

Original Research

Prevalence of oral cancer among general adult population in Tamil Nadu, India: A cross-sectional study

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ABSTRACT:

Aim: The study aims to evaluate the prevalence of oral cancer in the general population of Tamil Nadu, India. **Materials and Methodology:** A total of 1321 samples were collected in Tamil Nadu, India, using a multistage random sampling technique. This cross-sectional study targeted the general population within specific age groups: 35-44 years and 65-74 years for oral cancer employing WHO Oral Health Assessment Form 2013. The statistical test used was Chi-square test using SPSS Software Version 20. p-value < 0.05 was considered statistically significant. **Results:** The collective prevalence of Oral cancer in Tamilnadu state was 3.6%. The prevalence of oral cancer among males were 8.7 % and females were 6.9 % respectively in Tamilnadu. The prevalence of oral cancer among 35 – 44 years and 65 – 74 years age group in Tamilnadu were 9.3% and 6.7% respectively. **Conclusion:** Addressing the prevalence of oral cancer and periodontitis 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.

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INTRODUCTION

Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, periodontal (gum) disease, tooth loss, oral cancer, orodental trauma, and malocclusion. Among them, Periodontal diseases and oral cancer are two major problems in the world, especially in developing countries such as India.[1]

Cancer is one of the common causes of mortality for people. Any malignant tumor that develops on the tongue, floor of the mouth, cheek lining, gingiva, palate, or lip is considered to be oral cancer. The most common forms of cancer found in India are breast cancer, cervical cancer, and oral cancer. The most frequent risk factors for oral cancer are severe drunkenness, tobacco use, including smoking and smokeless tobacco, chewing betel nut, and the human

papillomavirus (HPV). Poor dental hygiene and poor diet can both contribute to oral cancer.[2]

In many low- and middle-income countries, including India, large segments of the population do not have access to well-organized and well-regulated cancer care systems. Although there have been no major advances in the treatment of oral cancer in recent years, current treatments have improved the quality of life for oral cancer patients.[3]

The global incidence of cancers of the lip and oral cavity is estimated at 4 cases per 100,000 people. [4] South and Southeast Asian nations, including India, have the highest rates of oral cancer. About 90% to 95% of oral malignancies in India are squamous cell carcinomas. In India, the incidence of cancer is expected to rise from 1 million in 2012 to more than 1.7 million in 2035, according to the Worldwide Agency for Cancer Research. This suggests that throughout the same period, the death rate from

cancer will likewise rise from 680000 to 1- 2 million.[5]

MATERIALS AND METHOD

A total of 1321 samples were collected for Oral cancer 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 Oral cancer in the index age group of 35-44 years and 65-74 years for Oral Cancer 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, i.e. for oral cancer were included in the study. Demographic data and oral mucosal Lesions were collected from WHO Performa 2013.

SAMPLE SIZE CALCULATION

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

$$n = \frac{Z^2 * P(1-P)}{d^2}$$

where n= Sample Size,

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

P = Prevalence Rate (25% for oral cancer) and

d = Margin of Error (10%).

On calculating the sample size using this formula provides the total number of samples for oral cancer is 1321.

According to WHO Performa 2013, we have chosen the index age group of 35 - 44yrs and 65-74yrs. 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.

Statistical analysis

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

RESULTS

TABLE 1: OVERALL PREVALENCE OF ORAL CANCER IN TAMILNADU

	STATUS	N (%)	TOTAL
ORAL CANCER	PRESENT	47 (3.55)	1321
	ABSENT	1274 (96.45)	

Table 1 shows the overall prevalence of oral cancer in Tamilnadu was about 47 (3.55%) among four zones.

TABLE 2: OVERALL PREVALENCE OF ORAL CANCER AMONG THE INDEX AGE GROUPS IN TAMILNADU

INDEX AGE GROUP	STATUS	N (%)	P-VALUE
35-44 YEARS	PRESENT	59 (9.3)	0.077
	ABSENT	574 (90.7)	
65-74YEARS	PRESENT	46 (6.7)	
	ABSENT	642 (93.3)	

P-value<0.05 is significant

Table 2 shows oral cancer prevalence rate in the 35-44 years index age group was 59(9.3%) and in the 65-74 years was 46 (6.7%).

TABLE 3: OVERALL PREVALENCE OF ORAL CANCER IN TAMILNADU BASED ON GENDER DISTRIBUTION

GENDER	STATUS	N (%)	P-VALUE
MALE	PRESENT	67 (8.7)	0.251
	ABSENT	706 (91.3)	
FEMALE	PRESENT	38 (6.9)	
	ABSENT	510 (93.1)	

P-value<0.05 is significant

Table 3 shows the prevalence of oral cancer among males and females was 67 (8.7%) and 38(6.9%) respectively.

TABLE 4: OVERALL PREVALENCE OF ORAL CANCER IN TAMILNADU BASED ON LOCATION

LOCATION	STATUS	N (%)	P-VALUE
URBAN	PRESENT	48 (8.2)	0.746
	ABSENT	536 (91.8)	

RURAL	PRESENT	57 (7.7)
	ABSENT	680 (92.3)

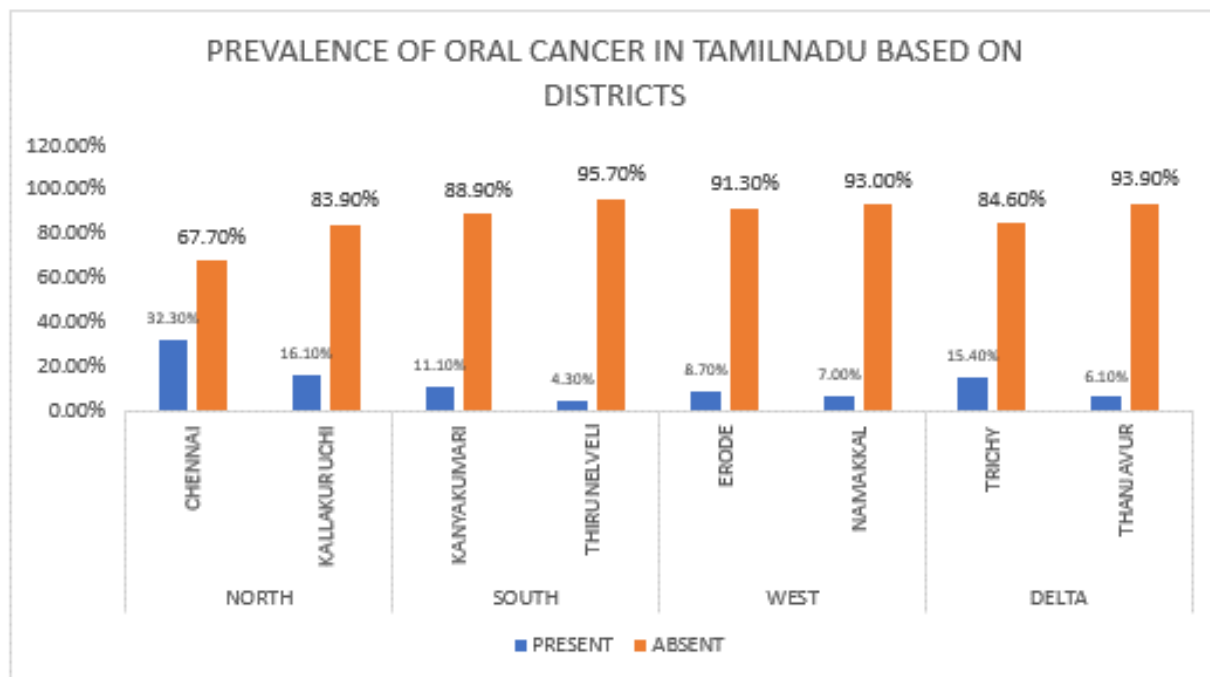
P-value<0.05 is significant

Table 4 shows among urban and rural populations the prevalence rate was higher in urban with 48 (8.2%) followed by 57(7.7%)

TABLE 4: PREVALENCE OF ORAL CANCER IN EACH ZONE BASED ON DISTRICTS

ZONES	DISTRICTS	STATUS	N(%)	P-VALUE
NORTH	CHENNAI	PRESENT	11(32.3)	0.255
		ABSENT	233(67.7)	
	KALLAKURUCHI	PRESENT	9(16.1)	
		ABSENT	47(83.9)	
SOUTH	KANYAKUMARI	PRESENT	14 (11.1)	0.657
		ABSENT	112(88.9)	
	THIRUNELVELI	PRESENT	9 (4.3)	
		ABSENT	199(95.7)	
WEST	ERODE	PRESENT	16(8.7)	0.278
		ABSENT	168(91.3)	
	NAMAKKAL	PRESENT	10 (7.0)	
		ABSENT	132(93.0)	
DELTA	TRICHY	PRESENT	28(15.4)	0.188
		ABSENT	153(84.6)	
	THANJAVUR	PRESENT	11(6.1)	
		ABSENT	169(93.9)	

p-value<0.05 is significant



Graph 1: Barchart representing the Prevalence of Oral Cancer in Tamil Nadu based on Districts

DISCUSSION

In India, 20 per 100000 population are affected by oral cancer which accounts for about 30% of all types of cancer. Over 5 people in India die every hour every day because of oral cancer and the same number of people die from cancer in the oropharynx and hypopharynx.[6] CANCER registration is not compulsory in India, so the true incidence and

mortality may be higher, as many cases are unrecorded and lose follow-up. In India, the prevalence of oral cavity cancers is still one of the highest in the world because tobacco products are easily available and the lack of awareness in the community.[7] Though the NCRP report covers various parts of the country, they do not sufficiently represent various regions. Despite this drawback, we

have presented the Zone-wise data of Tamil Nadu (North, South, West, Delta). A compiled summary of such updated recent, detailed statistics on all cancers of the oral cavity and other associated sites would serve as a ready reference for researchers and clinicians who are interested in knowing about the oral cancer load in the country.[8]

The present article revealed that the prevalence of Oral cancer was high among the Chennai district with a rate of 32.3% followed by the Kallakuruchi district population with a rate of 16.1%. According to the current study, 3.6% of Tamil Nadu's population has oral cancer. The results of the other study showed variations in the incidence and prevalence of oral cancer in various districts of Tamil Nadu. Districts with high tobacco consumption rates and poor oral hygiene practices tend to have a higher prevalence of oral cancer compared to others. Coastal districts such as Kanyakumari and Thoothukudi have been reported to have particularly high rates of oral cancer, possibly due to the prevalence of smokeless tobacco use among the fishing communities residing in these areas.[9] A study conducted in the Chennai district by Rajendran et al. indicated that alcohol intake and tobacco smoking were the main risk factors for oral cancer, which had a prevalence of 14.5 per 100,000 people.[10] Another study by Kumar et al. reported a higher prevalence rate of 18.2 per 100,000 population, highlighting the role of consumption of tobacco products in contributing to oral cancer incidence.[11] In Coimbatore district, a study conducted by Sundaram et al. documented a prevalence rate of 12.8 per 100,000 population. This study emphasized the impact of environmental factors such as industrial pollution alongside tobacco use on oral cancer prevalence.[12] Manoharan et al.'s study found that chewing betel quid was the main risk factor, with a prevalence rate of 9.6 per 100,000 people. Madurai district exhibited a relatively lower prevalence rate compared to Chennai and Coimbatore. [13]

The present study implies that the prevalence of oral cancer among the index age group of 35 – 44 years has the highest rate of 9.3% and in 65 – 74 years with 6.7%. Tobacco and alcohol consumption remain primary risk factors for the disease, other factors such as dietary habits, genetic predisposition, and environmental exposures also contribute to its prevalence. Additionally, disparities in healthcare access and awareness further exacerbate the burden of oral cancer in certain districts. In contrast, a study conducted by Kuppaswamy S et al. reported that in Chennai the oral cancer prevalence rate was 12.3%, whereas in Kanyakumari, it was 8.7%. Furthermore, age-specific prevalence rates revealed that individuals above the age of 45 years accounted for the majority of cases in both districts.[14] In addition, Deepthi P et al. also imply that the individuals in the age group of 45-60 years constituted the highest proportion of oral cancer cases in Thoothukodi, accounting for 55% of all reported cases. This age group was followed by

individuals above 60 years, comprising 30% of the cases.[15] It is a known fact that Oral cancer is widespread among the elderly. However, the pattern visualized varies in the present article. The rates obtained were 9.3% in 35-44 years and 6.7% in 65-74 years in Tamilnadu, where the younger age group affected the most. Based on earlier research, individuals between the ages of 41 and 50 were the most frequently impacted by Oral Cancer. [16] The increased frequency of oral cancer in younger age groups has typically been linked to long-term, indiscriminate substance use, mostly tobacco products, which causes genetic harm.

The present study implies that Prevalence of Mucosal lesion is seen higher among Males with 8.7%, whereas in females with a lower prevalence of 6.9%. Male tobacco usage has been higher in India than female, according to the Global Adult Tobacco Survey (GATS). Many etiological variables contribute to the high incidence of oral cancer in the northern zone of Tamil Nadu. Among all the usage of tobacco is the most significant. Male usage of tobacco products was found to be most prevalent in India, according to the 2009–2010, GATS. The results of our study were in accordance with the previous study.[17]

Tamil Nadu has consistently exhibited a high burden of oral cancer, contributing significantly to the overall cancer incidence in the state. The alarming prevalence of Oral cancer among men and women of various age groups has been brought into focus by numerous studies. Major factors that have been identified as contributing to the high incidence of oral cancer in the region include alcohol intake, chewing betel quid, smoking, and poor oral hygiene.[18] Moreover, the habit of smokeless tobacco consumption, including gutka and paan, is deeply ingrained in the socio-cultural fabric of Tamil Nadu, further exacerbating the prevalence of oral cancer. Socio-cultural Determinants: The socio-cultural context of Tamil Nadu plays a crucial role in shaping the prevalence of oral cancer. Deep-rooted cultural practices, such as offering betel leaves and areca nuts during social gatherings and religious ceremonies, perpetuate the habit of chewing tobacco and betel quid among individuals of all ages.[19] Furthermore, the lack of awareness about the health hazards associated with tobacco consumption and the normalization of such practices within communities contribute to the sustained prevalence of oral cancer.[20] Despite efforts to increase awareness and improve healthcare infrastructure, Tamil Nadu continues to face significant challenges in effectively addressing the burden of oral cancer. Inadequate availability of high-quality healthcare services, particularly in remote regions, restricts early identification and prompt intervention. Additionally, socio-economic disparities and inadequate funding for cancer prevention and control programs pose significant obstacles to mitigating the prevalence of oral cancer in the region.

Oral cancer will remain a major health problem and the incidence will increase by 2020 and 2030 in both sexes, however, early detection and prevention will reduce this burden.[21]Patients unfortunately continue to present with late-stage disease. An oral screening examination is a simple non-invasive test to apply, has a comparable sensitivity and specificity to that of the well-established cervical and breast cancer screening programs, and is felt to probably be cost effective when applied to high-risk individuals. In the absence of any formal screening program being introduced, dentists can best serve these high-risk patients by performing regular opportunistic oral examination and educating these patients to increase their awareness of the early signs and symptoms of oral cancer. Early detection has better curing rates and it will also reduce the cost for the treatment. If a suspicious lesion found Immediate referral or further investigation and subsequent treatment is advised. Oral cancer can be prevented by action against risk factors, especially tobacco which is the key factor.

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