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Assessment of Smokeless Tobacco Dependency in Adults with Prevalence of Oral Potentially Malignant Disorders – A Cross Sectional Study

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Abstract

Background: Tobacco is a major burden to the global health contributing to various tobacco related illnesses and death. About one-fourth of tobacco consumed in India is in the smokeless form.

Aim: To assess the tobacco dependence among individuals with the habit of tobacco chewing and to evaluate the presence of associated oral potentially malignant disorders (OPMD).

Materials and Methods: 100 subjects who had the habit of consuming various forms of smokeless tobacco were included in the study. Complete case history along with thorough examination of the oral cavity was performed. Dependence to smokeless tobacco among the study subjects was assessed by the cumulative scores obtained from Severson smokeless tobacco Dependence Scale.

Results: There was statistically significant difference in the occurrence of OPMD among the subjects with the habit of betel quid chewing. ($p < 0.001$) Males showed a statistically significant higher tobacco dependence score ($p = 0.027$). Subjects in the age group of 31-40 years showed high dependence to tobacco with a score ($p = 0.009$). The subjects with habit of betel quid chewing had the highest score ($p = 0.003$). Among various OPMDs, the highest score was found in subjects with OSMF, followed by Oral lichenoid lesion and

Leukoplakia, which was statistically significant (p <0. 001).

Conclusion: High dependence to smokeless tobacco was noted along with association of various oral potentially malignant disorders. Active Tobacco cessation and health education programmes are recommended to promote habit cessation and deaddiction.

Keywords: Health, Oral cancer, Oral medicine, Smokeless tobacco, Tobacco use cessation.

Introduction

Tobacco is a global threat and a major concern to human health. By the end of the 21st century, Tobacco is estimated to cause death in about 1000 million people.(1) In under developed and developing nations, the burden of tobacco-related illness and death is reported to be the highest. India has experienced more than one million adult deaths annually due to tobacco use, which accounts for about 9.5% of all fatalities.(2) Smokeless tobacco is consumed in a variety of ways, most frequently through chewing, snuffing, etc. (3) About one-fourth of tobacco consumed in India is in the smokeless form, such as mishiri, khaini, zarda, and gutkha, while more than one-half is consumed in the form of smoking such as bidi and cigarette.(4) According to the Global Adult Tobacco Survey of 2016-2017 (GATS-2 India) report, Khaini and bidi are the most abundantly used tobacco products.(5) The most common misperception about smokeless tobacco is that it is thought to be safer than smoking, but there are more than 28 compounds have been extracted from smokeless tobacco that are reported to be carcinogenic.(6) Nicotine from the smokeless form of tobacco gets absorbed directly into the body by the oral and nasal mucosa exerting their ill effects. Literature evidence has reported comparable levels of nicotine in the blood of tobacco smokers and chewers. There are various health risks associated with tobacco chewing such as oral malignancies, cardiovascular disorders, etc.(3) Tobacco dependence is the driving force that directs an individual to continue the habit and it is also a major hindrance to tobacco cessation.(7) Literature evidence regarding the relation between tobacco dependence and oral lesions in individuals using smokeless tobacco forms are limited, Hence the present study was undertaken to assess the tobacco dependence among individuals with the habit of tobacco chewing and evaluate the associated oral lesions.

Materials and Methods

The present cross-sectional study was done in the department of Oral Medicine and Radiology, Babu Banarasi Das College of Dental Sciences, and undertaken in compliance with the guidelines of the institutional ethical committee. A total of 100 subjects who reported to the Oral Medicine Out patient department for various dental problems were randomly selected for the study. Subject above the age of 18 years who had the habit of consuming various forms of smokeless tobacco were included in the study, while subjects with systemic illnesses, psychological illness and subjects who had adverse habits other than smokeless tobacco and those who had the habit of using more than one product of smokeless tobacco were excluded from the study. The subjects included in the study were explained about the objectives and procedures of the study and written informed consent were obtained. Complete case history was recorded, and a thorough examination of the oral cavity was performed by a qualitied oral medicine specialist. Various tobacco related oral lesions such as Leukoplakia, Oral submucous fibrosis, Oral lichenoid lesions were clinically diagnosed. Dependence to smokeless tobacco among the study subjects was assessed by the

cumulative scores obtained from Severson 7-item smokeless tobacco Dependence Scale. (8) The results obtained from the study was tabulated and subjected to statistical analysis using Statistical Package for the Social Sciences - Version 26 (SPSS Inc., Chicago, IL, USA). Chi square test was used to test the association of prevalence of oral lesions with various types of smokeless tobacco. Independent t test and Kruskal Wallis test was used to analyse the dependence score with regard to various parameters. P value less than 0.05 was considered to be statically significant.

Results

The characteristic details of the subjects included in the study were enumerated in Table no 1. 82% of the subjects included in the study were males and 18% were females. 48% of the subjects had the habit of using gutkha, 32% used betel quid and 20% used Khaini. 75% of the subjects presented with various tobacco related oral lesions/Oral potentially malignant disorders. There was statistically significant difference in the occurrence of OPMD among the study subjects, habit of betel quid chewing was found to be associated with the highest prevalence of OPMD. ($p < 0.001$) (Table no. 2) On comparison of the tobacco dependence scores among both the genders, Males showed a higher tobacco dependence score of 7.81 ± 4.00 which was statistically significant. ($p = 0.027$) Subjects in the age group of 31-40 years showed high dependence to tobacco with a score of 8.54 ± 4.36, followed by 51-65 years age group, 41-50 years age group and 18-30 years showed the least scores among all, and the difference was statistically significant. ($p = 0.009$) Based on the usage of various types of tobacco products, subjects who had the habit of betel quid chewing demonstrated the highest score of 8.90 ± 3.33, followed by subjects who had the habit of using Khaini and the least was reported in subjects who used Gutkha. ($p = 0.003$) Among various OPMDs, the highest score was found in subjects with OSMF, followed by Oral lichenoid lesion and Leukoplakia, which was statistically significant with a p value of <0.001. (Table no. 3)

Discussion

Tobacco is a well-established carcinogen that is being used around the globe in various forms despite the ill effects caused by tobacco. The global usage of tobacco is at an increasing trend in the recent years. The prevalence of tobacco usage in the Indian subcontinent is reported to be higher and it is considered as a major causative factor for oral cancer. (2,9) Smokeless forms of tobacco are obtained by drying and curing, followed by subsequent grounding of the tobacco leaves. The processed tobacco is used by various means such as nasal or oral snuff, stripped or grated chewable forms. (10) The burden of tobacco especially smokeless tobacco is high low- and middle-income countries including India. The general prevalence of smokeless tobacco usage among the Indian population has been estimated to be 21%. Smokeless forms of tobacco are also popular among south Asian women. (11) In our present study, 72% of the subjects who had the habit of using smokeless forms of tobacco were males, while 18% were females. We evaluated the tobacco dependence among the study subjects using Severson smokeless tobacco Dependence Scale. The tobacco dependence scores in males were found to be increased than females, which could be due to the increased exposure of tobacco among men. However, Thakur et al. reported tobacco dependence to be more related to the educational level and socio-economic status rather than gender. (3)

We observed significantly higher dependence in the age group of 31- 40 years, similar findings were reported by Thakur et al. where 35-39 years was reported to be the

most dependent age group. (3) Sarkar et al., from their study in urban population found 24–34 years as the peak age with maximum prevalence in the usage of smokeless tobacco forms. (11) Jadhav et al. reported subjects in the age group of 20-30 years to exhibit more psychological dependence to smokeless tobacco, which may be slightly contrasting to our study. (12) However, frequency of tobacco usage is considered as a major factor determining the dependence. The more frequently a person uses tobacco, the greater dependence he may exhibit due to the psychological craving.

In our study, the subjects who had tobacco chewing habits with only one specific product were selected to avoid the confounding effect due to usage of multiple products. The subjects who participated in the study reported the habits of Betel quid (Paan with tobacco), Khaini and Gutkha chewing. We observed a higher dependence among betel quid users. Literature evidences refer to the dependence to betel quid as an orphan addiction. (13) Similar to our study, Singh et al., from their analysis reported the dependence to betel quid to be equally as higher as nicotine dependence in smoking cigarettes. (14) We also found higher scores of dependence in Khaini users and the least was noted in Gutkha users. Joshi et al. who studied the addiction to gutkha among the Indian population reported a strong dependence among gutkha users, resulting in relapse of the habit and it was considered as a greater menace in the Indian population. (15) The fact that gutkha is banned in most Indian states could be related the least prevalence and lesser dependence may be attributed due to the difficulty in the availability, but the habit was not abandoned because of the illegal availability of gutkha being sold in the black market. (16,17,18)

In our study, we analysed the presence of oral lesions based on the tobacco dependence scores. A positive correlation between the prevalence of OPMDs with respect to increased tobacco dependence was noted. About 75% of the subjects with the habit of using smokeless tobacco had OPMDs. Our findings actually reflect the ability of the chewable tobacco to induce direct oxidative stress and cellular damage to the oral epithelial cells resulting in the development of OPMDs and Oral Cancer. (19) Processed tobacco leaves belonging to the species of Nicotiana tabacum and Nicotiana rustica are the major components of smokeless tobacco forms. Along with the tobacco specific nitrosamines released from the tobacco, various other additive heavy metals such as nickel, cadmium, chromium and copper that are being added in various custom made and commercially available tobacco forms have been identified as most potent carcinogens related to the level of cyto and genotoxicity of the oral mucosal cells. (20,21)

We observed various OPMDs such as OSMF, Leukoplakia and oral lichenoid lesions among the study subjects. OSMF was the most prevalent OPMD seen among the study population and higher dependence scores were reported in subjects with OSMF, than in Leukoplakia and oral lichenoid lesions. Our findings can be matched with the study of Kumar et al. where they reported OSMF to be the most common OPMD. (22) The increased use of areca nut can be the reason for a greater number of subjects with OSMF, as arecanut is one of the major causative factors for the development of OSMF. Previous studies estimated about 40% of the Indian population to consume betel quid which contains areca nut, with or without tobacco. India is one of the major producers of areca nut getting most of the contribution from the states such as Karnataka, Kerala, Bengal etc. (23,24) The increased usage and dependence to the wider availability and ease of custom-made pan-

tobacco preparations. Our observation of high dependence to betel quid can be attributed to the fact that areca nut chewing is considered as a cultural practice in India, exerting a psychological influence towards dependence to betel quid. (25)

Our study was an attempt to understand the dependence to smokeless tobacco preparations and their effect on the oral cavity. Dependence to tobacco is a highly volatile parameter that can be related to numerous influencing factors. However, our study is bound for certain inherent limitations due to the study design, smaller sample size, inclusion of only clinical evaluation of the oral lesions with no histopathological evaluation etc. Further prospective studies involving a large population have to be undertaken to understand the factors associated with the dependence to specific tobacco preparations.

Conclusion

We observed a high tobacco dependence among smokeless tobacco users. Tobacco dependence is directly related with oral potentially malignant disorders. Active Tobacco cessation and health education programmes targeting the high-risk population including both tobacco and areca nut chewers is recommended to assist the affected individuals in quitting the habit to lead a healthy life.

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Legend Tables

Table 1: Characteristics of the study subjects

Total number of subjects (n)	100
Males n (%)	82 (82%)
Females n (%)	18 (18%)
Mean age in years	33.76 ± 10.96
Mean Tobacco Dependence Score	8.00 ± 4.17
Number of subjects with Oral lesions n (%)	75 (75%)
Number of subjects without any Oral lesions	25 (25%)

Table 2: Comparison of prevalence of OPMD among various habits

Tobacco form (n = Number of subjects with the habit)	Presence of OPMD	P value
Gutkha (n=48)	28 (58%)	< 0.001*
Khaini (n=20)	15 (75%)	
Betel Quid (n=32)	32 (100%)	
* Chi square test		

Table 3: Comparison of Tobacco dependence score based on various parameters

	N	Dependence Score	P value
Gender			
Male	82	7.81 ± 4.00	0.027*
Female	18	5.22 ± 2.15	
Age group			
18-30 years	44	6.25 ± 3.81	0.009**
31-40 years	33	8.54 ± 4.36	
41-50 years	12	7.66 ± 2.57	
51-65 years	11	7.81 ± 2.48	
Tobacco Product			
Gutkha	48	6.58 ± 3.93	0.003**
Khaini	20	6.70 ± 3.89	
Betel Quid	32	8.90 ± 3.33	
Oral Lesion/OPMD			
OSMF	32	8.90 ± 3.33	< 0.001**
Leukoplakia	37	7.94 ± 4.33	
Oral Lichenoid Lesion	6	8.00 ± 2.44	
No OPMD	25	4.32 ± 2.03	
* Independent t test ** Kruskal Wallis test			

Figure Legends

Figure 1: Comparison of tobacco dependence scores based on OPMD lesions. (1- OSMF, 2- Leukoplakia, 3- Oral Lichenoid lesion, 4- No OPMD lesions)

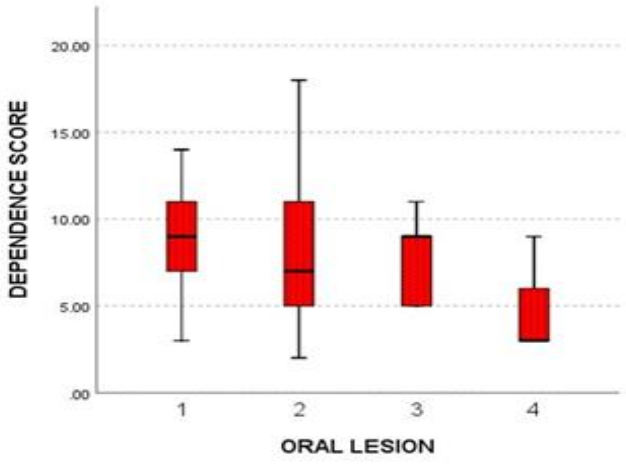

Figure 2: Comparison of tobacco dependence scores based on the tobacco product. (1- Gutkha, 2- Khaini, 3- Betel Quid)

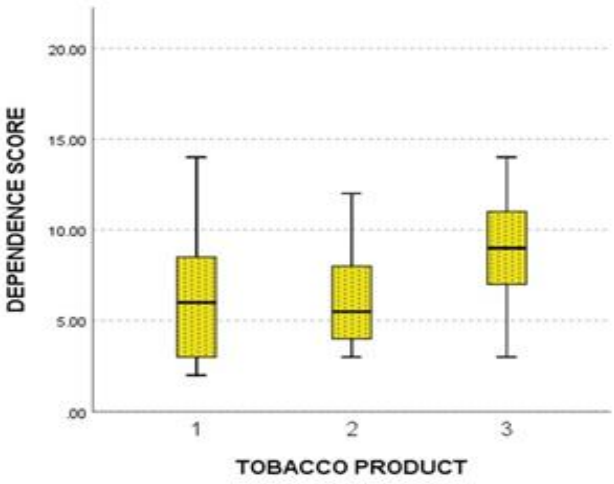

Figure 3: Comparison of tobacco dependence scores among various age groups. (A – 18 to 30 years, B – 31 to 40 years, C – 41 to 50 years, D – 51 to 64 years)