Association of Demographic Details with the Onset of Precancerous Lesions in Bengaluru Population

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ABSTRACT

Oral cancer is among the top three types of cancers in India. In India, 90 -95% of the oral cancers is squamous cell carcinoma. The mortality due to oral cancer is increasing in a high rate in India. There are many contributing factors which increase the incidence of oral pre-cancer and cancer. Therefore, this study analyzed the correlation between various demographic characters with the onset of oral lesions (leukoplakia). In the present study, total of 80 subjects with oral leukoplakia were included from Indian Cancer Society organized camps in different region of Bangalore city. The respondent was personally interviewed and collected the data. The demographic data includes education, alcohol addiction, tobacco intake, sexual activity etc. Interestingly, the result obtained after statistically test found positive correlation between demographic details and oral leukoplakia. Socioeconomic status, brushing number, alcohol, tobacco, poor oral hygiene ($p < 0.01$) emerge out as a major contributing risk factors for the pathogenesis of oral lesions.The demographic characteristics of Bangalore population concurred with oral pre-cancer (leukoplakia) were found to be smokeless tobacco, alcohol, poor hygiene, and caffeinated drinks. Hence, awareness among the population about the resulted contributing factors would help to reduce the occurrence of oral carcinogenesis.

KEYWORDS: leukoplakia, demographic, oral carcinogenesis

1. INTRODUCTION

Oral cancer is among the top three types of cancers in India *(Coelho et al., 2012).* In India, 90 -95% of the oral cancers is squamous cell carcinoma *(Singh et al., 2016).* The international agency for research on cancer has predicted that India's incidence of cancer will increase from 1 million in 2012 to more than 1.7 million in 2035. This indicates that the death rate because of cancer will also increase from 680000 to 1-2 million in the same period (WHO, 2016). In 2012 the incidence of oral cancer in India is 53842 in males and 23161 in females *(Varshitha et al., 2015).*

In India, men are two to four times more affected than women due to the changes in thebehavioral and lifestyle patterns *(Rao et al., 2012).* However, high incidence rates are seen amongstthe sub populations of women in southern India because of tobacco chewing (Pemberton et al, 2018). Cancer in the tongue is the most common type of cancer and the common site is buccal mucosa and gingiva *(Montero et al., 2013).*

A case control study from India demonstrates that oral cancer is interrelated with low income. Low social economic class is interrelated with factors like nutrition, health care, living condition and risk behaviors which contribute to the development of oral cancer. Oral cancer affects the people from the lower socioeconomic status of society and people in rural area due toa higher exposure to risk factors such as the use of tobacco.

The use of smokeless tobacco (pan parag, zarda etc.) is on rise in north India and especiallyin states like Uttar Pradesh *(Niaz et al., 2017).* The impact of tobacco intake habit leads to highincidence of oral cancer in this region.Tobacco instigates cancer of the lung, oral cavity, nasal cavity, larynx, oropharynx,hypopharynx, esophagus, stomach, liver, bladder, ureter, kidney, cervix, and myeloid leukemia *(Moura et al., 2014).* Estimates indicate 57% of men and 11% of women between 15- 49 years of age use some form of tobacco *(Kulkarni et al., 2015).* The different forms of tobacco include smokeless tobacco, use of betel liquid, pan (pieces of Areca nut), processed or unprocessed tobacco, aqueous calcium hydroxide (slaked lime) and some pieces of areca nut wrapped in the leaf of piper betel vine leaf. Additionally gutka, panparag, zarda,mawa, kharra and khainni are used. These are dry mixture of powdered tobacco, lime and Areca nut flakes which are chewed or

sucked orally *(Niaz et al, 2017).* In this background, the present study sought to analyze if the statistical correlation between the lifestyle habits associated with cancer risk and the incidence of pre-cancerous leukoplakia stage of Bangalore population.

2. METHODS

2.1 Collection of demographic details

We personally interviewed 80 subjects who were enrolled in camps conducted by Indian Cancer Society, Bengaluru in various parts of the city. Out of total 80 enrolled subjects, 40 pre-cancer and 40 controls were included (Table 1). The patients detail sheet and consent form was dully taken from patients.

2.2 Statistical Analysis

The demographic characteristics were analyzed using chi -square and Fischer test.

3. RESULTS

The most significant factor found to be associated with precancerous lesions was the smokeless tobacco intake (p < 0.01). Thirty subjects having leukoplakia stage out of 40 cases were found to be users of tobacco. Whereas, in the control group only 5 were found to be tobacco users. Thus, tobacco intake among Bangalore population is the most dreadful reason of acquiring oral carcinogenesis. Most of the cases were acquired with the addiction of smoking (32/40) but only few subjects were having the habit of smoking (09/40). Altogether, tobacco intake found to be strongly associated with onset of leukoplakia. The other factor which showed up as a risk factor for the oral carcinogenesis in our study was the intake of spicy food. In which, 35/40 (p<0.01) were taking more spicy food in daily diet. And 18/40 preferred non spicy food in daily diet in the controls subjects. Therefore, more spices intake resulted as a contributing factor for the cause of oral pre-cancer. The other strong character was the hygiene. Most of the subject do not maintain oral hygiene properly. Whereas, in the control (27/40) population have the habit to clean their oral mouth with water immediately after taking the lunch. Only 19 out of 40 do the water rinsing of oral cavity after taking lunch. In the oral leukoplakia cases most of the subjects do brushing only one time with no water gargling behavior when compare with the oral leukoplakia. The other emerging factor contributing the incidence of oral lesions was addiction of alcohol. In the pool with oral lesions, 28/40 was found to be addicted with habit of alcohol intake. Whereas, in controls only 11/40 was found to be having habit of alcohol consumption. The subjects enrolled in the study were mostly low socio economic status in both cases and controls. So could not found any association with their status with the onset of disease. The marital status and sexual activity was not found to be a significant factor with the comparison between cases and controls. The other surprisingly factor which showed the association with oral precancerous stage was intake of tea more than 5 times (27/40) whereas 17/40 in controls (p<0.1) were taking tea more than 5 times. The frequency of tea intake may also contribute the risk of oral infections. Therefore, the lifestyle and demographic characters are major contributing characteristics.

4. DISCUSSION

Oral Cancer rate is rapidly increasing in present time. The previous study stated that the tobacco intake and alcohol consumption represent as a risk factor for oral cancer. High alcohol use is responsible for increase in oral cancer in western countries which supports the finding of the present population *(Johnson et al, 2012).* Oral squamous cell carcinoma is associated with the use of tobacco products. Nicotine in the tobacco is a predominant addictive substance. In Sweden, the modified form of tobacco is intake which lead to the onset of oral carcinogenesis. Now tobacco intake patterns are varying which remains as risk causing oral cancer. Oral cancer is the most common cancer in India accounting for 50-70% of total cancer mortality *(Park K,1994).* Johnson et al, stated that in eastern European countries tobacco account that female frequency is 7% while male have 24% death. In Asian countries like India, Pakistan and China areca nut was the major aetiologic factor for oral leucoplakia (Lee et al,2013). The role of areca nut was further confirmed by one of the study in Pakistan (Maher et al,1994). Besides areca nut,the chemical basis is presence of polynuclear aromatic hydrocarbons (usually benzo[a]pyrene), polonium 210, and N- nitrosamines *(Walsh et al., 2000).* The combination of alcohol and tobacco is more harmful than intake of tobacco alone. This statement was verified by Zygogianni et al and described as the interaction of smoking and alcohol significantly increases the risk for aero-digestive cancers *(Zygogianni et al., 2016).* Therefore, when these factors combine then their cumulative effect will be more adverse than single factor. Recent study showed a higher prevalence rate of leukoplakia among smokers, with a dose-response relationship between tobacco use and oral leukoplakia *(Bánóczy et al., 2001).* Therefore, results of the present study strengthen the proof that tobacco consumption is directly associated with the incidence of oral carcinogenesis. The study demonstrates that intake of tobacco was found to be more in leukoplakia bearing subjects as compared to controls.

Table 1: Demographic details of oral pre-cancer and controls

CHARACTERISATION	PRECANCEROUS N=40	CONTROL N=40	P-value
AGE			
(0-20 Y)	0	0	
(20-40Y)	11	18	
> 40 Y	29	22	1
EDUCATION			
1. Illetriate	24	33	
2. Literate	16	7	1
RELIGION			
1. Hindu	24	25	
2. Muslim	11	14	
4. Christian	5	1	
5. Others	0	0	1
MARITAL STATUS			
1. Unmarried	7	11	
2. Married	33	29	0. 5304
SOCIO ECONOMIC			
1. Upper	3	1	
2. Middle	12	14	
3. Lower	25	25	0. 03898
BRUSHING NUMBER			
1. Once	29	33	
2. Twice	8	4	
3. None	3	3	0. 04828

Table 1: Demographic details of oral pre-cancer and controls (contd..)

CHARACTERISATION	PRECANCER-OUS N=40	CONTROL N=40	P-value
TOBACCO INTAKE			
1. Chewers	30	5	0. 032
2. Non-chewers	10	35	
SMOKING STATUS			
1. Smokers	32	9	
2. Non-smokers	08	31	0. 0482
ALCOHOL STATUS			
1. Alcoholic	28	11	
2. Non-Alcoholic	12	29	0. 0422
SPICY FOOD			
1. Yes	15	15	
2. No	0	0	1. 0
TEA- More than 5 times			
1. Yes	27	17	
2. No	13	23	0. 0378
SEXUAL ACTIVITY			
1. Active	34	33	
2. Non-active	6	7	0. 3898
MULTIPLE PARTNER			
1. Yes	7	2	
2. No	33	38	1

In addition to smokeless tobacco, smoking tobacco was also found statistically associated with oral precancerous low socioeconomic population.

In the population of Hungary prevalence of smoking was found to be very high among leukoplakia patients when compared to controls. They showed higher number of smokers suffering from oral leukoplakia . Recent study demonstrated that the smoking fives huge impact on the oral carcinogenesis *(Morse et al., 2007).* Tobacco and alcohol are responsible factors for the oral carcinogenesis. The present study showed that the smoking is significantly associated with the transformation of healthy oral physiology to oral leukoplakia conditions. Besides, tobacco intake oral hygiene is also major concerning factor for the progression of oral precancerous lesions. One of the interesting result was the close association of caffeinated drink with the oral infection .In the present study subjects taking more cup of tea >6/day were observed to be oral pre-cancer. Whereas, one study showed that caffeinated coffee was inversely related with the risk of cancer of the oral cavity and pharynx, especially with an intake of more than 4 cups per day Tea, coffee and oral cancer risk *(Al-Dakkak et al, 2010).*

5. CONCLUSION

The demographic characteristics of Bangalore population concurred with oral pre-cancer (leukoplakia) were found to be smokeless tobacco, alcohol, poor hygiene, and caffeinated drinks.

CONFLICT OF INTEREST STATEMENT:

The authors declare no conflict of interest

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