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# Risks associated with betel quid chewing

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### ABSTRACT

Betel quid is one of the most commonly used psychoactive substances in the world, especially among Asian communities, just after caffeine, nicotine and alcohol. The mixture that is chewed usually contains betel leaves, areca nut and slaked lime, nonetheless, its ingredients and the preparation manner tend to vary. Areca nut contains four main alkaloids – arecoline, arecaidine, guvacine and guvacoline that are responsible for its psychoactive effects. The act of betel chewing might have a negative impact on an overall health and can cause pathological lesions or diseases to develop and/or progress, both directly and indirectly. Also, it may happen that the negative impact of betel chewing on one system might have indirect harmful influence on another. Still an association has been drawn between betel chewing and the presence of metabolic diseases, cancers and proteinuria, as well as cardiovascular disorders – including hypertension, chronic renal failure, diabetics type II and obesity. Likewise, it is a known risk factor in the development of oral and esophagus cancer. Moreover, a correlation between betel chewing and smoking exists in that betel chewing might theoretically hinder the abandonment of tobacco smoking. Tissues of oral cavity and the upper part of digestive system are additionally exposed to the mechanical injuries caused by the areca nut. Therefore, they tend to be the most prone to be pathologically affected by betel quid chewing.

### WHAT IS BETEL

Betel, also known as the areca nut, is the fourth most commonly used psychoactive substance in the world – just after caffeine, nicotine and alcohol [8]. The act of betel chewing has been known for centuries among the residents of Asian countries, and later, compatibly to the migration of some of its habitants, it has spread to Europe, North America and Africa. In many societies, betel chewing is commonly practiced and publicly accepted, even though there are countless evidences that it may pose a great risk to overall health, especially to the tissues in the oral cavity.

The act of betel chewing refers to the chewing of the composition of betel quid and various other ingredients. These may vary due to geographical regions and to the individual preferences of the user. The most commonly used mixture is made of areca nut, betel leaves and slaked lime, although the ingredients, as well as the way of their preparation, may differ. Moreover, the areca nut can be processed in many different ways, as it may be unripe, ripe, baked/

boiled/roasted, fermented or treated with sweeteners and/or added essences. Sometimes, instead of betel leaves, betel inflorescences are used, and the addition of, among other ingredients, nicotine, cinnamon and a variety of plant roots is quite popular. Some individuals prepare the betel quid by themselves, while others tend to purchase the commercially manufactured product. The betel quid that is factory-made can be associated with even bigger risk for a person's health as it may potentially cause the development of pathological lesions or may trigger their progression [8,10].

### THE CORRELATION BETWEEN BETEL QUID CHEWING AND HEALTH

Many researches have been conducted so as to determine the existence of a correlation, or its lack, between betel quid chewing and the development and/or progression of given diseases and/or medical conditions. Based on observations, an association has been drawn between usage of the fourth most common psychoactive substance in the world and the presence of metabolic diseases, cancers, proteinuria,

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cardiovascular disorders – including hypertension, chronic renal failure and diabetics type II [2,5,10,11,13,14,20,22].

Areca nut contains four main alkaloids that have an inhibitory effect on the GABA (gamma-aminobutyric acid) receptors – arecoline, arecaidine, guvacine and guvacoline. Arecoline, however, is considered to be the its crucial component. These alkaloids can cause psychoactive effects to appear, both those theoretically positive – like intense feeling of happiness, higher alertness, and those negative – including, but not limited to dizziness or the feeling of light-headedness [3,6,21]. When these alkaloids are in direct contact with gastric acid and certain bacteria (which are naturally originally found in the mouth), potentially carcinogenic substances might be formed [3]. This fact has been reflected in the report issued by WHO that classifies the act of betel quid chewing as one of the risk factors involved in the development of oral and esophagus cancer [18]. Furthermore, the alkaloids can have a role in the development and progression of diabetes, since arecoline can theoretically influence the secretion of insulin [21], and it might increase the appetite, thus it may be involved in the development and/or advancement of obesity [15]. The noted increase in appetite can be associated with the fact that alkaloids found in betel work as GABA receptors antagonists [4]. Likewise, the study conducted by Tung *et al.* [2004] revealed that betel chewing is an independent factor in the development of type II diabetes [19], whilst Gould *et al.* [1999] saw an association between betel chewing and insulin resistance – and, hence, the development of obesity [7], and ultimately, the development of cardiovascular diseases [16].

Betel quid chewing results in an immediate vasoconstriction effect and thus speeds up the heart rate. In addition, studies have shown that in individuals who have just recently begun to chew betel, a temporary increase in blood pressure might appear [3]. Likewise, a noted development or further progression of hypertension could be influenced by the heavy metals (such as Manganese) whose trace amounts can be found in the areca nut [1,12]. Likewise, the increased level of homocysteine generated through betel nut chewing can pose as a risk factor in the induction or advancement of cardiovascular diseases [12,23]. What is more, chewing the areca nut can also indirectly influence the circulatory system since it may trigger the formation of periodontal disease, and the latter may be a causative agent in the formation of pathology in the circulatory system [17].

## ORAL HEALTH IN INDIVIDUALS CHEWING BETEL QUID

Parmar *et al.* [2006] attempted to determine whether there is any connection between oral hygiene and the condition of periodontal tissues in individuals who chew betel quid containing nicotine as one of its ingredients. In that study, it has been concluded that such association indeed exists, as bleeding gums, lesions on the soft tissues of the mouth, including erosion, as well as halitosis do seem to be present more habitually than in individuals who do not chew betel. Additionally, it appears that betel quid users suffer more frequently from gum recession, and the pathological gingival pockets tend to appear more often. Overall worse oral health

also seems to be an issue [17]. Based on the conducted research of Zhang and Reichart [2007], the following oral diseases might be correlated with betel quid chewing: oral leukoplakia, submucosal fibrosis, as well as oral cancer [24].

In regards to the relationship between betel chewing and a rise of dysfunctions in the urinary system such as chronic renal failure in particular, some studies have reported the independent impact of betel chewing on the development and possible progression of the previously mentioned diseases. However, the group that was subjected to study was relatively small [14]. A study, conducted on a wider scale, also saw the occurrence of such a correlation, but only conditionally, i.e. depending on the existence of other demographic factors, comorbidities, as well as health-care habits – in other words, stating that such dependency ought to be treated with great caution [14].

## IMPORTANCE OF INCREASING AWARENESS ABOUT THE SIDE EFFECTS OF BETEL QUID CHEWING

The effects and side effects of betel quid chewing, especially in Asian countries where it is highly popular, nowadays seem to be drawing the attention of many researchers. The studies that are being carried out not only tend to determine whether the use of fourth most common psychoactive substance in the world has an effect on the incidence and/or progression of disease entity, but also on the other aspects of everyday life. In Taiwan, for instance, the codependency between betel chewing and tobacco smoking has been analyzed, and, based on the obtained results, it was concluded that among current smokers, the percentage of people also chewing betel is higher in comparison to non-smokers. Also, it seems that betel chewing can hinder the abandonment of tobacco smoking [5].

Betel quid chewing, practiced by more or less 600 million people worldwide [9], affects, both directly and indirectly, the entire human body. The greatest negative effects appear to concern, but they are not limited to, the tissues that are in direct contact with the areca nut. Among these are the tissues of oral cavity and the upper part of digestive system. These tissues are additionally exposed to the mechanical injuries caused by betel. Furthermore, the negative impact of betel chewing on one system might have indirect harmful influence on another, for example, the correlation between periodontal disease and cardiovascular system. The practice of Betel nut chewing, therefore, is well-worth studying.

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