

Betel, the Orphan Addiction

Melissa A Little¹ and Roger L Papke^{2*}

¹Department of Preventive Medicine, University of Tennessee Health Science Center, Memphis, Tennessee, USA

²Department of Pharmacology and Therapeutics, University of Florida College of Medicine, Gainesville, FL, USA

Abstract

Hundreds of millions of people worldwide are addicted to “betel nut” (areca), but unfortunately, to most people in Western nations, this addiction is perceived as little more than a curious Asian custom. Recent epidemiology has shown that betel use has concomitant health risks similar to tobacco use. This review discusses the magnitude of the problem, the need for increased public awareness, and the potential for developing programs to reduce the burden of this addiction on world health.

Introduction

Strangely, it seems that a hundred years ago no one noticed or cared about the health hazards of smoking, even though for as long as there have been tobacco smokers there certainly must have been smoking-related deaths. Fortunately, in the past fifty years increased public awareness of the deleterious effects of tobacco smoke, whether first or second hand, has led to a decrease in the use of cigarettes by adults in America from 42.4% in 1965 to 17.8% in 2013 [1,2]. Fiscal and social factors, such as increased taxes and laws banning smoking in public areas, as well as a reversal in the media presentations, from ads for cigarettes to government-sponsored anti-smoking propaganda, have been instrumental in promoting this decrease, and those who have been able to quit, or were discouraged from acquiring the addiction, could expect, on average, an additional ten years of life [3]. However, as impressive as this decline in smoking has been, for tens of millions of Americans with a desire to quit smoking, the addiction remains insurmountable, even with the smoking cessation aids and programs currently available.

There are only two other drugs considered to be “addictive” that are more widely used than nicotine: alcohol and caffeine. However, there is virtually no public awareness or concern in Western nations about the fourth most widely used addictive substance, commonly known as “betel nut”, even though 300 to 600 million people worldwide are potentially addicted and at increased risk for oral disease and cancer [4]. Of course, for much of the Western world, the ignorance and indifference to this widespread addiction can be attributed to what Douglas Adams identified in his Hitchhiker novels as the closest thing to invisibility, the SEP (somebody else’s problem) field. For thousands of years the use of areca nut (betel) has been endemic throughout South Asia and the Pacific Islands. Curiously, although Europeans were quick to pick up the tobacco habit brought back by Sir Walter Raleigh, the Europeans who first explored and then exploited the nations of Asia were not prone to becoming habitual users of betel nut preparations.

The purpose of this review is to attempt to peek through the SEP field and encourage awareness of a problem of considerable scope and significance to world health. At present, however, the World Health Organization “have no activities on betel and no plans to promote activities in this field”, is according to Vladimir Poznyak, the head of the organization’s substance abuse unit (personal communication).

Our failure to appreciate this orphan addiction begins with a lack of understanding about what terms the “betel” or “betel nut” even refer to. The real drugs in “betel” come from the fruit of the palm *Areca catechu*, which, although commonly referred to as nuts, are technically drupes. The connection to “betel” comes from the common way in which pieces of areca nut are combined with other spices, flavorants, and sometimes

tobacco, and wrapped in leaves of the *Piper betle* vine, forming a packet known as a “betel quid”, which is then chewed. The main psychoactive ingredient of the areca nut is arecoline, which is known to be a muscarinic cholinergic agonist. Since arecoline is a weak base, another important ingredient in the betel quid that is required to alkalize the saliva and permit absorption is some form of slaked lime, often from burnt sea shells or coral. With the widespread use of areca in Asia, there are many regional differences in how the nut is prepared, variously from soft unripe fruit to hard dried nuts that would be impossible to chew and even require special cutters (Figure 1A) to prepare the pieces for the quid [5]. Often vendors in Asian markets sell prepared quids to the tastes of the local users. In Taiwan, where the quids are made from unripe nuts combined with betel flowers and/or leaves, as well as red lime paste, cardboard boxes of prepared quids are sold to motorists from glass-walled roadside booths in which the quids are prepared by scantily-clad women known as “Betel-nut girls”. In Taiwan the commercial value of areca nut production is greater than that of rice [6].

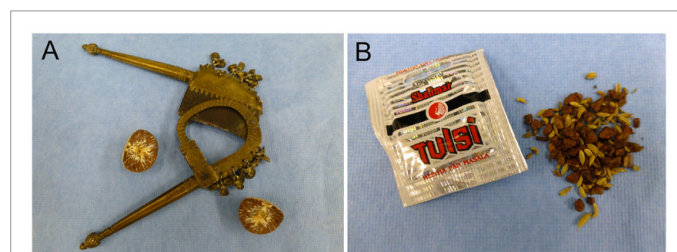


Figure 1: A) Traditional preparation of areca nut. A decorative guillotine-style betel nut cutter, probably from nineteenth century Rajasthan India, is shown with a sliced areca nut.

B) Twenty-first century areca preparation. A packet of Pan Masala, along with the contents of a similar packet, showing the brownish-red areca nut fragments as well as fennel seed and other ingredients used to flavor this brand of pan. All of the ingredients have been coated with an artificial sweetener, making this sort of product appealing to adolescents as well as adults.

*Corresponding author: Roger L. Papke, Ph.D, Professor, Department of Pharmacology & Therapeutics, University of Florida College of Medicine, Gainesville, FL, USA; E mail: rlpapke@ufl.edu

Received August 27, 2015; Accepted August 28, 2015; Published August 31, 2015

Citation: Little MA, Papke RL (2015) Betel, the Orphan Addiction. J Addict Res Ther 6: e130. doi: [10.4172/2155-6105.1000e130](http://dx.doi.org/10.4172/2155-6105.1000e130)

Copyright: © 2015 Little MA, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Historically, betel use cut through all levels of Asian society and was very common amongst the nobility. As recently as 1998, Queen Elizabeth II was presented with a silver betel nut box by the Sultan of Brunei [7]. Presently, though, betel use in Asia is generally inversely related to level of education and income [6,8]. Additionally, just as machine-made cigarettes increased the accessibility of tobacco, in recent decades areca nut preparations have become widely available, especially in India, in convenient foil packets sold as Paan Masala / Supari mix (Figure 1B) or as Gutka, which is a combination of both smokeless tobacco and areca nut pieces. Both whole areca nuts and inexpensive packets of Paan Masala are readily available in the United States for sale on eBay. Such worldwide accessibility permits areca nut users to maintain their habit even should they immigrate to countries such as the U.S., the U.K., or Australia, where fresh areca preparations would not be available. Of course, traveling with them are all of the health risks associated with their addiction.

Just like the addicting properties of areca, the concomitant health hazards have likewise been affected by the “somebody else’s problem” effect. Nonetheless, evidence is mounting regarding increased risk of oral diseases such as oral sub mucous fibrosis [9-12] and cancers [13-18]. As a result, betel quid has been classified as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, 2004) [19]. While these associations are irrefutable, the economic impacts of these health consequences to the developing nations of Asia has never been assessed but are doubtless considerable.

As noted above, although people of European descent have been exposed to areca nut use for centuries, and both the raw and processed nuts are available cheaply to anyone with a computer, areca nut addiction has remained largely restricted to peoples of Asian descent. Westerners often describe a highly aversive reaction to their first use of betel [20-22]. For any user, the most obvious and immediate reaction to areca is the copious production of almost asphyxiating amounts of saliva. Pigments from the nut combine with the alkalized secretions to produce brilliant red spittle that must be either expectorated or swallowed. Many walls in poorer neighborhoods in India carry the marks of this phenomenon. For some people, the effects that follow are disorienting or debilitating, probably associated with muscarinic effects in the brain. Habitual Asian users are more likely to report mild euphoria or stimulant effects like strong coffee. In India betel has long been considered an aphrodisiac.

Most of the research on areca use has been limited to epidemiological and biological investigations. However, there is a growing body of research focusing on the behavioral and psychosocial factors that lead individuals to initiate and/or maintain areca use. Recently, researchers have begun exploring the psychology of areca addiction. There is growing support for areca (betel) addiction [23-25], although it is unclear what threshold signifies dependence. The stimulant and anxiolytic effects of areca have been associated with escalation of use and dependency [23,27-29]. However, disentangling the independent effects of areca addiction is challenging, given that many users concomitantly use tobacco [19,30,31]. In a multi-country study, researchers found that areca dependence ranges from 12.5% to 92.6% for tobacco free users and 47.9 to 99.3% among tobacco added users [32]. Other studies have found similarly high rates of dependence among tobacco-added users [25]. Further support for areca addiction can be found in reports from areca users trying to quit undergoing withdrawal symptoms that are similar to nicotine withdrawal [27]. Additionally, researchers have begun to explore reasons why people use areca [24,33]. The most strongly endorsed reason people reported

for using areca was because of the way it made them feel [24]. This growing body of research suggests that in order to promote cessation, the stimulating effects of areca use must be addressed either through pharmacotherapy or behavioral interventions.

Given that areca users experience many of the same patterns of dependence and withdrawal symptoms experienced by tobacco users, researchers have begun to compare these two groups to see if similarities could be found which would inform the development of areca cessation behavioral interventions. Researchers have found that both sorts of users express a desire to quit and intend to quit; however, most do not have plans for when or how to quit [34], suggesting that, similar to smokers, users may be in need of assistance in planning and carrying out their quit attempt [34]. Counseling techniques such as motivational interviewing or cognitive-behavioral therapy, which have been widely used to help people stop smoking [35,36], could be a good starting point for the development of areca cessation interventions. Of course, in nations such as India and Taiwan, where betel use is high and undoubtedly is already presenting a burden on the national health care systems, public awareness programs could also be implemented to encourage cessation and discourage acquisition of the habit.

Another approach for treating areca dependence could be in pharmacotherapy. Pharmacotherapy has been successful in promoting tobacco cessation. It is unknown whether any of the pharmacotherapies that have proven effective in aiding tobacco cessation could prove helpful for areca users. However, it has recently been discovered that arecoline functions as a partial agonist for the nicotinic receptor subtypes most closely linked to nicotine dependence [37], making such crossover therapeutics an attractive possibility. While this nicotinic activity may not be the basis for the short-term reinforcing effects of betel use, it would be consistent with changes in the meso-limbic reward pathways; similar to what occurs in smokers that leads to dependence and withdrawal [38,39]. For a habituated betel user, the reported anxiolytic effects of the drug may be due to the alleviation of withdrawal.

The global health burden associated with areca use worldwide necessitates attention towards this addictive behavior. Given that it has been demonstrated that users do indeed become dependent [23-25], and that a substantial portion of the areca users have the desire to quit [34], it seems to be an addressable problem.

References

1. Jamal A, Agaku IT, O'Connor E, King BA, Kenemer JB, et al. (2014) Current cigarette smoking among adults--United States, 2005-2013. *MMWR Morb Mortal Wkly Rep* 63: 1108-1112.
2. U.S. Department of Health and Human Services (2014). *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
3. Jha P, Peto R (2014) Global effects of smoking, of quitting, and of taxing tobacco. *N Engl J Med* 370: 60-68.
4. Winstock A (2002) Areca nut-abuse liability, dependence and public health. *Addict Biol* 7: 133-138.
5. Patidar KA, Parwani R, Wanjari SP, Patidar AP (2015) Various terminologies associated with areca nut and tobacco chewing: A review. *J Oral Maxillofac Pathol* 19: 69-76.
6. Williams S, Malik A, Chowdhury S, Chauhan S (2002) Sociocultural aspects of areca nut use. *Addict Biol* 7: 147-154.
7. Strickland SS (2002) Anthropological perspectives on use of the areca nut. *Addict Biol* 7: 85-97.
8. Croucher R, Islam S (2002) Socio-economic aspects of areca nut use. *Addict Biol* 7: 139-146.

9. Merchant AT, Haider SM, Fikree FF (1997) Increased severity of oral submucous fibrosis in young Pakistani men. *Br J Oral Maxillofac Surg* 35: 284-287.
10. Sinor PN, Gupta PC, Murti PR, Bhonsle RB, Daftary DK, et al. (1990) A case-control study of oral submucous fibrosis with special reference to the etiologic role of areca nut. *J Oral Pathol Med* 19: 94-98.
11. Maher R, Lee AJ, Warnakulasuriya KA, Lewis JA, Johnson NW (1994) Role of areca nut in the causation of oral submucous fibrosis: a case-control study in Pakistan. *J Oral Pathol Med* 23: 65-69.
12. Ranganathan K, Devi MU, Joshua E, Kirankumar K, Saraswathi TR (2004) Oral submucous fibrosis: a case-control study in Chennai, South India. *J Oral Pathol Med* 33: 274-277.
13. Awang MN (1988) Fate of betel nut chemical constituents following nut treatment prior to chewing and its relation to oral precancerous & cancerous lesion. *Dent J Malays* 10: 33-37.
14. Trivedy CR1, Craig G, Warnakulasuriya S (2002) The oral health consequences of chewing areca nut. *Addict Biol* 7: 115-125.
15. Nair U, Bartsch H, Nair J (2004) Alert for an epidemic of oral cancer due to use of the betel quid substitutes gutkha and pan masala: a review of agents and causative mechanisms. *Mutagenesis* 19: 251-262.
16. Akhtar S (2013) Areca nut chewing and esophageal squamous-cell carcinoma risk in Asians: a meta-analysis of case-control studies. *Cancer Causes Control* 24: 257-265.
17. Song H, Wan Y, Xu YY2 (2015) Betel quid chewing without tobacco: a meta-analysis of carcinogenic and precarcinogenic effects. *Asia Pac J Public Health* 27: NP47-57.
18. Kao SY, Lim E (2015) An overview of detection and screening of oral cancer in Taiwan. *Chin J Dent Res* 18: 7-12.
19. Lin CF, Wang JD, Chen PH, Chang SJ, Yang YH, et al. (2006) Predictors of betel quid chewing behavior and cessation patterns in Taiwan aborigines. *BMC Public Health* 6: 271.
20. Goins A (2005) *The Last Longhouse (Xlibris)*.
21. Chu NS1 (2002) Neurological aspects of areca and betel chewing. *Addict Biol* 7: 111-114.
22. Garg A, Chaturvedi P, Gupta PC2 (2014) A review of the systemic adverse effects of areca nut or betel nut. *Indian J Med Paediatr Oncol* 35: 3-9.
23. Bhat SJ, Blank MD, Balster RL, Nichter M, Nichter M (2010) Areca nut dependence among chewers in a South Indian community who do not also use tobacco. *Addiction* 105: 1303-1310.
24. Little MA, Pokhrel P, Murphy KL, Kawamoto CT, Suguitan GS, et al. (2014) The reasons for betel-quid chewing scale: assessment of factor structure, reliability, and validity. *BMC Oral Health* 14: 62.
25. Herzog TA, Murphy KL, Little MA, Suguitan GS, Pokhrel , et al. (2014) The Betel Quid Dependence Scale: replication and extension in a Guamanian sample. *Drug Alcohol Depend* 138: 154-160.
26. Lee CH, Ko AM, Warnakulasuriya S, Ling TY, Sunarjo, et al. (2012) Population burden of betel quid abuse and its relation to oral premalignant disorders in South, Southeast, and East Asia: an Asian Betel-quid Consortium Study. *Am J Public Health* 102: e17-24.
27. Winstock AR, Trivedy CR, Warnakulasuriya KA, Peters TJ (2000) A dependency syndrome related to areca nut use: some medical and psychological aspects among areca nut users in the Gujarat community in the UK. *Addict Biol* 5: 173-179.
28. Chandra PS, Carey MP, Carey KB, Jairam KR (2003) Prevalence and correlates of areca nut use among psychiatric patients in India. *Drug Alcohol Depend* 69: 311-316.
29. Mubeen K, Kumar CN, Puja R, Jigna VR, Chandrashekar H (2010) Psychiatric morbidity among patients with oral sub-mucous fibrosis: a preliminary study. *J Oral Pathol Med* 39: 761-764.
30. Lam CY, Gritz ER (2012) Incorporating behavioral research to examine the relationship between betel quid chewing and oral cancer in Taiwan. *BioMed* 160-166.
31. Chen KT, Chen CJ, Fagot-Campagna A, Narayan KM (2001) Tobacco, betel quid, alcohol, and illicit drug use among 13- to 35-year-olds in I-Lan, rural Taiwan: prevalence and risk factors. *Am J Public Health* 91: 1130-1134.
32. Lee CH, Chiang SL, Ko AM, Hua CH, Tsai MH, et al. (2014) Betel-quid dependence domains and syndrome associated with betel-quid ingredients among chewers: an Asian multi-country evidence. *Addiction* 109: 1194-1204.
33. Kuo SC, Lew-Ting CY (2008) The Health Lifestyles of Areca quid-chewing Taxi Drivers-An Exploratory Study from the Viewpoint of Social Context, Taiwan. *Journal of Public Health* 27:67-80.
34. Little MA, Pokhrel P, Murphy KL, Kawamoto CT, Suguitan GS, et al. (2014) Intention to quit betel quid: a comparison of betel quid chewers and cigarette smokers. *Oral Health Dent Manag* 13: 512-518.
35. Lai DT, Cahill K, Qin Y, Tang JL (2010) Motivational interviewing for smoking cessation. *Cochrane Database Syst Rev*: CD006936.
36. Perkins KA, Conklin CA, Levine MD (2008) *Cognitive-behavioral therapy for smoking cessation : a practical guidebook to the most effective treatments* (New York, Routledge).
37. Papke RI, Horenstein NA, Stokes C (2015) Nicotinic activity of arecoline, the psychoactive element of "betel nuts", suggests a basis for habitual use and anti-inflammatory activity, Paper presented at the 45th annual meeting of the Society for Neuroscience, Chicago, IL.
38. Picciotto MR, Addy NA, Mineur YS, Brunzell DH (2008) It is not "either/or": activation and desensitization of nicotinic acetylcholine receptors both contribute to behaviors related to nicotine addiction and mood. *Prog Neurobiol* 84: 329-342.
39. Picciotto MR, Mineur YS (2014) Molecules and circuits involved in nicotine addiction: The many faces of smoking. *Neuropharmacology* 76 Pt B: 545-553.

Citation: Little MA, Papke RL (2015) Betel, the Orphan Addiction. *J Addict Res Ther* 6: e130. doi: 10.4172/2155-6105.1000e130

OMICS International: Publication Benefits & Features

Unique features:

- Increased global visibility of articles through worldwide distribution and indexing
- Showcasing recent research output in a timely and updated manner
- Special issues on the current trends of scientific research

Special features:

- 700 Open Access Journals
- 50,000 editorial team
- Rapid review process
- Quality and quick editorial, review and publication processing
- Indexing at PubMed (partial), Scopus, EBSCO, Index Copernicus and Google Scholar etc
- Sharing Option: Social Networking Enabled
- Authors, Reviewers and Editors rewarded with online Scientific Credits
- Better discount for your subsequent articles

Submit your manuscripts as E-mail: www.omicsonline.org/submit/