted an increase in severity in the 2nd trimester. **Uma R (1989)⁴** stated that pregnancy gingivitis is a condition not seen in every pregnant woman. Even if the oral hygiene is good, gingiva in most cases will exhibit an elevated tendency to bleed after tooth brushing. A pregnant woman is anxious about the health of her child and herself. This alertness to total health proves an unusual opportunity to the patients to learn certain principles which can be applied for the future care of the child. The gingiva that is already slightly inflamed now appears excessively enlarged and the severity is believed to be the greatest between 2nd and 3rd trimester of pregnancy.

b) *Epidemiological Studies Conducted Among Adult Population*

Sharma (1953)⁴ examined 1158 patients in the age group 15 to 50 years and found that the incidence of high oral hygiene index was more in early age group and decreased with advancing age. **Mehta et al (1953)⁴** examined 2219 male subjects in 18-55 years age group from low socio economic status in Bombay and Ratnagiri district and concluded that the incidence of periodontal disease among Indians is very high, severity of disease increased with age, papillae and margins do not show much difference in the severity of the disease and the extent of involvement of upper and lower marginal gingival and papillae is much the same.

Studies on descriptive epidemiology of gingival disease⁴

Prevalence of gingivitis: A number of surveys on the prevalence and severity of gingivitis has been conducted. **McCallin (1933)** conducted a survey in New York among 4,600 children in the age group 1-14 year and concluded that the percentage of persons affected with gingivitis was about 98.0%. In another survey conducted by **Messner et al in 1938**, among 1,438,318 children in 26 states of United States of 6-14 years age group concluded that about 3.5 - 8.6% suffered from gingivitis.

Surveys on prevalence of gingivitis conducted in India⁴

Marshall - Day and Tandon (1940) conducted a survey on 756 middle class children in Lahore of approximately 13 years of age among which 68.0% were affected with gingivitis. **Marshall - Day (1940)** conducted a survey in fluoride endemic area in Northern India in 203 individuals of age group 5-18 years and concluded that about 59.6% had gingivitis. In 1944, **Marshall - Day** in their survey conducted among 200 boys in Kangra district of India of approximately 13 years of age, concluded that 81.0% of them had gingivitis. **Marshall - Day and Shourie (1944)** concluded that about 80.0% of children out of 613 children from low and middle class of 5-15 years age group, had gingivitis. **Marshall - Day**

and Shourie (1947) did a study on 1054 children from low to middle class male school children in Lahore, India, in the age group of 9-17 years and concluded that about 99.4% had gingivitis. Marshal - Day and Shourie (1947) again conducted a study among 179 girls of high socioeconomic level in Lahore, India, in the age group of 9-17 years and concluded that 73.3% of them had gingivitis. A study conducted by Greene (1960)¹⁰ among 1613 school boys in low socio-economic area of India (11-17 years), concluded that 96.9% had gingivitis.

c) *Necrotizing Gingivitis and Noma (Cancrum Oris)*

Noma is confined to children. However the prevalence estimates vary considerably depending on country and region. Sheiham¹¹ estimated the prevalence of necrotizing gingivitis among Nigerian children aged 2-6 years to range between 1.7% and 26.9% depending on location. Enwonwu¹² evaluated the prevalence of necrotizing ulcerative gingivitis to be 15.3% among rural Nigeria children aged 0-10 years with most cases seen from 2 to 6 years of age. Taiwo¹³ observed necrotizing ulcerative gingivitis in 27.4% of the children under the age of 12 years attending a dental clinic in Nigeria with estimates ranging from 2.4% of the children with good oral hygiene to 66.7% of children with poor oral hygiene. A large epidemiological study conducted among children in Senegal showed an overall prevalence of necrotizing ulcerative gingivitis among 0-14 year old children of 2.1% with the majority of cases observed among 1 - 9 years. Olsson¹⁴ did not observe a single case of ANUG among 1700 Ethiopians aged 6-54 years.

d) *Is more or Less Gingivitis Present Now than Previously?*

Although it is generally believed that the prevalence of gingivitis is declining in the United States, the epidemiologic data needed to make that claim do not exist. Because of difference in populations, sampling methods, and periodontal measurement methods, comparisons of results between those surveys are difficult, if not impossible, to make. Even if results from these studies could be compared, they do not support the view that the prevalence of gingivitis is declining.

e) *Does my Patient With Gingivitis Fit the Typical Profile?*

It is observed that gingivitis is more prevalent among certain groups. Adolescents have a higher prevalence of gingivitis than pre-pubertal children or adults. The rise of sex hormones during adolescence is suspected to be the cause of the increased prevalence. (Studies shows that the increased level of testosterone in boys and estradiol and progesterone in girls were associated with increased level of the periodontal pathogens *Prevotella intermedia* and *Prevotella nigrescens*). Hormonal effects also may be responsible for the increased prevalence during pregnancy and

among women. Males in all age groups are more likely to have gingivitis than females. Males with gingivitis have more involved sites than females especially in younger age groups (13-17 years.) Poorer plaque control among males could likely explain much of their higher prevalence and extent of disease.

f) *Why Do Patients Have Gingivitis, And What Puts Them At Risk?*

It is clear from experimental and epidemiologic studies that microbial plaque is the direct cause of gingivitis. The cause-and-effect relationship between plaque and gingival inflammation was demonstrated in a classic study by Loe et al. (1965). Because bacterial plaque is the cause of the most common form of gingivitis, factors that influence the oral hygiene status of individuals would likely influence the prevalence of gingivitis eg. poor oral hygiene, tooth brushing frequency. Although smoking is one of the most important risk factors for adult periodontitis, its role in gingivitis is unclear.

g) *National Oral Health Survey (Dental Council Of India: 2002 -2003)¹⁵*

i. *Oral Hygiene Practices Across Age Groups*

About two-thirds of 12, 15, and 35-44 year olds and one-third of 65-74-year-old respondents across both sexes, and more in urban, had used toothbrush to clean teeth in the country. Nearly three-fourths in most of the states and union territories reported the use of toothbrushes for cleaning teeth. About 90 percent, across ages, both sexes, and more in rural, had cleaned teeth once a day. Only 8-9 percent, irrespective of age, across both sexes and more in urban, had cleaned teeth twice a day in the country as well as in most of the states and union territories.

About two-thirds of respondents, across both sexes and more in urban, had used tooth paste, while a quarter of them, across ages and both sexes and more in rural, reported the use of tooth powder in the country.

h) *Dental Problems and Treatment Aspects Across Age Groups*

More and more respondents, across both sexes and more in urban, reported oral health problems with the increase in ages. More in Assam than in other states and union territories reported the occurrence of oral health problems. More than 50 percent of respondents, across both sexes and more in urban, reported less than half an hour to reach dental care facility places in the country as well as in states and union territories.

i) *Awareness of Dental Health Problems Across Age Groups*

More and more respondents reported knowledge of oral health problems, factors responsible for problems and their preventive measures with increase in age of respondents in the country as well as

in each of the states and union territories. The majority of respondents, irrespective of age, across both sexes and more in rural, reported oral health problems such as dental decay, followed by gum disease and foul breath in the country as well as in each of the states and union territories.

j) *Tobacco Smoking And Chewing Habits Across Age Groups*

About 23-24 percent, males with higher percentage across age groups, reported smoking tobacco in the country. 40-45 percent, males with higher percentage, across age groups were smoking bidi, followed by the habit of smoking cigarettes while was more males and more in urban across age groups. About 76-86 percent of smokers, more females, across places of residence and age groups in country as well as in the states and union territories, reported smoking less than 10 times in a day. A high percentage reported chewing paan or paan masala in Orissa than in other states and union territories. 42-52 percent reported chewing paan or paan masala over the last 5-10 years.

II. PERIODONTAL STATUS

a) *Bleeding, calculus and pockets*

The prevalence of periodontal disease increased as 12 year and higher age groups were surveyed. In children aged 12 years, the prevalence was 57 per cent while the prevalence peaked at 89.6 per cent in the 35-44 year age group. The prevalence was lower in 65-74 year age group (79.9 per cent), possibly due to the presence of a high number of edentulous or partially edentulous subjects in the age group. Calculus was more prevalent than bleeding across age groups from 12 years to 65-74 year age groups. Periodontal pockets were recorded in the higher age groups of 35-44 and 65-74 years and both shallow (4-5 mm) and deep (6 mm) pockets were markedly more prevalent in the older adults (65-74 years). In states, periodontal-disease prevalence was generally high across states and appeared very high in the majority of states in the 35-44 year age group (ranging from about 70 to 100 per cent).

b) *Loss of attachment*

Loss of attachment was prevalent in subjects aged 35-44 (41.2 per cent) and 65-74 years (60.7 per cent). The least severe form of loss of attachment (4-5 mm depth) was the most prevalent in both age groups. In the states, in adults (35-44 years), only 6 out of 18 states surveyed had loss of attachment in more than 40 per cent of the subjects with a peak at 70 per cent in the state of Madhya Pradesh. In 65-74 years, this number increased to 15 out of 18 states with the peak at 80 per cent in Madhya Pradesh.

c) *National Oral Health Survey – 2002 – 2003 Karnataka Oral Hygiene Practices Across Age Groups*

The practice of cleaning teeth was universal across age groups. More than 60 per cent in all ages except in the age group 65-74 years, across both sexes and more in urban areas reported the use of toothbrush to clean their teeth. About 87-94 per cent, across both sexes and more in rural areas cleaned their teeth once a day. In urban areas, more people reported cleaning teeth twice a day. About 56-64 per cent across ages except 65-74 years old, across both sexes and more in urban areas reported the use of the toothpaste. The Hills & Coastal Region had a higher proportion using toothpaste. About 42-48 per cent across all age groups, sexes and area of residence had changed toothbrushes once in 3 months. About two-thirds of the respondents, across all age groups, sexes and area of residence had rinsed their mouth either always or sometimes.

d) *Dental Problems and Treatment Aspects Across Age Groups*

13-27% of 15 year olds and below respondents and 43-49% in the age groups 35-44 and 65-74 years reported some oral health problems in the last one year. It was more in females and in urban area. More than 50% were aware of Government and private dental facilities and over 68% of the respondents in urban area required less than half an hour time to reach the facility.

e) *Awareness of Dental Health Problems Across Age Groups*

About 36 % across age groups and both sexes, more in urban areas were aware of oral health problems. The problems most reported were tooth decay and gum disease. About 30-45 percent more females than males & more in rural were aware of preventive measures.

f) *Tobacco Smoking and Chewing Habits Across Age Groups*

About 30-39 % more males and more in rural, across ages had the habit of smoking tobacco. More than two thirds of them, more males and more in rural areas reported smoking Bidis. About 18-39 per cent, across age groups, both sexes and places of residence reported chewing pan or pan masala with tobacco. Around 43 per cent of them in 35-44 year age group said that they were chewing for less than 5 years, while 44 per cent of chewers in 65-74 years age group had this habit for more than 10 years.

III. PERIODONTAL STATUS

a) *Bleeding, calculus and pockets*

The prevalence of periodontal disease was highest in 35-44 years age group (about 94.3 per cent) and lowest in 5 years (about 46.5 per cent). Calculus was more than bleeding in subjects aged 15 years and above. The prevalence was more in males. The pattern of periodontal disease was similar in urban and rural

areas although more disease was recorded in rural than urban areas. The mean number of teeth with bleeding (2.4) was highest in 12 years, calculus in 15 years (2.9) and shallow pockets (1.6) in 35-44 years while deep pockets (1.1) and excluded sextants (1.3) were high in 65-74 years age group. Kodagu District had a higher mean number of sextants with periodontal disease (5.1-5.3) while Bangalore District had about 2.5-2.6 in 35-44 year age group.

b) Loss of attachment

The prevalence proportion of subjects with loss of attachment in one or more sextant was lowest in the 15 years age-group (4.8 per cent); it was much higher in 35-44 years (33 per cent); and highest in the 65-74 years age-group (47.9 per cent) in the state. It was higher in males than in females across age groups. The pattern of loss of attachment was similar in urban and rural and all the regions where in the prevalence of disease in urban was higher than rural. The prevalence of disease was highest in Bangalore region (75.2 per cent) and lowest in Mysore region. The mean number of sextants with loss of attachment was expectedly highest in 65-74 years age group (1.3) and lowest in 15 years (0.2).

IV. CONCLUSION

Health problems are linked with the social, economic and cultural environment of society. In India, chronic inflammatory diseases are endemic. The prevalence of periodontal disease is world-wide. It is present from first decade of life to old age. Many local factors as well as systemic factors play their role in the etiology of periodontal diseases. Oral hygiene has been proved as one of the most important etiologic factor. All adults will at some point during their lifetime experience some deterioration of their periodontal structures. As more people retain their teeth throughout their lifetime, and as the proportion of older people increases more teeth will be at risk for periodontal disease. Periodontal disease accounts for over 50% of missing teeth in adults and results in tremendous economic and social burdens both to the individual and society. Prevention aspect of periodontics requires the active involvement of both dentist and patient. Early diagnosis and treatment are essential. The disease should be intercepted in the earliest stage possible to prevent irreversible damage.

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