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Association of Various Forms of Tobacco Consumption with Pre-Malignant and Malignant Conditions of Oral Cavity.- A Retrospective Analytical Study

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I. Introduction

India is considered as the global capital for tobacco consumption and tobacco is regarded as the major etiological factor for oral cancer. The various forms of tobacco consumed are smokeless tobacco (the chewing form - gutka, paan, missy, mawa, snuff) and the smoking tobacco (beedi, cigarettes, reverse smoking). Studies have proved that tobacco contains a myriad of toxins and irritants which are potential carcinogens namely, extremely elevated levels of trace elements such as copper, magnesium, zinc found in the chewing tobacco cause fibrosis of oral mucosa, Areca nut causes stimulant and noxious defects. In the smoking form nicotine, is an alkaloid which causes addiction and nitrosation of these alkaloids (polyacrylic hydrocarbons etc) produces nitrates and nitrites which determine the level of carcinogenicity. Oral cavity cancers, account to 3% of all malignancies and the most common oral malignancy is squamous cell carcinoma. As per the World Health Organization report, the most significant risk factor for cancer is tobacco use, which alone is responsible for 22% of oral cancer deaths worldwide. 38% of these oral cancers, arise from premalignant conditions of the oral cavity namely leukoplakia, oral sub mucous fibrosis, Erythroplakia, palatal lesions of reverse cigarette smoking, tobacco pouch keratosis. In this study, we aim to study the association of pre malignant lesions with tobacco consumption prevalence, patterns of pre malignant conditions occurring in the oral cavity in response to various forms of tobacco consumption and the relation of premalignant and malignant conditions of oral cavity among tobacco users.

II. Methods and Materials

This study its a cross - sectional community based design conducted for a span of 6 months from July 2019 to January 2020 in 8-9 community health care centres in Chattisgarh. A dental camp was conducted for Oral Health checkups with a questionnaire survey form made to be filled for the prevalence of Tobacco Consumption among resident population. A total of 200 candidates were included in the study. The inclusion criteria were the general population above the age of 18 years who had tobacco consumption as a habit with diversifying frequency. Exclusion criteria were pregnant women, people having oral ulcers without any specific tobacco consumption history, disabled and handicapped population, the population having medical concerns, people above the age of 80 years, and those who were not willing to participate in the study. The sample size was large enough to provide reliable estimates for the association of various forms of

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tobacco with pre- malignant and malignant conditions, for different population groups for each of the Community health centres.

III. Data Collection

Patients were encountered in dental camps. Questionarre was made to be filled along with the regular dental checkups.

IV. Ethical Issues

Informed consent was taken from the study participants after fully explaining the study in a language they understood well. No biological sample was taken. Confidentiality was maintained.

a) Data analysis

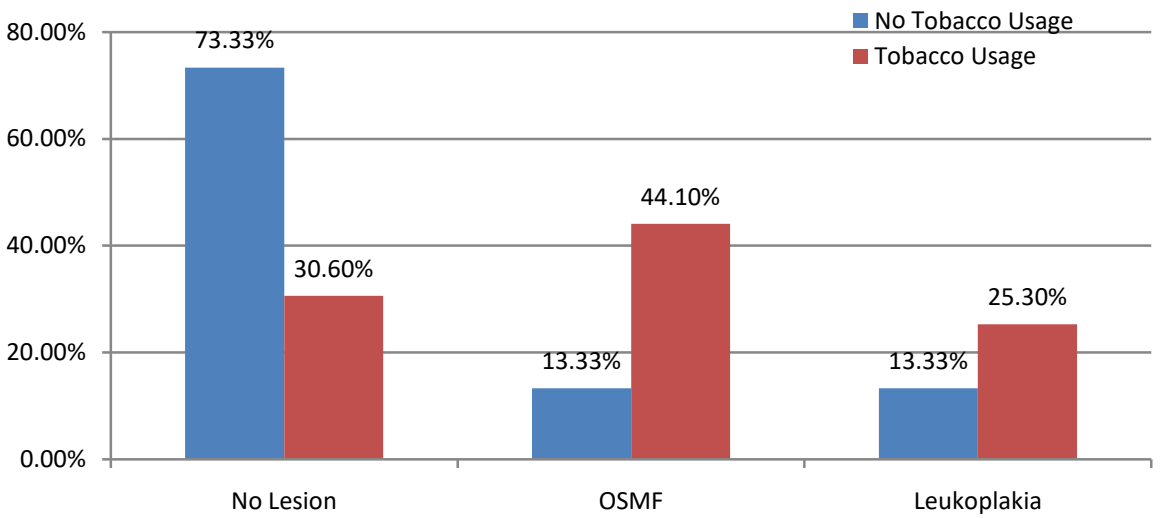
Data were entered in Microsoft Excel 2007. Data analysis was done using SPSS (version 20.0; SPSS Inc. Chicago, IL, USA) software. Statistical significance (P value) was set at a level of 0.023. Data were evaluated and proportions were obtained showing a correlation between various forms of tobacco consumption and the occurrence of pre malignant and malignant conditions. Chi square test was performed to check the statistical significance.

V. Results

a) Association of Pre malignant lesion with Tobacco Consumption Prevalence

Among the subjects who were not using tobacco in any of the form 73.33% were having no lesion whereas 13.33% each were having OSMF and Leukoplakia. Among the subjects with tobacco usage, 44.1% were having OSMF and 25.3% were having Leukoplakia whereas 30.6% were without any lesion. the difference between the groups was statistically significant when analysed using chi square test

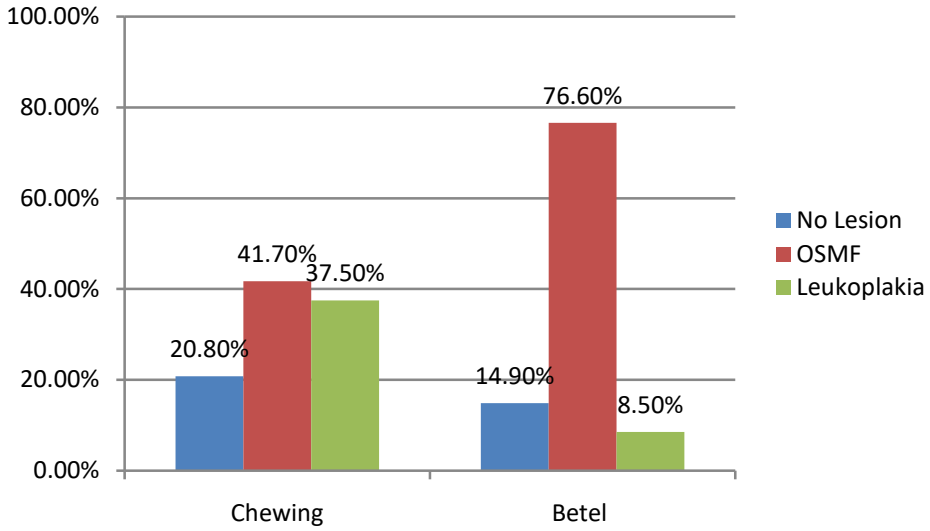
	No Lesion	OSMF	Leukoplakia	Ch Sq	P value
No Tobacco Usage	22	4	04	13.657	0.001 (Sig)
	73.33%	13.33%	13.33%		
Tobacco Usage	52	75	43		
	30.6%	44.1%	25.3%		



b) Association of Pre malignant lesion with Form of Smokeless Tobacco

Among the subjects who were using chewing tobacco 41.70% were having OSMF whereas 37.5% were having Leukoplakia whereas Among the subjects who were using betel 76.60% were having OSMF whereas 8.5% were having Leukoplakia. The difference between the groups was statistically significant when analysed using chi square test

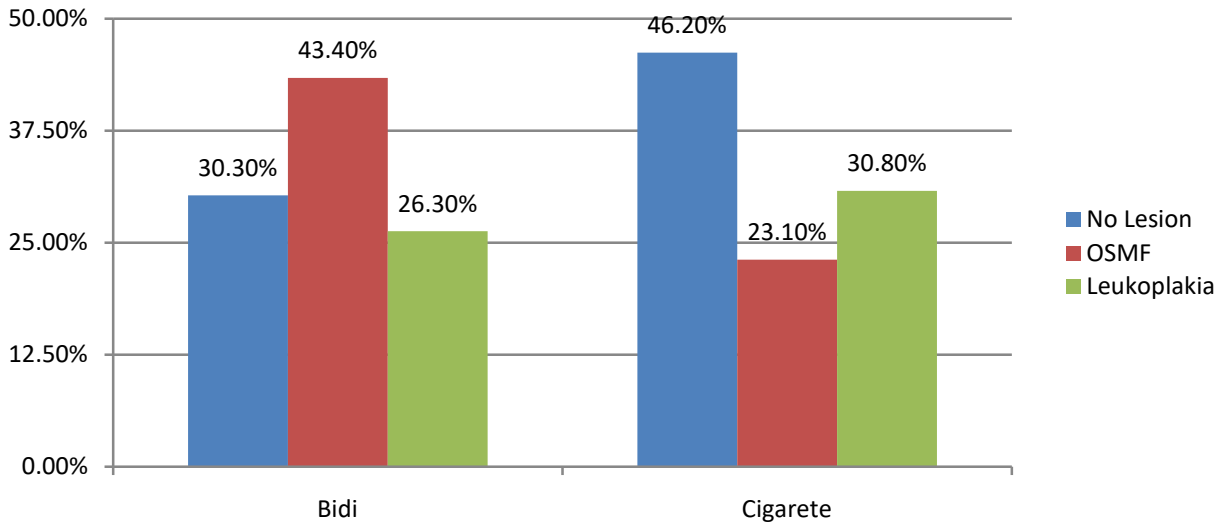
	No Lesion	OSMF	Leukoplakia	Ch Sq	P value
Chewing	10	20	18	13.657	0.001 (Sig)
	20.8%	41.7%	37.5%		
Betel	7	36	4		
	14.9%	76.6%	8.5%		



c) *Association of Pre malignant lesion with Form of Smoking Tobacco*

Among the subjects who were using bidi 43.40% were having OSMF whereas 26.3% were having Leukoplakia whereas Among the subjects who were using cigarette 23.1% were having OSMF whereas 30.8% were having Leukoplakia. The difference between the groups was statistically non-significant when analysed using chi square test. Among the cigarette users 46.2% were lesion free and among the bidi users, 30.3% were lesion free

	No Lesion	OSMF	Leukoplakia	Ch Sq	P value
Bidi	23	33	20	2.078	0.532 (Non-Sig)
	30.3%	43.4%	26.3%		
Cigarette	6	3	4		
	46.2%	23.1%	30.8%		



d) *Association of Precancerous Lesions with Oral Cancer*

Among the subjects who were having OSMF, 23.6% developed oral cancer and among the subjects with Leukoplakia, 17% developed oral cancer. Among the subjects with no precancerous lesion none of the subjects developed oral cancer The chi square association between precancerous lesions and oral cancer was statistically significant when analysed using chi square test with p value of 0.001.

VI. Discussion

In the present study, among the subjects with tobacco consumption 44.1% were having OSMF and 25.3% were having leukoplakia. Thus we conclude, that there is a strong relation between the consumption of tobacco and the occurrence of premalignant conditions in the oral cavity. Among the subjects who were using chewing tobacco 41.70% were having OSMF whereas 37.5% were having Leukoplakia whereas and among the subjects who were using betel 76.60% were having OSMF whereas 8.5% were having Leukoplakia. Thus reflecting that, chewing tobacco and betel quid consumption, both are highly responsible for the occurrence of OSMF and leukoplakia, with betel quid being the most dangerous one. Thomas et al. in Kerala conducted Case control study considering risk associated with tobacco chewing in multiple OPMLs like leukoplakia, erythroplakia and OSMF. The adjusted Occurrence rate among continuous tobacco chewers was very high (OR = 37.8, 95%). Hashibe et al. investigated the association of other habits with OSMF. This study found ever-tobacco chewing as a strong risk factor for OSMF (41%). Thus results are in accordance to these studies conducted in Kerala.

Oral submucous fibrosis, is basically characterised by abnormal collagen deposition and frequently occurs on buccal mucosa. Clinically OSF patients experience burning sensation after consumption of spicy food, reduced mouth opening, dry mouth, pain, taste disorders, restricted tongue mobility, trismus and Leukoplakia is the adaptive response of the body to the irritants of tobacco, it is a non scrappable white patch or plaque that develops in the oral cavity and is strongly associated with tobacco.

Among the smoking forms, people who were using beedi, 43.40% were having OSMF whereas 26.3% were having Leukoplakia and among the subjects who were using cigarette 23.1% were having OSMF whereas 30.8% were having Leukoplakia. Thus, we can clearly establish an association between the smoking forms of tobacco and the occurrence of pre malignant lesions. However, bidi smoking has a stronger potential of causing OSMF as compared to cigarette smokers. Researches have proved that smoke from bidi contains three to five times the amount of nicotine, tar and carbon monoxide as a regular cigarette and thus placing users at a high risk of addiction. The low prices of bidi's, their easy availability, lack of knowledge, low socio-economic status, addiction -all these factors contribute to increasing use of bidi's.

Among the subjects who were having OSMF, 23.6% developed oral cancer and among the subjects with Leukoplakia, 17% developed oral cancer. Thus we can establish a definite relation between the pre malignant and malignant conditions, which reflects that When pre malignant lesions are neglected not treated treated, it leads of oral cancer- mainly squamous cell carcinoma. A study conducted by Dr Biplab Nath in Tripura stated that 35% oral cancers are preceded by leukoplakia. In our study, the frequency of oral cancers being preceded by leukoplakia (17%) was less than the findings of other studies conducted in Tripura (35%). The early diagnosis of these pre malignant lesions can help reduce the ocurrence of oral cancer. A study done by Subapriya et al. in Tamil Nadu indicated that the chewing of betel nut and tobacco, chewing of tobacco alone, bidi smoking and alcohol consumption (OR = 1.65) were all significant risk factors for oral cancer. On histological examination dysplastic changes, atypical hyperplasia, keratosis with dysplasia indicate malignant transformations. SCC is one of the major reason of premature deaths worldwide. Among the subjects with no precancerous lesion none of the subjects developed oral cancer. Early detection of oral cancer is very crucial because survival rates remarkably increase when timely intervention is done. Among the subjects with no precancerous lesion none of the subjects developed oral cancer.

The first step in the management of these pre malignant conditions is habit cessation which can be achieved via verbal counsellings, announcing incentives, educating the population and having de-addiction centres. The interventions in the treatment of OSMF include a wide spectrum of medications comprising of dietary supplements (vitamins and antioxidants), anti-inflammatory agents (corticosteroids), proteolytic agents (such as hyaluronidase and placental extracts), vasodilators, immunomodulators, and anti-cytokines. For the management of leukoplakia, retinoids and antioxidants should be prescribed. The ideal treatment for a leukoplakia is surgical excision. The commonly used surgical options for the excision are conventional scalpel surgery, carbon dioxide laser ablation, electrocauterization, and cryosurgery. The timely intervention in these premalignant conditions can prevent the progression towards Oral cancer. The treatment modality for oral cancer depends upon the stage at which it is diagnosed - after the biopsy and TNM staging of tumour mass the treatment option is chosen. It may vary from chemotherapy, external radiation therapy to surgical excision of tumour mass.

VII. Conclusion

From the present study we conclude that there is a direst link between various forms of tobacco consumption and premalignant conditions, and These premalignant conditions may progress to oral cancer Tobacco is the leading cause of premature deaths globally. With Timely intervention, habit cessation and antioxidant therapy these premalignant conditions can be controlled. However if not curbed at the right time, these premalignant lesions carry a strong predisposition

to become oral cancer. 23.6% of the oral cancers were preceded by OSMF and 17% were preceded by leukoplakia.

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