Short Communication

Correlates of Betel Nut Chewing among Burmese Refugees in Nebraska

Dejun Su, Mai-Thao Nguyen, Drissa Toure*

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

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

Department of Health Promotion, Center for Reducing Health Disparities, College of Public Health, University of Nebraska Medical Center, 984340 Nebraska Medical Center, Omaha, NE 68198, USA. *For Correspondence: drissa.toure@unmc.edu

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.

Measurements

The outcome variable on betel nut chewing was based on the question: "Do you currently chew betel nuts one or more times each week? (yes, no). Explanatory variables used in the analysis included age, gender, number of years living in the U.S. (less than 3 years, 3-5 years, and more than 5 years), marital status (married, unmarried), education (below high school, high school and above), employment status (work fulltime or not), homeownership (yes, no), health insurance coverage (yes, no), self-rated health (excellent, very good, good, fair, poor), happiness level (feeling happy about life on a scale of 1 to 10 with 1 being least happy, and 10 the happiest)), currently smoking (yes, no), currently drinking alcohol (yes, no), having leisure-time physical activity (yes, no), BMI categories (underweight, normal, overweight, and obese), whether having delayed seeing health care provider in the past 12 months due to cost (yes, no), and whether having delayed medication purchase in the past 12 month due to cost (yes, no).

Analysis

The associations between the outcome variable on betel nut chewing and the explanatory variables was examined through chi-square test, t-test, and multivariate logistic regression. A p-value of less than 0.05 was considered statistically significant. SPSS (Statistical Package for the Social Sciences) v25.0 was used for all analyses.

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. 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
	n (%)	n (%)	n (%)	
	188 (100)	54 (29)	134 (71)	
Age (Years)				0.001
19-30	78 (41.5)	12 (22.2)	66 (49.3)	
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				0.353
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				0.44
3 years or less	50 (26.6)	13 (24.1)	37 (27.6)	
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)	

Table 1. Continued

Correlates of Betel Nut Chewing	All Participants	Chewing betel nuts	Not chewing betel nuts	P-Value
	n (%)	n (%)	n (%)	
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)	
Self-rated health status				0.66
Excellent	23 (12.2)	9 (16.7)	14 (10.4)	
Very Good	44 (23.4)	11 (20.4)	33 (24.6)	
Good	67 (35.6)	19 (35.2)	48 (35.8)	
Fair	36 (19.1)	13 (24.1)	23 (17.2)	
Poor	9 (4.8)	2 (3.7)	7 (5.2)	
Happiness Level (mean (sd))	67 (2.39)	6.83 (2.31)	8.02 (2.35)	0.002

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

jobs (AOR=6.17, 95% CI (1.80, 21.10)). Refugees who reported that they had delayed medication purchase during the 12 months before the survey due to cost were more likely to report betel nut chewing than those otherwise (AOR=5.20, 95% CI (1.02, 26.39)) after adjusting for the effect of other explanatory variables.

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 of less 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

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

Correlates of Betel Nut Chewing	AOR (95%CI)
Education	
Below high school	Reference
High school or above	0.10** (0.02, 0.61)
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

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

Acknowledgements

Dejun Su et al

Nebraska Medical Center. We would like to thank Benson High School in Omaha, Nebraska and other community partners for their assistance in participant recruitment and data collection. Views and opinions expressed in the study are the sole responsibility of the authors and do not necessarily reflect those of the funding agency.

Funding

This study was supported by funding support from the Center for Reducing Health Disparities at the University of Nebraska Medical Center.

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 applicale.

Conflicts of interest

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

References

Auluck A, Hislop G, Poh C, Zhang L, Rosin MP (2009). Areca nut and betel quid chewing among South Asian immigrants to Western countries and its implications for oral cancer screening. *Rural Remote Health*, **9**, 1118.

Iqbal MP, Mehboobali N, Haider G, Pervez S, Azam I (2012). Effe cts of betel nut on cardiovascular risk factors in a rat model. *BMC Cardiovascular Disorders*, **l2**, 1-7.

Islam S, Muthumala M, Matsuoka H, et al (2019). How each component of betel quid is involved in oral carcinogenesis: mutual interactions and synergistic effects with other carcinogens-a review article. *Curr Oncol Rep*, **21**, 1-13.

Lin WY, Pi-Sunyer FX, Liu CS, et al (2009). Betel nut chewing is strongly associated with general and central obesity in Chinese male middle-aged adults. *Obesity*, **l7**, l 247- l54.

Mehrtash H, Duncan K, Parascandola M,et al (2017). Defining a global research and policy agenda for betel quid and areca nut. *Lancet Oncol*, **18**, 767-75.

Myint SK, Narksawat K, Sillabutra J (2016). Prevalence and factors influencing betel nut chewing among adults in west insein township, yangon. myanmar. S*outheast Asia J Trap Med Public Health*, **47**, 1089-97.

Pew Research Center. Burmese in the U.S. Fact Sheet (2017). Retrieved from https://www.pewsocialtrends.org/fact-sheet/ asian-americans-burmese-in-the-u-s/. Accessed 02 June 2020.

Refugee Processing Center: Admissions and Arrivals (2019): https ://i reports. wrapsnet .org/1 n teracti ve-Reporting Enum Type/Report?! temPath=/rpt_ WebArrivalsReports/ Map - Arrivals by State and Nationality. Accessed 09 January 2020.

Su D, Wang H, Michaud T, et al(2019). Acculturation and unmet health needs among refugees in Omaha, Nebraska. *J Immigr Minor Health*, **21**, 73-9.

Wei YT, Chou YT, Yang YC, et al (2017). Betel nut chewing associated with increased risk of arterial stiffness. *Drug Alcoho Dependence*, **180**. 1-6.

Wen CP, Cheng CW, Cheng TY, et al (2009). Trends in betel quid chewing behavior in Taiwan-exploring the relationship between betel quid chewing and smoking. *Taiwan J Public Health*, **28**, 407-19.