Short Communication

Correlates of Betel Nut Chewing among Burmese Refugees in Nebraska

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Abstract

**Background:** Betel nut chewing is an important risk factor for oral cancer, yet there has been little research identifying correlates of betel nut chewing among Burmese refugees in the U.S. **Methods:** Based on survey data from 188 Burmese refugees from Nebraska between 2015 and 2016, logistic regression was estimated to identify correlates of betel nut chewing. **Results:** The prevalence rate of betel nut chewing among participating Burmese refugees in Nebraska was 29%. Relative to Burmese refugees who had an education of less than high school, refugees with higher education were less likely to report betel nut chewing (AOR=0.1, 95% CI (0.02, 0.61)). Refugees who worked full time had higher odds of chewing betel nuts compared to those otherwise (AOR=6.17, 95% CI (1.80, 21.10)). Delaying medication purchase due to cost during the past 12 months was associated with higher odds of betel nut chewing (AOR=5.20, 95% CI (1.02, 26.39)). **Conclusions:** Betel nut chewing was common among Burmese refugees in the U.S., yet the odds of betel nut chewing varied across different socioeconomic groups. Health education programs that aim to reduce betel nut chewing might become more cost-effective by disproportionately targeting and serving high-risk groups among Burmese refugees.

**Keywords:** Betel nut chewing- oral cancer- Burmese refugee- correlates

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Introduction

Betel nut is the fourth most globally used psychoactive substance following caffeine, alcohol, and nicotine (Wei et al., 2017). Betel quid is a mixture of substances placed in the mouth to be chewed, usually comprising of areca nut, slaked lime, catechu, with or without tobacco, and wrapped in betel leaf (Mehrtash et al., 2017). While chewing betel nut is widely practiced in the world, it is especially prevalent in South and Southeast Asia and immigrant communities arising from there. In many countries in the region, betel nut chewing is considered a cultural identity and an essential part of social life. Moreover, it is also widely accepted as an alternative medicine to refresh breath after meals or to treat morning sickness, indigestion, impotence, gynecological problems, and other diseases (Auluck et al., 2009). Previous research suggests that betel nut chewing is a significant risk factor for cancers (oral and esophageal), as well as cardiovascular (hypertension) and metabolic (obesity and type 2 diabetes) diseases (Iqbal et al., 2012; Islam et al., 2019; Lin et al., 2009).

Betel nut chewing is particularly common in Myanmar (Burma), where it was estimated that over 50% of the adult population routinely chew betel nuts (Myint et al., 2016). An increasing number of Burmese refugees have resettled in the United States, from 17,000 in 2000 to 168,000 in 2015 (Pew Research Center, 2017). As of the end of 2019, 5,475 refugees from Myanmar have resettled in Nebraska, out of which 4,431 are living in Omaha, the largest city in Nebraska (Refugee Processing Center, 2019). Despite the growing number of Burmese refugees in the U.S., to our knowledge, there has been no study assessing betel nut chewing and its correlates in this population.

This study seeks to assess the prevalence and correlates of betel nut chewing among Burmese refugees in Nebraska. These correlates will help identify groups of Burmese refugees that are at high risk of betel chewing. Future interventions that aim to reduce betel nut chewing among Burmese refugees and related disparities can become more cost-effective by targeting high-risk groups.

Materials and Methods

**Study Setting and Populations**

This study used data collected as part of the refugee health needs assessment survey conducted between 2015 and 2016 by the University of Nebraska Medical Center (Su et al., 2019). The research team worked with refugee community leaders and related community organizations to recruit 291 adult refugees who were living in Omaha. This study restricted the analysis to 188 Burmese refugees.
who were from Myanmar with known status on betel nut chewing. The survey was distributed at local events involving refugees (e.g., health fairs, English classes), as well as different community settings where refugees gather. The study protocol was reviewed and approved by the Institutional Review Board of the University of Nebraska Medical Center.

**Table 1. A Description of Variables Used in the Analysis by Betel Nut Chewing Status**

| Correlates of Betel Nut Chewing | All Participants | Chewing betel nuts | Not chewing betel nuts | P-Value |
|--------------------------------|-----------------|-------------------|------------------------|--------|
| Age (Years)                    |                 |                   |                        |        |
| 19-30                          | 78 (41.5)       | 12 (22.2)         | 66 (49.3)              | 0.001  |
| 31-40                          | 37 (19.7)       | 11 (20.4)         | 26 (19.4)              |        |
| 41-50                          | 30 (16.0)       | 14 (25.9)         | 16 (11.9)              |        |
| 51 or older                    | 30 (16.0)       | 14 (25.9)         | 16 (11.9)              |        |
| Sex                            |                 |                   |                        |        |
| Male                           | 70 (37.2)       | 23 (42.6)         | 47 (35.1)              |        |
| Female                         | 117 (62.2)      | 31 (57.4)         | 86 (64.2)              |        |
| Length of stay in the U. S.    |                 |                   |                        |        |
| 3 years or less                | 50 (26.6)       | 13 (24.1)         | 37 (27.6)              | 0.44   |
| 3-5 years                      | 44 (23.4)       | 16 (29.6)         | 28 (20.9)              |        |
| More than 5 years              | 94 (50.0)       | 25 (46.3)         | 69 (51.5)              |        |
| Education                      |                 |                   |                        | <0.001 |
| Below high school              | 134 (71.3)      | 51 (94.4)         | 83 (61.9)              |        |
| High school or above           | 52 (27.7)       | 2 (3.7)           | 50 (37.3)              |        |
| Marital Status                 |                 |                   |                        | 0.018  |
| Never Married/Single           | 62 (33.0)       | 11 (20.4)         | 51 (38.1)              |        |
| Married                        | 125 (66.5)      | 42 (77.8)         | 83 (61.9)              |        |
| Employment                     |                 |                   |                        | 0.02   |
| Fulltime                       | 63 (33.5)       | 25 (46.3)         | 38 (28.4)              |        |
| Part-time                      | 20 (10.6)       | 2 (3.7)           | 18 (13.4)              |        |
| Unemployed                     | 104 (55.3)      | 26 (48.1)         | 78 (58.2)              |        |
| Insurance Coverage             |                 |                   |                        | 0.012  |
| No                             | 63 (33.5)       | 10 (18.5)         | 53 (39.6)              |        |
| Yes                            | 117 (62.2)      | 39 (72.2)         | 78 (58.2)              |        |
| BMI Range                      |                 |                   |                        | 0.185  |
| Less than 18.5                 | 6 (3.2)         | 1 (1.9)           | 5 (3.7)                |        |
| 18.5-24.9                      | 80 (42.6)       | 16 (29.6)         | 64 (47.8)              |        |
| 25-29.9                        | 57 (30.3)       | 19 (35.2)         | 38 (28.4)              |        |
| 30 or higher                   | 24 (12.8)       | 9 (16.7)          | 15 (11.2)              |        |
| Delayed seeing health care provider due to cost | | | | 0.841 |
| No                             | 123 (65.4)      | 38 (70.4)         | 85 (63.4)              |        |
| Yes                            | 31 (16.5)       | 9 (16.7)          | 22 (16.4)              |        |
| Delayed buying medication due to cost | | | | 0.425 |
| No                             | 134 (71.3)      | 44 (81.5)         | 90 (67.2)              |        |
| Yes                            | 19 (10.1)       | 8 (14.8)          | 11 (8.2)               |        |
| Homeownership                  |                 |                   |                        | 0.812  |
| No                             | 129 (68.6)      | 37 (68.5)         | 92 (68.7)              |        |
| Yes                            | 52 (27.7)       | 14 (25.9)         | 38 (28.4)              |        |
| Currently drinking             |                 |                   |                        | 0.001  |
| No                             | 148 (78.7)      | 34 (63.0)         | 114 (85.1)             |        |
| Yes                            | 39 (20.7)       | 20 (37.0)         | 19 (14.2)              |        |
| Currently smoking              |                 |                   |                        | 0.007  |
| No                             | 168 (89.3)      | 44 (81.5)         | 124 (92.5)             |        |
| Yes                            | 13 (6.9)        | 8 (14.8)          | 5 (3.7)                |        |

**Results**

Table 1 displays the bivariate associations between the outcome and explanatory variables. Among the 188 participants, 54 (29%) reported chewing betel nuts at the time of the survey, out of which 57% were women, and 43% were men. The age of the respondents ranged between 19 and 82 years with a mean of 36.7 years. Significant associations were seen between betel nut chewing and age, education, marital status, employment, insurance coverage, smoking, alcohol drinking, and happiness level. Betel nut chewing was more common among Burmese refugees who were older, having lower education, married, working full time, having health insurance, who were currently drinking or smoking, and who felt less happy.

Table 2 shows the results of the logistic regression analysis. Relative to refugees who had an education of less than high school, refugees with high school or higher education were less likely to report betel nut chewing (AOR=0.1, 95% CI (0.02, 0.61)) after adjusting for the effect of other explanatory variables listed in Table 1. Refugees who worked full time had higher odds of chewing betel nuts compared to those with no or part-time...
Table 1. Continued

| Correlates of Betel Nut Chewing | All Participants | Chewing betel nuts | Not chewing betel nuts | P-Value |
|-------------------------------|------------------|--------------------|------------------------|---------|
| n (%)                         | n (%)            | n (%)              |                        |         |
| Happiness Level (mean (sd))   |                  |                    |                        |         |
| Poor                          | 9 (4.8)          | 2 (3.7)            | 7 (5.2)                | 0.002   |
| Fair                          | 36 (19.1)        | 13 (24.1)          | 23 (17.2)              |         |
| Good                          | 67 (35.6)        | 19 (35.2)          | 48 (35.8)              |         |
| Very Good                     | 44 (23.4)        | 11 (20.4)          | 33 (24.6)              |         |
| Excellent                     | 23 (12.2)        | 9 (16.7)           | 14 (10.4)              |         |
| Self-rated health status       |                  |                    |                        | 0.66    |
| No                            | 73 (38.8)        | 16 (29.6)          | 57 (42.5)              |         |
| Yes                           | 115 (61.2)       | 38 (70.4)          | 77 (57.5)              |         |
| Having leisure time physical activity |      |                    |                        | 0.1     |
| No                            | 115 (61.2)       | 38 (70.4)          | 77 (57.5)              |         |
| Yes                           | 73 (38.8)        | 16 (29.6)          | 57 (42.5)              |         |

Note: Percentages might not add to 100% due to missing values or non-applicable cases. (sd), Standard deviation.

Table 2. Significant Correlates of Betel Nut Chewing Based on Logistic Regression

| Correlates of Betel Nut Chewing | AOR (95%CI) |
|---------------------------------|-------------|
| Education                       |             |
| High school or above            | 0.10** (0.02, 0.61) |
| Below high school               | Reference   |
| Employment                      |             |
| Part time jobs/Unemployed       |             |
| Work full time                  | 6.17** (1.80, 21.10) |
| Delayed buying medication due to cost |          |
| No                              | Reference   |
| Yes                             | 5.20* (1.02, 26.39) |

AOR, Odd ratios adjusted for the effect of other explanatory variables as listed in Table 1. *p < 0.05; **p < 0.01

Discussion

Betel nut chewing is common among Burmese refugees in Nebraska. This is especially the case for Burmese refugees who have an education level lower than high school, who have fulltime jobs, and who cannot afford medication due to cost. Approximately 15% of Burmese refugees in this study concurrently practiced smoking and betel nut chewing. In the United States, oral cancer rate among Asians is higher than in the general population (Auluck et al., 2009). This disparity might be related to the habits of betel nut chewing among Burmese refugees and many other immigrants of Asian descent.

The association between low level of education and betel nut chewing was also reported in previous studies (Myint et al., 2016; Wen et al., 2009). Refugees with an education level lower than high school might not be as aware of the health risks posed by betel nuts as compared with those with a better education. While providing relevant health education on betel nut chewing to refugees with low education would help in the short term, a more fundamental solution would be to increase the educational attainment among these refugees, especially those with younger ages.

The somewhat unexpected association between having fulltime employment and betel nut chewing can be partially explained by the relatively higher income associated with full-time employment that would make consuming betel nuts more affordable. Similar findings were also reported in a previous study that documented the growing use of betel nut chewing in urban centers in Myanmar among employees with higher wages (Myint et al., 2009). It is also plausible that refugees who worked fulltime might be more exposed to peer influence in betel nut chewing than those without fulltime employment.

Refugees who cannot afford medication might have more economic distress than those otherwise, which in turn might lead some of them to resort to betel nut chewing for relief. It could also be the case that betel nut chewing per se might have resulted in more health issues, especially oral health issues that incur high medication expenditures. Delineating causation between these two factors would warrant further research.

A couple of limitations of the study are noteworthy. First, the use of a convenience, rather than a population-based sample of Burmese refugees, calls for caution when generalizing findings from this study to the whole Burmese population in the United States. Second, the data on betel nut chewing and health were all based on self-report, so potential biases in recall and social desirability might have influenced the accuracy of the data. Despite these limitations, the high prevalence and significant correlates of betel nut chewing, as reflected in this study, should help inform future studies or interventions that seek to reduce betel nut chewing among Burmese refugees in the U.S.

In conclusion, chewing betel nuts is common among Burmese refugees in the U.S. This is especially the case among Burmese refugees who have an education of less than high school, who work fulltime, and who struggle financially in purchasing needed medications. Interventions that aim to reduce betel nut chewing might become more cost-effective by disproportionately targeting and serving these groups.

Author Contribution Statement

Dr. Su contributed to the conception, design, data analysis, and manuscript writing. Ms. Thao contributed to this article by her substantial involvement in the literature review, analysis and interpretation of data and drafting. Dr. Toure contributed to the conception and design, data acquisition, analysis and interpretation of the data, and drafting of the article.

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Ethics approval

The study protocol was reviewed and approved by the Institutional Review Board of the University of Nebraska Medical Center (IRB# 757-15-EX).

Consent to participate

Informed consent was obtained from participants before the initiation of survey data collection.

Consent for publication

All authors have reviewed and approved the submitted version of the manuscript.

Availability of data

Not applicable.

Conflicts of interest

The authors have no financial or other conflict of interests to declare.

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