

PREVALENCE OF ARECA NUT EATING HABITS AND INCIDENCE OF ORAL SUBMUCOSAL FIBROSIS IN SCHOOL CHILDREN- A PROSPECTIVE CROSS-SECTIONAL SURVEY

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ABSTRACT

The objectives: was to study the prevalence of areca nut (Chalia) eating habits and its effects on the incidence of oral submucosal fibrosis (OSF) among school children.

A prospective cross-sectional survey was conducted in schools with a sample size of 1092. All children aged between 6-15 years were included in the study. The cases were diagnosed clinically by a single examiner for the presence of OSF. A questionnaire based on areca nut eating habit got filled. Yates corrected Chi-Square Test was applied between the incidence of oral submucosal fibrosis (OSF) and the frequency, duration and severity of symptoms.

One thousand ninety two (1092) children were surveyed with males 66.5%. A total of 79.6% of children reported areca nut eating habit. The incidence of oral submucosal Fibrosis was 6.6% in school children. Majority of subjects chewed 1-3 sachets daily of areca nut (43.6%). Subjects with 1-6 months duration of habit were 47.1%. There exists a relationship between the frequency and duration of areca nut eating habits with the presence and severity of symptoms of oral submucosal fibrosis ($p=0.001$).

Areca nut eating habit is increasingly becoming prevalent among lower age group of school children. There exists significant relationship between the frequency and duration of areca nut eating habits with the incidence of oral submucosal fibrosis among school children ($p=0.001$).

Key Words: Areca nut, Oral submucosal fibrosis.

INTRODUCTION

Areca nut is a substance of abuse used commonly in Western Pacific and South Asian countries. The fourth most common substance of abuse worldwide and is used by 10% of the world population.¹ Commercially available in various forms, Areca Nut is linked with the Oral Submucosal Fibrosis (OSF). It is a precancerous condition with incidence of 0.5% in general population in India.² It leads to Squamous Cell Carcinoma of oral cavity, pharynx, esophagus and stomach in 7-13% of cases.^{1,3,4} The clinical symptoms of OSF includes ulceration, burning mouth sensation, blanching of buccal

mucosa and gradual decrease in mouth opening. The decrease in mouth opening is due to the formation of fibrotic bands in the oral and paraoral mucosal soft tissues. The inflammatory process in buccal mucosa is exacerbated by a compound called Arecoline which is the main component of Areca nut. This substance causes increased deposition of collagen in lamina propria (submucosal level of soft tissues). The incidence of Oral Submucosal Fibrosis is increasing in children with various case reports in South Asian population.^{5,9} Previous studies done on Oral Submucosal Fibrosis focused on 18-65 years of age groups.^{10,11} Very few studies have been done to find the prevalence of areca nut chewing habits, incidence of Oral Submucosal Fibrosis in school children and the relationship of duration and frequency of areca nut habit and OSF.

METHODOLOGY

A prospective cross-sectional survey was conducted among school children. The sample size was calculated using WHO sample size calculator by keeping the prev-

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absence of Oral Submucosal Fibrosis at 0.5% referenced from previous studies.² The margin of error was set at 0.05 confidence level at 95% and expected response rate at 5% adjusting it for school aged group. The recommended sample size was calculated to be 922. After permission from the Ethical Review Board of Karachi Medical & Dental College, the 3 district union council schools were surveyed by the dental students over a period of 6 months (September 2013-February 2014). The school's principals gave written permission for the survey and notified the parents one week in advance about the dental survey. The 14 item questionnaire was based on open and closed questions related to the habit of areca nut chewing. It was filled by dental students on behalf of the school children after interviewing them. The frequency, duration, reason and preferred method of eating areca nut was inquired. Specific questions linked with the symptoms of oral submucosal fibrosis were also asked. A clinical examination was performed on school children who reported symptoms of oral submucosal fibrosis on the questionnaire. This was performed by a single specialist examiner who was well acquainted with oral lesion in local population. To avoid inter-examiner reliability issues, a single examiner was responsible for final diagnosis of each oral submucosal fibrosis case throughout the study. A brief education program about the hazards of areca nut chewing habits was arranged immediately after the survey. The cases diagnosed at clinical examination were referred for further diagnostic follow up at the local tertiary hospital and the parents were informed in writing about the results of survey. All children attending school from age 6-15 years of age were included in the study. Children with any systemic disease or illness were excluded from the study. The forms filled were entered into SPSS statistical analysis software version 20 (Chicago, Illinois). The descriptive analysis and inferential analysis using Chi-Square test was performed.

RESULTS

One thousand ninety two children were surveyed with a mean age of 10.4 a standard deviation of ± 3.32 years. Males were 66.5% in this study. A total of 79.6% of students reported to have areca nut eating habit. The incidence of Oral Submucosal Fibrosis among school children was 6.6% as confirmed by clinical examination and presence of fibrotic bands in buccal cheek. Table 1 represents the frequency of areca nut sachets usage. Majority of subjects chewed 1-3 sachets daily of areca nut (43.6%) followed by 4-6 sachets daily (16.4%), more than 6 sachets daily (15.4%) and weekly but not daily (4.2%). A total of 20.4% did not have areca nut habit. Table 2 represents the duration of areca nut habit. Subjects with 1-6 months duration of habit were 47.1%, followed by 7-12 months of habit in 16.5%. A total of 12% of subjects had areca nut eating habit for

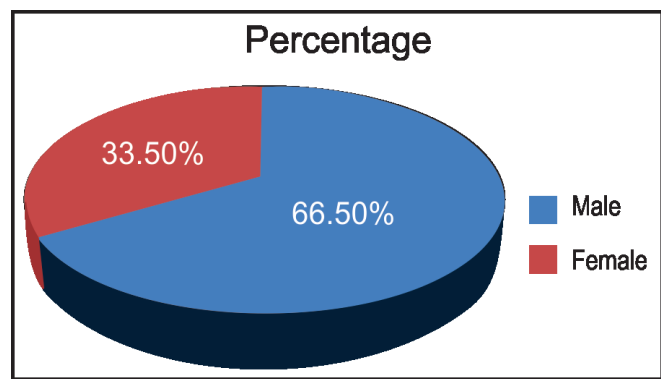


Fig 1: Gender of subjects

TABLE 1: FREQUENCY OF USAGE

Frequency of Sachets	Frequency	Percent
1-3 sachets daily	476	43.6
4-6 sachets daily	179	16.4
More than 6 sachets daily	168	15.4
Weekly but not daily	46	4.2
No usage	223	20.4
Total	1092	100.0

TABLE 2: DURATION OF USAGE

Duration	Frequency	Percent
1-6 months	514	47.1
7-12 months	180	16.5
More than a year	44	4.0
More than 5 years	131	12.0
No usage	223	20.4
Total	1092	100.0

TABLE 3: SEVERITY OF SYMPTOMS

Severity of Symptoms	Frequency	Percent
Burning sensation	38	3.5
Ulceration	34	3.1
No symptom	1020	93.4
Total	1092	100.0

TABLE 4: REASON OF USAGE

Reasons of usage	Frequency	Percent
Tastes good	559	51.2
Used by family/friends	220	20.1
Easily available/low cost	90	8.2
No usage	223	20.4
Total	1092	100.0

TABLE 5: FREQUENCY OF USAGE AND PRESENCE OF SYMPTOMS

Frequency effects on symptom		Symptom present		Total	Yates corrected Chi Square test p Value
		Yes	No		
Frequency of usage	1-3 sachets daily	0	476	476	0.001
	4-6 sachets daily	13	166	179	
	More than 6 sachets daily	59	109	168	
	Weekly but not daily	0	46	46	
	No usage	0	223	223	
Total		72	1020	1092	

TABLE 6: DURATION OF USAGE AND SYMPTOMS PRESENT

Duration effects on symptom		Symptom present		Total	Yates corrected Chi Square test p Value
		Yes	No		
Duration of usage	1-6 months	0	514	514	0.001
	7-12 months	0	180	180	
	More than a year	0	44	44	
	More than 5 years	72	59	131	
	No usage	0	223	223	
Total		72	1020	1092	

TABLE 7: FREQUENCY OF USAGE AND SEVERITY OF SYMPTOMS

Frequency effects on severity of symptoms		Severity of symptoms			Total	Yates corrected Chi Square test p Value
		Burning sensation	Ulceration	No symptom		
Frequency of usage	1-3 sachets daily	0	0	476	476	0.001
	4-6 sachets daily	10	3	166	179	
	More than 6 sachets daily	28	31	109	168	
	Weekly but not daily	0	0	46	46	
	No usage	0	0	223	223	
Total		38	34	1020	1092	

more than 5 years. Only 4% had a habit for duration of more than a year but less than 5 years. The Table 3 represents the severity of symptoms with 38 cases reported burning sensation in mouth on eating spicy food and 34 cases with ulceration in mouth. The Table 4 represents the reason for usage of areca nut, with 51.2% reported good taste as the reason for usage.

Table 5 represents the frequency of usage cross-tabulated with the presence of symptoms of oral submucosal disease and Yates corrected Chi square test applied. A total of 59 cases were reported with the presence of symptoms that were eating more than 6 sachets of

areca nut daily ($p=0.001$). The Table 6 represents the duration of usage with the presence of symptoms and Yates corrected Chi square test applied. All the 72 cases reported with symptoms had the habit of eating areca nut for a duration of more than 5 years ($p=0.001$). Table 7 represents the cross-tabulation of frequency of areca nut usage with the severity of symptoms and Yates corrected Chi square test applied. A total of 59 cases reported with severity of symptoms were consuming more than 6 sachets daily of areca nut ($p=0.001$). The Table 8 represents the duration of usage with the severity of symptom and Yates corrected Chi square test applied. A total of 38 cases reported with burning

TABLE 8: DURATION OF USAGE AND SEVERITY OF SYMPTOMS

Duration effects on severity of symptoms		Severity of symptoms			Total	Yates corrected Chi Square test p Value
		Burning sensation	Ulceration	No symptom		
Duration of usage	1-6 months	0	0	514	514	0.001
	7-12 months	0	0	180	180	
	More than a year	0	0	44	44	
	More than 5 years	38	34	59	131	
	No usage	0	0	223	223	
Total		38	34	1020	1092	

sensation and 34 cases with ulceration that were eating areca nut for more than 5 years ($p=0.001$).

DISCUSSION

Areca nut chewing is an increasingly common habit in South Asia. It is linked with oral submucosal fibrosis (OSF) which is a precancerous oral condition. In this condition, the oral soft tissues become stiff due to increase in collagen deposition in lamina propria. This is a progressive disease with gradual increase in symptoms and signs. Initial symptoms include burning sensation on eating spicy food, vesicle formation which leads to painful ulceration and gradual decrease in mouth opening. In this study we found that males (66.5%) had more prevalence of areca eating habit than females (33.5%). This was reported earlier with Male to Female ratio of 2:1.¹² The mean age of children in this survey was 10.4 ± 3.32 years. Most common age group was 7 years old (15.9%). The 14 and 15 years age group combined were 27.8% of this sample. In this study, 79.6% of the school aged children were found to have areca nut eating habit, with 75.3% eating at least once daily. This was found comparable to a study reported earlier.¹³ The incidence of Oral Submucosal Fibrosis was 6.6% among school children which was comparable to similar studies done earlier.^{11,13,14} No mention about the specific diagnostic criteria was presented in earlier studies. This includes history of burning sensation on eating spicy food, ulceration, blanching of oral mucosa and band formation in buccal mucosa with stiffness. Although restricted mouth opening is also an important symptom of OSF but it is classified as a symptom in later stages of disease.⁷ In this survey, we did not find any subject who presented with restricted mouth opening. A total of 43.6% of children were eating areca nut at 1-3 sachets daily followed by 4-6 sachets daily and more at 16.4% and 15.4% respectively. These results were found comparable to previous study,^{12,13} but the number of sachets used daily and the duration of habit was not studied previously. The high number

of sachets used daily by a majority of school children indicate that areca nut sachets are cheaply and easily available. More than 47.1% of children had a habit of areca nut eating for the last 1-6 months followed by 7-12 months duration of habit by 16.5%. Surprisingly, 12% of the subjects were chewing areca nut for more than 5 years. Marginally more cases were reported who had a history of burning sensation on eating spicy food (38) as compared to ulceration (34). The symptoms criteria were based on the study which presented a scoring system for early detection of oral submucosal fibrosis by a self administered questionnaire.¹⁵ A total of 93.4% of sample population had no symptom history. School friends (36.5%) were among the most common reported person with areca nut chewing habit, followed by neighbor friends (23.6%) and family members (15.6%). In another study,¹² friends (55.1%) were people from whom school children learned to eat areca nut. In this study friends were approximately 60% of the people responsible for influencing areca nut habit if we combine the school friends and neighbor friends. Although majority did not feel any effect if deprived of areca nut (60.1%), 15.8% reported craving for the substance. The lowest age of OSF symptom in this study was found in a 13 year old child. The rest of the cases were diagnosed in 14-15 years age group. A total of 59 cases were reported to chew more than 6 sachets daily. The frequency of usage was significantly and independently related with the presence of oral submucosal fibrosis ($p=0.001$). A total of 72 cases were reported to have OSF symptoms that had the habit for more than 5 years. The duration of habit was found significantly and independently related to the symptoms of oral submucosal fibrosis ($p=0.001$). The frequency of usage daily and the severity of symptoms were also found independently related ($p=0.001$). The duration of habit also reported to be significantly and independently linked with the severity of symptoms ($p=0.001$). These results were comparable to studies done to establish an etiological relationship of oral submucosal fibrosis in adults.¹⁶ The mean duration of

areca nut eating habit alone to develop oral submucosal fibrosis was 10 years in adults. But this study was done in adults and with patients who already had been screened of oral submucosal fibrosis. In this study, we found dint measure the number of years of habit, rather grouped the habit in year categories. Still, all the cases reported with OSF symptom have duration of habit of more than 5 years.

CONCLUSION

Within the limitation of this study, areca nut eating habit is rapidly increasing in school children. There is high incidence of Oral Submucosal Fibrosis (6.6%) in school children. The easy availability, low cost and friends with habits of chewing areca nut habit has an impact on the incidence of Oral Submucosal Fibrosis. The frequency and duration of areca nut eating habit is independently related with severity of oral submucosal fibrosis in low age group children. Alarmingly, high incidence of oral submucosal fibrosis is present in school children. But due to no significant restricted mouth opening at early stage and lack of education about the initial symptoms, majority of cases are insidiously present.

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