

## International

# Prevalence, Habit Pattern, and Awareness on Harmful Effects of Tobacco/Areca Nut Use among Patients Visiting a Tertiary Care Center in Sri Lanka

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## Abstract



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## Keywords

- ▶ tobacco
- ▶ areca nut
- ▶ psychoactive
- ▶ cancer burden
- ▶ Sri Lankan adults
- ▶ dental setup

**Background** The carcinogenicity of tobacco and areca nut is well established worldwide. Areca nut is the fourth most common psychoactive substance identified recently. The effects of areca nut on the autonomic nervous system make the users dependent on the habit which has been an emerging health issue among Sri Lankan adults and adolescents. This study aimed to evaluate the prevalence and patterns of these risk habits among the patients attending a tertiary care center in Sri Lanka, and their awareness of the harmful effects of the habit.

**Method** A hospital-based cross-sectional study was conducted among 512 patients using an interviewer-administered questionnaire.

**Results** The sample consisted of 167 (33%) tobacco consumers. The average age of the initiation of tobacco consumption was 23.66 years (standard deviation  $\pm$  8.04). Age ( $p = 0.001$ ), gender ( $p = 0.001$ ), income ( $p = 0.005$ ), and educational level ( $p = 0.001$ ) are significantly associated with tobacco consumption. There is a strong likelihood for tobacco consumers to consume areca nut (odds ratio [OR] 30.58, 95% confidence interval [CI] 17.05–54.88) and alcohol (OR 11.16, 95% CI 6.91–17.98) at any stage in their lives. The majority of the tobacco consumers (61%) were smokeless tobacco users. Areca nut consumers are 0.44 times more likely to know its carcinogenic effects than nonconsumers (95% CI 0.28–0.69). Tobacco consumers are more likely to be aware of the harmful effects of tobacco consumption than nonconsumers (OR 1.11, 95% CI 0.45–2.74). Sixty percent have made at least one attempt to quit the habit. Sixty-two percent of the unsuccessful quitters reported the reason as “addiction.”

**Conclusion** Prevalence of smokeless tobacco consumption prevails at a high level among Sri Lankans. Tobacco and areca nut users are more likely to be aware of its harmful effects than the nonconsumers but unable to quit the habit due to the psychoactive properties of tobacco and areca nut.

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## Introduction

Tobacco is the single most preventable cause of death in the world today. The global tobacco epidemic has threatened the lives of one billion men, women, and children during this century.<sup>1</sup> It is a major risk factor for cardiovascular diseases, chronic obstructive pulmonary disease, cancers, reproductive disabilities, and certain oral conditions. The pattern of tobacco use includes the smoking of tobacco as well as the use of smokeless tobacco. Cigarette smoking is the most common form of tobacco use but “bidi” is the most popular smoking product in rural areas in comparison to cigarette smoking in urban areas.<sup>2</sup> However, there are other methods such as cigars, pipe-smoking, etc. and the pattern varies according to the geographic area, gender, socioeconomic status, and age.<sup>3</sup>

Smokeless tobacco is predominantly consumed as betel quid (betel leaf filled with screwed areca nut, lime, and tobacco); however, some people add spices like cardamom, saffron, turmeric, cloves, aniseeds, and mustard as flavors and sweeteners to their betel quid depending on preferences. Most betel chewers commonly use areca nut in their betel quid together with betel leaf and lime powder with or without tobacco. The usage of areca nut is indigenous to India, Sri Lanka, Maldives, Bangladesh, Myanmar, Taiwan, and numerous islands in the South Pacific region.<sup>4</sup> In the recent past, the use of commercially available areca nut-containing products such as gutka, pan masala, and mawa is on the rise, especially among the youth. Areca nut is the most common psychoactive substance in the world after caffeine, alcohol, and nicotine and contains nine known alkaloids that are released on mastication.<sup>2</sup> Arecoline, the primary psychoactive constituent in the areca nut is the most abundant alkaloid followed by arecadine, guvacine, and guvacoline.<sup>5</sup> Many studies have reported the development of dependency on areca products.<sup>6</sup> Users of areca nut perceive it as a way of increasing stamina and the sense of euphoria.<sup>7</sup> Also, they have reported its soothing effects on digestion and aches in teeth and gums. They have claimed its effect on their alertness, salivation, hunger tolerance, and warming of the body. In other words, chemicals present in the areca nut influence the autonomic nervous system to various degrees.<sup>8</sup>

There is a great variation in the consumption pattern of tobacco and areca nut among different populations. Among Sri Lankan adults a significantly higher prevalence of betel chewing can be seen in the rural areas than the urban areas.<sup>9</sup> The prevalence of tobacco smoking and areca nut chewing is higher in the estate sector of Sri Lanka than in the villages.<sup>10</sup> The complex interplay of sociocultural factors of tobacco also determines the pattern of use.<sup>11</sup>

Association between tobacco and areca nut usage and oral cancer is well established and it carries a high risk of developing oral potentially malignant conditions and lesions.<sup>12</sup> In Sri Lanka, oral cancer is the most common cancer among men.<sup>13</sup> According to the 2020 national cancer incidence data in Sri Lanka, oral-pharyngeal cancer was 12.8% of all reported cancers in Sri Lanka and carried the highest mortality rate among different types of cancers (3

deaths per day) whereas lip and oral cavity cancers account for 9.5% of all cancer cases reported.<sup>14</sup> A previous study conducted among the patients attending the University Dental Hospital, Peradeniya, Sri Lanka revealed that their level of awareness of oral cancers, oral potentially malignant disorders, and the effects of betel chewing was not at a satisfactory level.<sup>15</sup> Another study conducted at the Institute of Oral Health, Maharagama, Sri Lanka has also revealed the same results.<sup>10</sup>

Dental Hospital Peradeniya is a tertiary care unit where the oral medicine clinic caters to patients with oral cancer and potentially malignant disordered patients from all over the country. The main objective of this study was to assess the consumption pattern of tobacco and areca nut and the awareness of their harmful effects among patients presented to University Dental Hospital, Peradeniya, Sri Lanka.

## Methodology

A hospital-based cross-sectional study was conducted for a period of 5 months (September 2021–January 2022) among 512 patients randomly selected who were above 18 years old visiting the University Dental Hospital, Peradeniya, Sri Lanka. The study conducted was where patients were interviewed using a standard-type interviewer-administered questionnaire after obtaining informed written consent for participation in the study. The questionnaire included sections to collect data on demographic factors, the reason for the initiation of the habit, form of tobacco/areca nut, frequency, and duration of consumption of tobacco/areca nut, attempts to quit the habit, and the awareness of harmful effects of tobacco/consumption.

The particular data was never used in a way that participants could be identified in any public presentation or publication.

Data were analyzed using SPSS for Windows 26 version. Descriptive statistics were computed for each variable. The chi-square test was used to determine the presence of statistically significant differences ( $p < 0.05$ ).

## Results

### Demographic Data

The analyzed sample consisted of 262 (52%) males and 250 (48%) females. The age-wise distribution of the participants was similar.

The ethnic distribution of the participants was as: Sinhalese (75%), Tamil (12%), and Muslim (13%). In this sample, 10% of the participants have never been to a school, and 34 and 24% had studied up to ordinary level and advanced level, respectively. The summary of the educational level of the participants is represented in [Table 1](#).

### Tobacco Consumption

There were 167 (33%) tobacco consumers (both smoked and smokeless). Among them 68 (41%) were continuing with the habit, while 18 (10%) have abstained for less than 1 month period, 31 (19%) have abstained for a minimum period of

**Table 1** The educational level of the participants ( $n = 512$ )

Educational level	Percentage
None	10
Up to grade 8	22
Up to O/L	34
Up to A/L	24
Diploma	3
Degree	7

Abbreviations: A/L, advanced level; O/L, ordinary level.

**Table 2** Places where participants consume tobacco ( $n = 167$ )

Place	Percentage (n)	
	Male	Female
Only at home	67 (10)	33 (5)
Only at workplace	75 (15)	25 (5)
Only at social events	85 (17)	15 (3)
Only at gatherings with friends	100 (20)	0.0
At all the above places	95 (87)	5 (5)

1 year, 20 (11%) have an abstinence period of 1 to 5 years, and 30 (19%) for more than 5 years. Among the present consumers, 68.6% were male and 11.4% were female.

The average age of the initiation of tobacco consumption was 23.66 years (standard deviation [SD]  $\pm 8.04$ ). The average duration of the habit was 28.18 years (SD  $\pm 14.78$ ).

A summary of the places where they use to consume tobacco is presented in [Table 2](#).

When analyzing the reasons for tobacco consumption, the results showed that 58% consume it as a habit, 14% because of social events, 1% as a cultural thing, 8% at friends' company, 10% because of increased workload, and 9% as a mean of relieving the tension. The "other reasons for tobacco consumption" were coded and analyzed through content analysis. The results of the content analysis are represented in [Table 3](#).

Chi-square test revealed that age ( $p = 0.001$ ), gender ( $p = 0.001$ ), income ( $p = 0.005$ ), and educational level ( $p = 0.001$ ) were significantly associated with tobacco consumption. It was also observed that the proportion of tobacco consumption increased with increasing age and decreased with increasing income and educational level.

There is a strong likelihood for tobacco consumers to consume areca nut (odds ratio [OR] 30.58, 95% confidence interval [CI] 17.05–54.88) and alcohol (OR 11.16, 95% CI 6.91–17.98) at any stage in their lives.

### Smokeless Tobacco Consumption

The majority of the tobacco consumers (61%) were smokeless tobacco users, and 26% used both smoke and smokeless forms. One hundred and thirty-eight (98%) of smokeless tobacco users consume tobacco with the betel quid and

**Table 3** Summary of the content analysis of the reasons for tobacco consumption

Coded phrases	Percentage
"nothing specific.."	76.5
"after meals or a tea.."	10.2
"family members consume it.."	4.2
"avoiding sleepiness.."	3.6
"cool climate.."	2.4
"avoid bitter taste.."	1.2
"tooth pain.."	0.7
"to stop smoking.."	0.6
"avoid bad breath.."	0.6

only 2% use commercially available tobacco powder. Among the smokers only 11% use cigarettes and 89% use "bidi."

Seventy-seven (55%) of the smokeless tobacco chewers do not keep the betel quid after chewing it while 63 (45%) kept the quid in the buccal sulcus after chewing the quid. The mean chewing time of betel quid was 10.67 (SD  $\pm 11.17$ ) minutes and the mean duration of keeping a betel quid in the mouth was 31.59 (SD  $\pm 57.24$ ) minutes.

### Areca Nut Consumption

In this study, 46% were areca nut consumers. Among them 162 (68.9%) were males and 73 (31.1%) were females.

There were 21 (9%) areca nut consumers who chew the areca nut alone and 213 (91%) chew it in raw form with the betel quid.

When analyzing the reasons for the areca nut consumption, the results showed that 48% consume it as a habit, 16% because of social events, 2% as a cultural thing, 10% at friends' company, 10% because of increased workload, and 14% as a mean of relieving the tension. The "other reasons for tobacco consumption" were coded and analyzed through content analysis. The results of the content analysis are represented in [Table 4](#).

The chi-square test revealed that only the gender of the consumer is significantly associated with areca nut consumption ( $p = 0.001$ ).

Areca nut consumers are 0.44 times more likely to know its carcinogenic effects than nonconsumers (95% CI 0.28–0.69).

### Attempts to Quit the Habits

Among the tobacco or areca nut consumers, 60% have made at least one attempt to quit the habit at any stage after initiation and 73% were successful in quitting. The majority (61%) reported the reason for quitting as "encountered a health hazard." Twenty-one percent reported realization of its harmful effects and only a minority, 10% were "inspired by the antitobacco programs." Sixty-two percent of the unsuccessful quitters reported the reason as "addiction." Females were more likely to quit the habit than males (OR 0.2, 95% CI 0.15–0.49).

**Table 4** Summary of the content analysis of the reasons for areca nut consumption

Coded phrases	Percentage
"nothing specific.."	69.1
"to avoid bitter taste.."	10.2
"available at home.."	5.1
"after meals or a tea.."	3.8
"relieve nausea during pregnancy.."	3.4
"avoid sleepiness.."	3.0
"cool climate.."	2.1
"tooth pain.."	1.7
"avoid bad breath.."	0.4
"like to eat the middle part, it has a milky taste.."	0.4
"relieve migraine pain.."	0.4
"family members use it.."	0.4

### Awareness of the Harmful Effects of Tobacco and Areca Nut Use

Almost all the participants (99.8%) agreed that using tobacco is not good for their health. Note that 86.5% of the respondents disagreed that "chewing tobacco has some positive medicinal purpose" while 13.5% agreed with this statement. Also, 81.4% had a negative opinion on areca nut chewing while 18.6% had a positive opinion. Note that 80.8% agreed that "chewing areca nut is unhealthy" while 9.2% disagreed with the statement. A total of 18.8% believed that chewing an areca nut does not cause mouth cancer, while 81.2% believed the statement. Also, 85.1% agreed that "quitting chewing tobacco/areca nut would improve their health," while 14.9% disagreed.

Tobacco consumers are more likely to be aware of the harmful effects of tobacco consumption than nonconsumers (OR 1.11, 95% CI 0.45–2.74).

### Discussion

Tobacco and areca nut usage which is a culturally bound habit is a long-standing health issue in Sri Lanka. This study was conducted at one of the largest tertiary care dental hospitals in Sri Lanka including 512 participants. In the analyzed sample the majority were smokeless tobacco consumers. Previous studies conducted in Sri Lanka reported that there is a higher prevalence of smokeless tobacco consumption among the Sri Lankan adult population. At the national level, in 2007, 15.8% of the adult population aged 15 to 64 years in Sri Lanka was smokeless tobacco consumers.<sup>16</sup> This study also demonstrates similar results.

In recent years, there is a tendency for Sri Lankan youth to develop smokeless tobacco consumption.<sup>17</sup> In our sample, the average age of the initiation of tobacco consumption was also 23.66 years which further supported the

point that this behavior is more likely to prevail in the young adult population. However, the majority consumed tobacco and areca nut as a habit and they do not have a specific place to consume it. In the literature, studies conducted in Western countries also have shown the tendency of youth toward consuming multiple tobacco products.<sup>18</sup>

A study conducted in Alaska has found that the majority of tobacco users exhibit dual use of cigarettes and smokeless tobacco products. The same study reports that over one-third of their study population first tried tobacco at age 11 or younger which supports the results of our study.<sup>19</sup>

Content analysis revealed that there are significant reasons for tobacco consumption such as avoiding "bitter taste," "sleepiness," "smoking," or "after meals or tea." Previous literature was compatible with these results where there has been an association between tea/coffee consumption and tobacco smoking behaviors<sup>20</sup> and sleep disturbances.<sup>21</sup> Further studies can be implemented to explore deeply the other reasons for tobacco consumption such as "to avoid bitter taste in the mouth."

Factors associated with the commencement of areca nut use have been investigated before by many researchers. They have reported that education level, ethnicity, cigarette smoking, and alcohol use are the prominently associated factors,<sup>22,23</sup> which is compatible with our results. The content analysis of the reasons for areca nut consumption revealed that they consumed it to avoid nausea during pregnancy which is another interesting area to study further.

Among the areca nut consumers of our sample, 14% consume it as a means of relieving tension. In par with the literature, areca nut can potentially produce different psychoactive and withdrawal effects.<sup>24</sup> Addiction to betel quid may be different from tobacco products because of the effects of areca nut which produces a sense of euphoria and a soothing mind. Another key finding observed in our study was the reported dual use of areca and tobacco. This suggests that for most of the betel quid users, tobacco and areca may contribute equally to their dependence.

The culture also affects betel quid chewing behavior. In Sri Lanka, the betel quid is attached to their traditional customs and household functions. In rural areas, it is still a custom to offer a betel quid to the visitors after a meal or tea.<sup>16</sup>

Another key finding of this study was related to quitting the habit. More than half of the tobacco and areca nut consumers have made at least one attempt to quit the habit, and the majority of the successful attempts were related to encountering some health hazards. It has been estimated that the health care system in Sri Lanka bears an annual cost of SLR 58,979 (US\$ 169) to manage a patient with stage II oral cancer and the family has to bear approximately SLR 77,649 (US\$ 222).<sup>25</sup> Therefore, quitting the habit after encountering such health problems does not have a significant impact on the financial burden of the health care system and caregiver burden in the Sri Lankan context.

Further, our results showed that the majority were unsuccessful in quitting the habit of their addiction to the substance. There is recent evidence from Sri Lanka that health professionals are receiving capacity-building programs and training to improve their knowledge and attitudes related to smokeless tobacco use and areca nut use<sup>26,27</sup> and we would like to suggest that these types of programs focus on improving the knowledge and expertise on the substance abuse treatment approaches among dental care professionals.

Surprisingly, the majority of betel quid chewers are aware of the harmful health effects of the contents in the quid.

## Limitations

Even though smokeless tobacco and areca nut users may have more dental-related issues than the nonusers, most of them do not seek treatment due to socioeconomic issues and poor knowledge. But still, there can be referral bias.

## Conclusion

Tobacco consumption is significantly associated with age, gender, ethnicity, income, and educational level. The prevalence of smokeless tobacco consumption prevails at a high level among Sri Lankans. Overall awareness of its harmful effects was reported to be satisfactory. Tobacco and areca nut users are more likely to be aware of its harmful effects than the nonconsumers but unable to quit the habit due to the psychoactive properties of tobacco and areca nut.

The results also imply that although awareness programs on this topic remain at an adequate level there is a need for novel behavior modification and habit intervention models to address these aspects. Especially dental surgeons and dental nurses should be empowered not only with the knowledge but capacity and expertise to carry out proper habit intervention counseling sessions.

### Ethical Approval

This research has been granted ethical clearance from the Ethics Review Committee, Faculty of Dental Sciences, University of Peradeniya, Peradeniya, Sri Lanka.

### Funding

None.

### Conflict of Interest

None declared.

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