

Etiological and Epidemiological study of Oral Submucous Fibrosis in Jamnagar, Gujarat Population - A Case–Control Study

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Abstract

Aim: An etiological and epidemiological study of oral submucous fibrosis (OSMF) has been done in Jamnagar, Gujarat. **Material and Methods:** A total of 150 cases of OSMF and 135 control subjects were selected for study in the period of 1 year. **Results:** It was observed that male: female ratio was 2.7: 1. The youngest case of OSMF was 11 year old and the oldest one was 54 years of age. Maximum numbers of cases were belonging to 21–40 years of age and they were belonging to low or middle socioeconomic class. Most of the OSMF cases used heavy spices and chilies, whereas control mild spices and chilies. Gutkha was the most commonly used by the OSMF cases only 3% did not use any gutkha or other areca nut product whereas 80% control did not have any chewing habit. Most of the OSMF cases kept gutkha in the buccal vestibule or they chewed and swallowed it. **Conclusion:** Since people take to gutkha chewing at a comparatively younger age and as it requires a shorter duration of chewing to precipitate OSMF, there may be an increased risk of their developing malignant changes, in such OSMF cases.

Keywords: Arecanut, Chilies, Gutkha, Oral submucous fibrosis, Pan masala.

INTRODUCTION

Oral submucous fibrosis (OSMF) is a chronic disease of oral mucosa characterized by inflammation and progressive fibrosis of lamina propria and deeper connective tissues, followed by stiffening of another wise yielding mucosa resulting in difficulty in opening the mouth.^[1] This condition includes the palate and the pillars of the fauces, which is called “atrophica idiopathica mucosa oris,” also termed as OSMF. The pathogenesis of OSMF has been directly related to the habit of chewing areca nut and its commercial preparation (Figure 1), which is widespread in Indian subcontinent and Southeast Asia.^[2]

Genetically susceptible individuals when exposed to areca nut chewing develop this disease over a variable period of time. OSMF is considered to be a disease of collagen metabolism. Several genetic factors are reported but there is no consensus about the exact mechanism of disease initiation. Variations in histopathological presentation are noted among OSMF patients with habitual areca nut chewing in different forms and other additive agents, for example, Betel quid, Pan masala, and Gutkha, together with a variety of tobacco habits.^[3]

MATERIALS AND METHODS

The study was conducted in Department of Oral Medicine and Radiology, Government Dental College and Hospital, Jamnagar, Gujarat, India. A total of 150 patients of OSMF and 135 controls were selected for study in the period of 2009–2010. The OSMF cases were diagnosed by presence of certain clinical criteria and some of them were confirmed by histopathological examination. Controls were selected from the patients who did not exhibit any oral mucosal lesions or conditions. Controls were matched for age (+ or - 2 years), sex, religion, and socioeconomic status by their income and education.

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Figure 1: The culprit of OSMF

Clinical examination of the subjects along with well-matched control was performed examining the factors such as burning sensation of mouth and tongue, irritation of mouth with chilies and spicy food, dryness of mouth or hyper salivation, difficulty or inability in opening mouth, blanched or opaque appearance of mucosa, loss of tongue papillae, atrophy of the tongue, soft palate movement restriction, inability to protrude tongue, and presence of Palpable fibrous band.^[4,5] The data were analyzed by Statistical Package for the Social Services version 10. Descriptive statistics such as frequency, percentage, and mean values were used.

RESULTS AND DISCUSSION

In the present study, males were dominating, 115 (73%) out of 150 OSMF patients were male. The youngest patient with OSMF was found to be 11 years of age where as the oldest patient was 54 years. Majority of the OSMF cases belonged to 21–40 years of age group. The present study indicated that most of the younger people were suffering from OSMF. Conventionally in India, only married adults have been consumers of areca nut. However, during the recent years, with the advent of attractive, conveniently packed sachets and mass and media advertisements, consumption of gutkha and pan masala by younger people has increased^[6-9] (Table 1). Most of the OSMF patients belonged to middle class and 30 per cent of OSMF cases belonged to low socioeconomic group. The reason for OSMF cases coming from low socioeconomic group might be due to poor quality of food, low vitamins particularly in iron deficiency and use of more spices and

Table 1: Basic information our study

Male: female ratio	2.7:1 (115 out of 150 were male)
Mean age group of OSMF	21–40 years (younger people more affected)
Age	Minimum age 11, max age 54 years
Socioeconomic status suffer from OSMF	High class (25%) Middle class (45%), Low class (30%)
OSMF: Oral submucous fibrosis	

chilies to make the food tasty, coupled with lack of health consciousness^[10,11] (Table 1).

When questioned regarding their dietary patterns, chilies and spices were observed as one of the predisposing factors of OSMF. It may be mentioned that chilies can damage the cells of the mucosa and if this is continuous, it probably causes chronic inflammation, which leads to the formation of excessive fibrosis. Thus, chilies have indirect effect on the pathogenesis of OSMF as hypersensitivity to chilies is often explained as a common factor in the development of OSMF. By excessive use of chilies and spices, as in the case of OSMF subjects, along with low nutritional value food, common in the lower middle class, it appears that such factors have a cumulative effect on the incidence, nature and severity of the disorder.^[12]

Out of the 150 cases, 47 (30%) of the OSMF patients were having poor nutritional food values. People having poor nutritional value in their food probably suffered more from OSMF.^[13]

It is very interesting to know that 123 out of 150 OSMF cases used gutkha and other areca nut products, with a majority in the relative number of cases who used only gutkha. About 55 per cent of subjects consumed only gutkha. Furthermore, about 16% of the fibrosed cases were addicted to pan chewing habit. From these data, it becomes evident that, it is the gutkha, containing areca nut, tobacco as main ingredients along with lime, catechu, pan extracts, and other flavoring agents in almost all the brands available in the market may be regarded as possible prime etiological factors for inducing OSMF. Moreover, the habit-forming process of gutkha chewers is due to tobacco and areca nut, which if consumed for longer duration and frequencies is responsible for causing addiction, leading to OSMF.^[14,15] It was found that average betel quid (areca nut, tobacco, catechu, and lime wrapped in betel leaf) approximately weighing 3.5–4 g has 70% moisture and dry weight of areca nut and tobacco is only 1.14 g whereas the gutkha sachet weighing 3.5 g has only 7% moisture and dry weight 3.26 g. Since habitual chewers tend to consume more dry weight of areca nut and tobacco when they use gutkha so they probably develop more fibrosis of the oral mucosa, which is probably the reason why the disorder manifests earlier as well (Table 2). Such cases on several post treatment checkups showed no improvement in the OSMF, as there was no cessation of the habit. Follow-up revealed that the extent of the disease was same as before but it did not increase any further.

In the above quoted study, it was also observed that OSMF

Table 2: Content of arecanut in varies culprits of OSMF

Habit of chewers	Moisture	Dry weight of arecanut and tobacco
Betel quid (arecanut, tobacco, catechu and lime wrapped in betel leaf)) (weight 3.5–4g)	70%	(1.14 g) 30%
Gutka sachet (3.5gm)	7%	(3.26 gm) 93%

OSMF: Oral submucous fibrosis

patients were taking different kinds of areca nut products such as pan, pan masala, and raw areca nut along with the gutkha. However, most of the patients who had OSMF were using gutkha maximally and consequently suffered more. This condition might be due to dry contents of gutkha, which has comparatively more areca nut and tobacco. Dry tobacco absorbed by the mucosa in more amounts produces addiction to the patients. A significant association was found between gutkha chewing and OSMF, indicating that gutkha produced OSMF earlier than raw areca nut. It was also observed that when compared to use of areca nut alone, a combination of areca nut with smokeless tobacco caused earlier onset of the disease. A lower incidence of OSMF was observed in only pan chewers. This may be attributed to the protective effects of pan to the oral mucosa against the harmful alkaloids present in the areca. Pan (betel leaf) is known to be rich in beta-carotene and hydroxychavicol, which have the capacity to quench free radicals that are toxic (Table 3 and Figure 1).

Association of OSMF as well as well-matched controls with duration of addiction of the chewing habit and period of keeping gutkha and other products in minutes in the mouth was observed and, it has been found that 44% of the subjects from the total cases developed OSMF with the chewing habit duration 2–4 years. With regard to period of keeping gutkha and other products in minutes in the mouth it was found that out of total 74.5% of OSMF cases kept the gutkha and related products for 2–10 min in the mouth.^[16,17]

With regard to the style of chewing gutkha and other products, it was observed that 21% of OSMF cases chewed gutkha and other products and spitted out it after keeping it for 2–10 minutes in the mouth. Remaining 40% chewed and swallowed after keeping for 2–10 min in the mouth and 39% kept it for longer period in the buccal vestibules majority of the subjects suffering from OSMF kept gutkha and other products in the buccal vestibules and swallowed the gutkha contents after chewing it for some time. Therefore, it appears that more amount of gutkha contents are absorbed by buccal mucosa or posterior region of the mouth like soft palate and uvula in such type of style of chewing and swallowing^[18,19] (Table 4).

Based on the style of keeping the gutkha, the maximum affected site was the vestibular area of the mouth followed by soft palate and uvula. On the other hand, most of the OSMF subjects chewed gutkha and other products for longer time and spitted it out, for this reason fibrosis developed in the entire

Table 3: Most leading cause of OSMF

Etiologic factor	Areca nut	Gutka	Smokeless tobacco and arecanut	Pan chewers
Chances of OSMF in percentage	25	40	25	10

OSMF: Oral submucous fibrosis

Table 4: Style of chewing habits and OSMF

Style of chewing	Chewing gutka for 2–10 min and swallowed	Chewing gutka for 2–10 min and spitting out	Kept gutka for more than 10 min on buccal vestibules
OSMF Patient (%)	40	21	39

OSMF: Oral submucous fibrosis

buccal mucosa, parts of labial mucosa, and also floor of the mouth. Fibrosis occurred in the region of buccal mucosa, soft palate and uvula of OSMF subjects who chewed and swallowed areca nut and tobacco after keeping for few minutes in the mouth. In the present study, most of the OSMF cases also kept areca nut and tobacco in the buccal vestibules for which they developed fibrosis in the buccal mucosa. Interestingly in the present study, some OSMF subjects showed unilateral fibrosis in the mouth. On examination one side of the buccal mucosa was fibrosed where as other side was completely normal. It was inferred that the patients used to keep the gutkha on the fibrosed side for few minutes and after that partially swallowed and partially spitted out.

CONCLUSION

The data of the present study with regard to etiological factors suggest that from many ingredients of the gutkha, it is the areca nut with tobacco, which is responsible for a “habitual” chewing response in almost all the gutkha users, irrespective of age, community, and socioeconomic status. The data of the epidemiological survey presented have proved beyond doubt that the chewing habit is caused by tobacco, which initially triggers histophysiological and histopathological changes leading to OSMF in susceptible individuals. These findings clearly document the hazard of gutkha chewing. Since people take to gutkha chewing at a comparatively younger age and as it requires a shorter duration of chewing to precipitate OSMF, there may be an increased risk of their developing malignant changes, in such OSMF cases. A small attempt has been taken to know the epidemiology and etiology of the disease in Gujarat where gutkha selling is very commonly seen in every corner of the street. However, there is a need of extensive study on gutkha and other areca nut product and its effect on oral mucosa.

CONFLICT OF INTEREST

Nil.

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No.

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