An Analysis of East Asian American Inpatient Psychiatric Data from the Hawai‘i Health Information Corporation Database

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Abstract

Past research has examined the complex reasons for the apparent reluctance of East Asian Americans (ie, Chinese, Japanese, Koreans) to seek mental health services when needed. The current study analyzed East Asian American (EAA) mental health, utilizing inpatient hospitalization data from the Hawai‘i Health Information Corporation (HHIC) database. Frequency of inpatient hospitalizations for specific mental health diagnoses (depression, bipolar disorder, schizophrenia, and suicide attempts/ideation) in EAA patients was examined. White, Native Hawaiian, and Filipino patients were included for comparative purposes. Retrospective data on adult (18 years and over) inpatient visits in Hawai‘i from 2007 to 2017 were analyzed. Variables available for analysis were detailed race/ethnicity, age, sex, island, and insurance type as well as readmission rates, severity of illness (SOI), and initial length of stay (LOS). Overall, there were no significant differences between race/ethnicity groups in regards to readmission, SOI, or LOS for a majority of the diagnoses. However, for depression, even when adjusting for other demographics, Japanese and Chinese patients had significantly higher initial LOS and SOI than White patients, though the strength of this association was weak (R Squared model fits being less than .1 for both outcomes). The reason for these findings requires further examination, including whether EAAs may be reticent to seek help and/or whether healthcare providers are not recognizing the need for assistance.

Keywords

East Asian American, Inpatient Psychiatric Data, Mental Health

Abbreviations and Acronyms

ACS = American Community Survey
EAA = East Asian Americans
HHIC = Hawai‘i Health Information Corporation
ICD-9 = International Classification of Diseases, Ninth Revision
ICD-10 = International Classification of Diseases, Tenth Revision
LOS = length of stay
NLAAS = National Latino and Asian American Study
PPR = potentially preventable readmission
SOI = severity of illness
WHO = World Health Organization

Introduction

Past research has examined the complex reasons for the apparent reluctance of East Asian Americans (ie, Chinese, Japanese, Koreans) to seek mental health services when needed. For example, Yoo et al reported that internalizing the "model minority myth" can lead East Asian Americans (EAA) to experience stress from excessively high expectations.[1] It may also prevent them from seeking help since they may feel pressured to preserve a positive self-image as being a member of a racial/minority group that is not perceived as needing mental health services.[2] Compounding the problem is how EAA's traditional views regarding mental health matters as "shameful" prevent them from getting the help they need.[3]

A number of past studies note the difficulties with studying Asian American mental health,[1,3–7] which include viewing Asian Americans as a monolithic group. Aggregation of Asian Americans or when the categorization is expanded to Asian American/Native Hawaiian/Pacific Islander fails to take into consideration the diverse backgrounds/history and experiences of each subgroup. The 2000 Census was the first time that respondents were able to select one or more race categories, allowing for the disaggregation of data.[8] Since then, efforts have been made to further refine how data is collected, analyzed, and disseminated. These can better inform public policy, program development, and the provision of services; however, small sample sizes for subpopulations prevent meaningful analyses.[9,10] Taking into consideration the concern with overgeneralizing to such a heterogeneous group, the current study focuses specifically on EAAs (Chinese, Japanese, and Korean adults) in Hawai‘i.

Based on data from the World Health Organization (WHO), 3 common mental health disorders – depression, bipolar disorder, and schizophrenia – were selected since their commonality would provide adequate sample size and be more relevant to analysis.[11] Suicide attempts and ideation were also included given the increasing concern of suicidality.[12] In 2019, WHO reported that approximately 264 million people worldwide have depression, 45 million have bipolar disorder, and 20 million have schizophrenia. WHO also reported on the lack of proper treatment options for those suffering from mental illness, particularly those in low to middle income countries, and is focused on the following 4 objectives for its Mental Health Action Plan (2013-2020): (1) improve leadership and oversight for mental health; (2) assure comprehensive and integrative services that are community-based; (3) implement prevention and promotion strategies; and (4) improve information systems, evidence, and research.

The Hawai‘i Health Information Corporation (HHIC) database contains inpatient information from Hawai‘i hospitals with details such as patient demographics and diagnoses available for analysis. It is a pay to access dataset.

The most current HHIC dataset was used to answer the following research questions:

1. What is the frequency of inpatient hospitalizations for mental health diagnoses (depression, bipolar disorder, schizophrenia, and suicide attempts/ideation) for Chinese, Japanese, and Korean patients, and are they under- or over-represented when compared to the rest of the population?

2. What are the general demographics for these patients and what were their readmission rates, severity of illness (SOI), and initial length of stay (LOS)?

Methods

Sample. Retrospective data on adult (18 years and over) inpatient visits in Hawai'i from 2007 to 2017 were analyzed. This newer data allowed for additional variables, such as readmission, to also be evaluated. The University of Hawai'i's Office of Research Compliance deemed that this study would not need IRB approval.

Visits where the patient was transferred ($n = 56\,702$), was a non-Hawai'i resident ($n = 43\,308$), had Department of Defense insurance and thus had limited race/ethnicity data ($n = 72\,094$), and visits related to maternity and newborn related codes ($n = 175\,997$) were excluded. Visits where the patient was deceased on the first visit for the diagnosis being analyzed were also excluded. Additionally, patients whose initial visits were not in the database (eg, if their initial visit was before 2007) were also excluded ($n = 490$) as there was limited data concerning readmission.

After looking at only visits with the diagnoses of interest there were 36 703 records in the analysis. American Community Survey (ACS) data was used to obtain Hawai'i population estimates for the race/ethnicity groups of interest,[13] though this estimate does include those below the age of 18 and may define race/ethnicity groups differently. These numbers were used when estimating the prevalence of certain diagnoses in the population.

Variables. The variables available for analysis were detailed race/ethnicity data, age, sex, island, and insurance type. Island was grouped into O'ahu and other. Island was analyzed as a variable due to potential differences in accessibility to care.[14] The race/ethnicity groups analyzed were Chinese, Japanese, Korean, White, Native Hawaiian, and Filipino. These self-reported race/ethnicity groups were the most prevalent in the HHIC dataset and thus would give an adequate sample size. Additionally, these were measured by patient self-identification. Insurance type was categorized into public (Medicare or Medicaid), private, or other (eg, self-pay). Insurance type was included as a measure related to social economic status,[15] which is often related to many health outcomes. Readmissions were calculated using the potentially preventable readmissions (PPR) chain number provided in the dataset. A PPR was defined as a readmission that was clinically related to the initial visit in the chain and as defined by the 3M software, version 20 (3M Health Systems Information, Maplewood, MN) which determined if a specific follow up admission could be clinically tied to an initial admission.

Statistical Analysis

The primary outcomes of this study were number of patients admitted with a primary or secondary diagnoses of interest (depression, schizophrenia, bipolar disorder, and suicide ideation or attempt), SOI, length of stay (LOS), and if they had a readmission. The ICD codes used for depression were ICD 9: 296.2-296.3, 296.9 and for ICD 10: F32, F33. The ICD codes used for schizophrenia were ICD 9: 295.1-295.4, 295.8-295.9 and for ICD 10: F20. The ICD codes for bipolar disorder were ICD 9: 296.4-296.6, 296.38 and for ICD 10: F31. The ICD codes listed from the Agency for Healthcare Research and Quality's report on *Suicidal Ideation, Suicide Attempt, or Self-Inflicted Harm: Pediatric Emergency Department Visits*[12] was used for suicide ideation and attempts. The patient count with the diagnoses of interest were calculated and compared by race/ethnicity group and compared to ACS data to estimate if certain race/ethnicity groups were under- or over-represented in the inpatient group when compared to the state's population. The distribution of primary and secondary diagnoses for these race/ethnicity groups were also compared as there could be differing patterns for these diagnoses by type.

SOI was measured according to the 3M Health Systems classification (3M Health Systems Information, Maplewood, MN) with SOI ranging from minor to extreme. SOI was categorized into either minor SOI or more than minor due to patients with the diagnoses of interest being heavily skewed towards minor SOI. Median LOS was used, as LOS was also very skewed. Chi-square tests were used to compare categorical variables (readmission, SOI, island, sex, and public insurance) among race/ethnicity groups who were admitted for the diagnoses of interest. Bonferroni tests were used for any needed follow up tests. For normally distributed variables (age) and non-normally distributed variables (LOS) ANOVA or Kruskal-Wallis procedures were conducted with follow up tests of either Tukey or Dunn's test, respectively.

Multiple regression or logistic regression was used for outcomes that were significantly different in previous analyses among race/ethnicity groups to see if those group differences were still present after adjusting for the previously listed patient characteristics. Analysis was done using R Statistics, 4.0.4 (R Core Team, Vienna, Austria).

Results

There were 16 376 visits which had a diagnosis of depression, 5170 with a diagnosis of schizophrenia, and 7377 with a

diagnosis of bipolar disorder. Additionally, 7780 visits had a diagnosis of suicide ideation or suicide attempt.

The number of Chinese, Japanese, Korean, White, Native Hawaiian, and Filipino people in Hawai‘i was from the 2012 ACS 5-year estimate. This was then compared with patients with either a primary or secondary diagnosis of depression, bipolar disorder, schizophrenia, and suicide attempts/ideation as shown in **Table 1**.

Overall, White patients had higher rates of diagnoses than the other race/ethnicity groups. No noticeable differences for schizophrenia diagnoses were observed across race/ethnicity groups. Rates for Chinese, Koreans, and Japanese patients tended to be similar and lower than for White patients, but not as low as the rates for Filipino patients for depression, bipolar, and suicide attempts/ideation diagnoses.

For patients with a primary diagnosis of one of the mental health diagnoses of interest, outcomes and demographics relating to those patients were examined by race/ethnicity in **Table 2**.

Readmissions were significantly different across race/ethnicity groups but follow up chi-square tests with a Bonferroni correction did not identify any clear differences between specific groups (data not shown). SOI was significantly different across race/ethnicity groups. Japanese patients had a significantly higher rate of SOI (72.2%) when compared with White patients (60.3%) ($P < .001$) and this was the only significant comparison in the post hoc tests.

Length of initial stay differed significantly across race/ethnicity groups. A Kruskal-Wallace with a post-hoc Dunn test showed that for median initial length of stay, Japanese patients tended to have had longer LOS (4 days) when compared to White (3

Table 1. Inpatient Visit Counts and Population Estimates for Selected Mental Health Diagnoses by Race/Ethnicity, HHIC 2007-2017

Race/ethnicity	Depression n (per 10000)[a]	Bipolar n (per 10000)	Schizophrenia n (per 10000)	Suicide attempts/ ideation n (per 10000)	Hawai‘i Population Estimates[b] n (percent of total population) (2012, 5 year) n (%)
Chinese	388 (68.0)	137 (24.0)	149 (26.1)	154 (27.0)	57 044 (4.2%)
Japanese	1 732 (92.6)	443 (23.7)	568 (30.4)	566 (30.3)	186 988 (13.7%)
Korean	196 (80.1)	75 (30.7)	81 (33.1)	87 (35.6)	24 466 (1.8%)
Filipino	1 179 (60.2)	380 (19.4)	463 (23.6)	438 (22.3)	195 993 (14.4%)
Native Hawaiian	354 (44.4)	121 (15.2)	108 (13.5)	216 (27.1)	79 749 (5.9%)
White	5 892 (173.8)	2 961 (87.3)	1 189 (35.1)	2 872 (84.7)	339 079 (24.9%)
Total	9 741 (110.3)	4 117 (46.6)	2 558 (29.0)	4 333 (49.1)	883 319 (64.8%)

[a] Estimates are calculated with the population estimate as the denominator.
[b] American Community Survey DP05 for Hawai‘i 2012, 5 year estimate (2008-2012), definition for participant ethnicity is different than the HHIC data (ACS population estimates include under 18 year old and groups those with multiple listed ethnicity differently).

Table 2. Characteristics of Inpatients with Depression as a Primary Diagnosis by Selected Race/Ethnicity, HHIC 2007-2017

	Chinese n = 84, n (%)	Japanese n = 461, n (%)	Korean n = 48, n (%)	Filipino n = 332, n (%)	Native Hawaiian n = 123, n (%)	White n = 2074, n (%)
Readmission: Yes, $P = .006$	4 (4.8)	72 (15.6)	6 (12.5)	31 (9.3)	20 (16.3)	322 (15.5)
Severity of Illness: More than minor, $P < .001$	63 (75.0)	333 (72.2)	34 (70.8)	212 (63.9)	75 (61.0)	1 250 (60.3)
LOS of initial visit: Days, median (IQR) $P < .001$	4.5 (7)	4 (8)	2.5 (5.3)	3 (4)	3 (3)	3 (4)
Age: Years, mean (SD) $P < .001$	47.18 (19.7)	48.97 (21.7)	42.13 (16.8)	40.63 (17.1)	38.72 (15.0)	43.29 (15.2)
Island: O‘ahu, $P < .001$	76 (90.5)	367 (79.6)	42 (87.5)	222 (66.9)	101 (82.1)	1 190 (57.4)
Sex: Male $P = .017$	38 (45.2)	214 (46.4)	18 (37.5)	132 (39.8)	59 (48.0)	1 028 (49.6)
Public insurance: Yes, $P < .001$	47 (56.0)	258 (56.0)	25 (52.1)	180 (54.2)	79 (64.2)	1 346 (64.9)

Note: Length of stay (LOS), interquartile range (IQR). The statistical tests were ANOVA for age, Kruskal–Wallis for LOS, and chi squares for the rest of the variables.

days) and Filipino patients (3 days) (both $P < .001$). Chinese patients also had a significantly longer median LOS when compared to Filipino ($P = .02$) and Native Hawaiian patients ($P = .02$). The rest of the post hoc tests were not significant.

Since age was more normally distributed, a Tukey post hoc tests also showed that Japanese patients tended to be significantly older than White, Native Hawaiian, and Filipino patients (all $P < .001$). Filipino patients were also less likely to be on public insurance when compared to White patients ($P = .002$). The additional post hoc tests were not significant.

Differences in patients with a primary diagnosis of bipolar disorder by race/ethnicity were also examined (data not shown). For a primary bipolar diagnosis, median LOS on initial visit, readmission, and SOI was not significantly different across race/ethnicity groups. Japanese patients were significantly older than Native Hawaiian ($P = .03$) and Filipino patients ($P < .001$). White patients seemed to be more likely to be male but follow up tests were not significant when using the Bonferroni correction. White patients were significantly more likely to have public insurance than Filipino patients ($P < .001$). The other post hoc tests were not significant.

There were no significant differences between race/ethnicity groups in regards to readmission, SOI, or LOS among patients with a primary diagnosis of schizophrenia (data not shown). Post-hoc analyses showed that Japanese patients tended to be significantly older than White ($P < .001$), Filipino ($P < .001$), and Native Hawaiian patients ($P = .003$). White patients tended to be significantly more likely to be male when compared to Korean patients ($P < .003$) and in general were older than other patients but alpha corrections did not show significance for other groups.

Suicide attempts and ideation patients were also compared with regards to readmission, SOI, LOS, age, island, sex, and insurance in **Table 3**.

Among patients who attempted suicide, readmission was significantly different overall across race/ethnicity groups. Follow up tests showed that White patients had a higher rate of readmission than Filipino patients ($P < .001$). SOI and LOS were not significantly different overall. Japanese patients were significantly older than Filipino ($P < .001$), White ($P < .001$) and Native Hawaiian ($P < .001$) patients. Filipino patients were significantly younger than White ($P < .001$), Chinese ($P = .010$), and Japanese ($P < .001$) patients. Both Japanese patients ($P < .001$) and Chinese patients ($P < .001$) were significantly less likely to be on public insurance than White patients.

While for most diagnoses there appeared to be no strong relationship between readmission, LOS, and SOI for depression, LOS and SOI were significantly different across groups. Regression was then used for these outcomes to examine whether race/ethnicity groups were still significantly related to these outcomes when controlling for other variables. These results can be seen in **Table 4**.

Even when adjusting for other demographics, Japanese and Chinese patients had significantly higher mean length of stays and initial length of stays than White patients. Filipino patients had a similar trend but to a weaker extent. However, the whole model was very weak in regards to estimating length of stay, which could indicate that there are other demographic or clinical variables that should be measured. When controlling for other variables, Chinese, Filipino, and Japanese patients were more likely to have a severity of illness score above minor when compared to White patients but the overall model for estimating severity of illness was also weak.

Table 3. Characteristics of Inpatients with Suicide Attempts and Ideation (Primary or Secondary Diagnosis) by Selected Race/Ethnicity, HHIC 2007-2017

	Chinese n = 154, n (%)	Japanese n = 566, n (%)	Korean n = 87, n (%)	Filipino n = 438, n (%)	Native Hawaiian n = 216, n (%)	White n = 2872, n (%)
Readmission: Yes, $P = .006$	31 (20.1)	131 (23.1)	16 (18.4)	72 (16.4)	48 (22.2)	706 (24.6)
Severity of Illness: More than minor, $P = .352$	115 (74.7)	429 (75.8)	61 (70.1)	326 (74.4)	151 (69.9)	2181 (75.9)
LOS of initial visit: Days, median (IQR) $P = .138$	3 (4)	3 (5)	3 (6)	3 (3)	3 (3)	3 (3)
Age: Years, mean (SD), $P < .001$	44.38 (18.7)	46.72 (20.0)	43.66 (18.5)	38.53 (16.4)	39.53 (13.8)	43.4 (14.7)
Island: O'ahu, $P < .001$	137 (89.0)	473 (83.6)	82 (94.3)	344 (78.5)	183 (84.7)	1680 (58.5)
Sex: Male, $P = .087$	79 (51.3)	304 (53.7)	39 (44.8)	224 (51.1)	116 (53.7)	1617 (56.3)
Public insurance: Yes, $P < .001$	81 (52.6)	330 (58.3)	62 (71.3)	279 (63.7)	139 (64.4)	1963 (68.3)

Note: Length of stay (LOS), interquartile range (IQR). The statistical tests were ANOVA for age, Kruskal–Wallis for LOS, and chi squares for the rest of the variables.

Table 4. Regression Model for Length of Stay (LOS) and Severity of Illness (SOI) for those with a Primary Diagnosis of Depression, HHIC 2007-2017 (n = 3579)		
Variables	**LOS Initial Visit**	**SOI**
Age: Years	0.17 (SE = 0.01), *P* < .001	0.04 (SE = 0.003), *P* < .001
Island: O'ahu	0.6 (SE = 0.43), *P* = .157	0.08 (SE = 0.08), *P* = .358
Sex: Male	-0.21 (SE = 0.4), *P* = 606	0.1 (SE = 0.08), *P* = .211
% Public insurance	1.34 (SE = 0.42), *P* = .002	0.52 (SE = 0.08), *P* < .001
Race ethnicity: Chinese	2.58 (SE = 1.26), *P* = .040	0.71 (SE = 0.27), *P* = .010
Japanese	3.19 (SE = 0.59), *P* < .001	0.52 (SE = 0.12), *P* < .001
Korean	1.38 (SE = 1.64), *P* = .401	0.66 (SE = 0.34), *P* = .051
Filipino	1.32 (SE = 0.67), *P* = .048	0.37 (SE = 0.13), *P* = .005
Native Hawaiian	0.03 (SE = 1.05), *P* = .974	0.22 (SE = 0.2), *P* = .281
Model fit	0.08	0.09

Note: LOS was multiple regression and SOI was logistic regression meaning that model fit for the LOS model was adjusted R Square and the model fit for the logistic regression was Pseudo R-Square. All variables in the model are shown.

Discussion

This study deliberately focused on Chinese, Japanese, and Korean Americans in Hawai'i in order to investigate the potential mental health concerns faced by this understudied group. Although few statistically significant differences were found among groups, for depression, even after adjusting for other factors, Japanese and Chinese patients had significantly higher mean LOS and initial LOS than White patients. Reflective of past studies, this may be an indication that EAA may be reluctant to seek help until the illness is severe.[2,3] However, the models predicting LOS and SOI were overall weak likely due to a lack of medical variables that are being used to predict these outcomes. While Japanese and Chinese patients overall inpatient stay numbers seemed to be underrepresented when compared to the population estimates, the ones who were admitted appeared to be more severe cases.

The first (and most current) national study on Asian American mental health was the National Latino and Asian American Study (NLAAS), which was a representative community household survey that investigated the prevalence of mental health disorders and service utilization.[7] Data was collected from May 2002 to 2003 and included 2095 Asian Americans (Chinese, n=600; Filipino, n=520; Other Asians, n=467). The study analyzed national and subgroup differences, social position, environmental context, and psychosocial factors. Analyses pointed out sex differences when looking at immigration status.[7] A separate NLAAS-based study reported that Asian Americans who were born in the US – specifically those third generation or later – were more likely to use mental health services (ie, seek help) if needed.[16] Another NLAAS study found that family cohesion played a significant role in mental health service utilization – those with a higher level of cohesion were less likely to utilize services.[17]

Studies in Hawai'i, where there is a relatively large Asian American population, have also attempted to analyze and present disaggregated data.[18,19] Sentell et al noted that prior to their research, past studies with subgroup data regarding inpatient admissions were over 3 decades old. Utilizing the HHIC database, 5 major racial/ethnicity groups in Hawai'i – Japanese (23.8%), Chinese (6.5%), Native Hawaiian (20.7%), Filipino (15.4%) , and White (23.6%) were reviewed.[18] Out of the study's sample of 303 621 hospitalizations from December 2006 to December 2010, 10 831 (3.6%) had mental health as a primary diagnosis. Chinese (11.4 per 10 000) had the lowest rate of psychiatric hospitalizations overall and for all diagnoses, with the exception of schizophrenia (Japanese had the lowest at 44 per 10 000). Whites had the highest psychiatric hospitalization rates for all diagnoses. Japanese, Chinese, and Filipinos had higher severity of illness or longer stays relative to Whites overall; Chinese and Japanese with schizophrenia with significantly longer stays; and Filipinos with schizophrenia and Japanese with depression had greater severity of illness. The authors suggested that Asian Americans may be less likely to be admitted for psychiatric reasons due to seeking help outside the hospital or possibly may be cared for at home. Lim et al found similar results when analyzing 2010 Hawai'i Medicaid data.[19] Racial/ethnic differences in mental health service utilization for inpatient, outpatient, and emergency department services were examined, and compared to Whites, Asians were less likely to use outpatient services and had lower rates of inpatient visits.

This study has limitations. While the dataset used has near complete data on hospital inpatient visits, the team was not able to see all patients diagnosed with certain mental health disorders to compare with population level estimates. Additionally, some participants may be missing race/ethnicity level data and were not included in the analyses. There can also be definitional differences in how ACS data classifies race/ethnicity when

compared to how HHIC collects race/ethnicity, and while the HHIC data excluded those below the age of 18, ACS data did not for the specific race/ethnicity groups compared. So, while comparing ACS data to HHIC data is not a direct comparison it can still be used to give a general idea of how HHIC demographics may compare to the population. Additionally, the ACS data appears to have more detailed information for those who report multiple racial identities while the HHIC data asks those to self-report the identity they most identify with, leading to different ways these 2 datasets classify those individuals. Another limitation with regard to the data is the possibility of physician coding or data entry errors, similar to what has been noted in previous studies.[19] Additionally, this study only looked at inpatient hospital stays relating to the diagnoses of interest. Different patterns may emerge when focusing on emergency room visits or outpatient visits. Furthermore, although certain ethnic groups demonstrated low rates of hospitalization for the diagnoses examined, they may have possibly higher rates of other mental health diagnoses. Future research should expand on the mental health diagnoses studied. While the sample size allowed for statistical analyses, when looking at the breakdown of these individual groups and comparing them using post-hoc tests, the power of statistical tests was weakened due to the size of groups that were being compared. Finally, while using Hawai‘i data allowed for a reasonable sample size of different East Asian groups, the experience of Asian Americans in Hawai‘i could potentially be different when compared to many other states where Asian Americans are less represented/ethnic minorities, which could impact the generalizability of this study.

This study found differences between EAAs and other ethnic groups when looking at inpatient psychiatric data, which may lead healthcare providers to better tailor their care. However, more research is needed to gain a better understanding of mental health concerns for EAAs. Additionally, taking a disaggregated look at EAA, South Asians, and Southeast Asians could potentially reveal differences within and among these groups. Most importantly, the stigma of mental illness needs to be addressed so that those who need help will receive the care they need.

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