

Emergency Department Use Among Asian Adults Living in the United States: Results from The National Health Interview Survey (2006 – 2013)

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Abstract

This paper presents secondary analyses of the National Health Interview Survey data focused on emergency department (ED) utilization among Asian adults residing in the United States. National Health Interview Survey data provided from survey years 2006-2013 was pooled and disaggregated by single-race Asian ethnic subgroups (Filipino, Chinese, Asian Indian, other Asian). We explored trends in reports of an ED visit over the survey years for the purpose of determining whether reports of an ED visit increased or decreased over survey years. We also explored background/biologic, environment, access to care, and behavior factors and their associations with having an ED visit. The majority of respondents were foreign-born (75.9%) and had lived in the United States for ten or more years (54.3%). Estimates for reports of any ED visits ranged from 8.3% for the Chinese to 15.3% for the Filipino subgroups. Filipinos were more likely to have an ED visit compared to the Chinese and other Asians (except Asian Indians). For the eight years of survey data, estimates indicate a trend of fewer reports of any ED visit among the Asian Indian and Filipino subgroups. Among Filipinos, having diabetes and a smoking history were associated with an ED visit. The odds of an ED visit were higher among Asians in the youngest age category, among other Asians born in the United States, and among those who saw/talked to a mental health professional within the previous year. As there is a paucity of information available about ED use among Asians or Asian subgroups, this report adds to the literature on patterns of health care utilization among Asian subgroups living in the United States with a specific focus on ED utilization.

Keywords: Emergency department utilization, Asian ethnic subgroups living in the United States, mental health care, smoking, chronic conditions, health insurance, prescription medications

Health care delivery services are in transition in the United States. Reasons for the transition are due in part to (a) the introduction of accountable care strategies for improving care delivery, (b) the shortage of general practitioners available in primary care, and (c) the recent changes in the health insurance marketplace including eligibility for health insurance. These changes are especially pertinent for persons who already experience disparities in health care access because of ethnic minority status, low-level education or literacy, and co-occurring mental and physical health conditions. For some populations, transitions in care delivery may make access to appropriate health care services more challenging and may influence emergency department (ED) utilization. Based on a nationally representative sample of civilian, non-institutionalized persons in the United States (Chen, Vargas-Bustamante, & Ortega, 2013),

considerable differences in health care spending were noted between Caucasians and Asians and also among Asian subgroups.

In the United States, higher rates of ED use have been associated with age and illness profiles (Albert, McCraig, & Uddin, 2015; Shim et al., 2014). ED use has also been associated with mental and substance use disorders (Castner, Wu, Mehrok, Gadre, & Hewner, 2015; Wen-Chieh, Bharel, Jianying, O'Connell, & Clark, 2015), with education, and with race (Vinton, Capp, Rooks, Abbott, & Ginde, 2014).

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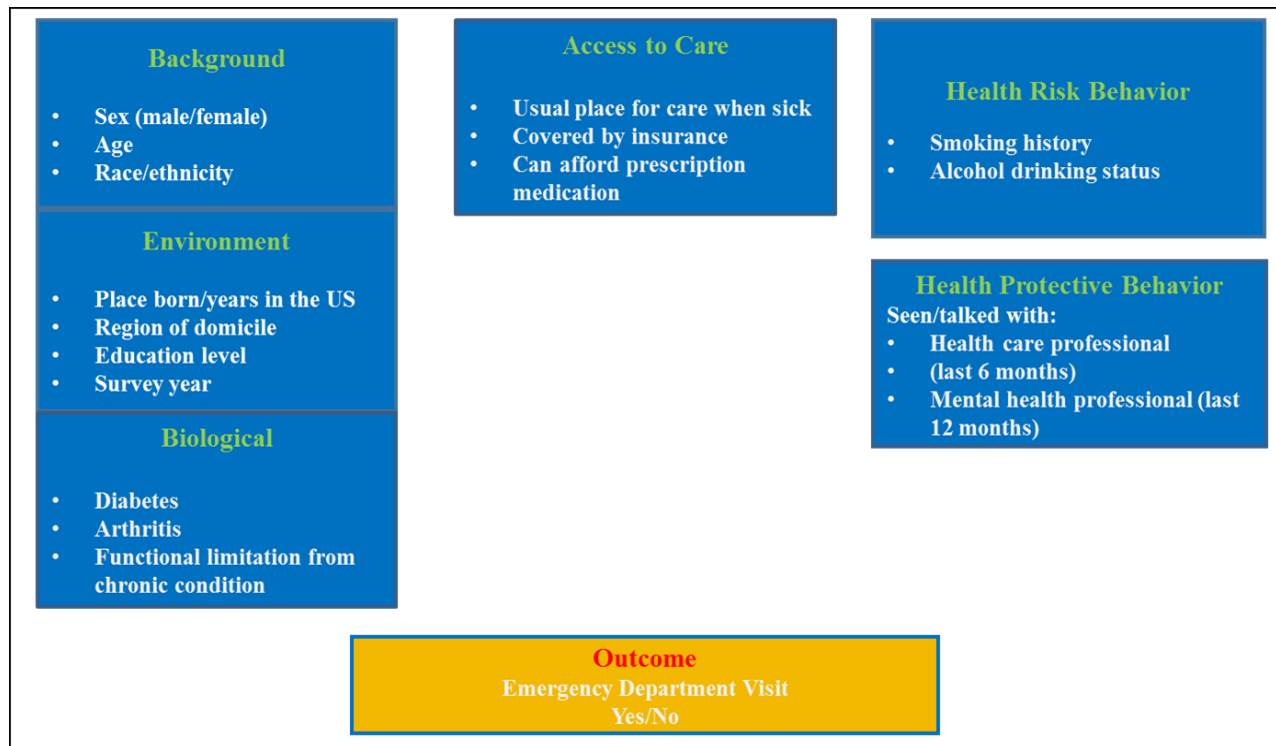


Figure 1. Model factors chosen to explore emergency department utilization among Asians in the United States.

The United States Federal Register (1997) defines “Asian” as, “A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam” (p. 5). Exploring factors associated with ED use disaggregated by Asian ethnicity may contribute to our further understanding of the unique needs of Asian ethnic subgroups.

Background

Emergency Department Utilization Among Asians in the United States

Asian Americans are the fastest growing ethnic group in the United States and are afflicted with diabetes, alcohol misuse, smoking, and mental health issues at increasing rates (Kwok, 2013). Reports indicate that among Asian ethnic subgroups, Filipinos and Chinese represent the largest proportion of Asians in the United States (Hoeffel, Rastogi, Kim & Shahid, 2012). While the immigration of Asians to the United States has continued over generations, differences have been noted in health care utilization by immigration status and between Asian ethnic subgroups (Ye, Mack, Fry-Johnson, & Parker, 2012).

Coupled with the many changes occurring in health care delivery, an exploration of trends in ED utilization and factors influencing ED use by Asian minority subpopulations is needed. Figure 1 includes the model factors deemed important from our literature review.

Historically, Asian adults have underutilized health care services (Kwok, 2013). ED utilization patterns may be associated with disparities in health status and health care access for Asians. Estimates from National Health Interview Survey (NHIS) data (2004–2006) indicate that non-Hispanic Whites utilized the ED more frequently than Blacks, Hispanics, and Asians (Vinton et al., 2014). Davis, Tam, and Taira (2016) reported that among enrollees in a large health care management program, Japanese respondents had lower rates of ED visits compared to Whites, Native Hawaiians, and Filipinos. For mental health services, sociocultural factors including the perception of the need for service and beliefs about the causes of illness have contributed to low utilization (Kwok, 2013; Sorkin, Nguyen, & Ngo-Metzger, 2011). Perception of need for health services can facilitate or limit the health-seeking behaviors of persons who manifest symptoms of physical or psychological distress (Bauer, Chen, & Alegría, 2012). Also, intergenerational differences were reported among Asian Americans in perceptions of need and access to

mental health services when symptoms emerged (Bauer et al., 2012).

If individuals do not seek care until symptoms become dangerous, an urgent need for immediate care could involve costly ambulance or ED services (Sommers, Boukus, & Carrier, 2012). Occurrences of treat-and-release from EDs are costly and pose potential financial hardships for both the patient and the provider's institution if additional ED visits occur in a short time frame.

The purpose of this secondary analysis of 2006-2013 NHIS data was to explore factors associated with ED utilization among Asian ethnic subgroups in the United States. The specific aims were to 1) describe selected background, biologic, and environment factors, access to care indicators, and health-protective/health-risk behaviors among NHIS-identified Asian subgroups (Filipino, Chinese, Asian Indian, other Asian); 2) explore trends in ED utilization over survey years, for which model factors were available (2006-2013); and 3) explore associations between model factors and self-reported ED utilization among Asian ethnic groups (pooled and disaggregated).

Method

Data

This report is based on pooled data from the NHIS for survey years 2006-2013 and includes deidentified information from 13,957 completed interviews with single-race Asians. We downloaded the data from the NHIS public use database. The National Center for Health Statistics oversees the administration of the survey and collects data on health care access, service utilization, and behavioral indicators affecting health (National Center for Health Statistics, 2017). Participants are selected using a complex design involving stratification, clustering, and multistage sampling. For each survey year, participants answered questions about their physical health status and utilization of health care services during the previous twelve months. Further information on the methods of data collection is described elsewhere (Centers for Disease Control and Prevention, 2017). For our analyses, we included data on adult participants of Asian race only. Data used in the analyses are presented in the context of our model (Figure 1).

Measures

Background factors included sex (male, female), age categories (18-24; 25-44; 45-64; 65-85), and ethnicity including Filipino, Chinese, Asian Indian, and other Asian (as categorized in the NHIS). Environmental factors included (a) place born/years

living in the United States (4 categories [not foreign-born; foreign-born living in the United States for less than 5 years; foreign-born in the United States for 5 - < 10 years; foreign-born in the United States for 10 or more years]), (b) region of U.S. domicile (Northeast, South, Midwest, West), (c) education level (less than high school diploma or equivalent; high school – some college, associate's degree or higher), and (d) survey year. We also explored biologic indicators of health status including (a) ever being told he/she had diabetes, arthritis, emphysema, cancer, kidney, or heart disease ("Yes/No" item-responses, respectively); and (b) whether at least one chronic condition limited overall function ("Yes/No"). The disease states with unweighted frequencies above three percent ($n > 500$) included arthritis (16.4%) and diabetes (7.8%), and these were considered robust enough to include in the model.

Access to care indicators included (a) covered by insurance ("Yes/No"), (b) can afford prescription medications ("Yes/No"), and (c) having one or more usual places for care when sick ("Yes/No"). For health-risk behavior factors in our model, we included smoking history (current smoker, former smoker, never smoked) and alcohol drinking status (lifetime abstainer/former drinker, current drinker, infrequent/light; current drinker, moderate/heavy). The health-protective behavior indicators included (a) time since last seeing/talking with a health professional (less than 6 months ago / ≥ 6 months ago – never), and (b) having seen/talked to a mental health professional within the last 12 months ("Yes/No"). For the outcome measures of ED utilization, we dichotomized ED visits as the report of one or more ED visits during the prior twelve months ("Yes/No").

Statistical Analysis

Eight years of NHIS data were pooled to examine trends and to increase the reliability of estimates. Analyses were performed with SAS version 9.4 and SPSS version 24. Analyses used the sampling weights, strata, and primary sampling unit variables provided with the NHIS dataset. To account for the use of pooled data across multiple years, we divided the survey weights by the number of years pooled as recommended (Parsons et al., 2014).

Initial analyses examined the frequencies of the model factors listed in Figure 1 by Asian ethnicities (Filipino, Chinese, Asian Indian, other Asian). Results provide estimated percentages with standard errors. The analysis of frequencies included an estimation of the percentages of participants who reported one or more ED visits by Asian ethnicity over the survey years. We employed logistic regression to model trends in ED utilization by Asian ethnicity and survey year. Probabilities are expressed as percentages calculated from the logistic regression models

Table 1. Percent (%) Distribution With Standard Errors (SE) for Model Factors (Background, Environment) by Asian Ethnicity Categories *

Factors	Filipino % (SE)	Chinese % (SE)	Asian Indian % (SE)	other Asian % (SE)	Total % (SE)
Ethnicity	23.9 (0.9)	20.3 (0.9)	19.7 (0.8)	36.0 (0.8)	100
Sex					
Female	54.9 (1.0)	54.7 (1.2)	46.3 (1.3)	53.3 (0.8)	52.6 (0.5)
Male	45.1	45.3	53.7	46.7	47.4
Age					
18 – 24 yrs.	11.1 (0.8)	11.2 (0.8)	12.0 (0.8)	13.1 (0.6)	12.0 (0.4)
25 – 44 yrs.	38.3 (0.9)	42.4 (1.1)	57.0 (1.6)	41.8 (0.8)	44.1 (0.6)
45 – 64 yrs.	35.6 (1.1)	32.6 (1.0)	24.2 (1.2)	31.7 (0.8)	31.4 (0.6)
65 – 85 yrs.	15.0 (0.7)	13.9 (1.1)	6.8 (0.6)	13.4 (0.5)	12.6 (0.4)
Place born, yrs. in U.S.					
Born in the U.S.	36.0 (1.3)	21.5 (1.3)	7.8 (0.8)	26.4 (1.2)	24.0 (0.7)
Foreign-born, < 5 yrs. in U.S.	6.2 (0.4)	11.6 (0.7)	21.6 (1.7)	8.6 (0.6)	11.2 (0.5)
Foreign-born, 5 to < 10 yrs. in U.S.	8.0 (0.6)	9.8 (0.6)	17.8 (1.0)	8.3 (0.5)	10.4 (0.4)
Foreign-born, ≥ 10 yrs. in U.S.	49.8 (1.4)	57.1 (1.2)	52.7 (1.9)	56.7 (1.2)	54.3 (0.7)
Region of domicile					
Northeast	14.6 (1.0)	24.9 (2.1)	25.5 (1.4)	15.0 (1.0)	19.0 (0.8)
South	9.8 (0.7)	11.2 (0.9)	20.1 (1.8)	13.7 (0.8)	13.5 (0.7)
Midwest	18.3 (1.2)	14.8 (1.0)	29.0 (1.7)	21.6 (1.0)	20.9 (0.8)
West	57.2 (2.1)	49.1 (2.1)	25.4 (1.4)	49.7 (1.5)	46.6 (1.1)
Education level					
Less than HS diploma/GED	8.8 (0.7)	11.9 (1.0)	6.2 (0.6)	13.1 (0.7)	10.5 (0.4)
HS diploma/GED - some college	38.5 (1.4)	26.3 (0.9)	19.4 (1.2)	39.5 (1.0)	32.6 (0.8)
Associate's or higher academic degree	52.8 (1.6)	61.8 (1.3)	74.4 (1.3)	47.4 (1.0)	56.9 (0.9)

Note. Data for survey year included in Figure 2; GED = General Equivalency Diploma; HS = high school; U.S. = United States; yrs. = years; *Unweighted ($N = 13,957$): Filipino ($n = 3,182$); Chinese ($n = 2,967$); Asian Indian ($n = 2,558$); other Asian ($n = 5,250$).

and graphed to illustrate the estimated trends. Regression models were age-adjusted using Centers for Disease Control and Prevention-determined age groups (Barnes, Adams, & Powell-Griner, 2008). Subsequent analyses employed multivariable logistic regression models to quantitate the independent associations of study factors with ED visits. Separate models were fit to examine pooled Asian ethnicities, and ethnicities disaggregated by NHIS determined Asian groups. Regression results include 95% CI and p -values. P -values of less than .05 were considered statistically significant.

Results

Background Factors

For the eight-year survey period, 13,957 adults reported being of Asian ethnicity (Table 1). The proportion of Asians in the NHIS-determined subgroups were (a) Filipino (23.9%, $SE = 0.9$), (b) Chinese (20.3%, $SE = 0.9$), (c) Asian Indian (19.7%, $SE = 0.8$), and (d) other Asian (36.0%, $SE = 0.8$). Females represented more than half of the estimated population (52.6%, $SE = 0.5$). The preponderance of respondents were between the ages of 25-44 years

(44.1%, $SE = 0.6$) and 45-64 years of age (31.4%, $SE = 0.6$).

Environmental Factors

Estimates indicate that less than one-quarter of Asian respondents were born in the United States (24.0%, $SE = 0.7$), and over half (54.3%, $SE = 0.7$) were foreign-born and living in the United States for ten or more years. Among ethnic subgroups, Asian Indians had the highest proportion of foreign-born adults living in the United States for less than 5 years (21.6%, $SE = 1.7$). For region of domicile, estimated proportions were highest for Asians residing in the West (46.6%, $SE = 1.1$) and lowest for those residing in the South (13.5%, $SE = 0.7$). For education level, the eight years of pooled data indicated that among Asians, over half reported having an associate's or higher academic degree (56.9%, $SE = 0.9$), while about one in ten (10.5%, $SE = 0.4$) did not attain the education level of high school diploma or equivalent.

Biologic Indicators

For queries about whether a person was told he/she had specific health conditions, estimates for "yes" responses were highest for arthritis (10.4%, SE

Table 2. Model Factors (Biologic, Access to Care, Behaviors) and Emergency Department Visits by Asian Ethnicity Categories (2006 – 2013)*

Factors	Filipino % (SE)	Chinese % (SE)	Asian Indian % (SE)	other Asian % (SE)	Total % (SE)
Biologic					
Arthritis (ever told she/he had)	16.0 (0.9)	9.1 (0.7)	6.9 (0.7)	9.4 (0.4)	10.4 (0.3)
Diabetes (ever told she/he had)	10.4 (0.6)	4.3 (0.5)	8.8 (0.8)	7.3 (0.4)	7.7 (0.3)
Overall function limited by at least one chronic condition(s)	23.6 (0.9)	16.3 (1.0)	13.4 (0.7)	18.2 (0.6)	18.2 (0.5)
Access to Care Indicators					
Covered by insurance	86.9 (0.8)	86.9 (0.8)	86.1 (0.8)	80.9 (0.8)	84.6 (0.4)
Can afford prescription medications	94.8 (0.5)	97.1 (0.4)	95.4 (0.5)	95.2 (0.4)	95.5 (0.2)
One or more usual places to go when sick	87.6 (0.7)	84.9 (0.8)	81.2 (0.9)	79.6 (0.8)	82.9 (0.4)
Health-Protective Behaviors					
Time since last seen/talked to health professional					
6 months or less	63.5 (0.9)	59.0 (1.1)	60.9 (1.1)	55.3 (0.9)	59.1 (0.5)
More than 6 months - never	36.5 (0.9)	41.0 (1.1)	39.2 (1.1)	46.0 (0.9)	40.9 (0.5)
Saw mental health professional within the last 12 months	3.5 (0.4)	3.4 (0.5)	2.5 (0.4)	3.7 (0.3)	3.4 (0.2)
Health-Risk Behaviors					
Alcohol drinking status					
Lifetime abstainer or former drinker	44.7 (1.2)	53.4 (1.2)	59.3 (1.0)	51.1 (0.9)	51.7 (0.6)
Current, infrequent – light	44.7 (1.0)	39.6 (1.2)	33.0 (1.0)	37.1 (0.9)	38.6 (0.5)
Current, moderate – heavy	10.6 (0.7)	7.0 (0.6)	7.6 (0.6)	11.7 (0.7)	9.7 (0.3)
Smoking status					
Current smoker	13.8 (0.9)	6.1 (0.4)	6.0 (0.5)	13.2 (0.6)	10.5 (0.4)
Former smoker	16.7 (0.8)	9.3 (0.7)	7.7 (0.6)	13.5 (0.5)	12.3 (0.4)
Never smoked	69.5 (1.1)	84.6 (0.7)	86.3 (0.8)	73.3 (0.7)	77.3 (0.5)
Report of an ED visit (last 12 months)	15.3 (0.8)	8.3 (0.6)	10.7 (0.8)	10.8 (0.5)	11.3 (0.3)

Note. SE = standard error; *Standard errors are abbreviated by SE.

= 0.3) and diabetes (7.7%, $SE = 0.3$). Filipinos had the highest proportion of persons told they had arthritis (16.0%, $SE = 0.9$) or told they had diabetes (10.4%, $SE = 0.6$). Over eighteen percent (18.2%) of Asians indicated that their overall function was limited by at least one chronic condition ($SE = 0.5$), with nearly one in four Filipinos (23.6%, $SE = 0.9$) reporting that at least one chronic condition limited their function.

Access to Care Indicators

For the access to care indicator of being covered by health insurance, most Asians (84.6%, $SE = 0.4$) indicated that they had insurance. Also, a clear majority (95.5%, $SE = 0.2$) indicated they could afford prescription medications. Within the Asian ethnicity categories, Filipinos had the highest frequency for having one or more usual places for care when sick (87.6%, $SE = .07$), with the lowest frequency being among those of other Asian (non-Chinese, non-Asian Indian) ethnicity (79.6%, $SE = 0.8$).

Health-Protective Behavioral Factors

For the health-protective factor of time since last seeing/talking with a health professional, over half of the sample reported seeing/talking to a health pro-

fessional within the last 6 months (59.1%, $SE = 0.5$). However, a much lower proportion (3.4%, $SE = 0.2$) reported seeing a mental health professional over a 12-month recall period.

Health-Risk Behavioral Factors

Based on the eight years of pooled NHIS data for alcohol drinking status, about half of Asian adults reported being abstinent or former users of alcohol (51.7%, $SE = 0.6$). Self-reported frequencies for current, moderate, and heavy drinking were highest among the other Asian (11.7%, $SE = 0.7$) and Filipino (10.6%, $SE = 0.7$) subgroups. Slightly more than one-in-five Asian adults reported a smoking history including current smokers (10.5%, $SE = 0.4$) and former smokers (12.3%, $SE = 0.4$). Filipinos and other Asians (non-Chinese, non-Indian) reported a smoking history more frequently (30.5% and 26.7%, respectively) compared to those of Chinese and Asian Indian descent (15.4% and 13.7%, respectively).

Emergency Department Utilization

For the cumulative 8-year NHIS dataset, an estimate of over one in ten Asians (11.3%, $SE = 0.3$) visited an ED one or more times during a 12-month recall period. The overall proportions for report of an

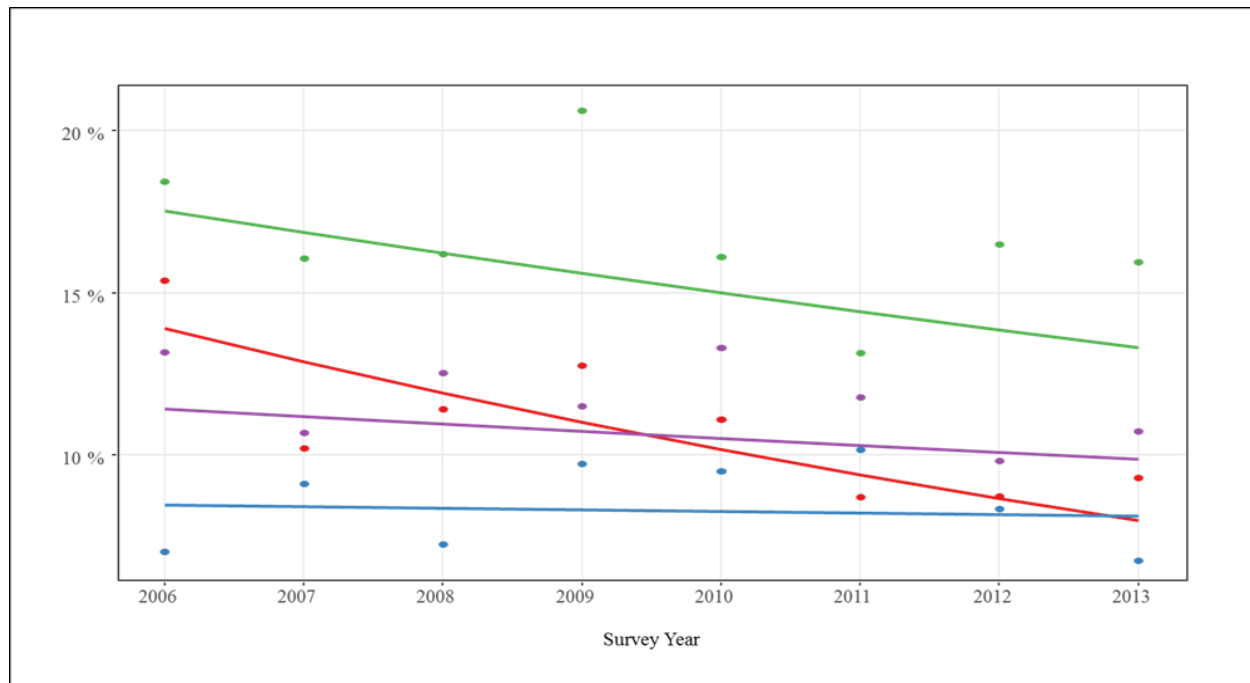


Figure 2. Trends in emergency department visits by Asian ethnicity and survey year; Data points are means by Asian ethnicity and survey year and the curves are estimated probabilities from logistic regression models*; ● = Filipino; ● = Chinese; ● = Asian Indian; ● = other Asian; *P-values: Filipino ($p = .02$); Chinese ($p = 0.57$); Asian Indian ($p = .01$); other Asian ($p = .11$).

ED visit were highest among the Filipinos (15.3%, $SE = 0.8$) and lowest among the Chinese (8.3%, $SE = 0.6$; Table 2).

Our analysis of trends in ED use by Asians over the eight consecutive survey years was significant ($Intercept = .03$, $p = .02$) and in a negative direction, indicating a decrease in reports of any ED visit by Asians over survey years (2006-2013). Figure 2 provides estimated probabilities for the report of an ED visit by survey year, disaggregated by Asian subgroups. The trend of fewer reports of any ED visit over survey years was significant for the Asian Indian ($p = .01$) and Filipino ($p = .02$) subgroups only.

Background Factors and Emergency Department Utilization (Pooled Data)

Table 3 includes results of a binary logistic regression for the report of an ED visit, using model factors and controlling for Asian ethnicity. Gender (sex) was not significant for having an ED visit ($p = 0.50$). Age category was associated with reports of one or more ED visits ($p = .02$): Compared to Asians aged 18-24 years, those in the older age categories were less likely to report an ED visit. Ethnicity was also associated with an ED visit: Compared to Filipinos, Asian ethnic subgroups less likely to report an ED visit were the Chinese ($p < .001$, $OR = 0.60$, 95% CI [0.47, 0.77]) and other Asians (except Chinese and

Asian Indian) ($p = .001$, $OR = 0.74$, 95% CI [0.61, 0.88]). Place born, with years living in the United States, was nearing significance in our model ($p = .06$). The odds of reporting an ED visit were higher for U.S.-born Asians compared to their foreign-born counterparts who resided in the United States for ten or more years ($p = .05$, $OR = 1.24$, 95% CI [1.01, 1.52]). However, region of U.S. domicile was not associated with having any ED visits ($p = .23$). Education level was significant ($p = .01$). Compared to those with less than a high school diploma or equivalent, those with an associate's degree or higher were less likely to report an ED visit ($OR = 0.73$, 95% CI [0.59, 0.92]).

We found a significant association between two biological health status indicators and having an ED visit. These included having diabetes ($p = .002$, $OR = 1.46$, 95% CI [1.16, 1.84]) and having one's overall function limited by a chronic condition ($p < .001$, $OR = 1.95$, 95% CI [1.63, 2.33]). Having arthritis was not associated with an ED visit ($p = 0.87$).

Access to Care Indicators and Emergency Department Utilization

There was no significant association between being covered by insurance and having any ED visit ($p = 0.70$). Likewise, having one or more usual places to go for care when sick was not associated

Table 3. Framework Factors Associated With Reports of Emergency Department Visits*

	OR (95% CI)	p-value
Background Factors		
Gender (female versus male)	1.05 (0.91, 1.22)	0.50
Age (yrs.)	REF = 18 - 24 yrs. of age	0.02
25 – 44	0.74 (0.58, 0.95)	0.02
45 – 64	0.63 (0.48, 0.83)	0.001
65 – 85	0.72 (0.53, 0.98)	0.04
Ethnicity	REF = Filipino ethnicity	0.002
Chinese	0.60 (0.47, 0.77)	< .001
Asian Indian	0.83 (0.66, 1.05)	0.12
other Asian	0.74 (0.61, 0.88)	0.001
Place born/yrs. in U.S.	REF = Foreign-born, in U.S. ≥ 10 yrs.	0.06
Foreign-born, in U.S. for < 5 yrs.	0.96 (0.76, 1.21)	0.72
Foreign-born, in U.S. for 5 to < 10.0 yrs.	0.89 (0.69, 1.15)	0.37
Not foreign-born	1.24 (1.01, 1.52)	0.05
Region of U.S. domicile	REF = West region domicile	0.23
Northeast	1.15 (0.94, 1.40)	0.17
South	1.01 (0.85, 1.21)	0.89
Midwest	1.12 (0.88, 1.42)	0.37
Education	REF = < high school diploma/GED	0.01
HS diploma/GED – some college	0.88 (0.70, 1.10)	0.25
Associate's or higher academic degree	0.73 (0.59, 0.92)	0.01
Diabetes (been told you have)	1.46 (1.16, 1.84)	0.002
Arthritis (been told you have)	1.02 (0.81, 1.29)	0.87
Overall function limited by ≥ 1 chronic condition	1.95 (1.63, 2.33)	< .001
Access to Care Indicators		
Covered by insurance	1.05 (0.81, 1.38)	0.70
No usual place for care when sick (REF = ≥ 1 place)	1.23 (0.96, 1.59)	0.11
Cannot afford prescription medications	1.48 (1.07, 2.05)	0.02
Behavioral Processes		
Time since last seen/talk to health professional	REF > 6 months ago	
≤ 6 months ago	2.64 (2.18, 3.21)	< .001
Seen/talked to mental health professional (last 12 months)	2.12 (1.61, 2.80)	< .001
Smoking status	REF = Never smoked	0.003
Current smoker	1.21 (0.96, 1.52)	0.10
Former smoker	1.42 (1.15, 1.74)	0.001
Alcohol drinking status	REF = Lifetime abstinent/former drinker	0.76
Current drinker, infrequent/light	0.94 (0.81, 1.10)	0.46
Current drinker, moderate/heavy	0.94 (0.73, 1.22)	0.64

Note. CI = confidence interval; GED = General Equivalency Diploma; HS = high school; OR = odds ratio; REF = reference range; U.S. = United States; yrs. = years; *Adjusted for survey year ($p = .004$).

with an ED visit ($p = .11$). However, based on estimates from the pooled data for Asian ethnicities, there was a significant association with not being able to afford prescription medications and reports of any ED visit ($p = .02$, $OR = 1.48$, 95% CI [1.07, 2.05]).

Health-Protective and Health-Risk Behaviors and Emergency Department Utilization

Within the pooled subgroups, Asians who had seen/talked to a health professional within the previous six months were more likely to report an ED visit ($p < .001$, $OR = 2.64$, 95% CI [2.18, 3.21]). In addition, talking with a mental health professional (last 12 months) was associated with an ED visit ($p <$

$.001$, $OR = 2.12$, 95% CI [1.61, 2.80]). We also found an association between the health-risk behavior of smoking and an ED visit ($p = .003$). Compared to non-smokers, former smokers were more likely to have had an ED visit ($OR = 1.42$, 95% CI [1.15, 1.74]). We found no association between alcohol drinking status and an ED visit in this model ($p = 0.76$).

Factors Associated with any Emergency Department Visit, Disaggregated by Asian Subgroups

To shed further light on the findings from the pooled data (all Asian ethnic subgroups), Table 4 presents results of binary logistic regression models for

Table 4. Framework Factors Associated With Reports of Emergency Department Visits by Asian Ethnicity

Predictors	Filipino		Chinese		Asian Indian		other Asian	
	OR (95% CI)	p- value	OR (95% CI)	p- value	OR (95% CI)	p- value	OR (95% CI)	p- value
Background Factors								
Age category (REF = 18 – 24 yrs.)		0.16		0.53		0.26		0.02
25 – 44 yrs.	0.8 (0.5, 1.2)	NS	0.7 (0.4, 1.3)	NS	0.6 (0.4, 1.1)	NS	0.8 (0.5, 1.1)	NS
45 – 64 yrs.	0.6 (0.4, 1.0)	0.04	0.7 (0.4, 1.2)	NS	0.9 (0.5, 1.6)	NS	0.5 (0.3, 0.9)	0.004
65 – 85 yrs.	0.8 (0.5, 1.3)	NS	0.9 (0.4, 1.7)	NS	0.8 (0.4, 1.7)	NS	0.5 (0.3, 0.9)	0.01
Place born, yrs. in U.S. (REF = Foreign-born, in U.S. ≥ 10 yrs.)		0.08		0.89		0.66		0.04
Foreign-born, in U.S. < 5 yrs.	1.2 (0.7, 1.9)	NS	1.0 (0.6, 1.9)	NS	0.85 (0.5, 1.2)	NS	0.9 (0.6, 1.3)	NS
Foreign-born, in U.S. 5 - <10 yrs.	0.6 (0.3, 0.9)	0.03	1.1 (0.6, 2.0)	NS	0.8 (0.5, 1.3)	NS	1.3 (0.8, 1.9)	NS
Not foreign-born (Born in U.S.)	1.1 (0.8, 1.5)	NS	1.2 (0.8, 1.9)	NS	1.1 (0.6, 2.1)	NS	1.4 (1.1, 1.9)	0.01
Education (REF = < HS diploma/GED)		0.09		0.43		0.33		0.02
HS diploma/GED–some college	0.8 (0.5, 1.2)	NS	1.4 (0.8, 2.4)	NS	0.7 (0.4, 1.2)	NS	0.9 (0.7, 1.2)	NS
AA degree or higher	0.6 (0.4, 1.0)	0.04	1.1 (0.7, 1.9)	NS	0.8 (0.5, 1.4)	NS	0.6 (0.5, 0.9)	0.02
Biologic Factors								
Diabetes (ever been told you have)	1.8 (1.2, 2.6)	0.002	1.5 (0.9, 2.6)	0.14	1.5 (0.9, 2.6)	0.15	1.1 (0.8, 1.6)	0.49
Overall function limited by one or more chronic condition(s)	1.9 (1.4, 2.5)	<0.001	1.5 (0.9, 2.4)	0.14	1.5 (1.0, 2.3)	0.03	2.5 (1.8, 3.6)	<0.001
Access to Care Indicators								
No usual place for care when sick	0.8 (0.5, 1.3)	0.46	0.7 (0.3, 1.6)	0.42	1.1 (0.7, 1.9)	0.66	0.6 (0.4, 0.9)	0.03
Cannot afford prescription medications	1.6 (0.9, 2.7)	0.11	0.7 (0.3, 1.6)	0.36	1.5 (0.7, 3.3)	0.35	1.5 (0.9, 2.4)	0.09
Behavioral Processes								
Time since last seen/talk to health professional < 6 months ago	3.2 (2.2, 4.5)	<0.001	3.3 (1.9, 5.7)	<0.001	2.2 (1.4, 3.5)	0.001	2.4 (1.8, 3.2)	<0.001
Seen/talked to mental health professional in the last 12 months	1.8 (1.0, 2.9)	0.04	2.7 (1.4, 5.2)	0.005	2.9 (1.5, 5.5)	0.002	2.4 (1.8, 3.2)	0.001
Smoking status (REF = Never smoked)		0.001		0.84		0.10		0.35
Current smoker	1.6 (1.1, 2.3)	0.02	1.0 (0.6, 1.7)	NS	1.6 (0.9, 3.0)	NS	0.9 (0.6, 1.2)	NS
Former smoker	1.8 (1.3, 2.6)	<0.001	1.2 (0.7, 1.9)	NS	1.6 (0.9, 2.8)	NS	1.2 (0.8, 1.6)	NS

Note. AA = Associate's degree; CI = confidence interval; GED = General Equivalency Diploma; HS = high school; NS = Not significant; OR = odds ratio; REF = reference range; U.S. = United States; yrs. = years; $p \leq .05$.

reports of any ED visit for each Asian subgroup. We included only those variables that were statistically significant or nearing significance in the pooled analyses (Table 3).

Across all four Asian ethnic subgroups, the odds ratios were less than one for the report of an ED visit by Asians in the older age categories versus those aged 18-24 years. For place born, the odds ratios were greater than one across all Asian subgroups for reports of an ED visit among those born in the United States, compared to those who were foreign-born and living in the United States for ten or more years. Among the other Asian subgroup, being U.S.-born was significantly associated with reports of any ED visit, compared to being foreign-born and living

in the United States for over ten years ($OR = 1.4$, 95% CI [1.1, 1.9]). For education level, the association between higher education and fewer reports of an ED visit was significant for Filipinos and other Asians (non-Chinese, non-Indian). For illness indicators, the association between diabetes and any ED use was significant for the Filipino subgroup only ($p = .002$, $OR = 1.8$, 95% CI [1.2, 2.6]).

Having a functional limitation from one or more chronic conditions raised the odds of an ED visit significantly for the Filipino, Asian Indian, and other Asian (non-Chinese) subgroups ($OR = 1.9$, 1.5, 2.5, respectively). For the same three Asian subgroups, not being able to afford prescription medications raised the odds (not significantly) for having an ED visit

compared to the ethnic subgroup counterparts who could afford prescription medications ($OR = 1.6, 1.5,$ and $1.5,$ respectively).

For behavioral processes, having an ED visit was associated with both seeing/talking to a health professional (within six months) and seeing/talking to a mental health professional (last 12 months) across all Asian ethnic subgroups. For smoking history (current and former smokers versus never smoked), the odds of reporting an ED visit were significantly higher among Filipinos with a smoking history ($p = .02$ and $< .001,$ respectively).

Discussion

We completed secondary analyses of public use NHIS survey data (2006-2013) and included Asian ethnic subgroups only. We made comparisons between subgroups using socio-demographic characteristics and other model factors. This was deemed important, as differences have been noted in socioeconomic status, years living in the United States, and access/utilization of health care services among distinct Asian ethnic groups (Ye et al., 2012).

We viewed ED use among Asians living in the United States as a health care-seeking behavior couched within the broader constructs of background/biologic/environmental factors, access to care influences, and health-promotion/health-risk behavioral processes. Our model (Figure 1) is used to frame the discussion.

Background Factors

For this multi-year national sample of Asian adults, both men and women reported ED visits at comparable rates. For age category (pooled and disaggregated data), the odds of having an ED visit were less than one among older-aged Asians compared to their younger counterparts (ages 18-24). This is consistent with previous research that reported younger adults were more likely to receive care in an ED compared to adults who were older (Fortuna, Robbins, Mani, & Halterman, 2010; Uscher-Pines, Pines, Kellermann, Gillen, & Mehrotra, 2013; Ye et al., 2012). This may also be partly explained by higher ED utilization rates for drug poisoning among persons aged 20-34 years (Albert et al., 2015). The 18-29 age period is a time of transition between youth and young adulthood when patterns of health-seeking and health care utilization behaviors are developing (Gindi, Black, & Cohen, 2016). This is also a time when young adults in the United States may have changes in health insurance coverage creating barriers to usual care due to high costs (Kirzinger, Cohen, & Gindi, 2012). Our secondary analyses of NHIS data also indicate that Asians in the United States who are aging or elderly have not been utiliz-

ing the ED at disproportionately high rates compared to their younger counterparts.

After adjusting for age and survey year, we found an association with ethnicity and reports of an ED visit. Filipinos were more likely to report an ED visit compared to Chinese and other Asians (non-Indian, non-Filipino). Based on our model (Figure 1), factors that may be moderating this outcome include the larger proportion of Filipinos who report (a) having diabetes, (b) having their overall function limited by a chronic illness, (c) having a smoking history, and (d) being current alcohol drinkers. It may be that Filipinos in the United States experience sequelae of chronic illness such as diabetes and arthritis and to drinking and smoking behavior that contribute to their ED use. Of note, Lee, Han, and Gfroerer (2013) reported that among a sample of Asian Americans ($n = 8,900$), U.S.-born Filipinos were more likely to have past-month alcohol use compared to their foreign-born counterparts. Also, Filipinos had the highest rate of past-month binge alcohol use (14.5%) compared to Japanese (14.2%), Asian Indian (10.1%), and Chinese (8.1%) respondents. It may be that U.S.-born Filipinos have acculturated to alcohol drinking behaviors seen in the United States. Kim, Kim, and Nochajski (2010) noted that the risk and protective factors for alcohol use disorder differed among Filipinos depending on their location of residence. For smoking behavior, historical data from the NHIS (Barnes et al., 2008; Kuo & Porter, 1998) indicate that Filipinos have consistently reported higher rates of current and former smoking behavior compared to those of Chinese and Asian Indian ethnicity.

Using eight years of pooled NHIS survey data, the measure for place born/years in the United States was significantly associated with an ED visit for the disaggregated subgroup of other Asians (non-Filipino, Asian Indian, Chinese). Among the other Asian subgroup, those who immigrated ten or more years ago were less likely to report an ED visit compared to their U.S.-born counterparts. This may coincide with the other Asian subgroup also having the lowest frequency of being covered by insurance. Ye et al. (2012) noted that among Asians, those who were foreign-born were significantly less likely to have health insurance. However, there was not an association between reports of an ED visit and geographic regions where larger populations of Asians reside.

Trend data for survey years was statistically significant in a negative direction for both the Asian Indian and Filipino subgroups (Figure 2), indicating lower estimated frequencies of one or more ED visits among these ethnic groups over survey years. For Asian Indians, less than one in ten were born in the United States, and it may be that over time (survey years) and with acculturation (years in the United

States) they have garnered improved access to health care services. While Filipinos have the highest overall rate of any ED visits, the trend of fewer reports of an ED visit over time may coincide with the higher frequency of Filipinos having one or more usual places to go for care when sick (Table 2).

The association between lower level of education and ED visits suggests the need for continued exploration of ED use among young adult Asians, as there may be a possible link between levels of health literacy in this population. Chang, Chan, and Hae-Ra (2015) noted that among Asian Americans residing in California, there were significant associations between limited proficiency with English, less time of residence in the United States, and with not having a usual source of health care. It may be that some Asians with less education are more challenged with understanding the United States health care system in general compared to their college-educated counterparts. While level of education is frequently used as a proxy variable for socioeconomic status, Chen et al. (2013) did not find that socioeconomic status explained differences in health care expenditures among Asian subgroups.

From our trend analyses, it appears that most Asians living in the United States do not use the ED as a routine access point for health care services. This is further supported by Gindi, Black, and Cohen (2016), who reported that for NHIS survey year 2013, estimated frequencies of one or more ED visits for Chinese and Filipino adults (aged 18-64) ranged from 6.3% to 13.9%, respectively. Comparative estimates for ED use were higher among Blacks (25.4%), non-Hispanic Whites (17.8%), and Hispanics (16.1%). While the number of Asians in the United States is increasing, the proportion of Asians who use the ED continues to remain lower than other racial groups. The lower rates of ED utilization among Asians may partly be explained by a recent NHIS survey-related report (Galinsky, Zelaya, Simile, & Barnes, 2017) that indicated single-race Asians were significantly less likely than larger ethnic groups in the United States to be (a) diagnosed with cancer, coronary heart disease, arthritis or asthma; or (b) to have experienced low back pain, migraines, or serious psychological distress in the past 30 days.

Access to Care Influences

From a health care access standpoint, our analyses found no significant association between health insurance status (covered/not covered) and reports of any ED use among the NHIS sample of Asian adults living in the United States. However, relatively few Asian respondents reported being uninsured. Also, there was no association between reports of an ED visit and not having a usual place for care when sick.

Based on the pooled data, Asians were significantly more likely to report an ED visit if they could not afford prescription medications. When disaggregated, differences were noted within the Asian groups: Among the Chinese, the odds for having an ED visit were lower if prescription medications were not affordable. Conversely, among Filipinos, the odds for having an ED visit were higher for those who could not afford prescription medications. However, less than ten percent of respondents for each Asian group indicated that they were unable to afford prescription medication. This finding needs further elucidation as additional descriptive data about the frequency of prescribing medications for Asians and medication adherence is needed.

Alternatively, a report of trends in health care spending for immigrants in the United States (Stimpson, Wilson, & Eschback, 2010) suggested that lower health care expenditures among Asians may be due partly to increasing barriers to care such as fear, lack of insurance, or lack of a regular provider, and that such barriers may lead to the use of alternative care options provided outside of the mainstream U.S. health care system. Kim and Keefe (2010) also suggested that inadequately insured Asian Americans may resort to less costly alternative medicine practices such as acupuncture and herbal medicine.

Health Protective and Health-Risk Behavior Factors

Our analyses indicate that Asians with more recent interactions with a health professional were more likely to utilize the ED compared to those with six months or more since last seeing/talking with a health provider. This finding further supports the assumption that Asians do not utilize the ED in lieu of regular health care utilization. The inverse relationship of greater time (more than six months) since seeing a provider and fewer reports of an ED visit needs further exploration. Ye et al. (2012) reported on NHIS survey data (2003-2005) among Asians and indicated that being foreign-born was negatively associated with routine access to care and access to health specialists. This suggests a need to further explore the regularity of health promotion and disease prevention interventions offered to Asians for whom a majority were not born in this country.

While estimates indicate that less than one in twenty (3.4%) Asians saw/talked to a mental specialist, there was an association between doing so within the last 12 months and having any ED visit. However, it is not unusual for consumers who utilize mental health services to frequent ED services and this is of growing concern (Chakravarthy et al., 2013; Owens, Mutter, & Stocks, 2010). For Asians living in the United States, it may be that non-acute

mental health care services geared for ethnic minority populations are scarce in some community settings or are inaccessible during times other than regular business hours.

For all Asian subgroups, there were more reports of being a former rather than a current smoker, which could indicate social bias contributing to current smokers not disclosing their smoking status, or a possible trend in reduced smoking behavior among Asians. We found no association between alcohol drinking status and reports of an ED visit. This finding needs to be viewed with caution as the measures used for current and past drinking behavior may not have fully captured the frequency with which the population of Asians had consumed alcohol. Continued exploration of alcohol use among Asians living in the United States is needed, as foreign-born Asians less accustomed to alcohol use may become acculturated to the social acceptability of alcohol consumption in the United States, with potential alcohol-related health and physical safety issues ensuing. This may increase subsequent ED utilization sequelae for alcohol-related events.

Implications for Research

The NHIS datasets were used to describe ED utilization related to the constructs in our model such as being covered by health insurance, having a usual place for care when sick, accessing health professional and mental health care services, and illness status (diabetes, functional limitations, etc.). Future studies can explore more detailed trends in ED use over time among Asians by immigrant status/time living in the United States, particularly because Asians are the fastest growing racial/ethnic group in the United States. This can include a review of factors influencing multiple ED visits and visits that do or do not result in hospital admissions. Hospitals in cities where newly immigrated Asians predominantly reside may serve as research sites for exploring unique environmental and access to care factors influencing health care access and ED use among Asians.

For future NHIS surveys, we recommend disaggregation of healthcare provider types (e.g., nurse practitioner, physician assistants, nurse midwives). This would be useful as many advanced practice nurses and physician assistants are positioned to address unique gaps in health care service delivery for ethnic minorities in the United States including Asians. Provider-type data can be explored related to access and utilization of health care in a variety of primary, community-based, and transitional care service sites. Also, targeted data collection including sampling of Asian ethnic subgroups including Japanese, Korean, Vietnamese, could help to further explore the unique needs of Asian subgroups living in the United States.

Application to Practice

ED utilization rates have remained lower among Asians in the United States compared to other ethnic groups including Whites, Blacks, and Hispanics. However, lower rates of access to other forms of health care including routine preventive care have been noted among Asians compared to other ethnicities as well (Kim & Keefe, 2010). Limited language proficiency and health literacy, immigrant status, and lack of insurance are factors identified as influencing this underutilization of health care by some Asian subgroups (Chen et al., 2013; Kim & Keefe, 2010). A greater understanding of health insurance status is needed. Capp, Rooks, Wiler, Zane, and Ginde (2017) discussed trends based on NHIS data of decreased reports of an ED visit over the survey years (2010 – 2015) for adults aged 18-64 who had Medicaid or private insurance, but no significant trend among those without health insurance.

The diversity among Asian ethnic groups has implications for addressing potential gaps in health care and ED usage patterns among Asian subgroups. It has been recommended that health care organizations include staff who have expertise in the socio-cultural contexts of Asians who reside within and outside of the United States (Kim & Keefe, 2010). Client-centered, culturally relevant programs and policies can be developed and implemented to address barriers to help-seeking behaviors among Asians living in the United States. Park, Chesla, Rehm, and Chun (2011) discussed practices of experienced providers who offer culturally sensitive care for Asians that is context-specific and nuanced. To address mental health care needs of Asian subgroups, specialized mental health services have been established in some community settings in the United States to address the unique needs of Asians from a cultural perspective and to improve access and utilization of services (Kwok, 2013). For example, culturally and linguistically appropriate programs tailored to health literacy levels may better reach Asian ethnicities who continue to experience health disparities. Young and Guo (2016) recommended cultural diversity training to promote cultural competence in nursing practice.

Limitations

Analyses of secondary data inherently limits construction of theoretically-driven predictor models for ED use. For example, we did not include some NHIS survey indicators related to emotional and mental health that we anticipated using, as data were not captured during all survey years. The NHIS data is self-reported, and participants could provide socially desirable answers for some of the questions about health status and utilization of services. Though respondents could choose the language of their inter-

view, most were conducted in English, which may have been based on social desirability.

Our secondary analyses of the nationally representative NHIS dataset sheds light on associations between ED use and background/environmental factors, access to care indicators, and health-protective and risk behavioral factors. However, ED utilization is multifactorial and complex, and all factors included in myriad conceptualizations of ED utilization could not be included in the model. In addition, our analyses do not address causality.

Despite these limitations, the framework used reflects indicators of health care access and utilization included in theoretically-driven national health surveys such as the NHIS (Andersen, 2008; Gindi, Cohen, & Kirzinger, 2012), and from the scientific literature on factors that may influence ED use among Asians living in the United States.

Conclusions

This report adds to the scientific literature on background and environment factors, access to care indicators, and health-protective/health-risk behaviors among NHIS-identified Asian subgroups. Health care professionals can use this report for consideration of the findings and when developing strategies to address issues of health care access and utilization of ED services among Filipinos, Chinese, Asian Indians, and other Asian ethnic groups in the United States.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest concerning the research, authorship, or publication of this article.

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