A comparative assessment of periodontal status and treatment needs among population in Tumkur district using CPITN: An epidemiological study

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Abstract

Background: Evaluation of existing oral health services showed that it is predominantly urban oriented, mostly curative in nature and accessible mainly to small a part of population, i.e., privileged few. Periodontal diseases are more prevalent in a rural population than the urban population. The socio demographic profile is highly contrasting between the urban and rural population. It is essential to know whether these sociodemographic factors influence periodontal disease by comparing periodontal status of urban and rural population.

Objective: The objective of the study is to assess and compare the periodontal status and treatment needs of rural and urban population in Tumkur district.

Materials and Methods: A cross-sectional study based on the World Health Organization (WHO) guidelines. The sample consisted of 1500 subjects among which 750 subjects were selected from the rural population and 750 from urban population of Tumkur district. The data was collected by modified WHO oral health assessment form and clinical examination was conducted by using CPITN C probe.

Results: It was found that the urban population had better periodontal health than rural population and this relationship was statistically significant (P < 0.05).

Conclusion: India is a country with a population having diverse culture, life style and religious beliefs which might influence the health status of the individuals significantly. Hence, it is necessary to conduct such surveys in different parts of the country and develop a strategy to improve the periodontal status of the population as a whole.

Keywords: Community periodontal index of treatment needs, epidemiological study, prevalence of periodontal disease, urban and rural population of Tumkur district

Introduction

Health has been declared as a fundamental human right, which implies that the state has the responsibility for the health of its people. Oral health is an integral part of general health; rather oral cavity can rightly be called the gateway of the body.[1]

Paleopathological studies have indicated that diseases of the gums and loosening of teeth are as old as humanity, and it continues to be one of the most common diseases affecting the human dentition.

Epidemiology is one of the most important areas of public health. It is the study of health and disease in populations and of how these states are influenced by heredity, biology, physical environment, social environment and personal behavior.[2] Thus, the major contribution of epidemiological studies at this point, is to identify prior or current risk factors in the proportion of the population who have or do not have Periodontitis.[3]

Since periodontal disease is complex or multi factorial, between the urban and rural population, it differs depending upon the sociodemographic profile. Evaluation of existing oral health care services warrants following valid criticism that it is predominantly urban oriented, mostly curative in nature, and it is accessible mainly to small a part of the population that is privileged few.[4] In India, dentist to population ratio in
urban areas is 1:18000 as compared to 1:50000, in rural areas. Equitable distribution is the most important principle of primary health care (Alma Ata conference 1978) i.e. services should be accessible to all section of society.[6]

The socio demographic profile is highly contrasting between the urban and rural population. It is essential to know whether these sociodemographic profile factors influence periodontal disease by comparing periodontal status of urban and rural population. Extensive exploration of available literature revealed no base line data related to the prevalence of periodontal disease in the population of Tumkur district. Hence, an attempt is made here to assess and compare the periodontal status and treatment needs of the urban and rural population of Tumkur district.

Thus by conducting this study, it would help the planners and health administrators of the Tumkur district to evolve oral health educational programs, establishing priorities in oral health care as well as preventive and service oriented programs.

Materials and Methods

A cross-sectional study based on the World Health Organization (WHO) guidelines was carried out among 15-74 year olds in and around the Tumkur district, Karnataka state, India. The sample consisted of 1500 subjects among which 750 subjects were selected from the rural population and 750 from urban population of Tumkur district. The data was collected by modified WHO oral health assessment form and clinical examination was conducted to assess the prevalence of periodontal status and treatment needs by the methods recommended by the WHO oral health surveys by using CPITN C probe.

Statistical analysis

The results are presented as mean, standard deviations, numbers and percentages. Chi-square test was used for analyzing categorical data. Z-test was used to test the significance of the difference between 2 means/proportions. The level of statistical significance was set at P < 0.05. Statistical test was performed using SPSS (Version 16, SPSS Inc., Chicago, IL, USA).

Results

The population was divided into two groups based on the location i.e. Group I - Urban and Group II - Rural. Of 1500 subjects examined, 750 people belonged to urban areas i.e.

| Table 1: Distribution of study population according to periodontal status in urban and rural population |
|---------------------------------|----------|----------|----------|----------|----------|
| CPI scores                      | Urban    | Rural    | Total    | Z value  | P value  |
| 0 - Healthy                     | 24 (3.2) | 1 (0.10) | 25 (1.7) | 4.75     | <0.01**  |
| 1 - Bleeding                    | 247 (32.90) | 64 (8.50) | 311 (20.70) | 3.56     | <0.01**  |
| 2 - Calculus                    | 257 (34.30) | 181 (24.10) | 438 (29.20) | 0.90     | 0.37     |
| 3 - Pocket 4-5mm                | 88 (11.70) | 201 (26.80) | 289 (19.30) | 1.56     | 0.12     |
| 4 - Pocket 6 mm/more            | 134 (17.90) | 302 (40.30) | 436 (29.10) | 2.04     | <0.05**  |
| X-Excluded sextant              | -        | -        | -        | -        | -        |
| 9 - Not recorded                | -        | -        | -        | -        | -        |
| Total                           | 750 (100.00) | 750 (100.00) | 1500 (100.00) | -        | -        |

CPI: Community periodontal index, **: Statistically significant
Group I and 750 people belonged to rural areas i.e. Group II of Tumkur district.

**Urban**

In urban population (Group I) 3.2% had community periodontal index (CPI) code 0, 32.9% had code 1, 34.3% had code 2, 11.7% had code 3 and 17.9% had code 4 (Table 1 and Graph 1).

When treatment needs were assessed, 3.1% did not require any treatment, 32.9% required TN code 1, 37.2% required TN code 2 and 26.8% required code 3 (Table 1 and Graph 1).

**Rural**

In rural population (Group II), 0.1% had CPI code 0, 8.5% had code 1, 24.1% had code 2, 26.8% had code 3, 40.3% had code 4 (Table 1).

When treatment needs were assessed, 0.3% did not require any treatment, 8.7% required TN code 1, 36.8% required code 2, 54.3% required code 3 (Table 2).

When logistic regression analysis was applied to find out the relationship between location and periodontal status, it was seen that the urban population had better periodontal health than rural population and this relationship was statistically significant ($P < 0.05$).

**Discussion**

Oral health is an important aspect of overall health status of an individual. The health of teeth and their supporting (periodontal) structures are of utmost importance. Healthy periodontal tissues are characterized by the absence of inflammatory, atrophic, traumatic and oncogenic pathological changes. Diseases of periodontium are among the most widespread diseases of mankind. Chronic marginal gingivitis and periodontitis are, by far, the most prevalent periodontal pathologies with a microbial etiology. Periodontal disease is a generalized term for a range of pathological conditions affecting the supporting and investing structures of the teeth (WHO, 1978). Periodontium is widely affected by dental plaque - a diverse microbial community found on the tooth surface, embedded in a matrix of polymers of bacterial and salivary origin. If not removed regularly, plaque gels mineralize to form calculus, which in turn initiates the inflammatory process of periodontal diseases. The consensus is that local microbial factors can modify the onset and progression of the condition. Later other supporting structures become involved so that pockets form around teeth, and there is a loss of attachment. This ultimately results in tooth mobility and tooth loss.

**Role of risk factors**

Based on epidemiological data gathered from many countries during 1960s and 1970s, periodontitis was thought to begin early in life and to increase in prevalence almost linearly until middle age at which time it was considered to have affected virtually almost 100% of the adult population. Under these circumstances, every adult was thought to be at risk of periodontal disease.

According to the present concept, progression of the disease from gingivitis to periodontitis occurs in cases who are exposed to risk factors. Therefore, risk assessment has become very important from the point of view of prevention and control of periodontal disease.

Identification of risk factors can be of enormous importance in many aspects of prevention and management of periodontal disease in the whole population. Consequently, investigators began conducting epidemiological studies seeking association between presence and severity of periodontitis and risk factors. Suspected risk factors can be taken into account are smoking and tobacco use, aging, poor oral hygiene, frequency of dental visits and systemic diseases like diabetes mellitus, etc.

**Smoking and tobacco use**

A wealth of data has been presented demonstrating of all the risk factors identified, smoking may be the environmental risk strongly associated with periodontitis. Earlier investigators attributed greater periodontal involvement in smokers mainly due to their poor oral hygiene as a result of their stress related habits.

**Age**

Although numerous cross-sectional studies indicate that the prevalence and severity of Periodontitis increase with age, the current opinion is that aging does not cause Periodontitis. The greater prevalence and severity of periodontitis among older people in different studies, results were from the cumulative effects of the disease over time rather than a greater susceptibility of older people.

**Low socioeconomic and educational status**

Periodontal disease is more severe in individuals with lower socioeconomic status and poorer education. However, when periodontal status is adjusted for oral hygiene and smoking, the associations between lower socioeconomic and education status and severe periodontal disease are not seen.

**Infrequent dental visits**

Many investigators have reported that failure to visit the dentists for a period of 3 years or more enhances risks for severe

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**Table 2**: Distribution of study population according to treatment needs in urban and rural population

| Treatment needs | N (%) | X² | P value |
|-----------------|-------|----|---------|
| Urban           |       |    |         |
| 0               | 23 (3.10) | 17.94 | <0.001 HS |
| 1               | 247 (32.90) | 134.10 | <0.001 HS |
| 2               | 279 (37.20) | 0.03 | 0.87 NS |
| 3               | 201 (26.80) | 117.30 | <0.001 HS |
| Total           | 727 (96.90) | 3.83 | <0.001 HS |
| Rural           |       |    |         |
| 0               | 2 (0.30) |    |         |
| 1               | 65 (8.70) |    |         |
| 2               | 312 (20.80) |    |         |
| 3               | 608 (40.50) |    |         |
| Total           | 748 (99.70) |    |         |

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periodontitis. Longitudinal data are available that with this there will be an increase in periodontitis.

**Poor oral hygiene**

Some authors have found a strong association of microbial deposits and poor oral hygiene with periodontitis. It was concluded that, even though, the materials used for tooth cleaning are well designed improper brushing method can result in poor oral hygiene which can be a risk factor for periodontitis.[10]

In the present study 1500 subjects were selected randomly among which 750 subjects from rural and 750 subjects from the urban areas were examined. In this study 15-24, 25-34, 35-44, 45-54, 55-64 and 65-74 years of age groups were examined, and examination was carried out according to WHO guidelines for surveying.

The present descriptive cross-sectional epidemiological study was aimed to assess and compare the periodontal status and treatment needs among urban and rural population of Tumkur population using CPITN. It showed that, rural population had poorer periodontal health because greater numbers of them were exposed to certain risk factors as compared to urban population. About 34.4% of the rural population belonged to illiterate group. Hence, they were not aware of the need for maintaining good periodontal health. 24.9% of people living in rural areas used indigenous methods of tooth cleaning such as chewing stick and fingers etc. 11.7% of people living in rural areas used salt, charcoal/sand/tobacco to clean their teeth. 29% of the people living in urban areas were smokers. All these factors must have contributed to the deterioration of periodontal health in rural compared to urban population. The results of present study were in accordance with the studies were done by D’silva and Zaveri[8] Bergström and Eliasson,[9] Singh et al.,[10] Maity et al.[11]

It was found that periodontal status was poor, and there is a need for more complex treatment in rural areas. So more attention should be given to motivate the rural people in maintaining good periodontal health. The subjects should be educated about the proper techniques of tooth cleaning. Adequate treatment facilities should also be provided to the rural population. They should be motivated to abstain from deleterious habits like smoking, paan chewing etc., which are injurious to the periodontium. The effort should also be made so that individual should recognize their own dental needs (felt needs) and translate them into demand for service.

**Conclusion**

India is a country with a population having diverse culture, lifestyle and religious beliefs which might influence the health status of the individuals significantly. Hence, it is necessary to conduct such surveys in different parts of the country and develop a strategy to improve the periodontal status of the population as a whole.

**Scope of future**

- Recruitment, training and distribution of oral health personnel to areas where the need is greatest (rural areas) and provision of adequate basic equipment and materials.
- Involvement of grampanchayat, zillapanchayat, national and international voluntary organizations in promoting oral health awareness camps through primary health centers.
- Information on oral health should be included in school text books.
- Treatment facilities should be made affordable for economically backward classes.
- Sales tax and excise duty should be exempted on requirements and materials for dentists setting up private practice in rural areas.
- Mobile dental unit with a dentist and dental auxiliary should be provided to community health centers so that they can render service in rural areas on a fixed schedule.

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