ORIGINAL ARTICLE

COMPARISON OF FREQUENCY OF HABITS AMONG DIFFERENT STAGES OF ORAL SUBMUCOUS FIBROSIS

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ABSTRACT

Background: To compare the frequency of habits among different stages of oral submucous fibrosis.

Methods: A cross-sectional study was conducted. Patients were recruited through purposive sampling technique from Dental OPD of Ziauddin Dental College, Clifton campus and Keamari campus, Ziauddin Hospital, Karachi. There were 50 stage 1 OSMF patients with limited mouth opening between 26-35 mm and 50 stage 2 OSMF patients with limited mouth opening less than 26mm. A detailed questionnaire was filled with details regarding patient's medical history along with the frequency of pan, ghutka, betelnut, tobacco and alcohol. Co-relations were studied between various continuous variables. Cross-tabulations were performed between frequency of habits and different stages of OSMF.

Results: In the present study, 100 OSMF patients, 70 (70 %) males and 30 (30 %) females, were recruited and diagnosed into different stages on the basis of limited mouth opening. Majority of addictions in OSMF stage 1were due to pan chewing (54%) followed by ghutka (40%), tobacco (34 %) and betelnut (28%) respectively. OSMF stage 2 patients showed highest consumption of ghutka (68%) followed by pan (60%), betelnut (50%) and tobacco (42%) respectively. Alcohol consumption alone in both stages was found insignificant causative factor in OSMF disease.

Conclusion: The present study revealed that the relative risk of disease becomes higher with increased frequency and duration of daily consumption of pan for stage 1 and ghutka for stage 2 OSMF patients.

KEY WORDS: Oral sub mucous fibrosis, frequency, ghutka, betelnut, tobacco, pan

INTRODUCTION

Oral submucous fibrosis (OSMF), which is considered to be an incurable and irreversible disease presents with rigidity and an eventual inability to open the mouth. The buccal mucosa is the most frequently involved site, but any part of the oral cavity and pharynx can be involved [1]. Paymaster in 1956 put forward the concept that OSMF has malignant potential, which was further confirmed by Pindborg in 1976 [2]. Early detection of oral cancer can be detected through visual inspection of the mouth, which is specifically been considered in countries where incidence is high, such as Bangladesh, India, Pakistan and Srilanka [3].

Oral submucous fibrosis patients often suffer from burning, blanching of mucosa, mucosal stiffening and the appearance of palpebral fibrous bands [1].The disease presents with rash, blisters, and ulcers inside the oral cavity and when it heals, get replaced with fibrous tissue. This leads to progressive fibrosis of sub-mucosal tissue [4]. Worldwide researches show that annually, oral cancer results in 5, 75,000 new cases and 3, 20,000 deaths [5]. In Pakistan, Oral cancer is the third most prevalent cancer in men and second most cancer observed among women [6]. The age range of OSMF patients has been found between 20 and 40 years [5].

A number of cross sectional, epidemiological, case-control, case series, cohort and intervention researches have proved that areca nut is the main etiological factor in the causation of OSMF [7].

Arecoline is an important alkaloid component present in arecanut, which undergoes hydrolysis to produce arecaidine that has the dominant effect on fibroblasts [8]. Slaked lime (Ca (OH)2) added to areca nut in pan is responsible for arecoline hydrolysis and formation of arecaidine. Pathogenesis of OSMF involved stimulation of fibroblast production and collagen formation is due to areca nut alkaloids [9]. An enzyme lysyl oxidase (LOX) is considered to be an important contributing factor, which in turn is regulated by various factors e.g TGF-β. In different cell lines, TGF-β has been found to play a strong role in increased expression of LOX both at the RNA and protein levels. The LOX activity has a prominent role in the formation of insoluble collagen cross linkages [8].

Areca nut without tobacco has also been considered to play a role in pathogenesis of oral cancer [6]. The highest consumption of chewing products like betel nut, ghutka, paan masala and niswar has been observed in Pakistan and South Asian subcontinent. The components of betel quid (paan) are betel leaf, betel nut and slaked lime, mostly mixed with tobacco. Betel nut (chalia) is the betel palm seed, ghutka is ground areca nut, while niswar is considered as dipping tobacco manufactured from fresh

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tobacco leaves, wood ash and calcium hydroxide [10]. Lately prevalence of use of areca nut among youngsters has increased [11], thus putting them at increased risk of oral cancer due to dose dependent relationship. Occurrence of oral cancer is highly dependent on time period and daily frequency of areca nut consumption [12].

Dental researchers have acknowledged the different aspects of OSMF. Yet, much more research has to be done in evidence based dentistry, specifically regarding the correlation of the role of duration and frequency of habits to the clinical grading/ staging of OSMF [13]. The present cross sectional study has correlated these variables of habit to the different clinical stages of OSMF.

METHODS

This cross sectional research has been conducted during the period from January 2014 to April 2015, in the department of Oral Pathology, Ziauddin University. There were 100 subjects recruited by purposive sampling technique from Dental OPD of Ziauddin Dental College, Clifton campus and Keamari campus, Ziauddin Hospital, Karachi. The detailed questionnaire was filled with details regarding patient's medical history along with the frequency of pan, ghutka, betelnut, tobacco and alcohol. The study was approved by Research and Advocacy Committee (RAC), Ziauddin University Ethics and Review Committee (ERC). Oral submucous fibrosis was diagnosed and staged into stage 1 and 2 [31]. Stage 1: Patients with red atrophic mucosa, vesicles, mucosal ulcers, melanotic pigmentation or mucosal petechia (Pindborg) [31] with limited mouth opening between 26mm-35mm [34]

Stage 2 : Patients with blanched mucosa, vertical and circular palpebral bands in buccal mucosa, may involve area around oral cavity (lips) resulting in mottled marble like appearance [31] and limited mouth opening with less than 26mm [34]. There were 50 stage 1 and 50 stage 2 OSMF patients.

Inclusion Criteria:-
a) Subjects with definitive habit of areca nut, chewable tobacco and ghutka in any form.
b) Subjects with the history of at least one packet of paan / chalia / chewable tobacco per day for at least six months.
c) Subjects with clinical signs and symptoms of oral submucous fibrosis.

Exclusion Criteria:-
a) Subjects with any other oral precancerous lesion.
b) Subjects taking antioxidants / multivitamin preparations.

The collected data was sorted, tabulated and statistically analyzed. The analysis was performed to determine the risk factors associated with decreased mouth opening among patients with OSMF. The dependent/outcome variable was decreased mouth opening (in mm). The independent variables were age, gender, duration of habits, pan, ghutka, tobacco and betel nut chewing. P-values were estimated with p-value of < 0.05 termed as statistically significant.

RESULTS

In the present study 100subjects were diagnosed as OSMF patients on basis of clinical grading/staging with 70 (70 %) males and 30 (30 %) females. Most of the patients were in 15- 44 years age group (87.5%) (P value =0.0001). Among the ethnic group, the majority of OSMF patients were Muhajir (40.8%) (Table 1). Ghutka consumption was seen in 40% of stage 1 and 68% of stage 2 OSMF patients, while pan was used by 54% stage 1 and 60% stage 2 (Table 2). The frequency of betel nut consumption (chalia) among stage 1 patients was 28% and among stage 2 patients was 50%.Frequency of tobacco consumption among OSMF stage 1 patients was 34% whereas in OSMF stage 2 patients was found to be 42%. Most of the patients reported use of these addictive substances for more than 4 years. All risk factors were found highly significant with (P value = 0.0001). Frequency of alcohol consumption per day in stage1 OSMF (6%) and stage 2 OSMF (16%) were not found significant in causation of disease (Table 2).

Table1: Characteristics of OSMF patients.

Characteristics of OSMF patients	n (Percentage %)
Age Range (years)	
6-14	10 (7.70%)
15-44	84 (87.50%)
45-65	6 (4.60%)
Mean age (30 years)	
Gender	
Male	70 (70%)
Female	30 (30%)
Ethinicity	
Muhajir	53 (40.80%)

Sindhi	4 (3.10%)
Balochi	47 (36.20%)
Pathani	15 (11.50%)
Panjabi	3 (2.30%)
Others	8 (6%)

Table 2: Comparission of Frequency of Habits with Stages of OSMF.

Frequency	OSMF Stage 1		OSMF Stage 2		P value
	n	%	n	%	
Betel nut	14	28%	25	50%	<0.05
Gutka	20	40%	34	68%	<0.05
Tobacco	10	34%	20	42%	<0.05
Pan	10	54%	17	60%	<0.05
Alcohol	3	16%	11	6%	>0.05

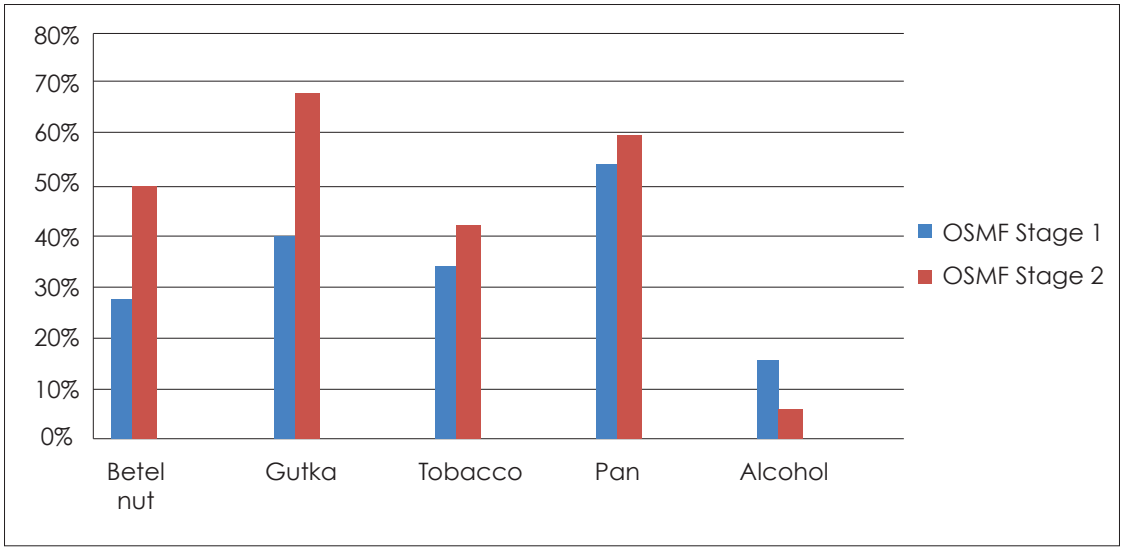

Figure1: Frequency of habits in stage 1 and stage 2 OSMF patients.

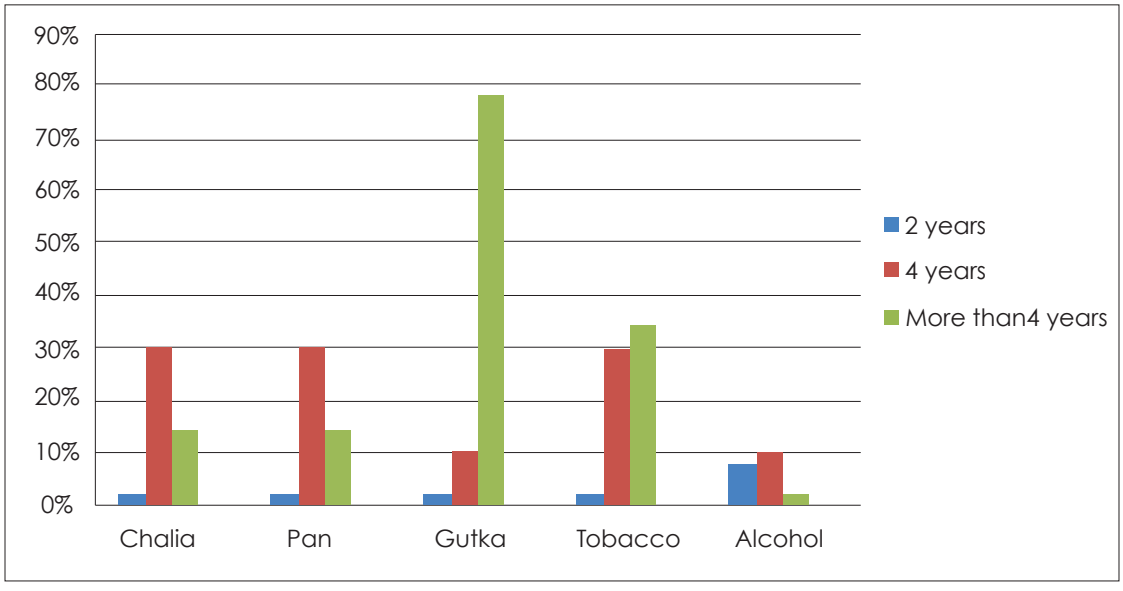

Figure 2: Frequency of time period of habits in OSMF stage 1 patients

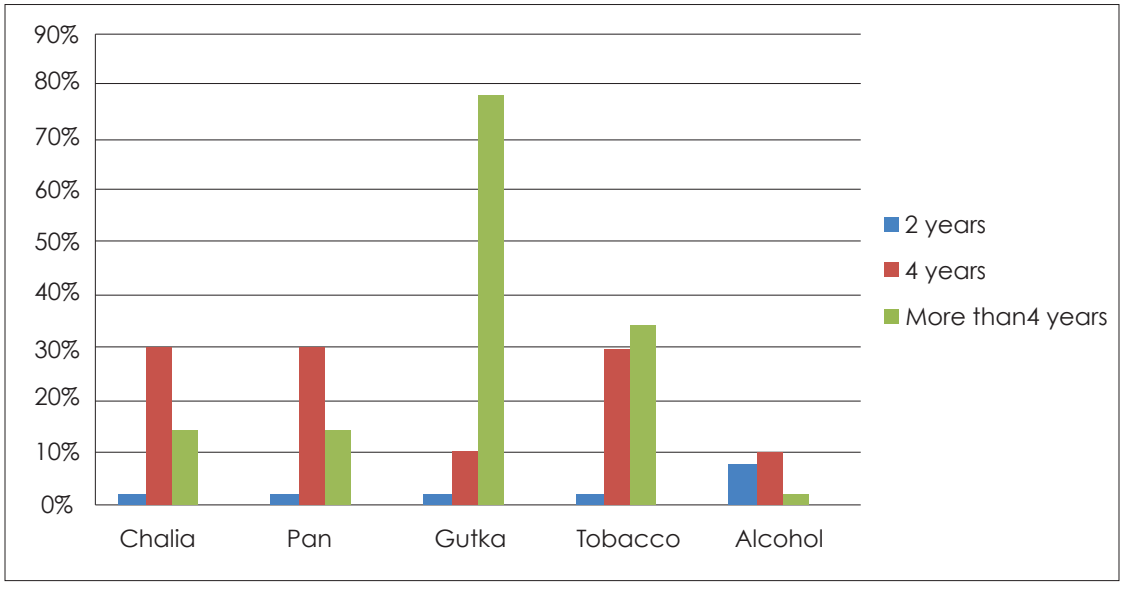

Figure 3: Frequency of time period of habits in OSMF stage 2 patients

DISCUSSION

IOral submucous fibrosis (OSMF) is considered as chronic and potentially malignant condition of the oral cavity that often leads to oral cancer [14].Our study shows that most of the OSMF patients were between 15 - 44 years with the mean age of 30 years. This is in accordance with a study conducted in Taiwan [15], reporting an age between 20-39 years; while a study conducted among 1000 patients in Central India [16] reported an age between 30-39 years. Similarly a study in Pakistan also reported age between 20-39 years, as the most frequently affected age group [17].The main etiology of the OSMF disease is excessive usage of products such as gutkha, pan masala, khaini, mava etc. made of areca nut and other tobacco products. These addictive products, which are widely available since few decades, are packed in small, colorful and cheap sachets of betel quid substitutes. Aggressive marketing and advertisements, that often claim these as safe products, results in high consumption by all the age groups, particularly in India and also among migrant populations from these areas worldwide [18]. The present study shows that OSMF patients were mostly males (70;

70%) as compared to females (30; 30%). Another study conducted in Karachi also reported increased number of OSMF patients amongst males (69%) as compared to females (31%) [20]. In contrast, an Indian study reported 12.8% males and 7.5% females [19]. Most of the OSMF patients were Muhajirs / Urdu speaking (40.8%). This is in accordance with a study conducted in Karachi in which OSMF patients were mostly Urdu speaking (55%) as compared to other ethnicities [20]. Muhajirs (Urdu speaking) are Indian immigrants and they have brought with them strong Indian culture of pan/ betel nut usage.

Ghutka is manufactured with the combination of arecanut, tobacco, lime, katechu and flavoring compounds. In our study, frequency of ghutka among OSMF stage 1 patients was found to be 40% but higher frequency of 68% has been observed among OSMF stage 2 patients. Ara et al., in India reported that the frequency of ghutka consumption among stage 1 OSMF was 35% and among stage 2 patients was found to be 53.3 % [18]. Ahmad et al., in a study also conducted in India found that approximately 55 per cent of OSMF patients mostly used gutkha [21]. Babu et al., concluded that gutkha was highly consumed by OSMF patients as compared to any other related areca nut products. They observed strong association between gutkha chewing and OSMF and also emphasized that ghutka is highly responsible for early OSMF disease as compared to raw areca nut [22]. Similar work was done by Shah and Sharma in Delhi, who observed that gutkha chewing produced OSMF earlier as compared to raw areca nut and other products [23]. Tobacco and areca nut if consumed for longer duration and frequencies will culminate in ghutka addiction especially in younger age group [18].

Betel quid(pan) is basically a mixture of betel leaf, arecanut and slaked lime and in some cases tobacco has also been added [11].Our observations regarding frequency of pan usage among OSMF stage 1 (54%) and OSMF stage 2 (60%) was found significantly high. OSMF stage 1 patients were observed with significantly higher consumption of pan than ghutka, betelnut and tobacco. In our study, OSMF patients mostly reported that they preferred multiple ingredients in pan of their choice including increase quantity of betel nut, tobacco and slaked lime. A study conducted in Karachi shows 60% consumption of pan which matches our finding [24]. Another Indian research reported 53.8% in OSMF stage 1 and 30.8% in OSMF stage 2 patients [13]. In contrast betel quid usage has been reported in approximately 10–20% of the world's population [18].

Betel nut addiction (also part of betel quid) has been termed as one of the most important etiological factor for the progression of OSMF disease [25]. Our study showed that the frequency of betel nut usage among OSMF stage 1 patients as 28% and OSMF stage 2 patients as 50%. According to the present study areca nut consumption has been found significantly high among OSMF patients. An Indian study showed consumption of areca nut in stage 1 as 11.8% and in stage 2 as 25.5% [18]. Areca nut (usually incorporated in betel quid) is considered as the fourth most common psychoactive substance in the world (after nicotine, caffeine and alcohol) and is being consumed by several hundred million people [23].

Tobacco chewing has been considered to be a major risk factor for developing OSMF [26, 27, 28].Our study shows higher frequency of tobacco among stage 2 OSMF patients (42%) as compared to stage 1 OSMF patients (34%). An Indian study noted tobacco frequency among stage 1 as 8.3% and in stage 2 OSMF as 13.5% [18] while another Indian study conducted by Singh et al., (2015) showed 25% tobacco frequency among stage 1 OSMF and 75% tobacco frequency among stage 2 OSMF [27]. Most of the studies conducted in Pakistan were related to associations between chewable tobacco and oral or pharyngeal cancers [29, 30]. A recent study from Karachi slum areas (squatter areas), reported 40% prevalence of use of smokeless tobacco [32].The leaching of various nitrosamines have been reported from tobacco when placed in mouth leading to free radical formation and OSMF [33].

In present study, alcohol addiction has not been found significant (OSMF stage 1 = 6% ; OSMF stage 2 = 16%). According to Ranganathan et al., [7] and Ariyawardana et al., [33] smoking and alcohol consumption alone, have no profound role in OSMF development. Moreover in our setup, people are reluctant in giving history regarding alcohol usage due to religious restrictions and cultural norms.

According to our study, most of the study participants were addicted to different products for more than four years, which contributes to the increased severity of the disease. A study conducted in Karachi in 1997, commented that OSMF patients with greater duration of using pan/ ghutka/ betel nut were more likely to have OSMF [17]. Similarly study done by Reddy in India, reported that addiction of betelnut, pan, ghutka and tobacco consumption for about 10 years increases the severity of disease . The present study describes significant correlation of severity of disease with the duration and frequency of the addictive carcinogenic products.

CONCLUSION

Oral submucous fibrosis plays an important role as a risk factor for oral carcinogenesis especially in Karachi, Pakistan. The present study revealed that the relative risk of disease rises with increase in frequency and duration of daily consumption of commercially available areca nut and tobacco by products in a dose-dependent relationship. Prevention involve taking steps to ban all these carcinogenic products from our society and to form addiction control institutions providing guidelines regarding usage of these seemingly innocuous substances. These measures can play a significant role in the elimination of oral pre-malignant diseases like OSMF and hence reduce the incidence of oral cancer.

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