

## Prevention

### Behavioral and Sociocultural Factors that Contribute to Use

A number of studies have been undertaken across the globe to identify factors that influence the oral use of betel quid/areca nut and tobacco. Betel quid use is strongly influenced by family, peers, and society, and is often continued despite awareness of associated health risks (Quinn Griffin et al., 2014). Areca nut chewers have also stated that chewing is a positive and learned behavior that signifies cultural identity (Murphy and Herzog, 2015).

- A study of Bhutan health care providers found that more males chew betel quid than females. Married people were twice as likely to chew as single individuals, and those from families in which more than 50% of family members chewed betel quid were 14 times more likely to chew than individuals with no chewers in their families (Dorji et al., 2012).
- In Chitrakoot, India, 46% of 124 survey respondents reported currently using gutka. Users attributed their use to reasons such as relieving tension, aiding concentration, combating bad breath and enjoying leisure time (Anwar et al., 2005).
- Male betel quid chewers from Myanmar associated the practice with masculinity, considering chewing to be manly, sexually attractive, and trendy. They also believed that chewing improves their social interactions in the business world, attributing an economic benefit, and stated that it made them work harder (Moe et al., 2015).



### Developing Effective Prevention Interventions

Limited evidence is available on the effectiveness of interventions to prevent betel quid and areca nut use. A study from Taiwan found that a school-based education program helped students to resist areca nut use (Wang et al., 2007). Another school-based program, Project MYTRI (Mobilizing Youth for

Tobacco-Related Initiatives in India), targeted students in grades 6–9 from 32 Indian schools to decrease susceptibility to tobacco use. An evaluation of the program found that delivery of a large-scale preventive intervention program was feasible when supported by teacher trainings and curriculum materials. (Goenka et al., 2010).

## Addiction and Cessation

### Biology of Addiction: Key Ingredients/Alkaloids in Tobacco and Betel Quid/Areca Nut

The primary chemical constituents of the areca nut are carbohydrates, fats, proteins, crude fiber, polyphenols such as flavonols and tannins, mineral matter, and at least six related alkaloids (IARC 2004). Biochemical studies have definitively identified four major alkaloids – arecoline (typically the main alkaloid), arecaine, guvacine and guvacoline (Raghavan & Baruah, 1958; Huang & McLeish, 1989; Lord et al., 2002). Arecoline is the primary active ingredient in the areca nut that is responsible for effects on the central nervous system. Recent research suggests that dependence levels are similar in betel quid chewers and cigarette smokers (Herzog et al., 2014). Some betel quid/areca nut products include tobacco and have elevated levels of nicotine and carcinogenic tobacco-specific nitrosamines (TSNAs) (Stanfill et al., 2011; Stepanov et al., 2005).

### Dual Use of Areca Nut or Betel Quid and Alcohol/Cigarette Smoking

A history of betel quid chewing has been shown to increase the likelihood of cigarette smoking and inhibit smoking cessation (Ghani et al., 2012). A study of Taiwan aborigines indicated that betel quid chewers were most likely to combine the use of alcohol and cigarettes, but chewers who did not drink alcohol were more likely to quit chewing (C.F. Lin et al., 2006). Another study of prison inmates with a history of betel quid use revealed habitual use of alcohol and cigarettes in addition to chewing. Inmates who quit smoking prior to incarceration were more likely to voluntarily quit betel quid chewing. Inmates who drank were less likely to quit chewing, but those who quit drinking before incarceration were more likely to quit chewing (Lee et al., 2016). Among Bhutan health care providers, smokers were more likely to chew betel quid than non-smokers, and occasional drinkers were three times more likely to chew than non-drinkers (Dorji et al., 2012).

### Cessation Interventions and Dependence Treatment

Cessation interventions have been implemented in various formats to target different audiences including betel quid users. However, these interventions are not necessarily specific to betel quid or areca nut, but may address a range of smokeless tobacco products.

Limited research suggests that arecoline may act on the same nicotinic acetylcholine receptors as nicotine, thus, using similar therapies such as cytosine or varenicline may be useful for betel quid cessation (Papke et al., 2015). The World Health Organization suggests that treatment of tobacco dependence within health care systems should also include information on the dangers of areca nut where appropriate and offer similar behavioral and pharmacotherapy treatments for areca nut cessation (WHO, 2012).

Given the increasing number of areca nut/betel quid users and the integration of mobile phones across the globe, mHealth programs offer substantial promise for delivering cessation interventions, including to populations that do not have regular contact with the health system (Sharma et al., 2015).