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Prevalence of periodontal diseases among general adult population in Tamil Nadu, India: A Cross-Sectional Fact-Finding study

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Abstract

The study aims to evaluate the prevalence of Periodontal diseases in the general population of Tamil Nadu, India. A total of 368 samples were collected for Periodontal diseases in Tamil Nadu, India using a multistage random sampling technique. A Cross–sectional study was conducted among the general population in a given number of samples to find out the prevalence of Periodontal diseases in the index age group of 35-44 years using the WHO Oral Health Assessment form, 2013. The statistical test used was the Chi-square test using SPSS Software Version 20. p-value < 0.05 was considered statistically significant. The collective prevalence of Periodontal diseases in Tamil Nadu state was 47.7%. The prevalence of Periodontitis among males was 46.8 % and females were 48.5 % respectively in Tamil Nadu. The prevalence of periodontitis among the 35 – 44 years age group in Tamil Nadu was 47.7%. Addressing the prevalence of Periodontal diseases in Tamil Nadu necessitates a multi-faceted approach encompassing preventive, educational, and policy interventions. It is essential to conduct public health programs that promote oral hygiene, raise awareness of the dangers of tobacco use, and support routine screening for early diagnosis. Collaborative efforts involving government agencies, healthcare providers, non-governmental organizations, and community leaders are essential for implementing effective tobacco control policies, ensuring access to affordable healthcare services, and fostering a supportive environment for behavior change.

Keywords: Periodontal diseases Tamilnadu, public health programs, tobacco, Oral Health Assessment

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1. Introduction

Periodontal disease which is comprised of gingivitis and Periodontal diseases is a common oral infection that affects the tissues that surrounds and supports the teeth. The condition often presents as gingivitis which is characterized by bleeding, swollen gums, and pain, and if left untreated, it progresses to Periodontal diseases which involve the loss of periodontal attachment and supporting bone. According to the Global Burden of Disease Study (2016), severe periodontal disease was the 11th most prevalent condition globally [1]. The prevalence of periodontal disease was reported to range from 20% to 50% around the world. It is one of the major causes of tooth loss which can compromise mastication, esthetics, self-confidence, and quality of life. Globally, periodontal diseases accounted for 3.5 million years lived with disability (YLD) in 2016 [2]. During the period from 1990 to 2010, there was a 57.3% increase in the global burden of periodontal disease. In 2010, worldwide loss of productivity due to severe Periodontal diseases was estimated

to be US$54 billion per year [3]. The global prevalence of periodontal disease is expected to increase in the coming years due to growth in the aging population and increased retention of natural teeth due to a significant reduction in tooth loss in the older population.

Chronic Periodontal diseases is more common in the adult population but can also occur in younger patients. The prevalence and incidence statistics of periodontal diseases vary because of bias, misclassification of stages of cases, the number of teeth and the sites examined [4]. It is estimated that approximately 14% of the world's adult population suffers from severe periodontal disease, with more than 1 billion cases reported worldwide. As far as periodontal disease is concerned, frequent professional care and good home care are the best preventive measure before the disease develops [5]. The National Oral Health Survey of India (2002-2003), provides a comprehensive national data on periodontal disease prevalence. However, In India monitoring of these diseases were not done in a periodic basis. Proper prevalence data helps the government to take appropriate preventive measures to overcome this problem. There are many studies which estimated the prevalence of periodontal disease in relation to particular district, city, town or institutions of Tamil Nadu. However, there is no recent data available for the prevalence of Periodontal diseases in Tamil Nadu as a whole. With this background, the current study was designed to collect the representative data of Tamil Nadu on prevalence of Periodontal diseases among the adult population in Tamil Nadu.

2. Materials and Methods

A total of 368 samples were collected for Periodontal diseases in Tamil Nadu, India using a multistage random sampling technique. A Cross–sectional study was conducted among the general population in a given number of samples to find out the prevalence of Periodontal diseases in the index age group of 35-44 years using WHO oral Health assessment form, 2013. The oral health status of the patient was assessed using the WHO Oral Health Assessment Form 2013 for adults by door-to-door survey method. Mouth mirror and CPITN Probe were used for screening. Individuals who gave informed consent and those who fall under index age groups. Demographic data and CPI were collected from WHO Performa 2013.

2.1 Sample size calculation

Sample size calculation for prevalence rate in a large population was done by the formula

$$n = \frac{Z2 * P(1-P)}{d2}$$

where n= Sample Size,

Z = Confidence Interval value which is the constant value of 1.96,

P = Prevalence Rate (51% for Periodontal diseases) and

d = Margin of Error (10%).

On calculating the sample size using this formula provides the total number of samples for Periodontal diseases is 368. Samples were collected from the entire population of Tamil Nadu. In Tamil Nadu there are 4 zones, in each zone two districts were selected, which were further divided into urban and rural areas in each district. Finally, the samples were collected from both males and females in each urban and rural area of 8 districts of Tamilnadu.

2.2 Statistical analysis:

Descriptive data for qualitative variables are expressed in frequency and percentage. Continuous data is expressed in mean and standard deviation. A chi-square test is used for statistical analysis. P-value < 0.05 is considered to be statistically significant.

3. DISCUSSION:

Periodontal disease is a specific disease, but it has a significant negative impact on individual life. According to the Global Burden of Disease Study (2016), severe periodontal disease was the 11th most prevalent condition in the world.[3] The prevalence of periodontal disease was reported to range from 20% to 50% around the world. It is one of the major causes of tooth loss which can compromise mastication, esthetics, self-confidence, and quality of life. Globally, periodontal diseases accounted for 3.5 million years lived with disability (YLD) in 2016[6]. Therefore, early detection of Periodontal diseases can lead to improved quality of life. The 2002 National Oral Health Survey was conducted on the prevalence of Periodontal diseases in India which results 89.1 % prevalence rate.[7] Though many studies involving prevalence of Periodontal diseases in Tamil Nadu deal with any systemic diseases, only a few studies reported the prevalence of Periodontal diseases in a particular district or area. Thus, the data on the prevalence of Periodontal diseases in Tamil Nadu is unprocurable. The present study bridges the gap in the existing literature and opens a new avenue with adequate data on the prevalence rate of Periodontal diseases.

The current study states that the prevalence of Periodontal diseases in Tamil Nadu, India, was found to be 47.7%. The obtained prevalence rate of Periodontal diseases is similar to the prevalence of Periodontal diseases in India witnessed by Gopalakrishnan et al. in 2021.[8] This higher prevalence may be due to various etiological factors like smoking, Systemic conditions, cardiovascular disease, drug-induced disorders, pregnancy, stress, obesity, and poor oral hygiene [9]. The current study revealed that the prevalence of Periodontal diseases was high among the Kanyakumari district population with a rate of 88.2% followed by Erode and Trichy districts with 57.4 % and 50% respectively which is in accordance with Malakar M et al, where there was a significant variation in the prevalence of Periodontal diseases across districts, with an overall rate of 55%. [10] Another study by Mohan R et al, done in five coastal districts of Tamil Nadu shows a higher prevalence rate when compared to the current which is of 62% prevalence rate for Periodontal diseases. Higher rates were found in areas where tobacco consumption was high, suggesting a possible link between lifestyle factors and periodontal health [11], and also Districts that have lower socioeconomic indicators, have higher prevalence rates. Gender disparities in periodontal health have been observed globally, with varying prevalence rates between males and females. In Tamil Nadu, studies have indicated differences in the prevalence of Periodontal diseases based on gender.

Table 1: Overall prevalence of periodontal diseases in tamilnadu

	STATUS	N (%)	TOTAL
PERIODONTAL DISEASES	**PRESENT**	176 (47.7)	369
	ABSENT	193 (52.3)	

Table 1 shows the overall prevalence of Periodontal diseases in Tamil Nadu was about 176 (47.7%) among four zones.

Table 2: Overall prevalence of periodontal diseases among the index age groups in Tamilnadu

INDEX AGE GROUP	STATUS	N (%)	P-VALUE
35-44 YRS	**PRESENT**	176 (47.7)	0.001*
	ABSENT	193 (52.3)	

P-value < 0.05 is significant Table 2 shows Periodontal disease prevalence rate in the 35-44 years index age group was 176(47.7%)

Table 3: Overall prevalence of periodontal diseases in tamilnadu based on gender distribution

GENDER	STATUS	N (%)	P-VALUE
MALE	**PRESENT**	80 (46.8)	0.041*
	ABSENT	91 (53.2)	
FEMALE	**PRESENT**	96 (48.50)	
	ABSENT	102 (51.5)	

P-value < 0.05 is significant

Table 3 shows the prevalence of Periodontal diseases among males and females was 80 (46.8%) and 96 (48.5%) respectively.

Table 4: Overall prevalence of periodontal diseases in Tamilnadu based on location

LOCATION	STATUS	N (%)	P-VALUE
URBAN	**PRESENT**	88 (48.1)	0.881
	ABSENT	95 (51.9)	
RURAL	**PRESENT**	86 (47.3)	
	ABSENT	98 (52.7)	

P-value<0.05 is significant, it shows among urban and rural populations the prevalence rate in urban with 88 (48.1%) followed by 86(47.3%)

Table 5: Prevalence of periodontal diseases in each zone based on district wise

ZONES	DISTRICTS	STATUS	N (%)	P-VALUE
NORTH	**CHENNAI**	**PRESENT**	29 (56.8)	0.835
		ABSENT	51 (43.13)	
	KALLAKURUCHI	**PRESENT**	10 (52.5)	
		ABSENT	5 (47.5)	
SOUTH	**KANYAKUMARI**	**PRESENT**	30 (88.2)	0.053
		ABSENT	4 (11.8)	
	THIRUNELVELI	**PRESENT**	23 (28.8)	
		ABSENT	35 (71.2)	
WEST	**ERODE**	**PRESENT**	31 (57.4)	0.001*
		ABSENT	23 (42.6)	
	NAMAKKAL	**PRESENT**	15 (36.6)	
		ABSENT	26 (63.4)	
DELTA	**TRICHY**	**PRESENT**	25 (50)	0.764
		ABSENT	25 (50)	
	THANJAVUR	**PRESENT**	15 (35.7)	
		ABSENT	27 (64.3)	

P-value < 0.05 is significant

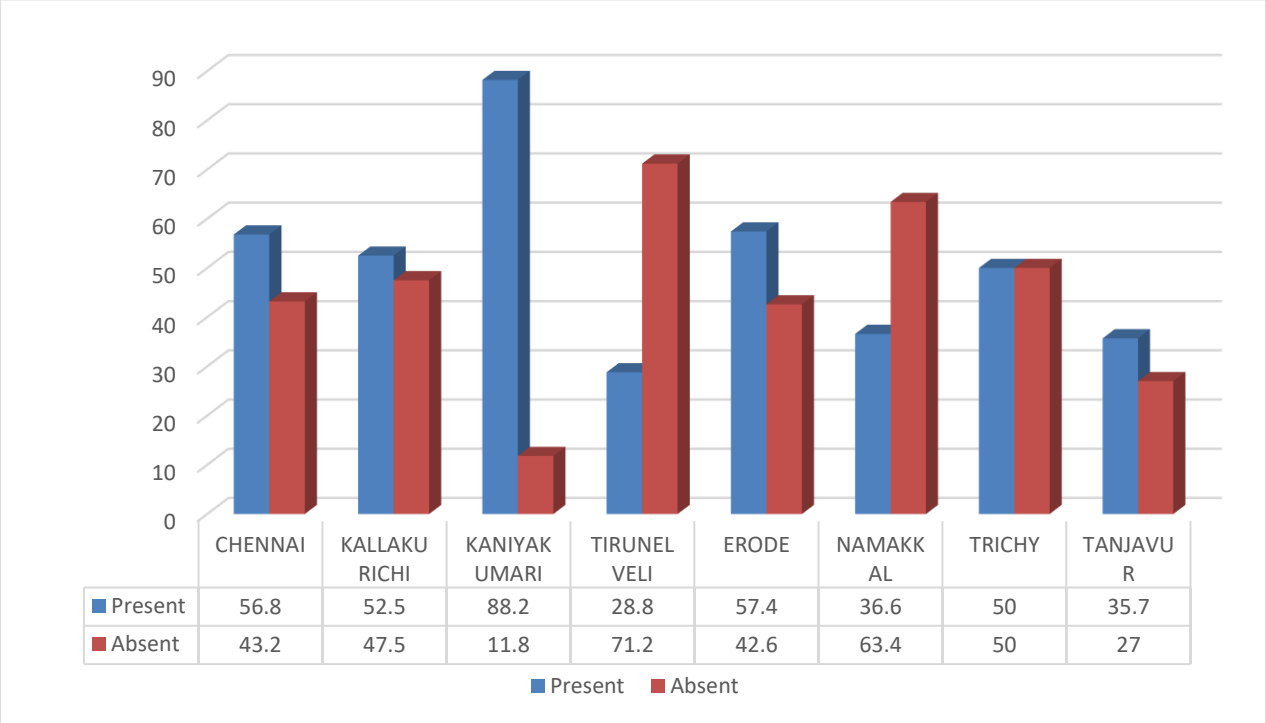

Table 6 and Figure 1 show prevalence of Periodontal diseases was highest in Kanyakumari at 88.2% followed by Erode at 57.4%.

The Periodontal disease prevalence rate is higher in females (48.5%) and slightly lower in males (46.8%). The findings of Keerthiga S et al. [12] support the fact in the current study that females had a higher prevalence of Periodontal diseases. In contrast, Balaji et al higher prevalence of Periodontal diseases among males (50%) compared to females (40%) [13]. Also Aurlene et al show a higher prevalence of advanced Periodontal diseases of 70% among males compared to females at 60%.[14] This variation is possibly due to hormonal imbalance among females and more exposure to pernicious habits among males. These findings underscore the importance of gender-specific oral health interventions tailored to address the unique needs of males and females. The prevalence of Periodontal diseases is higher in rural areas (48.1%) than in urban areas (47.3%) which was similar in Kumar V et al where higher prevalence of Periodontal diseases is in rural areas (68.5%) than urban areas (49.2%).[15] This higher prevalence in rural populations may be due to low socioeconomic conditions, limited access to dental care, and poor oral health practices. In contrasts to the current study by Nath S et al. 2013 [16] and Baiju RM et al. in 2021[17], who encountered a higher prevalence of Periodontal diseases in urban areas. This might be due to improper diet and sedentary lifestyle followed in urban areas. The Periodontal diseases prevalence rate in the state of Tamil Nadu (among different zones) varies between 30%- 34.6%. According to Vinoth Kumar et al [18] Periodontal diseases is more prevalent in South India than in other parts of India. Various factors contribute to the higher prevalence of Periodontal diseases, like genetic predilection in that region, environmental conditions, and even dietary habits to a particular extent. Thus, the current study addresses the need for awareness of prompt and timely utilization of oral health care.

Enforcing policies that discourage tobacco use can drastically reduce the prevalence among the male population. Strong implementation of laws for tobacco usage and sales should be monitored periodically. The availability of more affordable public health dental services can ensure that people receive timely preventive care and treatment, especially in these vulnerable populations, and can aid in easy referral to TCC. Educating people about the value of good oral hygiene, the necessity of routine dental exams, and the potential risks of oral diseases can encourage them to take preventative measures against the disease. Engaging communities through outreach programs, mobile dental clinics, and community health workers can help to reach vulnerable populations and provide them with the necessary information and resources.

4. Conclusions

The study reveals a high prevalence of Periodontal diseases in the state of Tamil Nadu. The present study reports the epidemiological data on Periodontal diseases for overall Tamil Nadu which are unavailable. Periodontal diseases are a widespread public health concern among different oral diseases, which leads to various further complications. Timely diagnosis and prompt treatments are indispensable. A compulsory preventive screening and treatment program with regular follow-up is strongly recommended, and monitored by a public health dentist appointed in that area's community health center. In every district's public health department and the community health center, an oral epidemiologist that is a public health dentist should be appointed (the same can be followed with the state and central government) to record the fluctuating trends of Periodontal diseases, it will be very helpful in formulating futuristic preventive and treatment strategies like implementing incremental oral health care

program in all states of Tamil Nadu was the role of public health dentist is vital in organizing periodic dental treatment schedule and render prompt preventive treatments and follow- up by a team of dentists under his supervision to prevent Periodontal diseases at its incipient stage which ultimately leads to a strengthened oral health policy in India.

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