# PREVALENCE AND FACTORS INFLUENCING BETEL NUT CHEWING AMONG ADULTS IN WEST INSEIN TOWNSHIP, YANGON, MYANMAR

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**Abstract.** Betel nut chewing can cause precancerous oral lesions and is common in Myanmar. We conducted a cross sectional study aimed to estimate prevalence and factors influencing betel nut chewing among 420 subjects aged ≥18 years in West Insein Township, Yangon, Myanmar in order to inform preventive health programs. The mean age of the study subjects was 45(±15) years. The overall prevalence of current betel nut chewing among study subjects was 55.2%. The mean age starting betel nut chewing was 29(±13) years, and the mean duration of chewing was 15(±13) years. The reasons given by study subjects for chewing betel nut included the addictive effect to betel nut, to release tension, to get rid of boredom and to stop smoking. Sixty-two point three percent of current betel nut chewers also chewed tobacco and 24.2% also smoked cigarettes. Factors significantly associated with betel nut chewing were male gender, current alcohol consumer, having no education or finishing primary or secondary school, having a low score regarding their attitude about the health effects of betel nut chewing, and having high score on interpersonal factors by family and peer pressure. Our results show a need to better educate the public about the health effects of betel nut chewing among the study population.

**Keywords**: betel nut chewing, influencing factors, prevalence, Myanmar adults

## INTRODUCTION

High prevalence of betel nut chewing is found in the Western Pacific region (WHO, 2012). Chewing betel nut produces a sense of wellbeing, euphoria, a warm sensation in the body and alertness when working (Chu, 2002). Chewing betel nut was not only culturally significant, but also a recreational habit among chewers (WHO, 2012). Common factors influencing betel nut chewing were curiosity and peer pressure, and betel nut mostly obtained from friends and classmates at the beginning (Wang *et al*, 2003). However, the adverse effects of betel nut chewing to oral health have been well documented such as oral lesion and oral cancer (Chang *et al*, 2004; WHO, 2012).

Betel quid chewing mixed with tobacco greatly increases a person's risk for bleeding gums, periodontal diseases, oral lesions and oral cancer (WHO and IARC,

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2004). Eighty-five percent of betel nut chewers in Myanmar added tobacco, and prevalence of oral precancerous lesions rose 9.6% among betel nut chewers with tobacco (Zaw *et al*, 2014). In Myanmar, betel nut preparation (without tobacco) has been fed to children as a digestive aid and mouth freshener, young children thus learn to add tobacco in betel nut chewing (Sein *et al*, 2014). A study among Myanmar migrants in Thailand found the prevalence of betel nut chewing at 53.3% and also reported that friends and family members influenced their betel nut chewing practice (Htin *et al*, 2014).

Significant risk of betel nut chewing to oral health associated with the frequency of chewing each day, the duration of chewing in years and the age at started chewing both among males and females and remained significant after allowance for other known risk factors: tobacco smoking and alcohol consumption (Phukan *et al*, 2001).

This study aimed to estimate prevalence and factors influencing betel nut chewing among Myanmar adults who lived in West Insein Township, Yangon, Myanmar. Implication of the findings will help providing baseline information to the concerned local authorities for the necessary intervention, as well as for further study.

## MATERIALS AND METHODS

### Study site and population

Insein Township is located about 12 miles from downtown Yangon, Myanmar, and has an adult population of 58,974 (Public Relations and Information Department, 2011). Zaw *et al* (2014) estimated the prevalence of betel nut chewing in Myanmar to be about 52%. Therefore, we calculated the minimum sample size needed for our study should be 381. This was increased to 420 to compensate incomplete data. Only households with an adult aged >18 years were invited to participate.

Inclusion criteria were: 1) a Myanmar adult living in West Insein Township; 2) age > 18 years, 3) able to participate in the interview; 4) willing to participate in the study. Exclusion criteria were: 1) non Myanmar adults; 2) those not residing in the study area; 3) those aged <18 years; 4) those unable or unwilling to participate. Ethical clearance was obtained from the Ethics Committee of the Faculty of Public Health, Mahidol University (COA. No. MUPH 2015-045; 2015 March 10). Informed verbal consent was obtained from all participants, prior to participation.

Each participant completed a questionnaire asking about demographics, betel nut chewing, tobacco use and alcohol use. If the participants were betel nut users, they were asked about the age they started chewing betel nut, duration, total amount per day, use of additional tobacco chewing or smoking, reasons for chewing and for stopping if they had quit.

The questionnaire asked about knowledge and attitudes concerning betel nut chewing and the associated health problems. The questionnaire also asked about social and family factors influencing betel nut chewing. Finally, participants were asked about laws and public health education concerning betel nut chewing (CDC, 2015; WHO, 2015). The questionnaire answers were quantified and stored.

### Data analysis

Data analysis was performed using Epidata and SPSS software, version 18 (IBM, Armonk, NY). Frequencies, means, standard deviations and ranges were used to describe demographic characteristics of

Table 1
Characteristics of 420 adult study subjects from West Insein Township, Myanmar.

| Variables | No. (%) |
|---|---|
| Age group in years | |
| 18-29 | 93 (22.1) |
| 30-49 | 159 (37.9) |
| 50-60 | 102 (24.3) |
| >60 | 66 (15.7) |
| (Mean ± SD, 45.1±14.8, range 18-80) | |
| Sex | |
| Male | 152 (36.2) |
| Female | 268 (63.8) |
| Marital status | |
| Single | 76 (18.1) |
| Married | 295 (70.2) |
| Divorce/widowed | 49 (11.7) |
| Education level | |
| Never studied | 20 (4.8) |
| Studying | 26 (6.2) |
| Finished primary school | 95 (22.9) |
| Finished secondary school/high school | 233 (56.3) |
| Finished bachelor's degree or higher | 40 (9.7) |
| Occupation | |
| Non-laborer: no occupation, studying, retired, professional, government civil servant, other. | 226 (53.8) |
| Laborer: driver, vendor, merchant, self-employed. | 194 (46.2) |

participants. Logistics regression analysis was used to calculate crude and adjusted odds ratios with 95% confident intervals. Significant factors from crude analysis were added to the model for multivariate analysis [ex-betel nut chewers ($n$=6) were excluded due to low numbers]. The dependent variables were non- and current-betel nut chewers. Independent variables were gender (male, female), education level (no education, studying, finished primary school, finished high school, finished bachelor degree), occupation (non-laborers, laborers), cigarette smoker (non-, current-, ex-smokers), alcohol consumers (non-, current-, ex-drinkers), knowledge score (low, high), attitude score (low, high), interpersonal factor score (low, high), community factor score (low, high), and public policy score (low, high).

## RESULTS

Our study group consisted of 420 participants with a mean age of 45.1(±14.8), (range 18-80) years; 62.2% were aged 30-60 years. Sixty-three point eight percents were females, 70.2% were married, 56.3% had finished secondary school, and 46.2% worked as laborers (Table 1).

The prevalence of current betel nut chewing among study participants was 55%, 74.4% of males, 45.5% of females,

Table 2
Prevalence and pattern of betel nut chewing among 420 study subjects.

| Health harming behaviors | No. (%) |
|---|---|
| Cigarette smoking | |
| Current smoker | 74 (17.6) |
| Non-smokers | 320 (76.2) |
| Ex-smokers | 26 (6.2) |
| Alcohol drinking | |
| Current drinker | 48 (11.4) |
| Non-drinkers | 362 (86.2) |
| Ex-drinkers | 10 (2.4) |
| Chewing betel quid status | |
| Current chewer | 232 (55.2) |
| Non-chewer | 182 (43.3) |
| Ex-chewer | 6 (1.4) |
| Among current betel nut chewers (*n*=232) | |
| Age started chewing betel nut (years) | |
| ≤29 | 139 (60.2) |
| 30-50 | 73 (31.6) |
| ≥51 and above | 19 (8.2) |
| (Mean ± SD 28.9±13.1, range 7-67) | |
| Total years of chewing betel nut | |
| ≤15 | 129 (55.8) |
| 16-30 | 74 (32.0) |
| ≥31 | 28 (12.1) |
| (Mean ± SD 15.5±12.6, range 1-57) | |
| Number of quid per day (bite) | |
| 1-16 | 152 (65.8) |
| 17-32 | 55 (23.8) |
| 33-48 | 13 (5.6) |
| 49-64 | 8 (3.5) |
| ≥65 | 3 (1.3) |
| (Mean ± SD 16.1±14.8, range 1-90) | |
| Tobacco added to betel quid | |
| Yes | 144 (62.3) |
| No | 73 (31.5) |
| Sometimes | 15 (6.5) |
| Additional smoking cigarette | |
| Yes | 57 (24.4) |
| No | 155 (66.2) |
| Ex-smoking | 22 (9.4) |

24.2% smoked cigarettes and chew betel nut. The overall prevalence of those who smoked cigarettes among both those who did and did not chew betel nut were 17.6% and 11.4% consumed alcohol (Table 2). Sixty point two percent of participants who chewed betel nut began chewing by age 29 years and 55.8% had chewed betel

Table 3
Reasons for chewing, not chewing and quitting chewing betel nut among study subjects.

| Reasons | No. (%) |
|---|---|
| Reasons for chewing among current chewers (*n*=232) | |
| Addictive effect | 47 (20.3) |
| Release of tension | 42 (18.1) |
| Refresh breath | 37 (15.9) |
| Boredom | 35 (15.1) |
| No reason | 25 (10.8) |
| Aid to concentration | 24 (10.3) |
| Fashion or popularity | 19 (8.2) |
| Tastes good | 19 (8.2) |
| To quit smoking | 10 (4.3) |
| To be alert | 8 (3.4) |
| Curiosity | 4 (1.7) |
| Make teeth and gums strong | 2 (1.9) |
| Factors influencing chewing of betel nut | |
| Self-initiated | 127 (54.7) |
| Friend | 49 (21.2) |
| Family member | 41 (17.7) |
| Peer | 12 (5.2) |
| Person in the community | 3 (1.3) |
| Reasons for not chewing among non-chewers (*n*=182) | |
| Did not like it | 162 (89.0) |
| Afraid of oral diseases | 18 (8.8) |
| Useless and wastes money | 2 (1.1) |
| Stains the mouth and teeth | 2 (1.1) |
| Reasons for quitting chewing (*n*=6) | |
| Health problems | 5 (83.3) |
| Afraid of oral diseases | 1 (16.7) |

nut for less than 16 years. Sixty-five point eight percent of participants who chewed betel nut less than 17 times per day (mean 16.1±14.8 times). Sixty-two point three percents of participants who chewed betel nut also chewed tobacco (Table 2).

The reported reasons for chewing betel nut among current chewers were: its addictive effect (20.3%), to release tension (18.1%), to refresh breath (15.9%), to get rid of boredom (15.1%), to improve concentration (10.3%), for fashion or popularity (8.2%), because it tastes good (8.2%) and others (10%) (Table 3). Current betel nut chewers reported factors influencing them to chew were: self- initiated (54.7%), influenced by friends (21.2%), influenced by family members (17.7%), and influenced by peers or persons in the community (6.5%) (Table 3). Among those who had previously chewed and quit, factors influencing them to quit were : health problems (83.3%), being afraid of oral diseases (16.7%). Those who had never

Table 4
Crude and adjusted associations between factors and betel nut chewing among study subjects.

| Variables | Crude analysis | | | Adjusted analysis[a] | | |
|---|---|---|---|---|---|---|
| | OR | 95%CI | *p*-value | OR | 95%CI | *p*-value |
| Age group (years) | | | | | | |
| 18-24 | 1 | | | 1 | | |
| 25-44 | 1.19 | 0.90-4.07 | 0.09 | 1.59 | 0.56-4.53 | 0.382 |
| 45-65 | 2.10 | 1.00-4.42 | 0.49 | 2.16 | 0.74-6.30 | 0.157 |
| 65+ | 1.20 | 0.46-3.12 | 0.70 | 0.77 | 0.21-2.87 | 0.704 |
| Sex | | | | | | |
| Males | 3.65 | 2.34-5.69 | <0.001 | 3.42 | 1.75-6.68 | <0.001[b] |
| Females | 1 | | | 1 | | |
| Level of education | | | | | | |
| No education | 3.50 | 1.14-10.74 | 0.29 | 9.80 | 2.10-45.69 | 0.004[b] |
| Studying | 1.23 | 0.43-3.54 | 0.694 | 2.09 | 0.48-9.09 | 0.323 |
| Finishing primary school | 4.38 | 1.97-9.73 | <0.001 | 15.12 | 4.69-48.70 | <0.001[b] |
| Finishing high school | 3.33 | 1.61-6.87 | 0.001 | 7.92 | 2.71-23.11 | <0.001[b] |
| Finishing bachelor degree | 1 | | | 1 | | |
| Occupation | | | | | | |
| Laborer | 2.19 | 1.37-3.48 | 0.001 | 1.10 | 0.58-2.06 | 0.763 |
| Non-laborer | | | 1 | 1 | | |
| Smoking cigarette | | | | | | |
| Non-smokers | 1 | | | 1 | | |
| Ex-smokers | 5.78 | 1.94-17.17 | 0.02 | 2.56 | 0.72-9.13 | 0.146 |
| Current smokers | 3.68 | 2.02-6.69 | <0.001 | 1.28 | 0.59-2.79 | 0.523 |
| Alcohol drinking | | | | | | |
| Non-drinkers | 1 | | | 1 | | |
| Ex-drinkers | 8.89 | 1.11-70.98 | 0.038 | 2.59 | 0.26-25.38 | 0.413 |
| Current drinkers | 10.87 | 3.82-30.91 | <0.001 | 5.92 | 1.71-20.46 | 0.005[b] |
| Score of knowledge | | | | | | |
| Low score | 2.08 | 1.05-4.09 | 0.034 | 1.56 | 0.65-3.75 | 0.319 |
| High score | 1 | | | 1 | | |
| Score of attitude | | | | | | |
| Low score | 2.12 | 1.33-3.36 | 0.001 | 1.88 | 1.03-3.44 | 0.038[b] |
| High score | 1 | | | 1 | | |
| Score of interpersonal factors | | | | | | |
| Low score | 1 | | | 1 | | |
| High score | 3.42 | 2.25-5.19 | <0.001 | 3.66 | 2.19-6.10 | <0.001[b] |
| Score of community factors | | | | | | |
| Low score | 1 | | | 1 | | |
| High score | 1.68 | 1.13-2.48 | 0.009 | 1.36 | 0.83-2.25 | 0.218 |
| Score of public policy | | | | | | |
| Low score | 1 | | | 1 | | |
| High score | 2.04 | 1.38-3.03 | <0.001 | 0.933 | 0.48-1.78 | 0.835 |

[a]Odds ratio adjusted for age, sex, level of education, occupation, cigarette smoking, alcohol drinking, knowledge score, attitude score, interpersonal factor score, community factor score, public policy score. [b]Significant. OR, odds ratio; CI, confident interval.

chewed or did not chew betel because they did not like it (89.0%), or were afraid of oral diseases (8.8%) (Table 3).

On multivariate analysis, factors significantly associated with betel nut chewing were being male (OR=3.42; 95%CI: 1.75-6.68, $p$ <0.001), having no education (OR=9.80; 95%CI: 2.10-45.69, $p$ =0.004), having a primary school education (OR=15.12; 95%CI: 4.69-48.70, $p$ <0.001) and having a secondary school education (OR=7.92; 95%CI: 2.71-23.11, $p$ <0.001), current alcohol consumers (OR=5.92; 95%CI: 1.71-20.46, $p$ = 0.005), having low attitude score about chewing (OR=1.88; 95%CI: 1.03-3.44, $p$ = 0.038), and having a low interpersonal factor score (OR=3.66; 95%CI: 2.19-6.10, $p$ <0.001) (Table 4).

## DISCUSSION

The prevalence of betel nut chewing among our study subjects (55.2%) is similar to another survey (52.4%) among Myanmar adults in 2014 (Zaw *et al*, 2014). Compared with other Asian countries, Myanmar had an abnormally high prevalence of betel nut chewing, India = 32.1% (Gupta and Ray, 2004), Sri Lanka = 42% (Gupta and Warnakulasuriya, 2002), Bangladesh = 31% (Flora *et al*, 2012 ) and Malaysia= 8.2% (Ghani *et al*, 2011). Similar to our study, betel nut chewing was more prevalent among males than females as in those studies.

More than half of our study subjects began chewing betel nut when they were aged < 30 years and the average duration of chewing was 16-30 years. This is a sufficiently long time to increase their risk of developing pre-cancerous oral lesion (WHO and IARC, 2004). In addition to poor knowledge and poor attitudes about the risk of chewing betel nut in our study population, other reasons given for chewing betel nut included being familiar with it, being addicted to it and the accompanying release of tension and boredom. The factors influencing betel nut chewing in our study were the same as those found in another study (Htin *et al*, 2014).

We found an association between tobacco smoking and chewing betel nut. One study from Myanmar found those who wanted to quit smoking chewed betel nut (Furber *et al*, 2013). Another study also reported smoking was more expensive and smokers were more likely to contract diseases than those who chewed betel nut (Furber *et al*, 2013). However, in our study only 4.3% of current betel nut chewers reported the reason they chewed betel nut was to quit smoking. In our study, many subjects added tobacco use to the betel nut use but this combination puts them at greater health risk (Gupta and Ray, 2004). In our study, 62.3% of adults added tobacco to betel nut chewing and 24.4% smoked tobacco in addition to chew betel nut, similar to a study of Myanmar migrant laborers in Thailand (Htin *et al*, 2014).

In our study both intrapersonal (poor knowledge and attitude about betel nut chewing) and intrapersonal (family, friends and peers) influenced betel nut chewing. A person's knowledge and attitudes are related to their education level (CDC, 2015). This was seen in our study. To promote change, health education programs about risks of betel nut chewing need to start in school. We found deficiency in this area. Health education programs need to be developed and conducted to make a change.

In Myanmar, there are signs in hospitals, health centers, public parks, guesthouses, hotels, restaurants, bus stations, railway stations, religious places, schools

prohibiting betel nut chewing and smoking tobacco. The main purpose for this is sanitation to avoid betel nut stains (Sein *et al*, 2014).

In Myanmar, the betel nut chewing has grown in urban centers with higher wages of employees. Ready-made betel nut preparations containing tobacco wrapped in plastic bags or metal containers are available as refrigerated items (Sein *et al*, 2014). Inexpensive betel nut products are available from street vendors into community. These products need to be labeled as health hazards and sale should be prohibited to those under age 18 years.

Community wide efforts are needed for implementing anti-betel nut programs to limit the age of consumers and places of sale of betel nut. Cultural beliefs, and practices need to be overcome to prevent problem with oral health and oral cancer.

A limitation of this study was the small sample size and location making it difficult to apply to other populations in Myanmar.

The prevalence of current betel nut chewing among our study subjects was high compared to other countries in Southeast Asia. Public health education program are needed for teachers and schools and the community in general. Cultural and traditional practices need to be overcome. A national campaigns is needed to accomplished this but need support from policy makers, who themselves need education regarding the hazard and costs of betel nut chewing. National betel nut control along with tobacco control can make it more cost effective for the health of population.

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