Areca nut cultivators from Tamil Nadu: Is the nut their friend or foe – A questionnaire study

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Abstract

Objective: The present study was done to evaluate the awareness of people involved in cultivation of areca nut from Tamil Nadu on various oral and systemic health effects of chewing areca nut.

Material and Methods: A cross-sectional study was conducted among areca nut cultivators from various districts of Tamil Nadu. People involved in the cultivation of areca nut were included in the study. 500 individuals participated in the study. They were instructed to complete a pre-tested questionnaire with 25 questions.

Results: 58% of the participants were males and 42% were females. Dryness of the mouth from decreased production of saliva due to areca chewing was known to 57% of the study participants. 39% of the participants were aware of addiction. Oral cancer from areca nut chewing in various forms with/without tobacco was also known to 51% of them. 86% of them were prepared to quit the habit and 92% of them admitted that government has banned the sale of commercial pan masala products.

Conclusion: The study evaluated the awareness of oral and systemic effects of chewing areca nut among people involved in cultivation of areca nut from rural parts of Tamil Nadu. Appropriate regulatory measures are critical for educating people from a variety of occupational and socioeconomic backgrounds in both rural and urban areas.

Keywords: Areca nut cultivators, Awareness, Oral effects, Systemic effects
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Introduction

Areca nut is the fourth most commonly used psychoactive substance in the world, after caffeine, nicotine, and alcohol. Areca nut is native to Malaysia, which is now cultivated throughout India, Thailand, Sri Lanka and Philippines. Chewing of areca nut is common in South and South-East Asian countries. The increase in consumption of areca nut appears to be due to an upsurge in production and easy availability. The use of the indigenous nut is strongly interwoven into religious and social rituals in Southeast Asian countries.

Areca nut is reported to be the chief etiologic agent for oral submucous fibrosis, which is a potentially malignant disorder. Arecoline, the principal alkaloid of areca nuts, is the active ingredient that causes oral and systemic effects. Chewing of areca nut can produce cholinergic, neurologic manifestations such as euphoria, sense of well-being, palpitation, sweating, and salivaization. The arecoline concentration of the nuts varies with the area and season of cultivation.

India is the world’s largest producer and consumer of areca nuts, accounting for 62% of the total area and 60% of the total production. Areca nut is the chief crop in Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Assam, West Bengal, Meghalaya, and Maharashtra. The cycle of events in the cultivation of areca nuts has been proposed by the Indian Council of Agricultural Research. In December, fertigation is done, followed by pollination in January, sowing in February, stem covering in March, irrigation in the month of April, pest control in May, planting in June, drainage in July, spraying in August, manuring in September, forking in October, and harvesting in November. This clearly documents that manual labour is essential in each and every phase of cultivation of the indigenous nut.

In the cultivation and processing, different types of labourers were involved. Cleaning was done by a small group, while land levelling, irrigation, plantation, manuring, harvesting, nut drying, and transportation were done by even fewer. The harvester jumps from one tree to the next to collect clusters, while the handler remains on the ground to receive them. During areca nut gathering from the ground, gatherers retrieve the errant areca nuts. The person who transports the clusters to a central location for processing comes next in the labour hierarchy. De-huskers help in the separation of the fibrous component from the intact nut. Processing of the de-husked nut is
done either by boiling or sun-drying. The white variety is sun-dried, whereas the red variety is boiled. In South India, areca nut is chewed with betel leaf as quid for a variety of reasons such as mouth freshener, stress reliever, digestion following food, part of social beliefs etc. The present study was done to evaluate the awareness of people involved in the cultivation of areca nuts from Tamil Nadu on various oral and systemic health effects of chewing areca nuts.

Material and Methods

The study was approved by the SRMDC Institutional Ethical Committee (SRMU/M&H/SPRMDC/2022/S/001-17.01.2022). A cross-sectional study was conducted among areca nut cultivators from various districts of Tamil Nadu. People involved in the cultivation, processing, transport and sales of areca nut products were approached. Participants who volunteered to take part in the study were recruited after obtaining informed consent. All procedures performed in the study were conducted in accordance with the ethical standards given in 1964 declaration of Helsinki, as revised in 2013. Almost 528 of them agreed to take part in the survey. After the final dropouts, 500 individuals participated in the study. They were instructed to complete a pre-tested questionnaire with questions pertaining to various harmful effects from chewing areca nuts in various forms. The importance of the study was explained to the participants. They were informed that mere participation in the study would have no impact on their occupation. They were educated to give only one response, which they felt was the most appropriate. The close-ended questionnaire covered oral signs and symptoms, oral and oesophageal cancer and other harmful effects of chewing areca nut. As majority of the participants were illiterate or had primary education, printed version of the questionnaire was used for the study. The questions were in their regional language so that the participants could comprehend them better.

Descriptive statistical analysis was done using the Statistical Package for Social Sciences (SPSS Inc, Chicago, IL) version 21 software. Chi-square test was used to analyse the variables. p-value of less than 0.05 was considered statistically significant.

Results

A total of 500 individuals were involved in the study. 58% of the participants were males and 42% were females. 15% of the individuals were less than 20 years of age, 41% of them were between 21-40 years of age, 26% were between 41-60 years and 18% of them were above 60 years of age. Almost 39% of the study population were illiterate. 41% had a primary education, whereas only 20% of the population had a secondary education.

Areca nut was chewed in dried form by 51% of them and in fresh form by 49% of the respondents. Nearly 58% of them chewed betel nuts without tobacco, and 77% of the study participants had the habit of spitting, while 23% swallowed the contents. Table 1 describes the demographic details and various chewing practices followed by the study participants. 57% of them were aware that areca nut chewing might alter the taste. A burning sensation in the oral cavity due to areca nut chewing was known to 55% of the participants. 79% of them noticed stains on teeth. Dryness of the mouth from decreased production of saliva due to areca chewing was known to 57% of the study parti-
pants. 39% of the participants were aware of addiction. Oral cancer from areca nut chewing in various forms with/without tobacco was also known to 51% of them. The difference was statistically significant (p=0.04). 86% of them were prepared to quit the habit and 92% of them admitted that government has banned the sale of commercial pan masala products. The awareness and attitude among the participants on various harmful effects of areca chewing are shown in table 2.

Discussion

The present study highlighted the awareness on adverse oral and health effects from chewing areca nut. The adverse outcomes of chewing areca nut are not in spotlight as compared to the awareness on negative effects from chewing or smoking tobacco. This lack of awareness is accentuated in Tamilnadu, where tamul is a religious practice.

The areca nut palm is cultivated mainly in India, Malaysia, Polynesia, Micronesia, and South Pacific Islands. It is an unbranching, long plant extending up to 15 m and crowned with 6 to 9 palm fronds. The nut is the seed (endosperm), which is mottled brown and has grayish-white markings. The outer surface is green when unripe and orange-yellow when ripe. The seed is separated from the outer fibrous pericarp. It has a characteristic astringent, slightly bitter taste. The nut may be used fresh or it may be dried and cured before use, by sun-drying, baking or roasting. It is consumed at different stages of maturity according to preference. Chemical constituents of areca nut include carbohydrates, fats, proteins, crude fibre, polyphenols (tannins and flavonols), alkaloids, mineral matter. Alkaloids are the most important of the chemical constituents of areca nut. The four major important alkaloids are arecoline, arecaidine, guvacaine, guvacoline. Betel quid contains betel leaf, areca nut, slaked lime and may contain tobacco. Quid is a substance or mixture of substances, placed in the mouth usually containing any of the two basic ingredients, tobacco and areca nut in raw/processed/manufactured form. Hence the chewing substance may be tobacco alone, areca nut alone, betel quid with tobacco or betel quid without tobacco. The processed forms of areca are gutka (areca nut, catechu, tobacco, slaked lime) pan masala (areca nut, catechu, slaked lime), khaini (tobacco, slaked lime), mawa (areca nut, tobacco, slaked lime). In the present study, middle-aged male workers were predominant than females with the habit of chewing areca nut. Literacy skills of our study population were also minimal with only less percentage of individuals with higher education. These findings are concordant with the findings of the study conducted by Guo et al. in Taiwan with increased prevalence of chewing and smoking in middle-aged males with less education. Similar findings were also reported by cross-sectional study conducted by Arvind et al in Assam. A study on areca nut use among rural residents of Sripurumbudur Taluk showed that areca nut chewing is the initiator of other habits such as smoking and alcohol intake. The reason stated by the residents less than 30 years of age were peer pressure and 30 to 50 years were habituation due to family problems.

Oral carcinogenesis is a multistep process that involves initiation, promotion and progression. The increased incidence in oral cancer among areca nut chewers is reported to be due to direct contact of the agent with the oral mucosa. A case series of squamous cell carcinoma in chronic areca nut-chewing Indian Women was reported by Muttagi et al. among 8 cases of oral cancer, 4 were from the tongue, 3 from the buccal mucosa and 1 from the floor of the mouth. In an institutional retrospective study over a period of 13.75 years from 2000-2013, reported 15.2% of oral squamous cell carcinoma cases among 151, exclusively due to areca nut chewing. A study reported that 64% of the patients were aware that tamul can cause oral cancer. Another study among young individuals concluded that 40% were aware of oral cancer and 36% were aware of throat cancer. Even a study among medical students reported that 98.5% of the students were aware that areca nut can cause oral and throat cancer. Almost 51% of our study population were aware of oral cancer.

Areca nut chewing damages vital organs and affects the general systemic health. Arecoline, the principal alkaloid in areca nut, acts as an agonist primarily at muscarinic acetylcholine receptors and stimulates the central and autonomic nervous system. Areca nut is reported to cause systemic effects such as euphoria, alertness, effects of well-being, tachycardia, flushing and warmth. Betel nut chewing can produce significant cholinergic, neurologic, cardiovascular, endocrine and gastrointestinal manifestations. Arecoline, the main alkaloid is reported to have cytotoxic, genotoxic, mutagenic effects. Arecaidine, the metabolite of areca nut...
may block the uptake of the central inhibitory neurotransmitter GABA. Nitrosated derivatives of arecal alkaloids are diabetogenic and responsible for oral cancer. Areca nut was also reported to cause dependency syndrome, with used with or without tobacco additives. Bhat et al. studied the dependence from the use of areca nut among daily chewers of areca without tobacco from six small villages of Karnataka using various dependence scales and validated questionnaire. The study concluded that the scores of the dependence scale were found to be directly related to the frequency of areca use. Only 39% of the present study population were aware of the addiction and dependence on areca nut chewing. Though there is improvement in awareness in the Global Adult Tobacco Survey-II (GATS-II) conducted in 2015-2016 in India compared to GATS-1 (2009-2010), efforts for further awareness are mandatory to reduce the burden of oral squamous cell carcinoma.

Conclusion
Similar to the campaign and various awareness programs on the ill effects of tobacco, various measures to spread awareness on the oral/systemic effects of pure areca with or without tobacco in rural areas where tamul is still a religious custom and considered an energy provider during occupation are the need of the hour. Every individual must be educated on the potential oral and systemic effects of chewing areca nut, from the farm to the consumer. Appropriate regulatory measures are critical for educating people from a variety of occupational and socioeconomic backgrounds in both rural and urban areas. Cessation programmes promoted through mass media could be a successful intervention.

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Conflict of Interest
The authors report no conflict of interest

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