ORIGINAL ARTICLE

Influence of Risk Habits on Demographic Factors and its Impact on Oral Submucous Fibrosis

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ABSTRACT

Objective: To establish a correlation and evaluate paradigm shift of demographic parameters in oral submucous fibrosis patients due to use of areca nut and tobacco.
Study Design: Cross sectional study.
Place and Duration of the Study: Outpatient Department of Tertiary Care Teaching Hospital, Lahore from 1st November 2019 to 30th June 2021.
Methodology: All patients with compliant of limited mouth opening and diagnosed clinically with oral submucous fibrosis were included. Biographical data was collected based on age, gender, literacy rate, socioeconomic conditions and habit of consumption of areca nut-based products and tobacco.
Results: Prevalence of OSMF was 0.45% with mean age of 29.26±14.12 years. Areca nut alone is consumed more by females (44.12%) whereas combination of tobacco and areca nut use was higher in males (87.76%). Risk habits were found to be highest in uneducated/primary education (63.01%) and in low socioeconomic group (59.03%).
Conclusion: Comparing the last two decades, there is paradigm shift in age of contracting OSMF towards younger age. Significant finding of areca nut use by females also draws attention for control measures. Harmful effects of areca nut and tobacco products should be highlighted and included in educational and community programs.
Keywords: Oral submucous fibrosis, Potentially malignant disorders, Areca nut, Oral squamous cell carcinoma

INTRODUCTION

The term "potentially malignant disorders," (PMDs) for oral precancerous lesions was proposed by WHO collaborating center in 2007.[1,2] PMDs are the lesions and conditions that may transform to oral squamous cell carcinoma (OSCC) which is the 8th most common malignancy of the lip and oral cavity worldwide and 2nd most common in Pakistan.[1-3]

Potentially malignant disorders embody a diverse group of conditions and oral submucous fibrosis (OSMF) is one of them.[4] It is a chronic progressive disease of South East Asian origin, that affects the oral cavity and sometimes the pharynx.[1,3] Disease pattern of OSMF is insidious, with early-stage symptoms like burning of oral mucosa with frequent ulcerations, which progresses to blanching and may ultimately leads to restricted mouth opening in later stages. As a result, there is difficulty in swallowing, speaking, mastication and maintenance of oral hygiene.[5] OSMF is most prevalent in 20-40 years old age group with male predilection.[6] OSMF has a malignant transformation rate ranging from 7%-30% to OSCC, posing a threat for public health.[7] Therefore, early diagnosis and treatment of OSMF is crucial to prevent malignant transformation, hence, improving the morbidity and mortality rate among patients.[4]

The main causative agents for OSMF can be divided into initiators and promoters, where initiators include areca nut and to some extent chilies, while the promoters are anemia (iron deficiency), vitamin deficiencies (B complex and folate) and immunologic derangements. An overwhelming evidence in the literature endorsed by numerous epidemiological surveys, case-series reports, large sized cross sectional surveys, case-control studies, cohort and intervention studies suggest areca nut as the topmost etiological factor for OSMF.[8] Areca nut or betel nut is the endosperm of the fruit of the areca catechu tree and is consumed either alone or in combination with other constituents commonly known by the terms like betel quid (paan), gutka, paan masala and mawa.[9,10] Conclusive biochemical studies on areca nut identify four alkaloids (arecoline, arecaidine, guvacine, guvacoline) along with flavanoids and copper.[8,9]

The numbers of OSMF cases were estimated to be 2.5 million in 1996 throughout the world.[11] Although many studies have been conducted, particularly in South and South East Asia, however no population-based data of Pakistan is available. Thus, this study was based on assessment of biographical data obtained from patients reported to dental OPD of tertiary care teaching dental hospital with complaint of limited mouth opening. Aim of this study was to establish a correlation between etiological factors like use of areca nut with parameters like age, gender, literacy rate and socioeconomic status for OSMF patients. Further to evaluate whether there is any paradigm shift of above mentioned parameters on OSMF due to increased availability of areca nut and similar products in recent years, so that the susceptible group should be targeted for creating awareness regarding predisposing factors of OSMF.

MATERIALS AND METHODS

This was a cross-sectional study conducted from 1November 2019 to 30th June 2021 in a tertiary care dental teaching hospital after approval from ethical committee (IRB: Ref: RLDC/004467/19). Out of 18,234 patients attending the OPD, only 83 patients presented with compliant of limited mouth opening due to rigidity of oral mucosa. Patients of all age groups and both gender with mouth opening less than 35mm, associated with presence of palpable oral mucosal fibrous bands were included in the study. Patients with limited mouth opening due to trauma, orofacial infection, ankylosis, TMJ or muscular disorder and radiation therapy were excluded.

After obtaining consent, demographic data including, age, gender, socioeconomic conditions and literacy rate was recorded, followed by detailed history of tobacco and areca nut consumption. Age was divided into three groups of teenagers to 20s, 30s and 40s and above 50s. Education was divided into uneducated/minimal, higher secondary and graduates. Socioeconomic status was divided according to the local pay groups of low, medium and high economic status. Andrade and Khanna classification was used to record staging of OSMF. Oral clinical examination was done using diagnostic instruments on dental unit under dental chair light. Four examiners were trained and calibrated against a gold standard to perform oral examinations following WHO guidelines.[12] Vernier caliper graded to 0.1 mm was used to measure inter-incisal distance in cases of limited mouth opening. It was followed by palpation of fibrous

bands and their location in oral mucosa like soft palate, pterygomandibular raphe and anterior faucial pillars, buccal and labial mucosa. All the data was entered in SPSS-25 for statistical analysis. Chi square and regression analysis were used to compare the different variable.

RESULTS

Prevalence of OSMF was 0.45% among those that attended the OPD. Out of the 83 participants, 41 (49.40%) presented with stage III OSMF and 42 (50.60 %) were stage IV of OSMF. No patient presented with signs and symptoms of stage I and II of OSMF. Mean age of the sample was 29.26±14.12 years. The percentage of age, gender, literacy rate, socioeconomic conditions, habits of tobacco and areca nut use (Table 1).

Comparison of gender with habits in Figure 1 shows that areca nut alone is consumed more by females (44.12%) whereas combination of tobacco and areca nut use was higher in males (87.76%). Figures 2a and 2b show comparison of age with habits depicting greater consumption between the ages of 30 to 49 years (50.60%). Consumption of areca nut alone and in combination with tobacco was found to be highest among participants that were uneducated or had minimal primary education (63.01%) as shown in figure 3a and 3b.Similar trend was seen in low socioeconomic group (59.03%) as shown in Figure 4a and 4b.

Out of 83 patients, 21 (25.30%) consumed areca nut alone while 62 patients (74.70%) used combination of areca nut and tobacco, however, there was no association between OSMF stages and the habit of areca nut and tobacco use (p=0.752) [Table 2].

Table 1: Demographic information of the patients (n=83)

Variable	No.	%
Gender		
Male	49	59.03
Female	34	40.97
Age		
Teenager & 2nd decade	18	21.67
3rd and 4th decade	42	50.60
5th and 6th decade	23	27.73
Habits		
Areca nut	21	25.31
Areca nut & tobacco	62	74.69
Education		
Uneducated/Primary	44	52.01
Higher Secondary	33	39.75
Graduate	7	8.24
Socioeconomic status		
Low income (< 20,000)	49	59.03
Mid-Income (20,000-50,000)	29	34.94
High-Income (>50,000)	5	6.03

Table 1: Comparison of clinical stages and habits (n=83)

Habits	OSMF			Total	P value
	I & II	III	IV		
Tobacco & areca nut	Nil	30 (73.20%)	32 (76.20%)	62 (74.70%)	
Areca nut	Nil	11 (26.80%)	10 (23.80%)	21 (25.30%)	0.752
Total	Nil	41 (100%)	42 (100%)	83 (100%)	

Table 2: Dependent variable; OSMF advance cases

Binary Logistic Model	B	S.E.	Wald	df	Sig.	Exp (B)
Teens & 20's	-1.62	0.79	4.16	1	0.041	0.20
30's & 40's	-1.16	0.65	3.21	1	0.073	0.31
Gender	1.06	0.54	3.81	1	0.051	2.89
Primary/Illiterate	1.65	1.22	1.82	1	0.177	5.20
Higher Secondary	1.95	1.22	2.56	1	0.11	7.00
Low Income	1.45	0.62	5.45	1	0.02	4.28
Constant	-2.81	1.40	2.40	1	0.121	0.12

The model was fit (p=0.003) and it explains 28% of the variation in OSMF status (Nagelkerke R Square 0.280). Participants from lower income groups were 4.28 times more likely to get OSMF when compared to other socioeconomic groups (p<0.001). Similarly odds for OSMF progression in uneducated and minimal educated people was 5.20 time more as compared to higher secondary group and 7 times higher than in graduates. Odds ratio of OSMF advancement in male was 2.89 times higher than female (p=0.05) [Table 3].
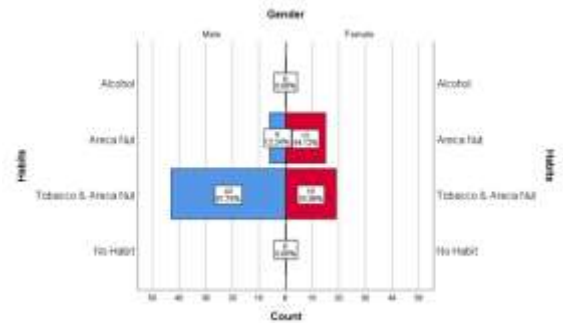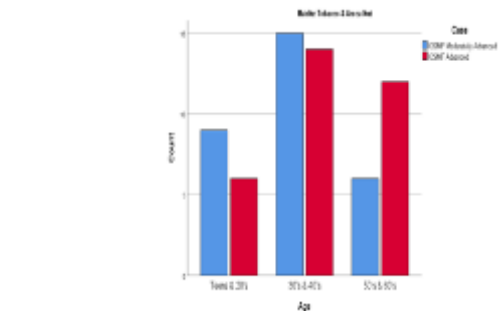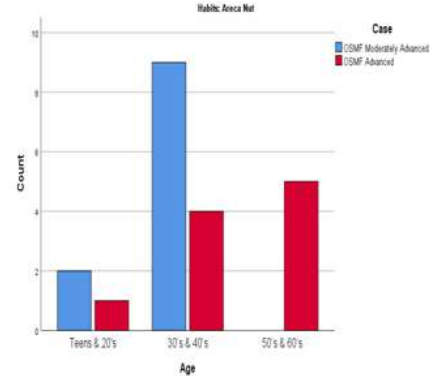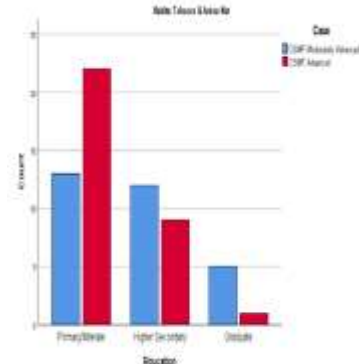

Fig. 1: Diverging stacked bar chart between habits and gender
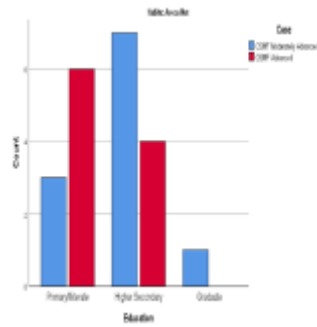

Figs. 2a & 3b Comparison of age with habits
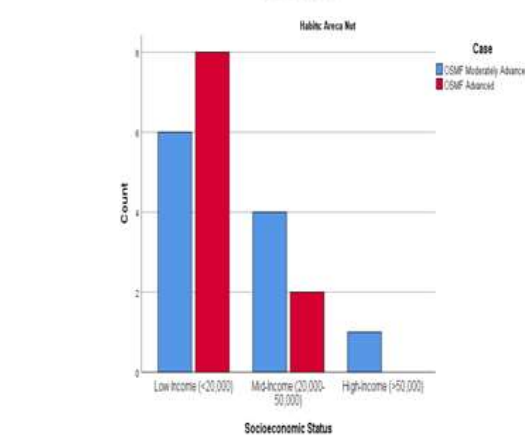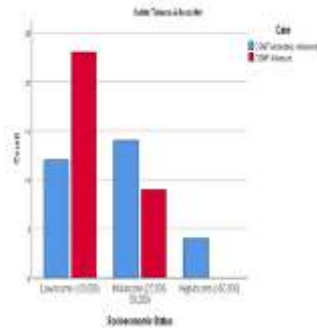
Fig. 3a & 3b: Comparison of education and habits

Fig. 4a & 4b: Comparison of socioeconomic status and habits

DISCUSSION

Oral submucous fibrosis is an insidious, progressive, chronic disease that involves oral cavity and pharynx.[5] It is ajuxta-epithelial inflammatory reaction with fibro-elastic change of the lamina propria, resulting in epithelial atrophy and stiffness of the oral mucosa, thus leading to limited mouth opening and inability to eat.[13] In this study clinical staging was based on Andrade and Khanna's clinical classification of OSMF, where 41 participants presented with stage III OSMF and 42 presented with stage IV. There were no patients with stage I and II OSMF. Reason could be ignorance or lack of awareness for seeking dental consultation earlier instead of only when their mouth opening became limited. These findings are consistent with Salam et al[13], Shaikh et al[14] in both studies most patients presented at stage III and IV, however these findings are in contrast from Kumar[15] in which greater percentage of patients presented at stage II (41.94%).

OSMF is more prevalent in Southeast Asians, with a prevalence rate of approximately 0.2-0.5% in India with higher male predilection.[16] Despite prevalence of OSMF in Pakistan, there is very limited evidence based data available to highlight this PMD. Demographic data obtained from this study was analyzed and compared with literature in South-east Asia, so that the vulnerable group of individuals could be identified to create awareness of risk habits.

In this study, incidence of OSMF was 0.45 % among population visiting a tertiary care dental teaching hospital showing that50.60% patients presented with OSMF between 30-49 years of age. This data is in line with findings of Memon et al[17], in which 61% of OSMF patients belonged to age 31-50 years. However, in the study of Salam et al[13], OSMF was dominant in 2nd decade of life. Similar findings were reported by Saalim et al[18], Hosein et al.[19] According to Merchant et al[20], two decades ago mean age of presentation of OSMF in Pakistan was 48.8±11.6 whereas, in current study the mean age was 30.26±14.12 years. This shows an alarming shift of incidence of OSMF from 4th decade to 3rd decade of life, which might ultimately progress to early malignant transformations resulting in high incidence of OSCC leading to increased morbidity and mortality.

In the present study, there were 59.04% males and 40.96% females with male to female ratio being 1.4:1 which is similar to findings of Tariq et al[17], Hosein et al[19], and Memon et al[21] conducted in Pakistan. However, these findings are inconsistent with recent literature in India as reported by Saalim et al[18] and Gondivkar et al[22], where male to female ratio was 6.4:1 and 7.5:1 respectively. Kumar[15] reported male to female ratio of 21.3:1.

This study showed that habits of patients presenting with OSMF showed 62 (74.70%) patients had a habit of consumption of tobacco and areca nut while 21 (25.30%) patients used areca nut alone. This explains the synergistic effect of tobacco with areca nut showing greater number of patients presenting with OSMF. Out of 21 patients who used areca nut alone, 15 participants were female and 6 were male. The association between gender and using only areca nut was statistically significant (p=0.001) being more common in females.

As far as role of education with use of areca nut and tobacco is concerned, 53% of OSMF patients presenting with history of risk habits were uneducated or had primary education while 38% had higher secondary education and 8.4% patients were graduate. These findings are according to study by Memon et al[17], and Tariq et al.[21] However, results are different from study of Gondivkar et al[22] showed more prevalence in graduates (32.0%).

This study also showed 59% of OSMF patients were from low socioeconomic status. The primary reason of these risk habits particularly in low socioeconomic status, are the properties of areca nut and its similar products and tobacco to increase work capacity, suppress hunger, alertness, and affordable source of entertainment. A systematic review also showed that tobacco use was approximately twice in low-income group as compared to high income. Also, in a multicenter study from India and Bangladesh, risk habits were more prevalent in low socioeconomic status and less education. More than half of patients with chewing habit had no proper education with rural background in a study from Bangladesh.[23]

CONCLUSION

The prevalence rate of 0.45% for OSMF in the population, with high use of areca nut in females, however, in males there was greater use of areca nut in combination with tobacco. Young adults had the highest prevalence for OSMF. Low economic status and minimal education were predictors for increased incidence of OSMF.

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