HHS Public Access

Author manuscript

J Racial Ethn Health Disparities. Author manuscript; available in PMC 2022 February 01.

Published in final edited form as:

J Racial Ethn Health Disparities. 2021 February ; 8(1): 256–263. doi:10.1007/s40615-020-00779-7.

Subgroup variation and neighborhood social gradients– an analysis of hypertension and diabetes among Asian patients (New York City, 2014–2017)

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Abstract

Diabetes and hypertension are socially patterned by individual race/ethnicity and by neighborhood economic context, but distributions among Asian subgroups are under-characterized. We examined variation in prevalence for both conditions, comparing between US Asian subgroups, including within South Asian nationalities, and comparing within subgroups by neighborhood economic context. We obtained data on a nonprobability sample of 633,664 patients ages 18–64 in New York City, New York, USA (2014–2017); 30,138 belonged to one of seven Asian subgroups (Asian Indian, Bangladeshi, Pakistani, Chinese, Korean, Japanese, and Filipino). We used electronic health records to classify disease status. We characterized census tract economic context using the Index of Concentration at the Extremes and estimated prevalence differences using multilevel models. Among Asian men, hypertension prevalence was highest for Filipinos. Among Asian women, hypertension prevalence was highest for Filipinas and Bangladeshis. Diabetes prevalence was highest among Pakistanis and Bangladeshis of both genders, exceeding all other Asian and non-Asian groups. There was consistent evidence of an economic gradient for both conditions, whereby persons residing in the most privileged neighborhood tertile had the lowest disease prevalence. The economic gradient was particularly strong for diabetes among Pakistanis, whose prevalence in the most deprived tertile exceeded that of the most privileged by 9 percentage points (95% CI: 3, 14). Only Koreans departed from the trend, experiencing the highest diabetes prevalence in the most privileged tertile. US Asian subgroups largely demonstrate similar neighborhood economic gradients as other groups. Disaggregating Asian subgroups, including within South Asian nationalities, reveals important heterogeneity in prevalence.

INTRODUCTION

As both income inequality and economic residential segregation increase in the twenty-first century United States,[1] there is an urgency to understand the relationship between

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COMPLIANCE WITH ETHICAL STANDARDS

The authors have no conflicts of interest to disclose. Our study was deemed exempt from review by the NYU School of Medicine Institutional Review Board because the dataset did not contain individually identifiable patient records.

neighborhood economic inequality and health. This is reflected by a growing epidemiologic literature on the association between measures of neighborhood economic context and disease risk, as well as the use of novel, improved metrics to characterize neighborhood privilege and deprivation.[2,3] Prior research demonstrates well-established relationships whereby economically deprived neighborhoods are associated with higher risk of many diseases, independent of individual-level sociodemographic characteristics, and economically privileged neighborhoods are protective[4]. At present, however, there is little research on neighborhoods as a determinant of health among US Asian populations. Existing research has focused on assessing whether disease risk among Asians is different for those who live in 'ethnic enclaves' (i.e. neighborhoods with large Asian populations) versus those who do not[5,6] – this research has not identified clear patterns for chronic conditions.[7] To our knowledge, there are no existing publications that analyze associations between neighborhood economic context and hypertension or diabetes among US Asians.

In addition to the lack of research on neighborhood determinants of health among US Asian populations, many US studies aggregate Asian subgroups due to sample size constraints. Representative surveys of the US, states, or cities, may treat Asian as a single category, aggregate Asians by region (e.g. "South Asian", which includes multiple nationalities), and/or solely include subgroups, such as Chinese Americans, with comparatively large populations. Health inequities for particular subgroups can be obscured with insufficient disaggregation.[8] While US Asians have a lower prevalence of hypertension than non-Hispanic whites overall, prior research from nationally representative health surveys has suggested that prevalence of hypertension among Filipinos exceeds that of non-Hispanic whites, as does prevalence of diabetes among Asian Indians.[9,10] Additionally, analyses of NYC-based population surveys have found higher prevalence of hypertension among South Asians, and higher prevalence of diabetes among all two Asian groups (South Asian and East/Southeast Asian), than the city population as a whole.[11,12]

The causes of variation in diabetes and hypertension prevalence among Asian subgroups are unclear. A systematic review found no evidence that high diabetes prevalence among South Asians relative to non-Hispanic whites was due to differential genetic risk.[13] Exploring the social patterning by neighborhood economic context can inform future research into potential socioeconomic causes of variation in disease prevalence among these subgroups.

Our study aimed to characterize prevalence of hypertension and diabetes between New York City (NYC) Asian subgroups and relative to larger racial/ethnic groups – namely non-Hispanic white, non-Hispanic black, and Hispanic persons – about which more epidemiologic research has been published. We also aimed to assess the association between neighborhood economic polarization and the two health outcomes. We hypothesized that the same social gradients observed for other racial/ethnic groups would exist within Asian subgroups. We drew on data from electronic health records (EHRs) which, unlike population surveys, offer very large sample sizes that can be used to analyze relatively small Asian subgroups and also offer information on residential addresses that can be used for small-area geographic analysis.

METHODS

Our cross-sectional study of a nonprobability sample of patients in NYC assessed inequalities in hypertension and diabetes prevalence by race/ethnicity, gender, and Asian subgroup. We additionally used multilevel logistic regression models to estimate prevalence differences based on a small-area index of economic privilege and deprivation.

Study Sample

We obtained data from the EHR system of NYU Langone Health, a large academic health care system in New York City, New York, USA (NYC), for the period 2013–2017. Records contained demographic, geographic, insurer, clinical, and laboratory data. Patients were included in the study sample if they met all of the following criteria over the study period: had ≥ 1 ambulatory care visit; were a NYC resident at the time of their first visit; were age ≥ 18 years during their first visit; were age ≤ 64 during their last visit. We excluded patients age >65 because there largest racial/ethnic inequalities in chronic disease are typically observed among younger age groups.[14] Additionally, we wanted to understand insurance type as a rough proxy for socioeconomic position in our comparison of the study sample and NYC population; the vast majority of the population aged >65 is enrolled in Medicare so it therefore cannot be used to assess socioeconomic differences.

Race/Ethnicity and Asian Subgroup

We obtained data on patient race/ethnicity and Asian subgroup identification were from EHRs. Offices within NYU Langone use a computer system to intake patients when they visit a new provider. As part of this process, patients typically self-report demographic details on electronic forms. Because NYU Langone is a large and heterogeneous system, it is not possible to confirm whether all patient demographics are based on self-report, or if some are based on clinician report. In all analyses, patients were included when they were categorized as 1 of the largest 7 non-Hispanic Asian subgroups (Asian Indian, Bangladeshi, Pakistani, Japanese, Korean, Filipino, and Chinese), or – for comparison – if they were non-Hispanic black, non-Hispanic white, or Hispanic.

Outcomes: Diabetes and Hypertension

We classified patients as having diabetes if they met any of the following criteria: ≥ 2 visits with a diabetes diagnostic code under the International Classification of Diseases, 10th revision (ICD-10; code E11); ≥ 2 lab results within two years of one another indicating elevated HbA1C levels (≥ 6.5%) and ≥ 1 visit with a diabetes diagnostic code; ≥ 1 prescription for a diabetes medication, excluding Metformin and Acarbose. In prior research similar criteria have been applied to EHRs and validated relative to the gold standard of chart review, yielding both sensitivity and specificity above 95%.[15] We categorized patients as having hypertension if they met any of the following criteria: ≥ 2 visits with an ICD-10 code for hypertension (I10, I11.0, I11.9, I12.9, I13.0, I13.10, I67.4, H35.031-H35.033, and H35.039); ≥ 3 visits with elevated measured blood pressure (systolic ≥ 130 mmHg OR diastolic ≥ 80 mmHg); or ≥ 1 prescribed antihypertensive medication. While prior chart review-based validation for a similar EHR algorithm for hypertension estimated lower validity (sensitivity: 0.85, specificity: 0.94), the assessed definition considered only

medication prescriptions and ICD codes.[15] Our inclusion of measured blood pressure is likely to result in improved sensitivity. While some of the criteria for each disease required more than a single visit, >80% of patients had ≥ 2 visits over the study period, reducing the risk of under-ascertainment. We additionally chose to include patients with any number of visits because restricting to patients with multiple visits can exacerbate selection bias by excluding healthier patients.[16]

Covariates

We obtained data on patient age, gender, and health insurance type (Medicaid, private insurance, or uninsured). We analyzed health insurance solely to compare characteristics of the study sample to the NYC population as a whole. Because public insurance eligibility depends on immigrant legal status, which was unavailable to us and likely differs in proportion between subgroups, we chose not to interpret type of insurance as a measure of individual socio-economic position in analytic models.

Census Tract Economic Polarization

We geocoded patient residential location, based on their address during the first visit of the study period, to ascertain census tract of residence. Census tracts are small tabulation areas designated by the US Census Bureau, typically containing 1,400 to 8,000 residents. Using data from the American Community Survey 2017 5-Year estimates – corresponding to the 2013–2017 study period, we characterized census tract economic polarization using the Index of Concentration at the Extremes (ICE). ICE is a measure developed by the sociologist Douglas Massey in 2001 based it on a theory that extreme concentrations of wealthy and deprived residents are important for a variety of social processes, not simply the proportion of deprived residents that would be captured in a more commonly used measure such as percent below the federal poverty level.[17] The measure has more recently been used for epidemiological monitoring of health inequities for various geographic levels.[2,3] We calculated ICE using the formula:

$$ICE_i = \frac{A_i - P_i}{T_i}$$

where A_i, P_i, and T_i correspond, respectively, to the number of households in the ith census tract that are categorized as belonging to the highest income group, the lowest income group, and the total area population. The ICE values range from −1 (100% of the population belongs to the deprived group) to 1 (100% belongs to the privileged group). We defined high-income households as those earning $125,000 or more per year (the 20th household income percentile in 2017, based on the national distribution) and low-income households as those earning less than $25,000 a year (the 80th percentile for the same year).[18]

Statistical Analysis

All statistical analyses were conducted in Stata version 16.0 (Stata Corp., College Park, Texas, USA). We first described key geographic and socio-demographic characteristics of the study sample. We compared characteristics of the study sample to those of the NYC population as a whole. To do so, we used American Community Survey Public-Use

Microdata[19], corresponding to the years of the study period, which is an individual-level dataset containing a 5% random sample of American Community Survey respondents and allows for a wider range of analyses than the tables published by the US Census Bureau. Within each racial/ethnic group and Asian subgroup, we assessed differences between the gender, age, health insurance, and borough composition of the study sample versus the composition for that group in all of New York City.

We obtained p-values for the null hypothesis of no difference (in proportions or means) between the study sample versus the census by combining both datasets, using the standard survey weights for census data, assigning each patient a weight of 1, and employing survey-weighted statistical tests. All comparisons were restricted to the population ages 18 to 64. The sole exception was for census tract ICE – census tract identifiers are not available for the public-use microdata. As an alternative, (using American Community Survey, Table B02018) and other racial/ethnic groups (Table B03002), weighting census ICE values by the population size of the subgroup within each tract, but including persons of all ages.

To compare disease prevalence by gender, race/ethnicity, and Asian subgroup, we calculated age-standardized rates based on the year 2000 US standard age distribution. To compare social gradients by census tract ICE, we fit multilevel logistic regression models separately for each disease and subgroup. We estimated the models using the formula:

$$logit\left(\Pr\left(Y_{ij}\right)=1\right)=\beta_0+\beta_1 age_{ij}+\beta_2 gender_{ij}+\beta_3 ICE_j+u_{0j}$$

Where Y is disease status (1 indicating diabetes or hypertension, depending on the model) for person *i* in census tract *j*. We modeled ICE as a categorical variable, with categories defined as tertiles based on the study sample ICE distribution. To assess social gradients by neighborhood economic composition, we used Stata's *margins(dydx)* marginal effects command to calculate prevalence differences for tertile 2 (middle; ICE range: −0.06 to 0.18) versus tertile 1 (most privileged; ICE range: 0.18 to 1) and for tertile 3 (most deprived; ICE range: −0.84 to −0.06) versus tertile 1.

RESULTS

The study sample consisted of 633,664 individuals, 493,849 (78%) of whom were included in subsequent analyses because they were identified as one of the 7 Asian subgroups, or as non-Hispanic black, non-Hispanic white, or Hispanic. Of the 40,694 persons identified as Asian in the full study sample, 10,556 (26%) were excluded from subsequent analyses because there was no subgroup identified or because another subgroup with a small sample size was identified (e.g. Hmong or Sri Lankan). We therefore analyzed data on 30,138 Asian patients. Subgroup sample sizes ranged from 928 (for Pakistanis) to 12,462 (for Chinese patients).

The study sample was more likely to be non-Hispanic white, economically privileged, and female compared to the NYC population as a whole. Among those with a known race/ethnicity or Asian subgroup, fully 57% were non-Hispanic white versus 33% for the same age range in NYC (Table 1). All 7 Asian subgroup was underrepresented in the study sample

relative to the city as a whole (a valid comparison, as Asians with no known ethnicity were excluded). Non-Hispanic black and Hispanic persons were similarly underrepresented. Overall, patients in the study sample were more likely to have private health insurance (75% vs. 61% in NYC) and less likely to be uninsured (2% versus 13% in NYC). Patients also resided in wealthier neighborhoods overall (ICE = 0.06 vs. −0.06 for NYC), corresponding to approximately half a standard deviation higher mean ICE value. The pattern of lower uninsured rates and greater neighborhood privilege persisted within all racial/ethnic and Asian subgroups. The study sample was also more likely to reside in the boroughs of Manhattan and Brooklyn, whereas pluralities of several NYC Asian subgroups reside in Queens.

Age-standardized prevalence of both hypertension and diabetes in this nonprobability patient sample varied considerably by gender, race/ethnicity, and Asian subgroup. For hypertension, prevalence was highest among Asian men who were Filipino (37%; 95% CI: 34, 40); this was comparable to prevalence among non-Hispanic black and Hispanic men (Figure 1). Among Asian women, prevalence was highest for Filipinas (25%, 95% CI: 23, 27) and Bangladeshis (24%, 95% CI: 21, 28) – both comparable to that of Hispanic women, but lower than for non-Hispanic black women. For diabetes, prevalence among men who were Bangladeshi (14%, 95% CI: 11, 17) and Pakistani (12%, 95% CI: 9, 14) exceeded that of any other Asian or non-Asian group (Figure 2). Bangladeshi and Pakistani women also had diabetes prevalence exceeding that of women in any other group.

For the 3 non-Asian racial/ethnic groups analyzed, the lowest disease prevalence was observed in the most economically privileged census tract tertile, and the highest prevalence in the most deprived tertile; this was true for both hypertension and diabetes (Figure 3 and Figure 4). While the 95% confidence intervals were wider for the Asian subgroup prevalence difference estimates and overlapped the null value in strata with small sample sizes, point estimates suggested higher prevalence in the middle and most deprived tertiles relative to the most privileged tertile. The sole exception was hypertension among Koreans, for which the most privileged tertile had the highest prevalence (prevalence difference for the middle tertile versus most privileged: −4 percentage points; 95% CI: −8, −1). The social gradient was particularly extreme for diabetes among Pakistanis, whose prevalence in the most deprived census tract tertile exceeded that of the most privileged by 9 percentage points (95% CI: 3, 14). For diabetes among Japanese persons, the logistic regression model was inestimable because zero patients in the most privileged tertile had the disease.

DISCUSSION

Our cross-sectional study of a large nonprobability sample of patients residing in NYC during 2014–2017 found evidence of inequalities in diabetes and hypertension prevalence both when comparing Asian subgroups to the non-Hispanic white population and when comparing within subgroups by level of census tract economic privilege. While Asian Americans are often overlooked in health equity research, we found disease prevalence in some subgroups comparable to that of black and Hispanic people, who are better-studied and more widely acknowledged to experience health inequities in the US. For hypertension, prevalence among Filipinos exceeded that of non-Hispanic whites and was comparable to

prevalence among black and Hispanic persons. For diabetes, prevalence was highest among Bangladeshis and Pakistanis versus any other racial/ethnic group or Asian subgroup. With the exception of Japanese patients, all Asian subgroups had diabetes prevalence exceeding that of non-Hispanic whites. Asian subgroups demonstrated a trend of higher prevalence for both diseases in the 2 most economically deprived tertiles relative to the most economically privileged tertile. The sole exception was for diabetes among Koreans, whose results suggested the highest rates were in the most privileged census tracts; this finding warrants further exploration in future research.

Our finding of high hypertension prevalence among Filipinos and high diabetes among South Asians is consistent with existing literature on Asian subgroups in the United States. Prior studies, however, either did not disaggregate South Asians or restricted to Asian Indians. A systematic review of publications on diabetes prevalence among Asian subgroups in the US over the period 1988–2009 identified no studies offering estimates for Pakistani or Bangladeshi populations[28], and none to our knowledge has been published since. Our study identified novel evidence of differences in diabetes prevalence within the NYC South Asian community, including higher risk among Bangladeshis and Pakistanis relative to Asian Indians. This may correspond to the relatively higher socioeconomic position of Asian Indians within the US South Asian population. We additionally identified new evidence of social gradients by census tract socioeconomic context for hypertension and diabetes among most Asian subgroups. Prior research on census tract socioeconomic context for smoking and for colorectal cancer did not find any discernable pattern among Asian subgroups.[29]

Study Limitations

Selection bias is a key limitation of our analyses. Comparisons with census data show that the study sample is more economically privileged compared to NYC as a whole due to the nature of the NYU patient population. Patient residence was also concentrated in Manhattan and Brooklyn, reflecting the distribution of NYU facilities. Additionally, because we restricted to persons using medical care, it is also possible that the population has higher disease prevalence versus NYC as a whole. Analyzing a wealthier but less-healthy population is likely to understate the inverse relationship between census tract ICE and disease prevalence. Additionally, we were unable to obtain data on potentially informative covariates such as patient immigration and legal status or individual-level measures of socioeconomic position, thus limiting the range of analyses we were able to conduct. We therefore not attribute social gradients to the effects of neighborhood context versus the socioeconomic conditions of the individual patients living in those neighborhoods.[30]

Conclusion

We found evidence that the prevalence of two key chronic conditions – hypertension and diabetes – vary widely across Asian subgroups. Certain Asian subgroups (hypertension among Filipinos; diabetes among Bangladeshis and Pakistanis) experienced prevalence equal or greater to that of black and Hispanic persons – groups with previously demonstrated health inequities. This observed heterogeneity highlights the need for the disaggregation of Asian subgroups in epidemiologic analysis, including disaggregation of nationalities within the South Asian community which is itself heterogeneous with regard to disease prevalence.

We additionally identified evidence that Asian subgroups experience similar social gradients by census tract economic context for hypertension and diabetes as other racial/ethnic groups. There is a need for further research into the causes of these social gradients, the degree to which socioeconomic factors may mediate differences between Asian subgroups, and the potentially inverse social gradient observed for diabetes among Koreans.

Acknowledgments

FUNDING

This study was supported by the NYU Center for the Study of Asian American Health Under the NIH National Institute on Minority Health & Health Disparities grant award #U54MD000538-15. It was additionally supported by grant award #U48DP005008 from the Centers for Disease Control and Prevention (CDC), and #R01DK110048 from the National Institute of Diabetes and Digestive and Kidney Diseases. The findings and conclusions in this article are solely the responsibility of the authors and may not represent the official view of the CDC, NIH, NIMHD, or NIH NIDDK.

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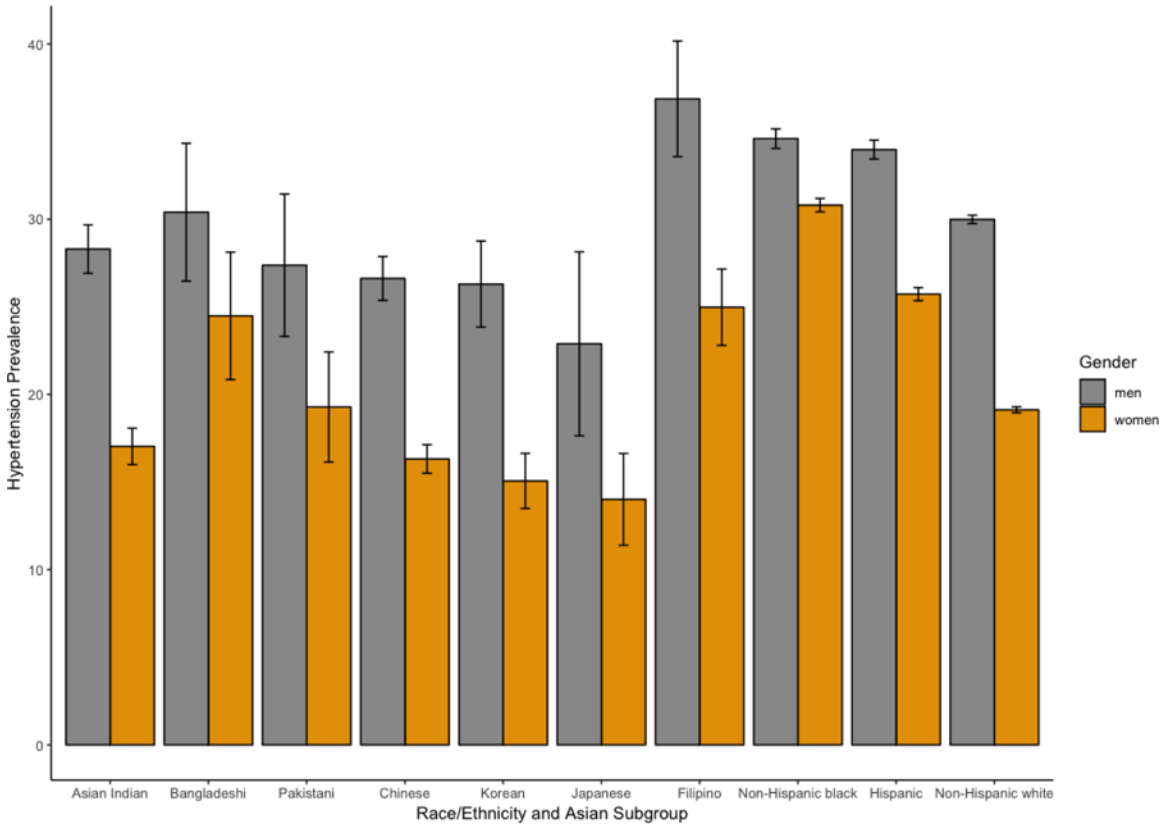

Figure 1.

Hypertension Prevalence by Race/Ethnicity and Asian Subgroup (NYC, Ages 18–64, 2014–2017)

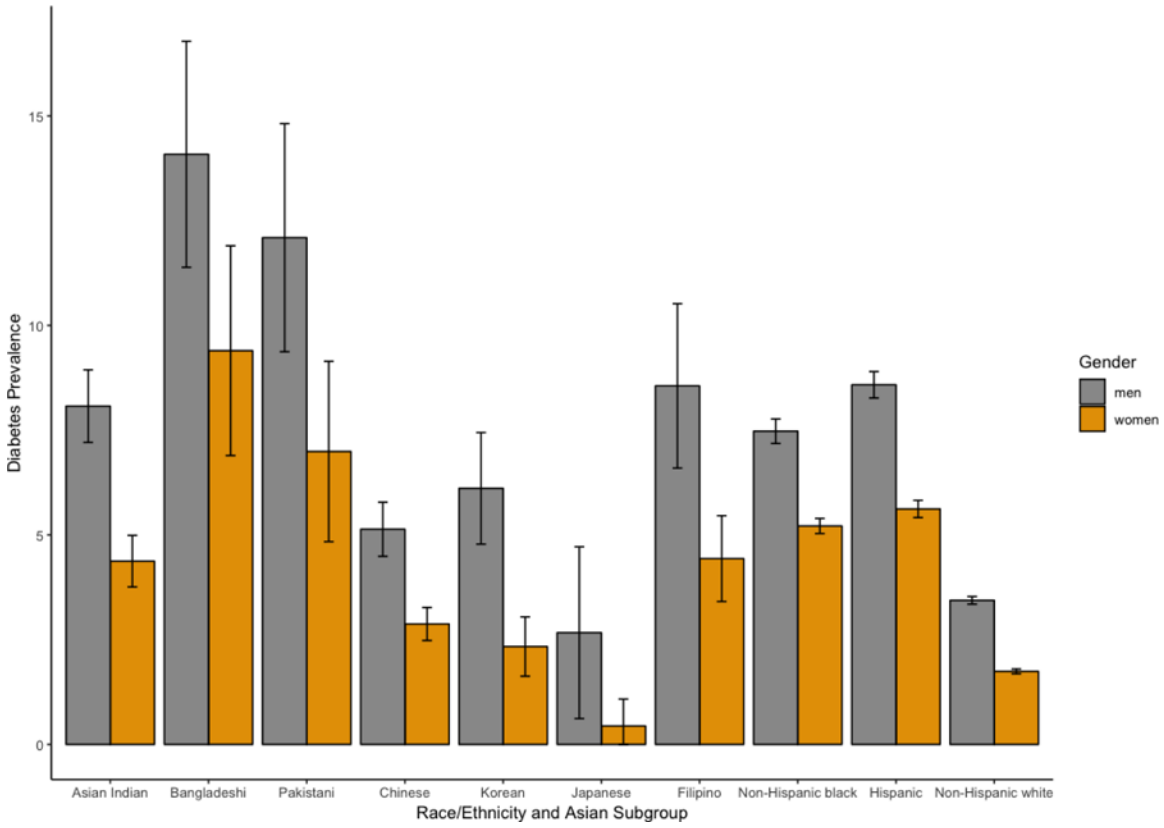

Figure 2.
Diabetes Prevalence by Race/Ethnicity and Asian Subgroup (NYC, Ages 18–64, 2014–2017)

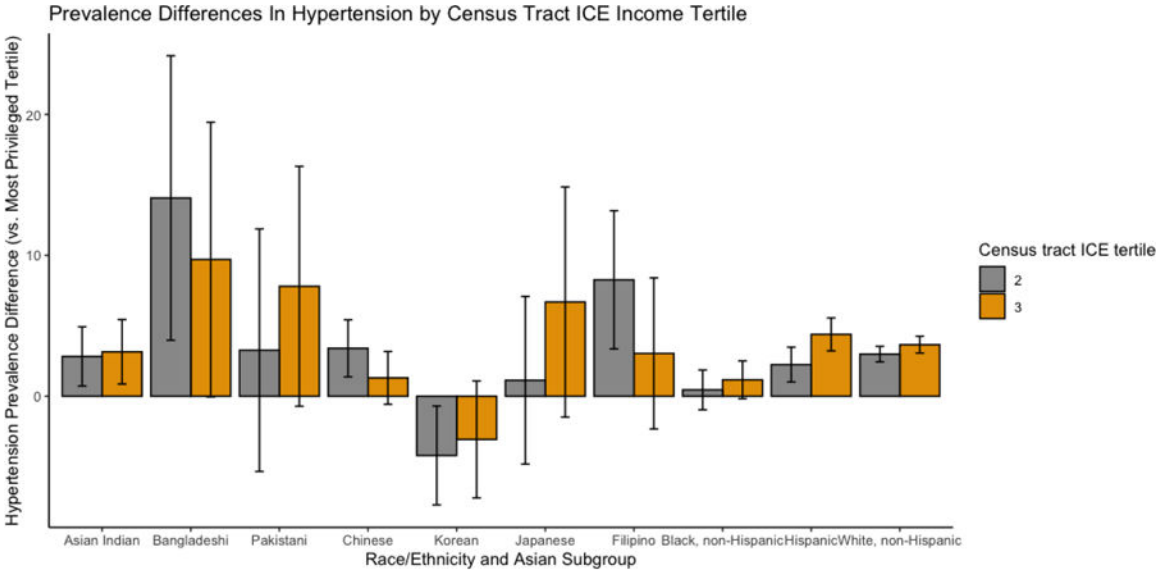

Figure 3.
Prevalence Differences in Hypertension by Census Tract ICE Income Tertile

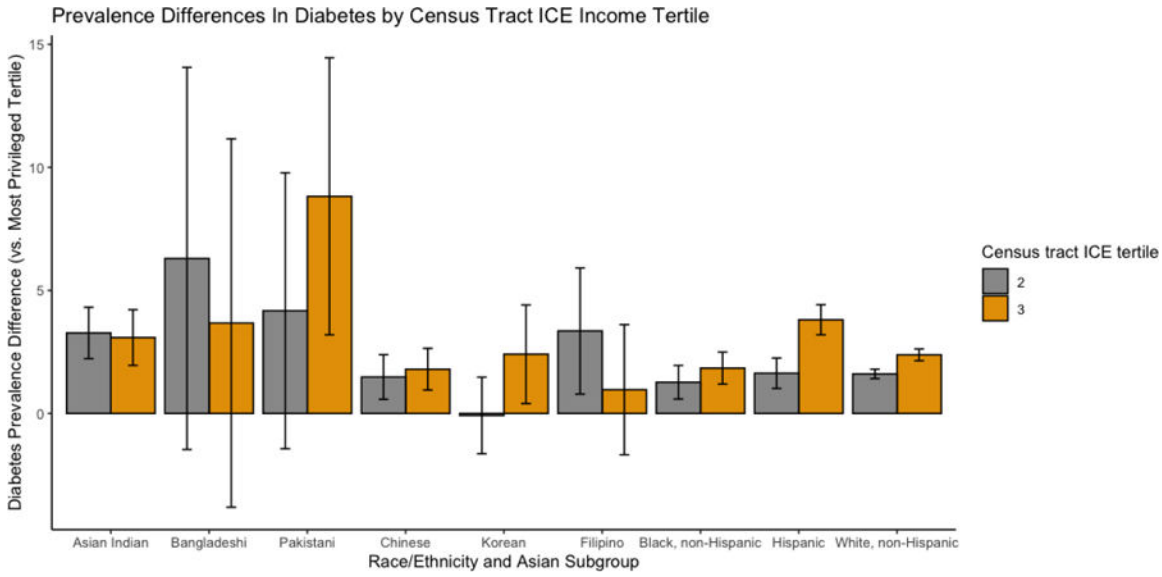

Figure 4.
Prevalence Differences in Diabetes by Census Tract ICE Income Tertile

Table 1.

Characteristics of the NYU Langone Patient Population Compared to the American Community Survey 5-Year Estimates (ACS) – New York City residents ages 18–64, 2013–2017

Race/ethnicity and Asian subgroup	Data source	N (% of all persons)[1]	Gender (% within subgroup)		Age: mean (SD)	Insurance (% within subgroup)			Borough (% within subgroup)					Census tract ICE
			Men	Women		Private	Public	Un-insured	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Mean (SD)
All races/ ethnicities	ACS	5597957 (100.0%)	48%	52%	39.5 (15.1)	61%	25%	13%	16%	30%	21%	27%	5%	−0.06 (0.27)
	NYU	633664 (100.0%)	40%	60%	42.2 (12.7)	75%	23%	2%	4%	41%	29%	20%	6%	0.06 (0.27)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Asian Indian	ACS	163955 (3.0%)	51%	49%	38.8 (12.8)	63%	25%	11%	6%	13%	16%	61%	3%	0.02 (0.21)
	NYU	9473 (1.7%)	42%	58%	39.2 (11.9)	80%	20%	<1%	2%	24%	38%	33%	3%	0.12 (0.25)
			p < 0.01		*p = 0.10*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Bangladeshi	ACS	43685 (0.8%)	51%	49%	38.9 (12.6)	35%	55%	11%	16%	14%	2%	67%	1%	−0.11 (0.17)
	NYU	987 (0.2%)	50%	50%	42.5 (13.0)	41%	58%	1%	6%	31%	8%	54%	1%	−0.07 (0.21)
			p = 0.62		*p < 0.01*		*p < 0.01*				*p < 0.01*			p < 0.01
Pakistani	ACS	35980 (0.7%)	54%	46%	38.3 (10.0)	41%	46%	14%	6%	47%	8%	33%	7%	−0.05 (0.19)
	NYU	928 (0.2%)	43%	57%	41.7 (13.3)	36%	63%	<1%	1%	61%	13%	20%	6%	−0.02 (0.21)
			p < 0.01		*p < 0.01*		*p < 0.01*							*p < 0.01*
Chinese	ACS	399942 (7.4%)	46%	54%	40.6 (13.1)	54%	31%	15%	1%	35%	19%	42%	3%	−0.06 (0.23)
	NYU	12462 (2.3%)	37%	64%	39.2 (11.8)	59%	40%	1%	0%	49%	28%	19%	4%	0.00 (0.26)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Korean	ACS	66177 (1.2%)	42%	58%	38.8 (12.7)	66%	14%	20%	2%	11%	27%	56%	4%	0.05 (0.23)
	NYU	3144 (0.6%)	35%	65%	40.7 (12.0)	76%	24%	<1%	1%	16%	37%	44%	1%	0.14 (0.24)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*

Race/ethnicity and Asian subgroup	Data source	N (% of all persons)[1]	Gender (% within subgroup)		Age: mean (SD)	Insurance (% within subgroup)			Borough (% within subgroup)					Census tract ICE
			Men	Women		Private	Public	Un-insured	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Mean (SD)
Japanese	ACS	19969 (0.4%)	41%	59%	40.2 (10.0)	79%	7%	14%	3%	23%	49%	25%	<1%	0.13 (0.25)
	NYU	934 (0.2%)	25%	75%	41.8 (10.7)	88%	11%	<1%	2%	24%	52%	22%	1%	0.19 (0.25)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p = 0.32*			*p < 0.01*
Filipino	ACS	52826 (1.0%)	40%	60%	41.8 (12.8)	77%	12%	11%	7%	13%	16%	58%	6%	0.02 (0.20)
	NYU	2046 (0.4%)	34%	66%	42.6 (12.1)	87%	12%	<1%	2%	23%	28%	42%	5%	0.08 (0.23)
			p < 0.01		*p = 0.05*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Non-Hispanic black	ACS	1224464 (22.7%)	45%	55%	40.2 (13.4)	58%	30%	13%	22%	43%	11%	21%	2%	−0.16 (0.24)
	NYU	76137 (13.8%)	35%	65%	44.2 (12.5)	68%	30%	2%	9%	53%	14%	23%	2%	−0.09 (0.25)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Hispanic	ACS	1605460 (29.8%)	49%	51%	38.5 (13.0)	45%	34%	21%	32%	20%	18%	27%	3%	−0.18 (0.24)
	NYU	73203 (13.3%)	37%	63%	41.9 (12.5)	55%	36%	9%	9%	49%	17%	20%	4%	−0.09 (0.25)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*
Non-Hispanic white	ACS	1784237 (33.0%)	50%	50%	40.0 (13.1)	80%	13%	7%	5%	33%	31%	21%	10%	0.09 (0.25)
	NYU	314535 (57.0%)	42%	58%	42.4 (12.9)	81%	19%	<1%	1%	40%	34%	17%	7%	0.13 (0.25)
			p < 0.01		*p < 0.01*		*p < 0.01*				*p < 0.01*			*p < 0.01*

[1]Percent those with non-missing race/ethnicity. Persons are included in the first row (“all races/ethnicities”) but excluded from subsequent rows if they have missing race/ethnicity, OR identified as more than one race, OR identified as a group not specified above. For the ACS data, 201,262 persons (3.5% of the total New York City population) are not shown in subsequent rows. This includes 52,379 Asians not identifying solely as one of the 7 subgroups above (6.2% of the total NYC Asian population). For the NYU data, 139,815 patients (22.1%) are represented in the “all race/ethnicities” row but not in subsequent rows; this included 10,556 patients (25.9%) who were classified as Asians but not identified as one of the 7 subgroups or had no subgroup identified.

Note. P-values compare the NYU sample to ACS data using chi-square tests (for categorical variables) and Wald tests (for age). For the Index of Concentration at the Extremes (ICE), we were unable to use ACS microdata because they do not identify census tracts. Instead, we used ACS Tables B03002 and B02015 to weight the ICE estimates to subgroup populations – these include persons of all ages rather than just 18–64 years. To calculate p-values for ICE, we treated ACS ICE as fixed values and used one-sample t-tests.