

## RESEARCH COMMUNICATION

# Chewing of Betel, Areca and Tobacco: Perceptions and Knowledge Regarding their Role in Head and Neck Cancers in an Urban Squatter Settlement in Pakistan

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### Abstract

The link of betel, areca and chewable tobacco with head and neck cancers is clearly established. Fifty eight percent of the global head and neck cancers occur in South and Southeast Asia, where chewing of betel, areca and tobacco are common. This study was carried out to establish the pattern of use of Paan, Chaalia, Gutka, Niswar, Tumbaku and Naas among population of squatter settlement of Karachi and to determine the perceptions and knowledge regarding their role in the etiology of head and neck cancers. It was a cross-sectional study, performed at Bilal colony in Karachi. Through systematic sampling, 425 subjects [a male and female from a household] were interviewed with a structured questionnaire. Knowledge regarding etiology of head and neck cancers was classified in ordinals of 'good', 'some' and 'poor', for each substance separately, while practices were classified into 'daily user', 'occasional user' and 'never user'. About 40% of the participants were chewing at least one item [betel, areca or tobacco products] on daily basis. This prevalence was 2.46 times higher among males than females and 1.39 times higher among adolescents than adults. At least 79% of the participants were classified as having poor knowledge about the carcinogenicity of each of these items. Knowledge increased with age and level of education. Health hazards of these items were poorly recognized and about 20% perceived at least one of these items to be beneficial. Positive attitudes were seen regarding the steps to curb the production, business and consumption of these substances. In conclusion, prevalence of chewing of betel, areca and tobacco among adults and adolescent is high. Deficiency in knowledge and wrong perception of favorable effect of chewing products is common. Besides curtailing the availability of chewing products, correct knowledge regarding its ill-effects should be inculcated among population to decrease the burden of head and neck cancers.

**Key Words:** Betel - areca - smokeless tobacco - knowledge - head and neck cancers - Pakistan

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### Introduction

Chewing of betel, areca and tobacco is an integral component of cultural fabric of 20% of the human population. Its use is vehemently acceptable in all age groups where the use is common (Norton, 1997). Very high prevalence of use of betel, areca and tobacco has been reported from several parts of South Asian subcontinent (Gupta, 2004; Qidwai, 2003; Shah, 2002).

Several studies have shown a clear independent link between the use of each of betel, areca and smokeless tobacco with oral submucous fibrosis [a pre-malignant condition with a high transformation rate], oral cavity

cancers, leukoplakias and other head and neck malignancies (Balaram, 2002; Gupta, 2004; Johnson, 2001; Mack, 2001; Merchant, 2000; Nair, 2004; Norton, 1997; vanWyk, 1993). Among Indian population, studies have estimated that 49% of oral cancers among males and 90% among females are attributed to chewing habits (Balaram, 2002; vanWyk, 1993). Another study conducted in Pakistan reported that betel, areca and tobacco chewing leads to 8.5 to 10 times increased risk of oral cancers, after adjusting the other covariates (Merchant, 2000). Consistent with prevalence of the use of chewed tobacco, studies have estimated that 58% of the total worldwide head and neck cancers occur alone in South and Southeast Asia (Ferlay, 2004; Nair, 2004). Incidence rates

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of cancers of the head and neck in both males and females in nearly all urban cancer registries of South Asia are among the highest in the world (Ferlay et al., 2004; Nair, 2004). On the other hand, incidence of head and neck cancers is much lower in western countries where the chewing habits especially that of betel and areca are not common (Bhurgri et al., 2003; Ferlay et al., 2004; Norton, 1997).

In Pakistan and most of other parts of the Indian subcontinent, the most popular chewing products are Paan, Chaalia, Gutka, Niswar, Tumbaku and Naas (Johnson, 2001). There is variation in the ways of preparing these products but the main ingredients always remain betel, areca and tobacco. Paan always contains areca nut, betel leaf and calcium hydroxide, though other ingredients like tobacco and various spices are also commonly added (Mack, 2001). Industrially prepared cheaper substitutes of chewing products having longer shelf life introduced a couple of decades ago contributed to growth in sale and development of export market for these products. These are mixture of areca nut, lime, a catechin containing substance, sandalwood fragrance with tobacco [Gutka] or without tobacco [Chaalia]. Tumbaku, Niswar and Naas contain tobacco as their main ingredient though small proportions of spices, areca and betel are also added. Tumbaku is oral chewable form of smokeless tobacco with sodium carbonate, used with or without Paan and Gutka. Niswar is placed in oral vestibule and is a moist oral snuff of tobacco, lime, indigo, cardamom, oil and menthol. Naas is a similar product of smokeless tobacco with ash, cotton or sesame oil used as tooth powder (Johnson, 2001).

A couple of studies have estimated the prevalence of chewing habits in Pakistan (Qidwai et al., 2003; Shah et al., 2002). A study conducted in Karachi city among hospital out-patients reported 20% and 17% of betel and tobacco chewing, respectively (Qidwai et al., 2003). Very high rates of daily use of betel and areca [74% and 35%] were reported among primary school children, with increasing frequency from lower to higher grades (Shah et al., 2002). However, these studies have taken limited groups [hospital attendees and schoolchildren], and have assessed restricted number of chewing substances.

The head and neck cancers are one of the most common malignancies among both males and females in Pakistan (Bhurgri et al., 2000; Bhurgri et al., 2003; Ferlay et al., 2004). The incidence rate of oral cavity cancer in Karachi city of Pakistan is estimated to be among the highest in the world (Bhurgri, 2005).

Unfortunately, there have been grossly insufficient efforts to control the use of chewing betel, areca and tobacco in Pakistan. Campaigns against cigarette smoking are beginning to gain momentum; however, these alternative chewing tobacco products are often perceived to be safe and daily use commodities. Consequently, there seems to be no move for policy formulation and it is not a priority area of concern for government and communities. In this respect, better estimation of the use of chewing products in the communities will direct the attention of the government

toward this major public health problem. This may help in formulating policies against the production, sale, marketing and consumption of these items. Also, determining the awareness and misconception among the communities regarding health effects of chewing products would provide basis for formulating health education messages and other interventions. With the foregoing objectives in mind, we designed a study to determine the magnitude of use of paan, chaalia, gutka, niswar, tumbaku and naas and the deficits in the knowledge [or misconception] and attitude regarding these products among adolescents and adults in an urban squatter settlement of Karachi.

## Materials and Methods

A cross sectional, house-to-house, knowledge, attitude and practice [KAP] survey was conducted at Bilal Colony, an urban squatter settlement located in the Korangi Industrial area of Karachi. The area represents the low socio-economic group and inhabits diverse ethnicities of Pakistan. One male and one female of age 10 years or above [adolescents and adults] were recruited from each household. Households were selected through systematic sampling. Random selection was made when more than one eligible person were available in a single household.

We needed a sample of at least 382 subjects to fulfill the objectives of the study. Sample size was calculated assuming the 20% prevalence of chewing habits, 80% power, 0.05 significance level and 4% bond on error and adjusting for 5% non-response rate. Verbal informed consent was sought from the subjects.

The information was collected on a pre-tested structured questionnaire [with a few open-ended questions] determining the frequency of use, knowledge and attitude regarding chewing tobacco. Apart from their demographic information, subjects were inquired about their chewing practices of Paan, Chaalia, Gutka, Niswar, Tumbaku and Naas separately. The subjects were classified into 'daily' [average use of once a day or more], 'occasional' [average use of less than once a day or ever used] and 'never' [have not used it in lifetime] users. 'Daily' users were further inquired about their frequency of use per day. Knowledge about the role of chewing products in the etiology of head and neck cancers was assessed by asking to enumerate the potential hazards associated with these substances. Subjects were classified into having 'good' [named head and neck cancers among the potential hazards], 'some' [named any cancer other than head and neck] and 'poor' [named no cancer] knowledge. Other questions were related to misconception about benefits, immediate side effects, addictivity and expenditure incurred by subjects per month on buying chewing products. Attitude of subjects regarding the production, sale, advertisement and consumption of chewing products was also determined.

Data was entered and analyzed in Statistical Package for Social Sciences 13.0 [SPSS 13.0]. Descriptive statistics of socio-demographic information and knowledge, attitude

**Table 1. Socio-Economic and Demographic Features of Adolescents and Adults of the Karachi Squatter Settlement Population**

Gender:	Male 221 [52.2%] Female 202 [47.8%]
Age [Mean(+SD)]:	28.4 [+12.8] Years
Education [Median]:	5 Years
Income [Median]:	4500 Rupees
Ethnicity:	Punjabi 167 [40.0%] Pathan 113 [27.0%] Sindhi 67 [16.0%] Urdu Speaking 40 [9.6%] Balochis 12 [2.9%] Others 19 [4.5%]
Marital Status:	Single 158 [37.4%] Married 250 [59.1%] Widowed 15 [3.5%]
Occupation:	Housewife 159 [37.7%] Laborer 102 [24.2%] Business 46 [10.9%] Student 41 [9.7%] Unemployed 36 [8.5%] Others 38 [9.0%]

and practices of each of chewing products were determined. Univariate analysis was conducted, using chi-square for categorical and student t-test for continuous variables, to look at the association between socio-demographic variables and knowledge and practice of chewing tobacco products, separately. The knowledge about the carcinogenicity of all items was converted into a single composite continuous variable by awarding for each item 1 point for poor knowledge, 2 for some knowledge and 3 for good knowledge and summing them to get a composite score.

## Results

Of the total 425 enrolled subjects, 52.2% [221] were males and 47.8% [202] were females. The mean age was 28.4+12.8 [Mean + SD] years. Fifty-nine percent of the subjects were married. Forty-two percent of the participants did not have any formal education. Mean years of education was significantly higher among males (5.75 vs. 3.44; p value <0.001). Median household income per month was Rs. 4500 (~US \$ 75). Muslims constituted 96.8% of the participants. Punjabi, Pathan, Sindi and Urdu speaking ethnicities comprised 40.0%, 27.0%, 16.0% and 9.6% of the study population, respectively (see Table 1).

More than 95% participants had heard of Paan, Chaalia, Gutka, Niswar and Tumbaku, while about 45% knew about Naas. Family and friends for most [95.1%] while media [12.5%] and academic activities [2.4%] for some were the main sources of information regarding chewing products. Proportion of people believing that the use of these items carry benefits, health hazards, immediate side-effects and

the knowledge about their role in the etiology of head and neck cancers has been summarized in Table 2.

At least one item was perceived to be beneficial by 20.7% [88] of the study participants. Beliefs that these substances 'taste good', 'give a feeling of well-being', 'aid in digestion of food', 'give fresh breath' and 'strengthen teeth and gums' were the most common reasons cited for their use. Naas was also thought to be 'the remedy for flu'. The health hazards common to all of the study items cited by the study participants were 'pulmonary diseases', 'cardiovascular diseases', 'gastrointestinal diseases' and 'dental caries'. Besides, the Chaalia was perceived to cause particularly 'stone diseases' by a large number of respondents, i.e. kidney stones [23.5%] and gall stones [9.4%]. Several participants [3.3%] also perceived that kidney stones were caused by Gutka. Additionally, many subjects [4.9%] considered Tumbaku to cause Tuberculosis. The common immediate side-effects listed by the population were 'dizziness', 'anxiety', 'breathlessness' and 'abdominal pain'. In addition to these, 'drying of mouth and throat' was reported as a result of the use of Chaalia.

About 86% of study participants believed that these chewing substances were 'addictive'. About 9% of subjects thought that chewing substances were 'not addictive' and 6% 'did not know' about the addictive potentials. About 77% of subjects thought that 'quitting was possible', 8.5% thought that 'quitting was not possible' and 3.8% were 'not sure about quitting'. The most commonly listed interventions which could help people to quit these substances were 'personal motivation', 'alternate recreations', 'encouragement', 'awareness campaigns' and 'rehabilitation'.

Use of these items was considered as a source of 'embarrassment' by about 66.1% of the study subjects. About 81% of the study subjects said that health care workers 'always actively discourage' the use of these items, while the rest thought that they 'never or sometimes discourage' the use. Majority of the subjects [89.6%] were of the opinion that these items 'should not be allowed among adolescents'. About 84% and 91% favored the banning of advertisements and businesses, respectively, of these chewing products.

Table 3 summarizes the overall and separate prevalence of use of all the studied chewing substances in the population by classifying them into 'daily users', 'occasional users' and 'never users'. Mean number of times the substances were used in a day is also given with 95% confidence interval. Overall, 40% [170] of the participants were using at least

**Table 2. Perceptions and Knowledge about Role of Chewable Products in the Etiology of Head and Neck Cancers among the Karachi Squatter Settlement Population [n=425]**

	Heard of	Perception			Knowledge		
		Beneficial	Hazardous	Has Side effects	Good	Some	Poor
Paan	419	35	233	106	50	39	336
Chaalia	421	50	285	123	43	26	356
Gutka	414	16	178	107	50	32	343
Niswar	421	28	149	109	21	7	397
Tumbaku	417	16	158	99	14	35	376
Naas	194	8	31	19	4	5	416

**Table 3. Pattern of Use of Chewable Products among Karachi Squatter Settlement Population**

	Never [%]	Occasion [%]	Daily [%]	Freq [95% CI]
Paan	273 [64.2]	120 [28.2]	32 [7.5]	7.3 [4.7,9.8]
Chaalia	172 [40.5]	164 [38.6]	89 [20.9]	6.7 [5.4,8.1]
Gutka	368 [86.6]	22 [5.2]	35 [8.2]	7.5 [5.3,9.8]
Niswar	331 [77.9]	25 [5.9]	69 [16.2]	14.6 [11.0,18.3]
Tobacco	374 [88.0]	19 [4.5]	32 [7.5]	9.1 [6.3,11.8]
Naas	417 [98.1]	6 [1.4]	2 [0.5]	9.0 *
Overall	108 [25.4%]	147 [34.6%]	170 [40.0%]	14.2 [11.6,16.8]

\* No CI [Confidence Intervals] could be calculated due to the same Freq in all cases

**Table 4. Predictors of Daily Use of Chewing Products among the Karachi Squatter Settlement Population**

	Univariate OR [95% CI]	p-value
Male/Female	2.46 [1.64,3.68]	<0.001
Adolescent/Adult	1.39 [0.89,2.16]	0.146
Education	1.00 [0.96,1.04]	0.853
Knowledge	1.01 [0.92,1.11]	0.821

OR, Odds Ratio; CI, Confidence Interval; Knowledge, Knowledge about role in carcinogenicity

**Table 5. Predictors of Knowledge Regarding the Carcinogenicity of Chewable Products among the Karachi Squatter Settlement Population**

	Beta	B	[95% CI]	p-value
Male/Female*	7.34/7.02	0.320	[-0.081,0.719]	0.117
Age	0.106	0.017	[ 0.002,0.033]	0.030
Education	0.232	0.105	[ 0.063,0.148]	<0.001
Frequency	-0.020	-0.003	[-0.021,0.016]	0.792

Beta; Standardized correlation coefficient, B; Unstandardized correlation coefficient. For \*, Beta; Mean knowledge of Male/Female, B; Mean Difference between the knowledge of males and females

one of the chewing substances on daily basis. Mean expenditure of the participants per month on these substances was Rs. 119 [~US \$ 2]; more than 6 times higher among males than females [206 (US\$3.5) vs. 33 (US\$0.5); p-value <0.001].

Table 4 shows age, male gender, years of education and knowledge about the role of chewing habits in the etiology of head and neck cancers as predictors of the daily use of one or more of the substances. Overall, the use of all products was 2.46 times more common among males. Daily use of the substances was 1.39 time more common among adolescents than adults, though the difference was not significant statistically. No change in the chewing habits of participants was observed with increasing education and awareness about the carcinogenicity.

Table 5 shows gender, age, number of years of education and frequency per day among daily chewers as independent predictors of the knowledge of the carcinogenicity of betel, areca and tobacco products. Increasing age and years of education significantly increased knowledge about the role of these products in the etiology of head and neck cancers.

## Discussion

Socio-economic and demographic data of the study population typically represents a multi-ethnic, low socio-economic group of Pakistan. As larger proportion of Pakistani population belongs to this less privileged section and chewing habits are more commonly practiced by this disadvantaged segment of the society (Mack, 2001), such a population readily makes an ideal choice for the study we have conducted.

The prevalence of chewing habits among the lower socio-economic strata of Pakistan studied in our study was very high as 40% of the participants were using at least one of the items under investigation on daily basis. Prevalence was 2.46 times higher among males than females and 1.39 times higher among adolescents than adults. Daily use of chaalia was the highest [~21%]. For every item, at least 79% of the participants had 'Poor Knowledge' about the carcinogenicity of these products. Increasing age and education were positively associated with better knowledge.

With the exception of Naas, almost all of the participants had heard about all the chewable products of betel, areca and tobacco. The perception of the people about the chewable products was based on incorrect information and all the chewable products were perceived to have some benefits. The reported benefits were similar to those reported in studies carried out in Indian and Bangladeshi populations (Ahmed et al., 1997; Anwar et al., 2005; Summers et al., 1994). Apart from recreational use, beliefs about the medicinal benefits of these substances certainly constitute an alarming situation. The proportion of people who develop the habit after using these products as a home remedy for digestion, toothache and common cold, remains to be determined. 'Family and friends' were responsible for the introduction of these items to more than 95% participants in our study. Therefore, interventions can be directed towards educating the families regarding the harmful effects of these substances and also to correct misinformation.

The misperceptions of the study population about the immediate side-effects and long term health hazards were interesting to note. Some ill-effects on health were associated generally with all of these items while others were more specific. Very few participants could list any ill-effects of Naas on the health. This is because only a small proportion of the participants were familiar with it. Due to the lack of any comparable data about the effects of misconception, we shall confine our discussion to the knowledge of participants about the role of these items in the etiology of head and neck cancers. However, in any event, these misconceptions are causing much harm in promoting the use of chewing products.

At least 79% of the participants were classified as having 'poor' knowledge about the carcinogenicity of each of these chewing substances. This is worse than the level of knowledge reported in some other populations (Patton et al, 2004; Seth et al., 2005). After Naas, knowledge about the role of Niswar was most unsatisfactory, as only 6.6% people

thought that its use can lead to any cancer. However, unlike Naas, more than 99% of the participants were familiar with Niswar. Though only 2.4% of the participants in our study considered academics as a source of information regarding these substances, level of education was a significant predictor of the better knowledge. A study from India also reported similar association of knowledge about the cancers with the level of education (Ray, 2004).

About 40% individuals were chewing at least one item on daily basis. A study conducted among Asian in UK reported 32% prevalence of regular chewing (Vora et al, 2000). Moreover, in our population overall mean frequency of use among daily chewers was higher than the individual frequency of most items, indicating that more than one substance was being used on daily basis among most daily chewers. Male gender and adolescent age group were the main identified risk factors for the daily use of chewing substance. These findings are in coherence with those reported in other studies from Asian subcontinent (Anwar et al, 2005). Males have social freedom and easy access to available chewable products. This finding also explains higher age standardized incidence rates [ASIR] per 100,000 among males than females for oral cavity/pharynx cancer [30.7 vs. 23.5] and laryngeal cancers [8.5 vs. 1.5] (Bhurgri, 2004; Ferlay et al, 2004). Similarly, children and younger people are more likely to get exposed to these products, and this exposure leads them to develop the lifelong habit.

The lowest mean frequency of use per day for any substance was 6.5, which hints towards the addictive potential of these substances. Chaalia was the most common substance of daily use. This is an important finding to support the idea that industrially processed products packed in attractive sachets are gaining more popularity and acceptability than conventional products. Niswar was the second most commonly used product because it is considered a 'benign chewing product' by most of the population. The frequency of use of Niswar per day was the highest among all the products.

Positive attitudes were identified among the study participants regarding these substances. Most participants identified the use of these substances to be addictive and embarrassing and favored banning their use among adolescents, their advertisements and their production, sale and consumption. In recent years, several states in India have banned the advertisements, sale, manufacture and storage of smokeless tobacco and areca nut products. In May 2003 in India, the Tobacco Products Bill 2001 was enacted to regulate the promotion and sale of all tobacco products (Gupta and Ray, 2003; Kumar, 2002). Similar measures are required to curb the use of these items in Pakistan. Moreover, mass campaigns about the health hazards of these items can also be effective as has been proven by interventional cohorts in India (Gupta et al., 1986a; Gupta et al., 1986b; Gupta and Ray, 2003). However, health care professionals, media and government have to be proactive to organize their efforts in this regard.

In conclusion, high prevalence of daily use of products

of betel, areca and smokeless tobacco have been identified in an urban squatter settlement in Pakistan. The knowledge about the carcinogenicity of these items among the studied population was poor. Most of them had misconceptions or they were ill-informed. However, positive attitudes were identified regarding the measures to restrain their production, marketing and use which should be used to facilitate the formulation of policies against these items.

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## Conflict of Interest

We declare no conflict of interest.

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