

Original Research Article

## Betel Nut Chewing Habit and Its Determinants among Adolescent Boys and Girls in an Industrial Town of Assam, India

Beauty Mahanta<sup>1</sup>, N Phukan<sup>1</sup>, PK Mohapatra<sup>2</sup>, J Mahanta<sup>2</sup>

<sup>1</sup>Department of Zoology, Duliajan College, Dibrugarh, Assam, India.

<sup>2</sup>Regional Medical Research Centre for Northeast India, Indian Council of Medical Research, Dibrugarh, Assam, India.

Corresponding Author: Beauty Mahanta

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### ABSTRACT

**Background:** Areca nut in betel quid is a chemical carcinogen and its significant association with cancers of oral cavity, upper Gastro intestinal tract and metabolic syndrome has been documented. Such cancers and hypertension are very high in Assam and betel nut chewing is also rampant.

**Objective:** To study the prevalence of betel nut chewing habit and its determinants among adolescent in Assam, a cross sectional study was done in 20 schools covering 1285 students in and around an industrial town.

**Material and methods:** A self answered predesigned questionnaire was used with the informed written consent from the Principals of the institute. Data were analysed in Epi-info 17 and SPSS-17.0.

**Results:** Prevalence of betel nut chewing without tobacco and with tobacco was found to be 72.1% and 10.9% respectively among the adolescent. Age of start was as low as 3 years of age. Most (54.9%) of the students gave history of chewing dry betel nut (*Supari*) followed by underground betel nut (14.3%), raw green betel nut (7.5%) and ripe betel nut (4.6%). About 4.2% keep the betel quid after chewing within the oral cavity for long time and 27.9% students swallow the quid. Location of school, age and sex were the major determinants for betel nut chewing. Influence of close friends was significant (OR-2.137; CI 1.313-3.477; p<0.01).

**Conclusion:** Very high prevalence of betel nut chewing among adolescent is relevant in the context of high prevalence of hypertension and cancer of upper gastro intestinal tract in Assam.

**Key words:** Adolescent habit, Betel nut chewing, Cancers of oral cavity, Cancer oesophagus, Hypertension.

### INTRODUCTION

Betel (areca) nut chewing is one of the top five oral habits in the world and about 200- 600 million people across the globe chew betel nut. It is a popular oral habit in Taiwan, India, Sri Lanka and many Southeast Asian countries. [1,2] It is chewed as raw along with betel leaf with or without slaked lime. Processed and scented preparations of betel nut are also chewed in various parts of India. Areca nut

in betel quid has been reported to be chemical carcinogen. [2] Meta-analysis of 12 case-control studies showed that areca nut chewing was significantly and independently associated with an increased risk of oesophageal squamous cell carcinoma in Asians. Moreover, risk of oesophageal squamous-cell carcinoma increases manifold in individuals who indulge in both areca nut chewing and tobacco smoking. [3] Study from Assam

also showed that betel nut chewer has higher risk of developing oesophageal cancer and the risk increases when chewed along with tobacco. [4] Tobacco and areca nut chewing together or with other ingredients has the potential for reproductive toxicity. [5] Further, areca nut (betel nut) chewing might be associated with metabolic syndrome and cardiovascular diseases (CVD). Low dosage of betel nut was found to be associated with hypercholesterolemia in experimental rats. [6] Studies have shown that habitual use of betel nut has several significant adverse effects on health, like cancers of oral cavity, oesophagus, stomach, liver, prostate, cervix and lungs, [7] many chronic non-communicable diseases, like obesity, type 2 diabetes mellitus, hypertension, hyperlipidemia, metabolic syndrome and cardiovascular disease. [8-10]

In north eastern part of India people use betel nut in four different forms viz: raw tender green nuts after removing outer pericarb, raw ripe nuts after removing outer pericarb, ripe nut cut into pieces and dried in sun (called "*Supari*") or processed, ripe nuts kept soaked in water for few days till the outer pericarb is rotten or put underground along with cow dung for 2 to 3 months till the outer pericarb is rotten. Nut is taken with betel leaf (piper leaf) with or without slaked lime. Some people chew tobacco along with betel nut. Betel nut is commonly known as "*Tamol*" in Assam, India. Adult as well as many young children chew betel nut and perhaps carry this habit for later life and also adapt to other addictive habits including tobacco use.

Cancer of oral cavity and oropharynx is very high in Assam as a whole and Dibrugarh District in particular. Oesophageal cancer is among the top 10 cancers in both sexes and is higher than other parts of the country. [11] Cardiovascular diseases is specially hypertension is reported to be very high among the

people of Assam. [12,13] Betel nut chewing is rampant (which includes very young people) in the states of Assam and Meghalaya, India. [4] A high proportion of adolescent boys and girls use areca nut daily in some form or other in Assam.

Adolescence being the formative period of life, boys and girls start the habit due to peer pressure, household influence, parental influence, inquisitive nature and with intention to experiment. Substance abuse is reported to be more in industrial towns. Easy access to illicit substances, pocket money and other factors, in industrial towns make the adolescent boys and girls vulnerable for substance abuse habits.

Duliajan is one of the most prosperous towns in Upper Assam associated with hydrocarbon (Crude oil) exploration, production and transport. Employees and officers along with their family mostly stay in Duliajan Township. Not much data is available on the status of substance abuse among the youth in this part of the country especially in industrial town where there is much vulnerable population. Since substance abuse starts in adolescence and youth, the present study has been planned to bring out a status report on substance abuse among the school and college going youths of the township.

With this background a cross sectional study was designed to study the prevalence and pattern of substance abuse among adolescent school and college going students, along with its determinants, in and around the industrial township of Duliajan.

## **MATERIALS AND METHODS**

**Selection of site:** For the study, Duliajan, an industrial town of Assam, was selected purposively to study the prevalence and pattern of substance use among adolescent school/college going students. Duliajan is a planned town located in Dibrugarh District of Assam. Employees with family

members and people associated with a hydrocarbon exploration, processing, and storage and transportation industry reside in this township. The town has full-fledged educational and other civic amenities.

**Sampling:** The list of schools and colleges situated in and around the industrial township of Duliajan having adolescent boys and girls (of class IX to XII) was collected from the office of the Inspector of schools. A total of 20 eligible schools and colleges (>95%) were selected purposively for sampling, on the basis of consenting head of Institute and operational feasibility. The survey was planned across the Schools/ Colleges to cover the adolescent students. The selected schools/ colleges were visited as per the plan. Fourteen schools located within Duliajan Township (counted as urban school for analysis) and 6 schools located outside the township in rural localities (counted as rural school). A total of 1285 students were interviewed during the study period.

**Preparation and validation of questionnaire:** A questionnaire was designed to elicit the appropriate response from young students. The questionnaire was designed to elicit the information about limited demographical information, habit of substance abuse (ever use), type of substance used, age at start, duration, frequency etc. without disclosing the identity. Details of habit of betel nut with or without tobacco (along with other substance), if any. Peer pressure for starting betel nut use if present. Parental information of education and habit etc. A subsample of students were asked about the availability of pocket money and analyzed to see its correlation with substance abuse.

The questionnaire was pretested for completeness and compliance among 20 students of the study area. Partial modification was done after the pretesting result. Since the educational institutes were located in an Assamese speaking area

and medium of instruction of most of the school were Assamese or English, the questionnaire was prepared in a bilingual format (Assamese and English). Of course help of interpreter was taken for exclusive Hindi and Bengali speaking students.

**Following working definitions were adopted for the study**

**a. Substance user:** All students who responded positively for using the substance even once in the past were included as user.

**b. Habit of substance use:** All students who responded as current or past user of any of the substances were interviewed to illicit the information about frequency of use, duration and age at start and cessation of the habit (if stopped).

**c. Parent, peer information and pocket money:** Parents education and habit of substance use, influence of peer, and availability of pocket money were asked to every alternate student and recorded as per the discloser of the student during interview.

**For data collection** Schools/ Colleges were visited several times for permission from the head of Institute, awareness generation among students and actual data collection. Awareness lectures were arranged in the school. A question answer session was also kept after the deliberation to clarify the queries of the students. After the awareness lecture and procedure to fill up the questionnaire, a self answered common Performa was introduced among the students in a closed room. Lecture was delivered to apprise the students about the anonymity and unlinked nature of the survey and how to fill up the questionnaire. All students with positive history of any substance intake were interviewed separately by the investigators for filling of rest of the questionnaire.

Students were also counselled for quitting the habit or not to start the habit (if not started) after the interview. More than 95% of schools in and around Duliajan were covered having students of

Class IX to XII. All the approached school/colleges were very cooperative and refusal rate among students was nil. Data was collected in anonymous format. However, informed consent was taken before interview.

**Data analysis:** For analysis of age, respondents were divided into two groups, below 15 years and more than or equal to 15 years. Analysis was also done for sexes. Students were also segregated into two groups according to location (Within Duliajan town and around the town) of schools. For analysis Epi-info 17 and Statistical Package for Social Sciences (SPSS-17) were used to determine frequency distribution and association with different risk factors.

## RESULTS

There were about 1400 eligible students in the selected schools/junior colleges. However, 1285 students could be interviewed because of absentees. Of course there was no refusal. Most frequently encountered substance use habit among students was use of Betel nut without tobacco (72.1%). Tobacco chewing with betel nut was about 10.9%. Though betel nut chewing alone was equal in both sexes yet use of tobacco with betel

nut showed significant male preponderance (**Table-1**). Mean age at start of betel nut chewing was as low as 4 years. Initiation to tobacco chewing with betel nut was also found to be as low as 5 years (**Table-2**).

Most (54.9%) of the students gave history of chewing dry betel nut (*Supari*) followed by underground betel nut (14.3%), raw green betel nut (7.5%) and ripe betel nut (4.6%). Many (5.5%) of them gave history of chewing all varieties of betel nut. About 4.2% keep the betel quid after chewing within the oral cavity for long time and 27.9% students had the habit of swallowing the quid after chewing.

Multiple regression analysis for risk factors showed location of school, age and sex as major determinant. Students from schools located in rural areas chew more in comparison to urban areas (OR-1.582; CI 1.21-2.07; p<0.00). Students aged >15 years indulge less in betel nut chewing than those < 15 years of age. Close friend forcing to take substance influences the habit of students (OR-2.137; CI 1.313-3.477; p<0.01). Present study showed that mother's habit of substance use played significant role in substance use of the adolescent (**Table-3**).

**Table1: Age and sex wise distribution Betel nut with or without tobacco and tobacco chewing habit among adolescent boys and girls**

Betel nut and tobacco chewing habits	Category	Number of individuals	Age duration		Chi-square (p value)	Sex		Chi-square (p value)
			<=15 years	> 15 years		Female	Male	
Betel nut and leaf with or without tobacco	Yes	<b>926 (72.1)</b>	445 (78.3)	481 (67.2)	19.64 (0.00)	434 (69.7)	492 (74.4)	3.62 (0.057)
	No	358 (27.9)	123 (21.7)	235 (32.8)		189 (30.3)	169 (25.6)	
	Total	1284	568	716		623	661	
Betel nut and leaf with tobacco	Yes	<b>140 (10.9)</b>	57 (10.0)	83 (11.6)	0.82 (0.36)	31 (5.0)	109 (16.5)	44.02 (0.00)
	No	1142 (89.1)	511 (90.0)	631 (88.4)		592 (95.0)	550 (83.5)	
	Total	1282	568	714		623	659	

**Table2: Age at start, stop and duration of betel nut use habit with or without tobacco among adolescent boys and girls**

Betel nut and tobacco chewing habits	Description of Habit	Number of individual	Minimum	Maximum	Mean	Std. Deviation (±)
Betel nut and leaf with or without tobacco (n=926/1284)	Age at start	724	4	17	11.77	2.475
	Current user	465				
	Age at stop	259	5	20	14.49	2.150
	duration	871	1	13	4.03	2.406
Betel nut and leaf with tobacco (n=140/1282)	Age at start	123	5	17	12.73	2.354
	Current user	78				
	Age at stop	45	10	18	14.76	2.080
	duration	121	1	10	2.76	1.971

**Table-3: Risk factors associated with habit of taking any substance (other than alcohol and tobacco) by children**

Risk factor	Category	N	Freq (%)	Crude OR	Adjusted		
					OR	95% C.I.for EXP(B)	
						Lower	Upper
Location	Urban	901	400 (44.4)	1	1		
	Rural	384	229 (59.6)	1.85	1.582	1.210	2.070
Age	<= 15 years	568	328 (57.7)	1	1		
	> 15 years	717	301 (42.0)	0.529	.588	.462	.748
Sex	Female	623	362 (58.1)	1	1		
	Male	662	267 (40.3)		.430	.336	.549
Close friend takes any substance	No	866	423 (48.8)	1	1		
	Yes	397	192 (48.4)	.981	1.084	.822	1.430
Close friend forces	No	1180	563 (47.7)	1			
	Yes	92	56 (60.9)	1.705	2.137	1.313	3.477
Father's habit	No	276	119 (43.1)	1			
	Takes alcohol	133	58 (43.6)	1.020	.864	.553	1.352
	Takes Tobacco	253	119 (47.0)	1.172	1.021	.705	1.477
	Takes Both	611	323 (52.9)	1.480	1.059	.766	1.465
Mother's Habit	No	661	275 (41.6)				
	Takes alcohol	55	32 (58.2)	1.953	1.713	.954	3.077
	Takes Tobacco	322	164 (50.9)	1.457	1.274	.948	1.712
	Takes Both	234	147 (62.8)	2.372	1.791	1.263	2.540

A sub sample (n=586) of students especially reading in urban school were asked about pocket money. But no statistically significant difference could be found among the students receiving different amount pocket money.

## DISCUSSION

In the present study students were given option to respond against the habit or experience of using 14 different groups of substances along with an open ended question of any other substances. Most frequently encountered substance use habit among students was use of Betel nut without tobacco (72.1%) and was in equal frequencies among both the sexes. The prevalence of areca nut chewing was very high in comparison to any other contemporary studies. Globally it was estimated that areca nut chewers are about 600 million users. [14] Raghavan and Baruah (1958) [15] quoted Marco Polo (1298) who wrote in his travelogue "the people of India have a habit of keeping in their mouth a certain leaf called "tambul".

It has been reported that approximately 50% of tobacco user chewed betel quid in Ernakulam District of Kerala. [16] However, most students in this present study used raw betel nut. [17] In a study conducted among school going children of Indore found 27.06% of them

were chewing betel nut. Among them boys were more than the girls. Most of them used sweetened and flavoured form of areca nut. [18] Present study showed significantly high prevalence of betel nut chewing among the students from schools located in rural areas. Study conducted in Indore also showed more than two time higher prevalence among school students of rural areas. (45.42% vs 20.09%). [19]

From a study in Bangladesh it was found that 33.2% chewed betel nut as against our finding of 72.1%. In the present study it was observed that 10.9% of students chew tobacco with betel nut. However, in Bangladesh they have found tobacco chewing along with betel nut is as high as 82.5%. Findings of present study also support the increased prevalence among younger students. With increase of age, perhaps people gradually leave the habit of betel nut chewing but tobacco chewing remains unaltered. Of course the conclusions of the Bangladesh study that betel nut chewing as a contributory factor of high blood pressure among women is more significant from public health context. [18] Though there is no published data for adolescent boys and girls from this part of the country yet common observation and indirect evidences with high prevalence of cardiovascular diseases [12] and cancers of oral cavity and



oropharynx [11] and oesophagus [4] among the people and their association supports the hypothesis.

Betel nut use is an integral part in social and religious functions in north eastern part of India. Lack of awareness about its harmful effects has contributed in higher use of betel nut by younger people. As this is a socially acceptable habit, elders also show indifference toward this habit. Further, betel nut or its products are easily available even in the small shops. Betel nut chewing is addictive like any other substances. Betel nut and betel leaf offering to guest and in religious and social function is a common custom in Assam. Therefore social acceptance is widespread. This might have contributed to very high prevalence of this habit.

Parents and peer behaviour influences the young mind for their substance use habit. Father and mother's indulgence in taking tobacco, alcohol or both were found to have increasing trend of substance intake by their siblings. Mother's habit of substance abuse influences comparatively more the siblings for the habit. This is perhaps due to availability at household and lack of social inhibition at home or society. Similarly close friend indulging in substance intake or forcing them have an increasing influence on the adolescent boys and girls like any other substance use. Similar parental and peer influences have been reported elsewhere. [20]

While betel nut chewing alone was equal in both sexes yet betel nut with tobacco showed significant male preponderance. Mean age at start of betel nut chewing was as low as 3 years. Initiation to tobacco chewing with betel nut was also found to be very low (4 years). Cultural and social acceptability might have contributed to the early induction to the habit in the society.

The limitations of the study were that the study was a school based and had access to only defined population. Number

of schools outside the industrial town was limited to 6 only. Further, our data collection was purposive and targeted to students of class IX to XII. We might have missed some studying in lower classes.

## CONCLUSION

Very high prevalence of betel nut chewing among adolescent has been observed in industrial town of Assam. This is relevant in context of high prevalence of hypertension and cancer of oral cavity as well as oesophagus. Location of schools, parental and peer habits were found to be determinants for high prevalence of betel nut chewing habits.

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