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## A qualitative study of attitudes to and perceptions of betel quid consumption and its oral health implications in Taiwan

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### Abstract

**Objectives:** Betel quid (BQ) chewing is extremely prominent in South and Southeast Asia **because** it considered by users to be of social, cultural, and religious importance. BQ chewing has been recognized as a **risk factor** for oral pre-malignant lesions and oral cancer. Because BQ chewing has become a severe health risk in Taiwan, the development of prevention and cessation programs is essential. The purpose of this study was to explore the attitudes and perceptions **associated with** BQ consumption and its oral health implications in an attempt to inform the development of health promotion initiatives and BQ cessation efforts in Taiwan, where the dental profession could have a pivotal role in preventing and controlling BQ use among persons at risk.

**Methods:** This qualitative study **used** data gathered from focus groups and individual interviews. A convenience sample of forty-one adults from Jhushan and Lugu Townships (Nantou County) and Taichung City, Taiwan, participated in this study (27 men, 14 women; 31 Han, 10 aboriginals from the Paiwan tribe; mean age **40.3**, **SD 9.2** years).

**Results:** Among the seven themes that emerged from the original study, five (Initiation, Health Risk Perception, Health Consequences, Withdrawal Symptoms, and Help from Healthcare Providers) had oral/dental implications.

**Conclusions:** Our **study** highlights research areas relevant to further investigation, such as incorporating brief BQ prevention and cessation counseling when early oral and dental signs associated with BQ consumption are detected. Undertaking behavioral interventions in dental settings **might help to** reduce the prevalence of BQ chewing in Taiwan.

### Keywords

betel; areca; dental; oral cancer; prevention

## Introduction

Betel quid (BQ) is the fourth most frequently used addictive substance in the world after tobacco, alcohol, and caffeine.<sup>1</sup> BQ has long been commonly used in South Asia and Southeast Asia, in Taiwan, Sri Lanka, China, Malaysia, Nepal, Indonesia, India, and other nearby countries.<sup>2, 3</sup> BQ usually contains areca nut, betel leaf, and slaked lime. In many countries, tobacco is also added to BQ.<sup>3-5</sup> However, BQ chewing has been recognized as a precursor for oral pre-malignant lesions and oral cancer.<sup>5-7</sup> According to the International Agency for Research on Cancer (IARC), BQ itself, with or without tobacco, has been identified as a Group 1 human carcinogen.<sup>4</sup>

According to the cancer registry annual report by the Health Promotion Administration Ministry of Health and Welfare, oral cancer is the sixth highest cause of death among Taiwanese men and the seventh highest among Taiwanese women.<sup>8</sup> It has become one of the greatest potential health threats to Taiwanese people. Nearly 2 million people are BQ chewers in a population of 23 million.<sup>9, 10</sup> One community survey conducted in southern Taiwan found that 10.7% of men and 2.5% of women were current chewers (current chewers were defined as those who had chewed at least one quid per day of any type of BQ for a minimum of 6 months).<sup>11</sup> Unlike practices in other countries, tobacco is never added to BQ in Taiwan.<sup>12</sup> However, a majority of BQ chewers are also cigarette smokers. One study that included 231,935 men aged 20 years and older indicated that 90.0% of current male chewers are cigarette smokers.<sup>9</sup> There is a strong synergistic effect of BQ chewing and cigarette smoking for oral cancer risk.<sup>7, 13</sup>

BQ chewing has destructive effects on oral health. It may cause damage to both hard and soft tissue, such as dental attrition, areca stain, periodontal disease, lichenoid lesions, oral leukoplakia, and oral submucous fibrosis. Of particular concern is **that** oral leukoplakia and oral submucous fibrosis are considered premalignant lesions.<sup>14</sup> **A random-effects meta-analysis of 50 publications found that chewing BQ, independently of tobacco and alcohol use, increases the risk of oral/oropharyngeal cancer in Indian subcontinent and Taiwan.**<sup>15</sup>

Because BQ chewing has become a severe health risk in Taiwan, the development of prevention and cessation programs is essential. According to the stages of prevention, dentists can not only advise their clients to adopt and maintain a healthy lifestyle to reduce the risk of oral cancer (primary prevention), but also screen for oral manifestations and inquire about the substance use behavior of BQ chewers before oral pre-malignant lesions and oral cancer develop (secondary prevention). Even more, dentists and oral health professionals can play an active role in assisting their clients in the quitting process.<sup>16</sup>

Previous research has shown that dentists and oral health professionals are in an ideal position to counsel their patients to quit smoking.<sup>17, 18</sup> **However**, to our knowledge, no studies have explored the role of dental professionals in BQ cessation and prevention. The purpose of this study was to identify behavioral factors and oral/dental conditions related to BQ use that may inform the development of health promotion initiatives and BQ cessation

efforts in Taiwan, where the dental profession could have a pivotal role in preventing and controlling BQ use among persons at risk.

## Methods

This qualitative study was based on secondary analysis of data gathered **between March and June 2013** from focus groups and individual interviews conducted in an international project launched in Taiwan where the aim was to identify the individual, social, and contextual (cultural) factors related to initiation, continued use, and cessation of BQ chewing.<sup>19</sup>

### Study participants, recruitment, and data collection

A convenience sample of forty-one adults from Jhushan and Lugu Townships (Nantou County) and Taichung City, Taiwan, participated in this study (27 men, 14 women; 31 Han, 10 aboriginals from the Paiwan tribe; mean age **40.3, standard deviation (SD) 9.2 years**, ranging **in age** from 22 to 59).

These three study sites were chosen for recruitment due to the success of previous research experiences that have strengthened the relationship with the targeted community. Jhushan and Lugu Townships, with populations of 55,125 and 17,821, respectively, are located in Nantou County, the second largest county in Taiwan.<sup>20</sup> Taichung City, with a population of around 2.7 million people, is the second most populous city in Taiwan.<sup>21</sup> While the Paiwan tribe is the second-largest indigenous group in Taiwan, its **population** proportion is around 1.6%<sup>22</sup> in Nantou County and 20% in Taichung City.<sup>23</sup>

Advertising flyers **and** word-of mouth methods were used to invite current or former BQ users to discuss their knowledge and self-perceptions about BQ and associated health consequences. A snowballing approach was also used to support recruitment. **There was no relationship between study participants and members of the research team prior to the study commencement. All potential participants were informed that the goal of study was to explore BQ consumption in Taiwan and were invited to share their personal experiences about its use. No obvious interview/facilitator bias was found that could have impacted the data collection process.**

Former and current BQ chewers **20 to 65 years old** were recruited for participation and shared their knowledge and self-perceptions about BQ and related health influences for the original study. Focus groups and interviews (approximately duration of 60 minutes each) took place at locations that were easily accessible for participants: (1) the Community Center in Nantou County, and (2) **the** Aboriginal Culture and Craft Development Association in Taichung. **No participant dropped out from the study.** Authors WFM and CIL, who are experienced qualitative researchers, led a team of three other qualitative experts who participated in data collection during the individuals' interviews and focus groups. **At the time of data collection, WFM was an Associate Professor at the School of Nursing and Graduate Institute of Nursing in China Medical University. CIL was an assistant researcher at the Department of Medical Research in China Medical University Hospital. Two of the other three qualitative experts were clinical nursing**

preceptors, and the other one was a research assistant. All five researchers were Han women. None of them was aboriginal. Although 24% of study participations were aboriginals, they were able to speak in Mandarin Chinese which is the official language of Taiwan. There was no communication barrier between researchers and the aboriginals participating in the focus groups and individual interviews. A discussion guide was followed to cover pre-defined themes for discussion, which included reasons for BQ chewing, use patterns, barriers to and facilitators of abstinence, and health beliefs, experience and expectancy. **The same discussion guide was used for conducting the focus groups, as well as the in-depth face-to-face interviews (available in its original language as a supplemental file). Before initiating data collection, all facilitators attended a two-hour training led by WFM for pretesting the discussion guide and participating in role play.**

Respondents who reported having chewed BQ for the past six months at the time of recruitment were defined as **Current BQ** chewers. Respondents who did not chew BQ for the past six months at the time of recruitment but reported chewed BQ in the past for more than one year were defined as **Former BQ** chewers.

Informed consent was obtained from all subjects, who participated in fifteen in-depth face-to-face interviews and four focus groups, each lasting approximately sixty minutes. Eligible participants were asked to complete a short questionnaire designed to gather data on demographic information, past or current use of cigarettes and alcohol, and patterns of BQ use (age of initiation, number of BQ used per day, and previous quit attempts). **Focus groups were conducted in four different age groups (20–29 years, 30–39 years, 40–49 years, and 50 years) in order to account for an age-wise perspective of the behavior. Individual interviews and focus groups were conducted simultaneously, mainly due to time restraints. This strategy also improved the recruitment rate as some participants could not attend the focus groups at the scheduled time, but were willing to contribute to the study by participating in the individual interviews.**

**Only study participants and facilitators were present when the focus groups and in-depth interviews were conducted. Participants received 150 New Taiwan Dollar (NTD) for participating in the study.** All focus group discussions and individual interviews were digitally recorded and transcribed. **Transcripts from individual interviews were returned to study participants for correcting the content before data analysis. This was not possible for the study participants taking part in the focus groups due to budgetary and time constraints.**

Secondary data analysis was undertaken manually. The researchers followed pre-defined themes for discussion and allowed novel themes to emerge freely in both the focus groups and interviews. The detailed methods, including the primary data analysis procedures, have been published previously.<sup>19</sup> The study was approved by the institutional review board of China Medical University Hospital in Taichung, Taiwan.

## Data analysis

An interpretative secondary analysis **based on content analysis** was undertaken manually to identify, within the thematic framework of the primary study, oral/dental health risk perceptions, withdrawal symptoms associated with the oral cavity, and opportunities for obtaining assistance from dental professionals in BQ cessation efforts (**deductive approach**). **The ultimate goal was to retest the existing data in a new context (attitudes to and perceptions of BQ consumption and its oral health implications)**. For this qualitative descriptive study, the analysis was conducted independently by two experienced reviewers (ITM and MTL) who met to discuss their interpretations of the “dental/oral” codes found within each theme. Selected codes included the following: oral, mouth, tooth, teeth, gum, saliva, dental, and dentist. **By using this consistent set of codes, ITM and MTL organized texts with similar content into categories, which in turn were revised, removed, and added during the analytical procedure. Separate files with codes and categories independently identified by ITM and MTL were compared and discrepancies were resolved via discussion and consensus to reach consistency in interpretation of the data. Then, resulted categories were reorganized into broader categories, which were finally grouped, revised, and refined into the themes presented in the results.**

## Results

Study participants (male = 27, female = 14) ranged in age from 22 to 59 (mean = 40.3, SD = 9.2 years). Most participants were non-Aboriginals from the Taiwanese population (75.6%). The majority of participants chewed BQ every day (53.7%) and started chewing at age 18 or younger (56.1%). Among them, 65.9% had attempted to quit BQ consumption. The number of attempts to quit varied from 0 to 10 (mode = 1, median = 2). Over half of the participants were current cigarette smokers (68.3%) and alcohol drinkers (51.2%).

Among the seven themes that emerged from the original study – *Initiation; Reasons for Chewing; Health Risk Perception; Health Consequences; Quitting Intention and Challenge; Multiple Substance Use: Alcohol, BQ, and Cigarettes; and Help from Healthcare Providers* – five had oral/dental implications. **While a facilitator was asked to take notes during the focus groups and interviews, researchers did not find any of the handwritten notes meaningful in the context of the discussions nor relevant to the interpretation of the data.** The five themes and **representative** quotes are presented below.

### Theme 1 - Initiation

More than half of the individuals in our study sample (23 persons, 56.1%) began chewing BQ at age 18 or younger, as illustrated by this quote:

*“I tried it [betel quid] once, secretly, in elementary school...my whole body warmed up, and my mouth and throat felt tight, very hot, and my head was dizzy.”*

(Interviewee 13, male, 37 years old, Taiwanese).

## Theme 2 - Reasons for Chewing

During the secondary data analysis, we did not find oral/dental implications related to this theme which emerged in the original study.

## Theme 3 - Health Risk Perception

Regarding cancer risk perception, the majority of participants believed that chewing BQ with other ingredients (such as slaked lime) leads to oral cancer. **Nevertheless, many participants did not recognize that BQ alone, without other ingredients, was carcinogenic.**

*“We aborigines don’t have this disease [oral cancer], not in our village. You don’t use red lime in betel quid...”* (Interviewee 1, male, 59 years old, Aboriginal).

## Theme 4 - Health Consequences

Most participants expressed concern about oral and dental lesions, such as oral ulcer, “flat teeth” (ground-down dental surfaces), and toothache. In addition, the majority believed that chewing BQ with other ingredients (such as slaked lime) leads to oral cancer.

*“I’m afraid of getting oral cancer; because of chewing betel quid, there are ulcers in my mouth from time to time, and the oral mucosa becomes thinner. I really should quit.”* (Focus Group 4, male, 27 years old, Taiwanese).

## Theme 5 - Withdrawal Symptoms

When participants stopped chewing, they reported experiencing several withdrawal symptoms. The most frequently mentioned withdrawal symptoms related to dental/oral conditions were tooth ache, tooth loss, bitter taste, and increased salivation.

*“I stopped using [betel quid] for more than two months...[when] eating something cold or hot foods, my teeth ached. I got frightened [of this pain] and chewed [BQ] again.”* (Interviewee 08, male, 57 years old, Taiwanese).

## Theme 6 - Multiple Substance Use

During the secondary data analysis, we did not find oral/dental implications related to this theme which emerged in the original study.

## Theme 7 - Help from Healthcare Providers

More than half of the participants mentioned that healthcare providers encouraged them to quit BQ. However, only four participants mentioned that their dentists encourage them to quit BQ. The participants revealed that they received only basic information about health risks associated with BQ. Quitting assistance in the dental environment was lacking.

*“They [healthcare professionals] seldom talk about BQ! It’s mainly about cigarettes and alcohol. They [healthcare professionals] advise me not to have alcohol and cigarettes.”* (Focus Group 4, male, 33 years old, Taiwanese).

## Discussion

Our qualitative study evaluated the attitudes to and perceptions of BQ consumption and underlined the oral health implications, including oral cancer, associated with BQ chewing among Taiwanese adults.

BQ chewing is prevalent in South Asia and Southeast Asia.<sup>24</sup> Although tobacco is not added to the BQ in Taiwan, a local study showed that most Taiwanese BQ chewers are also cigarette smokers and alcohol drinkers, which increases their risk of oral cancer.<sup>25</sup> Both BQ and tobacco are addictive substances and are characterized by dependence syndromes, and the dependence on BQ seems to be higher among those who also use tobacco.<sup>26–29</sup> More research needs to be undertaken to fully characterize BQ dependence and its relationship to tobacco dependence. Arecoline, the primary psychoactive agent in the areca nut, has systemic central and autonomic nervous system effects, acting on both muscarinic and nicotinic receptors, which has implications for future pharmacologic intervention.<sup>30, 31</sup> A study conducted by Chen and colleagues<sup>32</sup> in Taiwan among 7,215 adults found that BQ chewing is more highly associated with a failure to quit smoking than with successfully quitting smoking (OR = 3.46; 95% CI = 2.17–5.51). These findings highlight the importance of simultaneously addressing both addictions among those BQ chewers who are also cigarette smokers, in order to achieve success in any cessation program. As Wen and colleagues<sup>13</sup> suggested, “*BQ chewing should not be considered as an isolated issue.*” Important efforts have already been initiated in Taiwan to incorporate BQ cessation efforts into the comprehensive national tobacco control program, with the ultimate goal of reducing health inequalities, especially among underprivileged communities.<sup>33</sup> Given that dentists are well positioned for identifying oral conditions associated with BQ and/or tobacco use, including them in these national efforts seems appropriate.

Surprisingly, most of our study participants had limited knowledge about the negative effect of BQ chewing on the human body and its role in the development of severe conditions such as oral cancer, adverse pregnancy outcomes, and cardiovascular disease, among others.<sup>34, 35</sup> This study highlights the pivotal role dental professionals can have in BQ cessation. BQ chewing has deleterious effects on soft and hard tissues of the oral cavity, which may result in oral cancer.<sup>36</sup>

In our study, all forty-one participants **mentioned** having oral health issues or dental conditions related to BQ chewing. However, only four study participants reported being told by their dentists to quit BQ chewing. Lack of communication between dental professionals and BQ chewers seems to be an underlying reason why dental professionals are not in the forefront of primary BQ prevention and/or control efforts in Taiwan. Even with the known pernicious effects of BQ chewing on oral health, its prevalence is still high.<sup>25</sup> A stratified random community-based survey conducted by Lin *et al* found that, of 7326 Taiwanese participants, 41.6% were BQ chewers.<sup>25</sup> The use of tobacco with BQ has led to including tobacco cessation intervention programs in dental settings.<sup>37</sup> Such intensive smoking cessation interventions have been proven effective, in terms of the long-term abstinence rate.<sup>37</sup> The same approach promises to be effective for assisting BQ users in their efforts to quit BQ consumption within a dental environment.

In agreement with our study, previous research efforts<sup>25, 38</sup> in the Southeast Asian region **have shown** that most individuals had their first BQ experience while in elementary school, with curiosity being the major reason for early initiation.<sup>39</sup> While most of the individuals were unaware of the health-risk factors associated with BQ chewing, they were alarmed by the fast development of oral mucosal and dental lesions even at a young age.<sup>38</sup> This clearly indicates the need to engage pediatric dentists in early intervention programs for preventing and/or controlling BQ consumption.

As reported in our findings, withdrawal symptoms in some individuals promote reluctance to quit BQ chewing. An earlier study identified a dependence syndrome (**involving** warm sensation of the body, sweating, salivation, palpitation, and **greater** capacity to work)<sup>26</sup> and withdrawal symptoms during abstinence from BQ (i.e., dry mouth, difficulty concentrating, fatigue, anxiousness, and craving) as possible barriers to quitting BQ.<sup>27</sup> Several participants in our study reported that chewing BQ alone without other ingredients (**such as** tobacco) had no harmful effects on oral health. This low perception of risk maybe due to lack of health education and health promotion concerning the harmful effects of BQ consumption, especially among the most vulnerable groups.<sup>40</sup> Increasing the level of awareness **of** the adverse effects of BQ on health will increase the accuracy of risk perception among **Taiwanese** who consume BQ.

Primary prevention is extremely important for changing behaviors and lifestyles that can potentially reduce oral cancer morbidity and mortality.<sup>41</sup> Secondary prevention is just as important for early detection and can be performed through screenings. When dental professionals examine their patients and observe oral conditions associated to BQ chewing (e.g., flattened teeth, staining of the teeth), a systematic evaluation and screening for oral cancer (i.e., oral examination, if possible with diagnostic markers such as toluidine blue or methylene blue) should be conducted simultaneously with providing brief counseling for BQ cessation.<sup>36</sup> Screening interventions for oral cancer have been shown to be successful when supported by local governments, medical services, and mass media<sup>36, 42, 43</sup> and could be used as “teachable moments” for implementing BQ prevention and cessation interventions. These steps taken by dental professionals can help in reducing the development of pre-cancerous oral lesions cause by BQ chewing and potentially the high incidence of oral cancer in Taiwan and the rest of the Southeast Asian region.

Following successful smoking prevention and cessation models, an adapted version of the “**5 As**” strategy for BQ prevention and cessation in the dental environment could include: (1) ASK patients about their BQ usage at every dental visit; (2) ADVISE dental patients to stop using BQ if they currently do; (3) ASSESS whether the dental patient is willing to quit BQ chewing at this time; (4) ASSIST with counseling and cessation programs to help them quit BQ; and (5) ARRANGE follow-up meetings or phone calls with dental patients a week after the quit date.<sup>44</sup> This “**5 As**” intervention should be used with individuals who are willing to quit BQ chewing. However, dental patients not willing to quit should be approached using the “**5 Rs**” intervention: (1) inform dental patients about the RELEVANCE of quitting BQ; (2) inform dental patients about the continuous RISK that BQ chewing can have on their oral health; (3) inform dental patients about the REWARDS of quitting; (4) inform dental patients about the ROADBLOCKS they will encounter while trying to quit; and (5)



REPEAT the intervention at each dental visit.<sup>44</sup> Quitting BQ chewing can be a challenging process, but these intervention approaches may be an effective and more proactive approach for dental providers to assist patients with their efforts to quit BQ, as has been shown for smoking cessation interventions in dental settings.<sup>37, 44, 45</sup>

Dental professionals have a pivotal role in BQ prevention and cessation and **in promoting, designing, and conducting** BQ cessation interventions in dental settings.<sup>46</sup> However, **our** findings **demonstrate** the lack of communication between dental professionals and their patients about the harmful effects BQ chewing has on the oral cavity and general health. Lack of communication between dental professionals and their patients is one of the factors in late diagnoses of oral cancer.<sup>47</sup> Dental professionals who raise awareness through discussion with patients concerning the pernicious effect of BQ chewing (i.e., oral cancer) could help in early diagnosis, which in turn reduces the morbidity and mortality of oral cancer.<sup>47, 48</sup>

Our study has several limitations. This study was a qualitative study based on secondary analysis of data generated from individual interviews and focus groups. **Accordingly**, potential biases such as biased samples, moderator bias, and reporter bias should be considered. However, as is the case for any secondary analysis, the above biases were unavoidable. Nevertheless, our study findings add more evidence to the role dental professionals have in BQ chewing prevention and control and the missed opportunities for teachable moments within the dental setting. One of the key challenges for dental professionals is communicating risk associated with BQ chewing.<sup>48</sup> Teachable moments that help in conveying the risk of BQ chewing and opportunities to implement preventive interventions need to be identified.<sup>48</sup> Dental professionals can prevent and reduce BQ chewing by implementing several interventions (**such as** advice, behavioral counseling, patient recall, and referral to preventive services or screenings).<sup>48</sup> At the present time, however, it is often difficult to identify which components of interventions are most effective, especially in the dental practice setting.<sup>45, 48</sup>

Our perspective highlights research areas relevant to further investigation, such as incorporating brief BQ prevention and cessation counseling when oral clinical and dental signs associated with BQ consumption are detected. Undertaking behavioral interventions in dental settings **may help to** reduce the prevalence of BQ chewing in Taiwan.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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