

COVID-19 and Immigrant Essential Workers: Bhutanese and Burmese Refugees in the United States

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Abstract

Objectives: Immigrants are believed to be at high risk of infection with severe acute respiratory syndrome coronavirus 2, the virus that causes coronavirus disease 2019 (COVID-19). A leading suspected risk factor is their role in the essential workforce. We aimed to describe COVID-19–related risk factors among Bhutanese and Burmese refugees in the United States.

Methods: We administered an anonymous online survey in May 2020 among community leaders of Bhutanese and Burmese refugees. Using a snowball sampling strategy, we invited community leaders to complete the survey and share the link with others who met inclusion criteria (English proficient, aged ≥ 18 , currently living in the United States). We compared respondents with and without recent COVID-19 and identified risk factors for infection.

Results: Of 218 refugees in 23 states who completed the survey from May 15 through June 1, 2020, fifteen (6.9%) reported infection with COVID-19. Being an essential worker during the pandemic (odds ratio [OR] = 5.25; 95% CI, 1.21-22.78), having an infected family member (OR = 26.92; 95% CI, 5.19-139.75), and being female (OR = 5.63; 95% CI, 1.14-27.82) were risk factors for infection. Among 33 infected family members, 23 (69.7%) were essential workers.

Conclusion: Although we had a small snowball sample, we found that working in essential industries was associated with an increased risk of COVID-19 infection among Bhutanese and Burmese refugees. We call for larger studies that include Asian immigrant subgroups, as well as immediate attention to protecting immigrant essential workers during the COVID-19 pandemic.

Keywords

immigrant, refugee, Asian American, COVID-19, essential worker

Media reports and commentaries indicate that refugees and other immigrants in the United States are at high risk of infection with severe acute respiratory syndrome coronavirus 2, the virus that causes coronavirus disease 2019 (COVID-19).^{1,2} A leading suspected risk factor is their role in the essential workforce. Refugees and other immigrants, especially those with limited English proficiency, are more likely than US-born workers to work in areas with low pay and high risk.³ These areas include food supply chain industries with high risk of exposure to COVID-19 and limited worker protections, as evidenced by multiple outbreaks among workers at packing plants.⁴⁻⁶ Refugees and other immigrants are also less likely than US-born workers to have public and occupational health information available in their preferred languages and often do not have the same legal protections afforded to citizens, making it difficult to advocate for safe working conditions.^{7,8} Vulnerability may be further compounded by poverty. For

example, in many states, immigrant workers without the means to obtain personal vehicles depend on crowded vans run by poorly regulated, for-profit transportation companies for travel

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to worksites.⁹ In addition, many refugees and other immigrants live in multigenerational households in which elderly family members may be at increased risk of infection from nonelderly workers.⁹

Despite these well-publicized concerns, public health data on COVID-19 vulnerability among refugees and other immigrants are limited. This lack of information is of particular concern for newcomers of Asian origin, as information about COVID-19 among Asian immigrants at higher risk of infection or mortality may be buried among data on nonmigrant Asian subgroups at lower risk of infection or mortality.¹⁰ As a result, the guidance is insufficient on public health communication and prevention strategies that target this fast-growing and culturally, linguistically, and economically diverse sector of the US population.¹¹

Refugees from Bhutan and Myanmar (previously called Burma) are 2 Asian immigrant populations that merit further attention. Of refugee communities resettled in the United States in the past decade, they are among the largest (14% and 21% of arrivals, respectively); of Asian-origin communities in the United States, they have among the largest proportions who are not US-born (92% and 85%, respectively). Compared with the general Asian American population and the US population, they have higher poverty rates (Bhutanese, 33%; Burmese, 35%; Asian American, 12.1%; US population, 15.7%) and lower rates of English proficiency (Bhutanese, 27%; Burmese, 28%; Asian American, 70%), and they are less likely to have a bachelor's degree (Bhutanese, 9%; Burmese, 24%; Asian American, 51%; US population, 30%).^{12,13} In addition, a high proportion of Bhutanese Americans live in multigenerational households (Bhutanese American, 53%; Asian American, 26%; US population, 19%).¹⁴ Because of these characteristics, these communities are less likely than the general Asian American population and the general US population to have access to public health information, managerial or office positions that allow for work from home, or access to information about occupational health protections.¹⁵ Furthermore, the high proportion of multigenerational households in the Bhutanese community places elderly family members at risk for COVID-19 transmission from nonelderly household members working outside the home.

For these reasons, we hypothesized that essential workers are at higher risk than nonessential workers of COVID-19 transmission in the Bhutanese and Burmese communities. In this study, we explored this hypothesis by describing the distribution of COVID-19 infection and the relationship to occupation, as reported by a sample of Bhutanese and Burmese refugee adults.

Methods

We conducted an observational study using a snowball sample. We limited the sample to English-proficient adults aged ≥ 18 currently living in the United States. From May 15

through June 1, 2020, we emailed or messaged an anonymous online survey link to 19 bilingual leaders in the Bhutanese and Burmese refugee communities identified through the study team's professional networks. Most of these leaders had previously participated in community health leadership training sessions or were leaders of refugee-led community organizations. We asked them to complete the 20-item survey and share the link with peers who met the inclusion criteria. To decrease potential selection bias, the survey invitation did not describe our a priori hypothesis, nor did the introductory text include language about the hypothesized relationship between COVID-19 infection and occupation. The Ball State University Human Research Protection Office approved this study.

Statistical Model

We compared characteristics of respondents who reported having COVID-19 infection with characteristics of respondents who reported not having COVID-19 infection. We compared categorical variables using the Fisher exact test and continuous variables using *t* tests for normally distributed measures and Mann-Whitney tests for nonnormally distributed measures. To identify risk factors for COVID-19 infection, we applied crude and adjusted penalized maximum likelihood logistic regression models to reduce the small-sample bias in maximum likelihood estimation. We conducted the analysis using Stata/SE version 15.1 (StataCorp LLC).

The outcome measure, infection with COVID-19, was a binary, self-reported outcome. Survey respondents replied yes or no to the following question: "Are you or have you been infected with the novel coronavirus?" The independent variable was employment as an essential worker. We categorized people working for pay at a job or business in the 7 days before survey completion as essential workers if their occupation corresponded to one described as a COVID-19 essential service by the emergency order issued by Massachusetts Governor Baker on March 23, 2020, and updated on March 31 and April 28, 2020.¹⁶ We also categorized as an essential worker a respondent whose occupation corresponded to an essential service but who did not work in the previous 7 days because of COVID-19 infection. Examples of essential services are food preparation, food serving, home care, health care, and sales and related occupations.

We included the following covariates in the adjusted model: having a family member infected with COVID-19 (yes, no), sex (male, female), age (≤ 30 , 31-40, ≥ 41), education (secondary degree, associate's degree, \geq bachelor's degree), annual household income (\leq \$25 000, \$25 001-\$50 000, \$50 001-\$75 000, $>$ \$75 000), self-rated health (excellent, very good, good, fair/poor), years spent in the United States, and the US States Stringency Index. These covariates are known to be associated with COVID-19 infection from previous studies.^{8,17-19} The US

Table 1. Characteristics of respondents (N = 218) to a survey in May 2020 among US Bhutanese and Burmese refugees and a comparison of those with and without infection with severe acute respiratory syndrome coronavirus 2^a

Characteristic	Overall (N = 218)	Reported infection (n = 15)	Reported not having infection (n = 198)
Age, y			
≤30	106 (48.6)	6 (40.0)	96 (48.5)
31-40	60 (27.5)	7 (46.7)	52 (26.3)
≥41	52 (23.9)	2 (13.3)	50 (25.2)
Sex			
Male	131 (60.1)	4 (26.7)	126 (63.6)
Female	87 (39.9)	11 (73.3)	72 (36.4)
Ethnicity			
Burmese	30 (13.8)	0	28 (14.1)
Bhutanese	188 (86.2)	15 (100.0)	170 (85.9)
Education			
Secondary degree	58 (26.6)	7 (46.7)	49 (24.9)
Associate's degree	50 (22.9)	5 (33.3)	45 (22.8)
≥Bachelor's degree	109 (50.0)	3 (20.0)	103 (52.3)
Essential worker ^b			
No	130 (59.6)	3 (20.0)	123 (60.6)
Yes	88 (40.4)	12 (80.0)	75 (39.4)
Annual household income, \$			
0-25 000	35 (16.1)	1 (6.7)	33 (16.7)
25 001-50 000	79 (36.2)	5 (33.3)	73 (36.9)
50 001-75 000	57 (26.2)	7 (46.7)	48 (24.2)
>75 000	47 (21.6)	2 (13.3)	44 (22.2)
Have a family member with COVID-19	15 (6.9)	8 (53.3)	7 (3.5)
Self-rated health			
Excellent	63 (28.9)	4 (26.7)	57 (28.8)
Very good	91 (41.7)	5 (33.3)	84 (42.4)
Good	58 (26.6)	6 (40.0)	51 (25.8)
Fair/poor	6 (2.8)	0	6 (3.0)
Years spent in the United States, mean (SD)	10.0 (3.0)	9.1 (3.2)	10.1 (3.0)
US States Stringency Index, ^c mean (SD)	52.6 (12.8)	50.2 (15.7)	52.9 (12.7)

Abbreviations: COVID-19, coronavirus disease 2019; SD, standard deviation.

^aMeasured as a binary, self-reported outcome. Survey respondents replied yes or no to the following question: "Are you or have you been infected with the novel coronavirus?" Respondents were from the following states: California, Colorado, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Tennessee, Texas, Vermont, Virginia, and Washington. All values are number (percentage) unless otherwise indicated.

^bEssential worker is defined as those who worked for pay at a job or business in the past 7 days in an occupation corresponding to one described as providing COVID-19 essential services under Massachusetts Governor Baker's March 23, 2020, Emergency Order.¹⁶ Those whose occupation corresponded to essential services but who did not work in the past 7 days due to COVID-19 were also categorized as essential workers. The prevalence of COVID-19 was 13.6% (12 of 88) among essential workers and 2.3% (3 of 130) among nonessential workers.

^cThe US States Stringency Index is an indicator created by researchers at George Mason University's National Science Foundation Spatiotemporal Innovation Center and is based on the Oxford COVID-19 Government Response Tracker, which codes government policies numerically using a scale from 0 to 100, with a higher index indicating a stricter lockdown.²⁰

States Stringency Index is an indicator created by researchers at George Mason University and is based on the Oxford COVID-19 Government Response Tracker, which rates government policies (eg, stay-at-home orders, prohibitions on large gatherings,

school closure orders) numerically, using a scale from 0 to 100, with a higher index indicating a more stringent lockdown policy.²⁰ We used the index on May 1, 2020, which is 14 days before data collection began, in consideration of effect lag and the

Table 2. Characteristics of family members (n = 33) of respondents (N = 218) to a survey of US Bhutanese and Burmese refugees on infection with severe acute respiratory syndrome coronavirus 2, May 2020^a

Characteristic	No. (%)
Age, y	
≤30	12 (36.4)
31-40	5 (15.1)
≥41	16 (48.5)
Essential worker ^b	
No	10 (30.3)
Yes	23 (69.7)
Sex	
Male	20 (60.6)
Female	13 (39.4)

Abbreviation: COVID-19, coronavirus disease 2019.

^aSurvey respondents replied yes or no to the following question: "Is or has anyone in your household been infected with the novel coronavirus?"

^bEssential worker is defined as those who worked for pay at a job or business in the past 7 days in an occupation corresponding to one described as providing COVID-19 essential services under Massachusetts Governor Baker's March 23, 2020, Emergency Order.¹⁶ Those whose occupation corresponded to essential services but who did not work in the past 7 days because of COVID-19 were also categorized as essential workers.

incubation period of COVID-19.²¹ We measured having a family member infected with COVID-19 as a binary variable by asking if anyone in the household was or had been infected with the novel coronavirus. For respondents whose family members had COVID-19, we asked about the family members' age, sex, employment status (ie, part-time or full-time), and occupation during the period they had COVID-19. We did not adjust demographic information about infected family members in the penalized maximum likelihood logistic regression models.

Results

Of 218 respondents to the survey from 23 states, 188 (86.2%) were Bhutanese refugees and 30 (13.8%) were Burmese refugees (Table 1). At least half of respondents were aged >30 (51.4%), were male (60.1%), and had ≥bachelor's degree (50.0%); 88 (40.4%) were essential workers.

Fifteen (6.9%) respondents overall reported COVID-19 infection, 8 of whom also had ≥1 family member with COVID-19 infection. Of the 15 respondents who reported COVID-19 infection, 11 (73.3%) were women; of the 198 respondents who reported no infection, 72 (36.4%) were women. Compared with respondents who were infected, respondents who were not infected were less likely to have ≥bachelor's degree (20.0% vs 52.3%), more likely to have an infected family member (53.3% vs 3.5%), and more likely to be an essential worker (80.0% vs 39.4%) (Table 1). The prevalence of COVID-19 was 13.6% (12 of 88) among essential workers and 2.3% (3 of 130) among non-essential workers.

Among 33 infected family members, 23 (69.7%) were essential workers (Table 2). Infected family members were older, on average, than survey respondents: 16 of 33 were aged ≥41, and most (20 of 33) were male.

Being an essential worker (odds ratio [OR] = 5.48; 95% CI, 1.62-18.55) and having a family member with COVID-19 infection (OR = 28.94; 95% CI, 8.52-98.34) increased the probability of infection in crude penalized maximum likelihood logistic regression models (Table 3). In the adjusted penalized maximum likelihood logistic regression model, being an essential worker (OR = 5.25; 95% CI, 1.21-22.78), having a family member with COVID-19 infection (OR = 26.92; 95% CI, 5.19-139.75), and being female (OR = 5.63; 95% CI, 1.14-27.82) were associated with infection.

Discussion

This exploratory study contributes to a growing body of evidence that identifies work in essential industries as a risk factor for COVID-19 infection among immigrants in the United States, including immigrants from Bhutan and Myanmar.^{1,6,9,22} In addition, in our sample of immigrants, female sex was associated with infection, possibly because of the added responsibility of taking care of family members with COVID-19 or overrepresentation of female respondents in occupations that have a higher risk than other occupations of COVID-19 exposure (eg, health care).²³

Limitations

Our study had several limitations. First, considering the low testing rate during the data collection period and the possibility of asymptomatic infection, self-reported infection may underestimate the prevalence of COVID-19 among Bhutanese and Burmese refugee communities. Second, some respondents could have assumed they had COVID-19 when in fact they had another illness with similar symptoms, such as mononucleosis or influenza. However, other influenza-like illnesses were not highly prevalent in the United States during the study period.²⁴ Third, the study used a snowball sample and the questionnaire was fielded in English only, whereas nearly two-thirds of Bhutanese and Burmese Americans have limited English proficiency.¹² Levels of annual household income and educational attainment among our respondents were higher than levels of other national measures among Bhutanese and Burmese communities in the United States.¹² Hence, our results may not reflect the experiences of Bhutanese and Burmese people with limited English proficiency and low income.^{7,8} Fourth, we speculate that people with higher levels of concern about COVID-19 would have been more likely than people with lower levels of concern to complete the survey. However, this selection bias would not have affected the comparison between essential workers and nonessential workers. Finally, the wide 95% CIs indicate uncertainty in the estimation of the association between the predictors and COVID-19 infection. We recommend that

Table 3. Results of crude and adjusted penalized maximum likelihood logistic regression models of indicators of infection with severe acute respiratory syndrome coronavirus 2 among US Bhutanese and Burmese refugees responding to a survey in May 2020^a

Indicator	Crude model 1 (N = 213)	Crude model 2 (N = 213)	Adjusted model (N = 212)
Essential worker ^b			
No	1 [Reference]	—	1 [Reference]
Yes	5.48 (1.62-18.55)	—	5.25 (1.21-22.78)
Have a family member with COVID-19			
No	—	1 [Reference]	1 [Reference]
Yes	—	28.94 (8.52-98.34)	26.92 (5.19-139.75)
Sex			
Male	—	—	1 [Reference]
Female	—	—	5.63 (1.14-27.82)
Age, y			
≤30	—	—	1 [Reference]
31-40	—	—	2.25 (0.49-10.47)
≥41	—	—	2.06 (0.22-18.85)
Education			
Secondary degree	—	—	1 [Reference]
Associate's degree	—	—	1.07 (0.22-5.15)
≥Bachelor's degree	—	—	0.52 (0.09-3.14)
Annual household income, \$			
0-25 000	—	—	1 [Reference]
25 001-50 000	—	—	0.83 (0.10-6.88)
50 001-75 000	—	—	1.61 (0.18-14.55)
>75 000	—	—	0.73 (0.05-9.89)
Self-rated health			
Excellent	—	—	1 [Reference]
Very good	—	—	1.68 (0.31-9.12)
Good	—	—	1.32 (0.23-7.65)
Fair/poor	—	—	1.42 (0.04-51.16)
Years spent in the United States	—	—	1.04 (0.84-1.29)
US States Stringency Index ^c	—	—	1.00 (0.95-1.06)

Abbreviations: —, does not apply; COVID-19, coronavirus disease 2019; OR, odds ratio.

^aThe dependent variable is the binary indicator of infection with severe acute respiratory syndrome coronavirus 2 (yes or no), and the independent variable of primary interest is essential worker (yes or no). Covariates adjusted in the penalized maximum likelihood logistic regression model include having family members with COVID-19, age, sex, education, annual household income, self-rated health, years spent in the United States, and the US States Stringency Index.

^bEssential worker is defined as those who worked for pay at a job or business in the past 7 days in an occupation corresponding to one described as providing COVID-19 essential services under Massachusetts Governor Baker's March 23, 2020, Emergency Order.¹⁶ Those whose occupation corresponded to essential services but who did not work in the past 7 days due to COVID-19 were also categorized as essential workers.

^cThe US States Stringency Index is an indicator created by researchers at George Mason University's National Science Foundation Spatiotemporal Innovation Center and is based on the Oxford COVID-19 Government Response Tracker, which codes government policies numerically using a scale from 0 to 100, with a higher index indicating a stricter lockdown.²⁰

our analysis be replicated with a larger sample identified by using a probability sampling strategy.

Conclusion

The strengths of our study included the examination of a prespecified hypothesis and the analysis of data on 2 Asian American

groups who are not represented in other public health data. In addition, the outcome of this study could apply to other newcomer communities that share challenges with the challenges our survey respondents face, such as poverty, limited English proficiency, and occupation in essential industries.²⁵⁻²⁷

Given the vulnerability of low-income essential workers to COVID-19 infection and high levels of participation

among refugees and immigrants in the essential workforce, we believe that a need exists to increase public health attention to protect these populations during the COVID-19 pandemic. COVID-19 is of particular concern for immigrant essential workers in multigenerational households, because younger essential workers may transmit infection to elders, who have the highest mortality risk among age groups. We recommend that public health departments improve multilingual education and consider distribution of personal protective equipment to multigenerational households and home caregivers for COVID-19 patients. Finally, considering the diversity of refugee and immigrant communities in the United States, we suggest that public health departments engage refugee and other immigrant stakeholders in planning processes to ensure that public health interventions are accessible to these communities.

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