

Prevalence of Areca Nut and Smokeless Tobacco Habit among the Youth of Gujarat – A Pilot Study

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Abstract

Introduction: Areca nut is major risk factor for oral cancer; despite that it is the fourth most commonly used psychoactive substance in the world after caffeine, alcohol, and nicotine. Areca nut use is of great antiquity in India. In the past decade, oral cancer has been diagnosed with increasing frequency in young users (<35 years) of packaged areca nut products, bringing the potential carcinogenicity of areca nut into focus.

Method: A total of 150 subjects belonging to the age group of 15–40 were selected by purposive sampling for areca nut habit. The different demographic factors and habit history were recorded and the data were analyzed. **Results:** Areca nut habit was more among the young males (68.6%) with lower education (33.3%) and economic status (65.3%). Community influence (33.3%) during the adolescent (36%) years and commercially available areca nut products (38%) were found as the major contributing factors. Oral submucous fibrosis was the common lesion (58.1%) found among the subjects of this study.

Keywords: Areca nut, Tobacco, Prevalence, Young

INTRODUCTION

Areca nut is major risk factor for oral cancer,^[1] despite that it is the fourth most commonly used psychoactive substance in the world after caffeine, alcohol, and nicotine.^[2] The areca nut, a fruit of oriental palm (areca catechu), is cultivated mainly in India, Malaysia, Polynesia, Micronesia, and most places in the South Pacific Islands [Figures 1 and 2]. The current production of areca nut in the world is about 0.613 million tonnes from an area of 0.476 million hectares. India ranks first in both area (58%) and production (53%) of areca nut.^[3]

Areca nut use is of great antiquity in India. Areca nut is also called “betel” nut in English, supari in Hindi, adike or betta in Kannada, adakka in Malayalam, and pakku in Tamil, is commonly used in India.^[4] It has been mentioned in the Sanskrit manuscripts and used as food, medicine, social, and religious purposes.^[5] Boron nitride is also reported to have varied and widespread stimulating effects such as euphoria, heightened alertness, improved concentrations, relaxations, improved digestions, and diminished hunger. Studies have reported that it may result in a dependence syndrome.^[2,5]

Areca nut is consumed alone or with other products [Figure 3]. It is used in traditional quids (beeda) wrapped in betel leaves (*Piper betle*) or as tobacco and areca nut mixtures. Areca nut

is also used *per se* and available in specialized shops and by roadside vendors, in sachets, as pan masala, and gutka.^[4] The nut itself contains alkaloids, including arecoline, which is thought to be the main contributor to the nut’s stimulatory and toxic effects as described in human studies. Slaked lime acts as a catalyst, enhancing the stimulatory effects of the nut.^[6]

There is widespread availability of areca nut, which is a major public health concern [Figure 4].^[7] Areca nut is the main etiological factor for the development of oral submucous fibrosis, a chronic insidious disease causing fibrosis of the oral cavity which causes stiffness of oral mucosa, increased trismus, and inability to eat.^[8] Furthermore, in the past decade, oral cancer has been diagnosed with increasing frequency in young users (<35 years) of packaged areca nut products, bringing the potential carcinogenicity of areca nut into focus.^[4] Hence, this study was undertaken to understand the reasons

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as well the prevalence of the areca nut usage among the youth of Gujarat.

METHOD

This study consists of 150 subjects between the age group of 15–40 which were selected by purposive sampling. The study protocol followed the principles laid down in the Helsinki Declaration and hence ethical approval for the study was obtained from the Institutional Ethical Committee.

The subjects having a habit of areca nut with or without smokeless tobacco and other products were selected. After obtaining written consent, they were thoroughly examined and detailed history was taken. A specially prepared pro forma for the study was filled. The sociodemographic factors and detailed habit history were recorded in detail. The sociodemographic details were recorded in the following manner:

1. Education levels		
A	Illiterate	If not cleared 10 class examination or left school before that.
B	Metric pass	If cleared 10th class examination only
C	Junior degree	Those who cleared the 12th class only
d	Graduate	Who cleared the college
2. Occupation		
A	No work	House wives, college students, jobless subjects
B	Unskilled work	Not requiring educational qualification – wage workers, farmers, watchmen, waiters, petrol stations workers, mechanics
C	Skilled work	Requires educational qualification – teachers, clerks, etc.
3. Socioeconomic status		
A	Lower	Daily wage income of the house
B	Middle	Fixed monthly income of the house

The habit history factors included type and pattern of habit with exposure duration and frequency. The age of initiation of the habit and the reasons for the habit such as influence from parents or friends, taste liking, increased concentration, enjoyment, helps in digestion, and relieves stress were also recorded.



Figure 1: Oriental palm – Areca catechu (source – Google images)

RESULTS

Table 1 shows the distribution of subjects having habit according to their sex. There are total 103 (68.6%) males subjects in the study with mean of 27.5. There are total 47 (31.4%) females with mean age of 29.2. The male: female ratio in this study is 2.19.

Table 2 shows sociodemographic details of the study subjects. About 24.6% of subjects were 10th fail, 65.3% were 10th pass, and 10.1% were graduates. About 36.6% of subjects did no work, 59.3% were unskilled workers, and 4.0% were skilled workers. About 65.3% of subjects belonged to lower socioeconomic level. About 34.7% belonged to the middle socioeconomic level.

Table 3 shows distribution of subjects according to age of initiation and reason for the habit. About 30.6% began their

Table 1: Distribution of the study subjects according to sex and age

Variables	Males	Females	Total
Total	103	47	150
Percent	68.6	31.4	78
Mean age	27.5	29.2	28.35
Male:female ratio		2.19	

Table 2: Sociodemographic factors of the study subjects

Variables	Frequency	Percent	Valid percent	Cumulative percent
Education				
Illiterate	37	24.6	24.6	24.6
Metric pass	50	33.3	33.3	33.3
Junior degree	48	32	32.0	32.0
Graduate	15	10.1	10.1	100.0
Occupation				
No work	55	36.6	36.6	36.6
Unskilled work	89	59.3	59.3	95.9
Skilled work	6	4.0	4.0	100.0
Socioeconomic status				
Lower	98	65.3	65.3	65.3
Middle	52	34.7	34.7	100.0

Table 3: Distribution of subjects according to age of initiation and reason for habit

Variables	Frequency	Percent
Childhood	46	30.6
Adolescence	54	36.0
Adulthood	50	33.3
Parents/friends	40	26.6
Taste	50	33.3
Digestion	12	13.3
Enjoyment	25	16.6
Concentration	14	9.3
Relieve stress	9	6

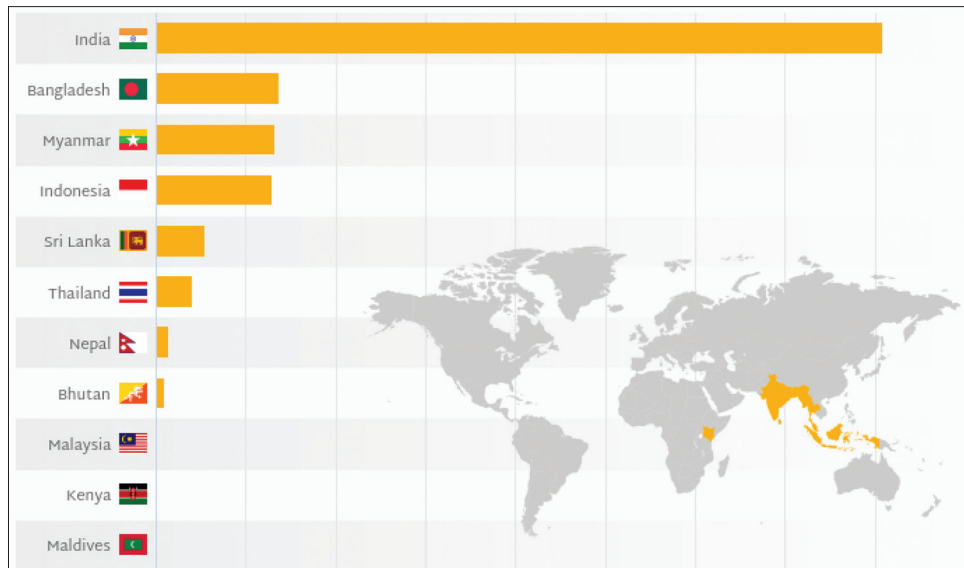


Figure 2: World production of areca nut (source – Goggle images)

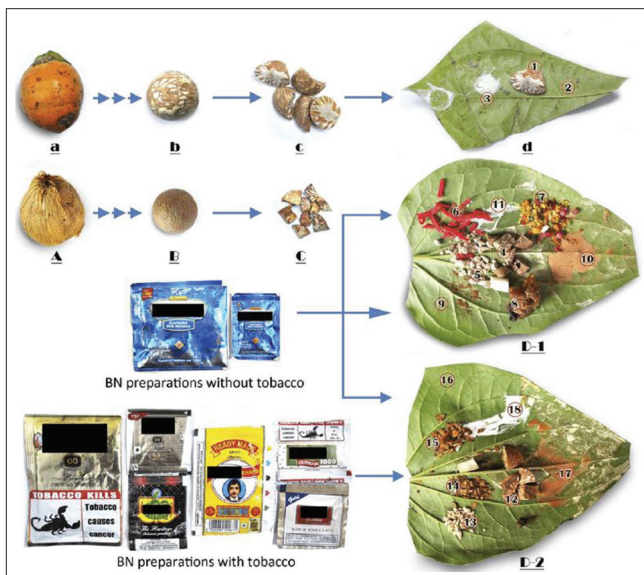


Figure 3: Different areca nut preparations

habit during the childhood, 36.6% during the adolescence years, and 33.3% during the adulthood years. About 26.6% have a habit due to influence from parents or friends, 33.3% have due to liking for the taste, 13.3% have as it helps in digestion, 16.6% have habit for enjoyment, 9.3% have to increase concentration in work, and 6% to help relieve stress.

Table 4 shows distribution of study subjects according to the type of habit. About 32% of subjects had habit of areca nut alone as sweetened supari, 30% had habit of areca nut in the form of mawa and betel quid, and 38% had habit of areca nut and smokeless tobacco available as commercially packaged products (pan masalas) [Figure 5].

Table 5 shows distribution of subjects according to the pattern of habit. About 20.3% had habit of chewing, 86.6% had habit of chewing and placement, and 13.4% had habit of placement.

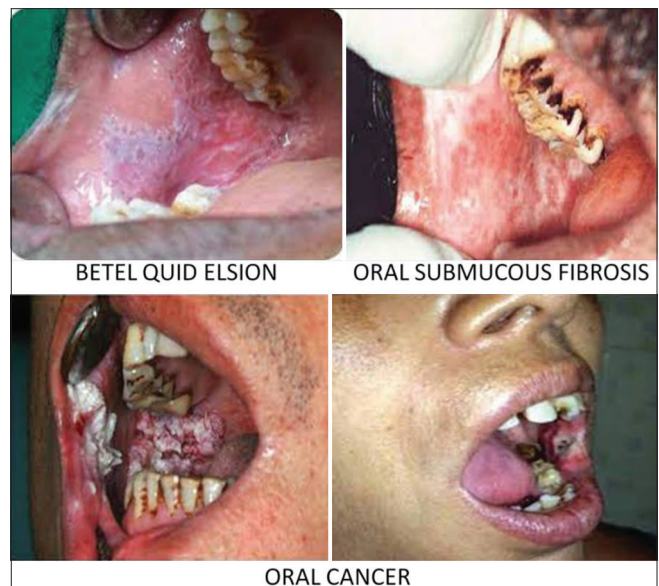


Figure 4: Lesions due to areca nut chewing

Table 5 shows that 92% had habit of 1–5 times in a day, 4% for 6–10 times, and 4% for >10 times. About 74.6% had habit for 1–10 years, 20.6% for 11–20 years, and 4.8% for >20 years. About 56.8% had the habit contents in their mouth for 1–10 min, 38% for 11–20 min, 2.6% for 21–30 min, and 2.6% for >30 min.

Table 7 shows distribution of subjects according to the prevalence of lesions. About 33.3% showed no lesions, 58.1% showed oral submucous fibrosis, and 8.6% showed betel quid lesions [Figure 6].

DISCUSSION

Cancer is not uncommon in India, where the number of people living with the disease is estimated to be around 2.5 million, with over 0.8 million new cases and 0.55 million deaths

Table 4: Distribution of study subjects according to types of habit

Contents	Frequency	Percent	Chi-square	
			Value	P value
Areca nut alone (sweet supari)	48	32.0	13.743	0.008
Mawa (29)	45	30.0		
Betel quid (16)				
Areca nut and tobacco with packaged products (pan masala)	57	38.0		

*P value significant <0.05

Table 5: Frequency distribution of study subjects according to the habit pattern

Habit	Frequency	Percent	Valid percent	Cumulative percent
Chewing	44	29.3	29.3	29.3
Chewing+Placement	86	57.3	57.3	86.6
Placement	20	13.4	13.4	100.0
Total	150	100.0	100.0	

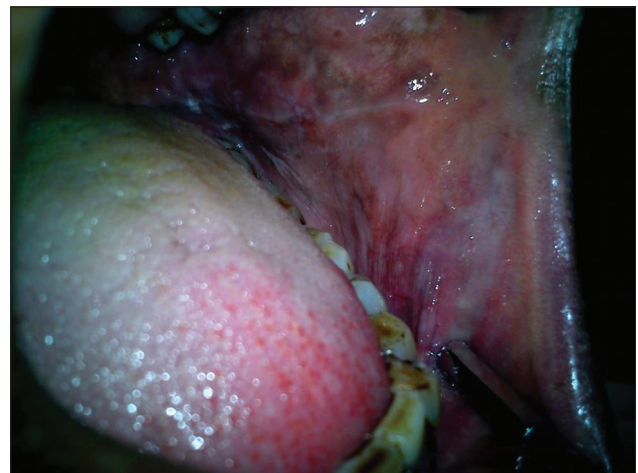
Table 6: Frequency distribution of study subjects according to the frequency, duration, and exposure of the habit

Habit	Subjects	Percent	Valid percent	Cumulative percent
Frequency (times/day)				
1-5	138	92	92	92.0
6-10	6	4	4	96.0
>10	6	4	4	100.0
Duration (years)				
1-10	112	74.6	74.6	74.6
11-20	31	20.6	20.6	95.2
>20	7	4.8	4.8	100.0
Exposure (min)				
1-10	85	56.8	56.8	56.8
11-20	57	38.0	38.0	94.6
21-30	4	2.6	2.6	97.2
>30	4	2.6	2.6	100.0

Table 7: Frequency distribution of study subjects according to lesions

Lesions	Frequency	Percent	Valid percent	Cumulative percent
No lesions	50	33.3	33.3	33.3
OSMF (oral submucous fibrosis)	87	58.1	58.1	91.4
Others – related to quid	13	8.6	8.6	100.0
Total	150	100.0	100.0	

occurring each year. Oral cancer in particular will continue to be a major problem. Crude incidence projections by Globocan demonstrate that oral cancer crude incidence will increase

**Figure 5: Types of habit seen in the study subjects****Figure 6: Study subjects with oral submucous fibrosis****Figure 7: Study subjects with betel quid lesion**

in India by 2020 and 2030 in both sexes.^[9] Areca nut is the major risk factor for oral cancer and global mortality, still it is estimated that 10–20% of the world's population chew areca nut in some form.^[10]

Despite the fact that the oral cavity is accessible for visual examination and that oral cancer and premalignant lesions have well-defined clinical diagnostic features, oral cancers are typically detected in their advanced stages. In fact, in India, 60–80% of patients present with advanced disease as compared to 40% in developed countries. Hence, it is imperative that cost-effective precancerous lesion (OSMF, betel quid, leukoplakia, etc.) and oral cancer screening and awareness initiatives be introduced in high-risk populations such as those found in India to lower the mortality.^[9]

As areca nut chewing is precursor for oral cancer, it is imperative that habit surveillance becomes core in the prevention. Hence, this pilot study was undertaken to screen the young population of Gujarat for the prevalence of areca nut habit and understand the reasons behind the habit.

In this study the distribution of subjects according to sex, revealed that the habit was more prevalent among males. There were 68.6% of males and 32.4% of females in the study.

Hence, the gender frequency distribution demonstrates that there were more males than females had a habit as the male: female ratio was 2.19. Similar findings were also observed by Gupta and Warnakulasuriya in their epidemiological survey of areca nut usage in Asian countries in 2002. In their study, the prevalence of areca nut/betel quid chewing was 34.5% in males and 27.2% in females in India.^[11] These findings are similar to other prevalence studies conducted in 2012. It was found that in India, the prevalence of areca nut chewing nationwide can be estimated at around 30% of men and 7% of women, since the National Family Health Survey found 36.5% of men and 8.4% of women aged 15–49 years chewing some form of tobacco, “including *pan masala*, *gutka*, and other tobacco” (IIPS, 2007).^[12] This could be as the males in Indian society get social exposure, economic independence, and excessive freedom at an early age, consequently, they get addicted to various harmful chewing habits, whereas females being more conscious and uncomfortable to ask the vendors in getting the *gutkha* products.^[13]

Our study report showed that prevalence of habit was more in subjects who had lower level of education followed by illiterate subjects. It was also more among those who were engaged in unskilled work such as laborers, mechanics, and watchmen. These habits were found to be more prevalent in those belonging to lower socioeconomic status having daily wage income. These findings were also observed in other studies.^[4,12,14] Illiteracy or lower education status encourages the development of noxious habits. Lower education is also responsible for lower income jobs and hence lowers socioeconomic status. These factors result in lack of awareness and paucity of knowledge regarding the oral and general health, which cause the individuals resort to habit initiation and dependence.^[9,11]

Identification of timing and reason of habit is very important in terms of future possible public health intervention programs

for harm reduction in same. In our study, it was found that 54% began the habit in their adolescence years. These findings were consistent with other studies.^[14,15] Many reports suggest that chewing sweetened areca nut starts at a young age, and it is being consumed freely by children as it tasted good and has got mild euphoric effects.^[16]

Areca nut has been claimed to produce a sense of well-being, euphoria, warm sensation of the body, sweating, salivation, palpitations, heightened alertness, improved concentration and relaxation, diminished hunger, improved digestion, and an increased capacity to work.^[5] In this study, there were various reasons reported for habit initiation and continuation. The three most common reasons were influence from family and friends. These findings were consistent with other studies and can be explained by social cognitive theory.^[15,17] According to the social cognitive theory, people learn through observation of others.^[18] The subjects picked up the habit of chewing areca nut because it was readily available around the home and at social gatherings with friends and family. Participants learned that it was an acceptable behavior to demonstrate in social situations and somewhat expected.

In this study, the most prevalent habit was of consuming areca nut with or without tobacco and slaked lime available in packaged products.

Usage of arecanut alone or in combination are practiced in different regions in various forms and knowledge of composition and way of practicing the habit is essential, if the health promotion initiatives are to be considered.^[19] Adequate knowledge of ingredients of mixture and eventual implementation of proper recording of the habit definitely leads to thorough understanding of associated oral mucosal lesions and also contributes to the control of oral cancer.^[19] However there is no uniformity or awareness in reporting of these various forms.^[20] In this study we have differentiated the forms of areca nut usage as well the pattern of usage.

In our study, 32% of subjects consumed areca nut alone but in sweetened form. Fresh uncured areca is poisonous, so it is consumed in dried and cured form as thin cut slices.^[3] About 30% consumed areca nut with smokeless tobacco and slaked lime as a mawa mixture or in the form of betel quid without any packaged products, that is, *pan masala*. Mawa is popular in Gujarat, India, especially among the young. The prevalence of this habit increased tremendously in the 1970s and 1980s.^[12] While 38% of subjects used areca nut available in packages as *pan masala*.

Pan masala is a generic term used for areca nut containing products that are industrially manufactured and marketed commercially. It consists of areca nut with other products such as tobacco, slaked lime, and other condiments and flavoring agents such as catechu, mint, menthol, sugar, camphor, aniseed, fennel seeds, cardamom, rose water, cloves, and spices.^[11,19] It is reported that traditional betel quid chewing is becoming less popular in India and more confined to elderly whereas

use of new smokeless tobacco forms like “pan masala/gutkha” (readymade chewable) usage have increased especially among youths, men, children, teenagers, reproductive age group women, Indian immigrants, and medical and dental students.^[1,21,22] These findings were evident in our study as well. Intense promotion and deceptive marketing of putting picture of betel leaf on the covers of the products that are inexpensive, convenient to use have led to increase in their use. Another technique is to give it a catchy name, slogan, or phrase to attract young mind. This is a deliberate marketing technique to impress people because use of betel leaves in the Indian society is culturally, socially, and religiously acceptable.^[23]

In our study, the most common habit is chewing and placement of the betel quid in the vestibule for varying duration and frequency. Due to the constant contact between the betel quid and the oral mucosa, the alkaloids and the flavonoids from the quid are absorbed and undergoes metabolism. These constituents along with their metabolites serve as a constant source of irritation to the oral mucosa. Along with this chemical irritation, the mechanical irritation of the oral mucosa also occurs due to the presence of the coarse fibers in the betel quid. The microtrauma resulting from this continues friction of coarse fibers of areca nut facilitates the diffusion of betel quid alkaloids and flavonoids into the subepithelial connective tissue, resulting in juxtaepithelial inflammatory cell infiltration. Due to the persistent habit of areca nut chewing, chronic inflammation sets in at the site. Inflammation is characterized by the presence of activated T cells, macrophages, etc. Synthesis of various inflammatory mediators like prostaglandins secreted by the oral keratinocytes in response to areca nut extract has been shown.^[24]

In our study according to Table 6, it was found that most subjects had a frequency of habit for 1–5 times a day, with most having a habit for 1–10 years of their life. The time of contact of the habit in mouth was for 1–10 min for majority of the subjects. This substance use initiation and maintenance can be explained by various social learning theories. The theories state that, substance use behaviours are motivated by expectancy reasons: that is, individuals use a substance because of the positive outcomes associated with the use. For example, individuals may continue to use an addictive substance because they like the way the substance makes them feel. Thus, there may be several social, cultural, behavioral, and physiological reasons that influence substance use initiation and maintenance.^[10] Hence, motives such as evasion of boredom, reinforcement, social/cultural, concentration, stimulation, and digestions can be attributed to for the dependence of this psychoactive substance.^[3,11,15]

In our study, not all subjects developed lesions. However amongst the subjects who developed lesions due to the habit, most of them had developed OSMF (oral submucous fibrosis) [Figure 6] followed by quid lesion [Figure 7]. The same findings were observed in their study by Ganapathy KS *et al*, Auluck A *et al*, Zain R B *et al*.^[20,25,26] OSMF is a potentially

malignant disease with an insidious onset of 2–5 years and chronically progressing in severity which leads to oral cancer.
[5,24,27,28]

CONCLUSION

This study was conducted in a very small sample size, however, it can be conclude that areca nut chewing has unique longstanding history of usage in the study area. Areca nut has been found to have strong relation with cultures and social meanings hence its popular in the community and more in the young males. Areca nut available in convenient commercially available packages is a major health concern. The present study has brought out possible future areas of public health researches and interventions in the field of areca nut. Therefore, it is imperative that the policy-makers address such issues.

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