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## Association between racial discrimination and delayed or forgone care amid the COVID-19 pandemic

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### ABSTRACT

Racial discrimination has intensified in the U.S. during the COVID-19 pandemic, but how it disrupted healthcare is largely unknown. This study investigates the association of racial discrimination with delaying or forgoing care during the pandemic based on data from a nationally representative survey, the Health, Ethnicity and Pandemic (HEAP) study ( $n = 2552$ ) conducted in October 2020 with Asians, Hispanics and non-Hispanic Blacks oversampled. Racial discrimination during the pandemic was assessed in three domains: experienced racial discrimination, race-related cyberbullying, and Coronavirus racial bias beliefs. Respondents answered whether they had delayed or forgone any type of healthcare due to the pandemic. Overall, 63.7% of respondents reported delaying or forgoing any healthcare during the pandemic. About 20.3% East/Southeast Asians, 18.6% non-Hispanic Blacks and 15.9% Hispanics reported experiences of racial discrimination, compared with 2.8% of non-Hispanic Whites. Experienced racial discrimination was associated with delaying/forgoing care among non-Hispanic Blacks (Adjusted odds ratios[AOR] = 4.58, 95% confidence interval[CI]: 2.22–9.45), Hispanics (AOR = 3.88, 95%CI: 1.51–9.98), and East/Southeast Asians (AOR = 2.14, 95%CI: 1.22–3.77). Experiencing race-related cyberbullying was significantly associated with delaying/forgoing care among non-Hispanic Blacks (AOR = 1.34, 95%CI: 1.02–1.77) and East/Southeast Asians (AOR = 1.51, 95%CI: 1.19–1.90). Coronavirus racial bias was significantly associated with delaying/forgoing care among East/Southeast Asians (AOR = 1.55, 95%CI: 1.16–2.07). The three domains of racial discrimination were consistently associated with delayed or forgone health care among East/Southeast Asians during the COVID-19 pandemic; some of the associations were also seen among non-Hispanic Blacks and Hispanics. These results demonstrate that addressing racism is important for reducing disparities in healthcare delivery during the pandemic and beyond.

### 1. Introduction

The COVID-19 pandemic has disrupted healthcare for many

Americans (Shioda et al., 2020). In 2020, around 37% of Americans under 65 reported delaying/forgoing medical care, including outpatient visits, emergency department visits, and other types of ambulatory care

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(Alsan et al., 2021; Jeffery et al., 2020). While social and physical distancing measures are critical for mitigating the spread of the virus, the disruption of health care due to financial hardship or lack of access to health care has long-term consequences on population health (Galea et al., 2020), with disproportionate impacts on patients with chronic conditions and mental health disorders (Brown et al., 2020; Steinman et al., 2020; Sy and Munshi, 2020) as well as patients with minority backgrounds (Tai et al., 2021).

In addition to the higher COVID-19 mortality and morbidity due to social vulnerability and pre-existing conditions (Romano et al., 2021), racial/ethnic minorities have also been the target of discriminatory responses and the victims of an escalated number of hate crimes during the pandemic (Devakumar et al., 2020). While racial discrimination has been recognized as a risk factor for poor health among minorities (Williams et al., 2019) prior to the COVID-19 pandemic, the pandemic exposed many of the institutional structures that widened racial disparities (Addo, 2020). Moreover, the healthcare sector has not been immune to structural racism (Rattani, 2021). Perceived COVID-19 health threat and the belief that Black Americans face racial discrimination in medical settings were associated with higher levels of psychological distress (Cobb et al., 2021), and experiencing policy discrimination was associated with medical mistrust (Alang et al., 2020). These pandemic-time findings were consistent with pre-pandemic patterns whereby African Americans, Hispanics and Asian Americans disproportionately perceived being discriminated against while receiving healthcare (Hughes, 2002; Lauderdale et al., 2006; Sorkin et al., 2010). Perceived discrimination was also linked with underutilization of medical care across different racial and ethnic groups (Burgess et al., 2008).

One consequence of experiencing discrimination while receiving health services could be the victim's lower rating of healthcare quality (Lee et al., 2009). Interpersonal discrimination or institutional racism deters positive changes in health behaviors, utilization of care, and adherence to medical regimens (Shavers et al., 2012), which may lead to less healthcare utilization by the victims of discrimination. Therefore, the escalated racial discrimination during the pandemic, with a dramatic rise in racist attacks towards Asians (Lee and Waters, 2021), may have compromised or deterred the utilization of health services among racial/ethnic minorities and worsened extant disparities.

Despite evidence showing that discrimination affects health (Williams et al., 2019), the extent to which racial discrimination could contribute to delayed/forgone care during the COVID-19 pandemic remains unknown. Such information is of critical importance for healthcare practitioners and policy makers to understand the long-term consequences of the pandemic on the mental and physical health of the population. Our study aims to (1) assess the prevalence of delayed/forgone care and the different types of care; and (2) examine the association between experienced racial discrimination or beliefs towards Coronavirus-related racial bias and delayed/forgone care among U.S. adults during the COVID-19 pandemic.

## 2. Methods

### 2.1. Data and sample

We used data from the Health, Ethnicity and Pandemic (HEAP) study, which collected a nationally representative sample of the civilian noninstitutionalized U.S. population aged 18 and over. The study was initiated by the Center for Reducing Health Disparities at the University of Nebraska Medical Center in collaboration with the National Opinion Research Center (NORC) at the University of Chicago. Data collection occurred in October 2020. A detailed design and sampling of the HEAP survey is described elsewhere (Chen et al., 2021; Matthews et al., 2021; Zhang et al., 2021). The survey questionnaires included questions on respondents' sociodemographic characteristics, changes in lifestyles, employment, health care utilization, mental health, experienced racial

discrimination, and beliefs towards Coronavirus-related racial bias. A total of 2709 respondents participated in the survey based on a multi-stage, stratified sampling design from the NORC AmeriSpeak Panel, with additional minorities including non-Hispanic Blacks, non-Hispanic Asians, and Hispanics oversampled and recruited from the Dynata Panel to increase the power to study these minorities and their subgroups. The majority of the respondents completed the survey online, and those who did not have internet access responded to the survey via telephone. Both English and Spanish versions of the questionnaire were available to respondents. The study protocol was approved by the NORC Institutional Review Board, and written informed consent was obtained from all participants. We excluded participants with missing values on race/ethnicity ( $n = 3$ ), experiencing racial discrimination or cyberbullying, Coronavirus racial bias ( $n = 75$ ), and other covariates ( $n = 79$ ), resulting in an analytic sample of 2552 subjects.

### 2.2. Measures

#### 2.2.1. Outcome variables

Delaying/forgoing care was measured with the question, "which of the following healthcare have you delayed or forgone due to the COVID-19 pandemic? (check all that apply)" with the options of 1) preventive care including physical examination, flu vaccination, and cancer screening; 2) mental health care or counseling; 3) prescription medicines; 4) dental care; 5) eyeglasses; 6) specialist care; 7) follow-up care; 8) other medical care; 9) or no care delayed. Delaying/forgoing any care was marked when one or more of the care options were checked and "no care delayed" was not checked.

#### 2.2.2. Explanatory variables

The primary exposure of interest in the study was experienced racial discrimination, race-related cyberbullying experience, and beliefs towards Coronavirus racial bias. The experienced racial discrimination was assessed via a question with a binary response yes vs. no, "Did you personally experience any discrimination or unfair treatment because of your racial or ethnic background during the COVID-19 pandemic?" The race-related cyberbullying experience was assessed through the question "Due to the Coronavirus, I have been cyberbullied because of my race/ethnicity" with the Likert-scale scores of strongly disagree (1), somewhat disagree (2), somewhat agree (3), and strongly agree (4). Using the same Likert-scale, beliefs about Coronavirus racial bias were measured using an 8-item Coronavirus Racial Bias Scale (CRBS) questionnaire (Fisher et al., 2022), including: (1) "I believe the country has become more dangerous for people in my racial/ethnic group because of fear of the Coronavirus"; (2) "People of my race/ethnicity are more likely to lose their job because of the Coronavirus"; (3) "I worry about people thinking I have the Coronavirus simply because of my race/ethnicity"; (4) "Most social and mass media reports about the Coronavirus create bias against people of my racial/ethnic group"; (5) "People of my race/ethnicity are more likely to get the Coronavirus"; (6) "People of my race/ethnicity will not receive Coronavirus healthcare as good the care received by other groups"; (7) "Since the Coronavirus I have seen a lot more cyberbullying of people of my race/ethnicity"; (8) "Negative social media posts against people of my race/ethnicity have increased because of the Coronavirus", and a final score was calculated by averaging the 8 responses, with higher scores indicating higher levels of Coronavirus racial bias.

#### 2.2.3. Covariates

Covariates were selected based on the Anderson healthcare utilization model (Andersen and Newman, 1973), including predisposing factors such as self-reported age, sex, race/ethnicity, educational attainment, marital status, region, and urban/rural status based on residence; enabling factors such as insurance coverage and employment status before the pandemic, and personal protection behaviors during the pandemic; and a need factor measured by self-rated health status.

We grouped Asians into East/Southeast Asians (Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese) and South Asians (Asian Indian, Bangladeshi, Nepalese, Pakistani) given similarities in appearance, origin, culture, and history (Klatsky and Tran, 2020; Lee et al., 2015). Respondents reported their health insurance coverage (uninsured, Medicaid or another state program, Medicare, employer-sponsored private insurance, self-purchased private insurance) and employment status before the pandemic. Frequency of adopting personal protection behaviors during the pandemic (mask-wearing, hand-washing, and social distancing) was reported (always = 2, sometimes = 1, never = 0) and summed into a score with a higher score indicating more frequent performance of the personal protection behaviors.

### 2.3. Statistical analysis

Descriptive statistics were provided for the study sample and compared between those who experienced racial discrimination and those who did not during the pandemic using Chi-square tests for categorical variables and *t*-tests for continuous variables. Scores of race-related cyberbullying experience and Coronavirus racial bias were also described by sample characteristics and compared between subpopulations using analysis of variance. Percentage reporting delayed/forgone any and each of the care types during the pandemic was calculated and visualized by race/ethnicity. Percentage delaying/forgoing care during the pandemic among those who experienced racial discrimination and those who did not were also calculated and visualized by race/ethnicity. For racial/ethnic minority groups, multivariable logistic regression models were used to assess the associations of experienced racial discrimination, race-related cyberbullying experience, and Coronavirus racial bias with delaying/forgoing care, where scores of race-related cyberbullying and Coronavirus racial bias were treated as continuous variables in the models. The stratified analyses by race/ethnicity were not conducted for the non-Hispanic other group given the heterogeneity of the group. All analyses were weighted to account for the HEAP survey design and nonresponse using SAS 9.4 (SAS Institute, Inc., Cary, North Carolina) software. Statistical tests were 2-sided with  $\alpha = 0.05$ .

## 3. Results

The demographic characteristics of our study respondents are largely comparable to the U.S. adult population (Table 1). Of the 2552 respondents, 374 (8.7%) reported personal experience of racial discrimination during the pandemic, and 376 (9.8%) reported “somewhat agree” or “strongly agree” with the race-related cyber-bullying statement. With the range of 0 (strongly disagree with all of the 8 items stated in the CRBS questionnaire) to 4 (strongly agree with all of the 8 items), the mean score (95% confidence interval [CI]) of the Coronavirus racial bias scale was 1.79 (1.75–1.84). Younger age, lower educational attainment, and being unmarried were positively correlated with the experience of racial discrimination as well as higher levels of race-related cyberbullying and Coronavirus racial bias during the pandemic; moreover, worse self-rated health was correlated with higher levels of race-related cyberbullying and Coronavirus racial bias (Table 1). Among the respondents, 18.6% of non-Hispanic Blacks, 15.9% of Hispanics, 20.3% of East/Southeast Asians, and 10.8% of South Asians reported personal experience of racial discrimination during the pandemic, compared to 2.8% non-Hispanic White respondents (Fig. 1). The racial/ethnic minorities also reported higher levels of race-related cyberbullying and Coronavirus racial bias, with East/Southeast Asians reporting the highest score of cyberbullying (1.7) and non-Hispanic Blacks reporting the highest score of Coronavirus racial bias (2.5).

Overall, 63.7% of the respondents reported delaying/forgoing care due to the pandemic, ranging from 60.1% East/Southeast Asians to 67.5% non-Hispanic Blacks (Fig. 2). Among racial/ethnic minorities,

those who reported personal experience of racial discrimination were also more likely to report delaying/forgoing care due to the pandemic (Fig. 3). For example, 85.9% of non-Hispanic Blacks who experienced racial discrimination, compared to 63.3% of those who did not, reported delaying/forgoing any care due to the pandemic; among East/Southeast Asians, 72.5% of those who experienced racial discrimination, compared to 57% of those who did not experience racial discrimination, delayed/forgoing any care during the pandemic (Fig. 3).

In adjusted analyses (Table 2), experienced racial discrimination was significantly associated with increased odds of delaying/forgoing any care among non-Hispanic Blacks (Adjusted Odds Ratio [AOR] = 4.58, 95%CI: 2.22–9.45), Hispanics (AOR = 3.88, 95%CI: 1.51–9.98), and East/Southeast Asians (AOR = 2.14, 95%CI: 1.22–3.77). Race-related cyberbullying experience was significantly associated with delaying/forgoing any care among non-Hispanic Blacks (AOR = 1.34, 95%CI: 1.02–1.77) and East/Southeast Asians (AOR = 1.51, 95%CI: 1.19–1.90). Coronavirus racial bias was significantly associated with delaying/forgoing any care among East/Southeast Asians (AOR = 1.55, 95%CI: 1.16–2.07).

By care type, the highest percentage of respondents reported delaying/forgoing dental care (43.2%), followed by eyeglasses/vision care (26.8%), preventive care (23.0%), follow-up care (19.3%), specialist care (15.3%), mental health care (12.9%), and prescription medicines (6.2%) (Fig. 2). The associations between racial discrimination and delaying/forgoing care were also observed for all care types. For example, experienced racial discrimination was significantly associated with delaying/forgoing mental health services among non-Hispanic Blacks (AOR = 2.87, 95%CI: 1.47–5.59) and non-Hispanic East/Southeast Asians (AOR = 2.57, 95%CI: 1.25–5.28). It was also significantly associated with delaying/forgoing dental care among non-Hispanic Blacks (AOR = 2.02, 95%CI: 1.12–3.65), East/Southeast Asians (AOR = 2.70, 95%CI: 1.63–4.48), and Hispanics (AOR = 2.07, 95%CI: 1.03–4.16). Notably, Coronavirus racial bias was associated with higher odds of delaying/forgoing preventive care among East/Southeast Asians, and was associated with increased odds of delaying/forgoing prescription medications among South Asians (AOR = 3.21, 95%CI: 1.06–9.75).

## 4. Discussion

In this cross-sectional study using a nationally representative sample, we found that 63.7% of respondents reported delaying/forgoing healthcare utilization due to the pandemic, with non-Hispanic Blacks (67.5%) and Hispanics (65.2%) most likely to delay/forgo care. Respondents were most likely to delay/forgo dental and vision care, whereas some reported delayed/forgone preventive care, follow-up care, specialist care, mental health care, and prescription medicines. We also found that around 8.7% of the respondents reported personal experiences of racial discrimination during the pandemic, with the prevalence high among East/Southeast Asians (20.3%), non-Hispanic Blacks (18.6%), and Hispanics (15.9%), compared to 2.8% among non-Hispanic Whites. The three racial/ethnic minority groups also reported high levels of race-related cyberbullying, and Coronavirus racial bias. Further, we identified that experienced racial discrimination, race-related cyberbullying, and Coronavirus racial bias during the pandemic were all significantly associated with increased odds of delaying/forgoing care among racial minority groups.

Previous surveys conducted during different periods of the pandemic have reported the percentage of U.S. adults who avoided medical care due to concerns about COVID-19: In June 2020, a CDC report used a web-based survey to show that around 40.9% of U.S. adults had forgone medical care (Czeisler et al., 2020). In September 2020, using data from the Coronavirus Tracking Survey, the Urban Institute reported that 36% of U.S. nonelderly adults had delayed/forgone healthcare utilization (Gonzalez et al., 2021). Our finding of 63.7% is higher than the previously reported prevalence. Aside from covering a longer duration of

**Table 1**  
Characteristics of participants, HEAP October 2020.

Characteristic	Full sample (N = 2552) Sample N (weighted %)	Experienced racial discrimination		P-value <sup>2</sup>	Score of race-related cyberbullying experience (N = 2552)		Score of coronavirus racial bias (N = 2552)	
		Yes (N = 374)	No (N = 2178)		Mean ± Std	P-value <sup>2</sup>	Mean ± Std	P-value <sup>2</sup>
		Sample N (weighted %)	Sample N (weighted %)					
<i>Predisposing factors</i>								
<i>Age group</i>								
18–44	1360 (46.0)	235 (57.6)	1125 (44.9)	<0.001	1.45 ± 0.04	<0.001	1.87 ± 0.04	<0.001
45–54	328 (13.6)	51 (19.2)	277 (13.0)		1.32 ± 0.07		1.71 ± 0.07	
55–64	430 (18.8)	52 (15.1)	378 (19.2)		1.27 ± 0.06		1.82 ± 0.05	
65–74	335 (17.1)	33 (7.0)	302 (18.0)		1.22 ± 0.06		1.69 ± 0.07	
75+	99 (4.5)	3 (1.1)	96 (4.9)		1.12 ± 0.04		1.54 ± 0.09	
<i>Gender</i>								
Male	1226 (48.3)	173 (57.0)	1053 (47.5)	0.036	1.38 ± 0.04	0.006	1.80 ± 0.03	0.454
Female	1326 (51.7)	201 (43.0)	1125 (52.5)		1.31 ± 0.04		1.79 ± 0.04	
<i>Race</i>								
Non-Hispanic white	491 (61.9)	16 (20.0)	475 (65.9)	<0.001	1.22 ± 0.04	<0.001	1.52 ± 0.03	<0.001
Non-Hispanic black	551 (11.8)	108 (25.2)	443 (10.5)		1.58 ± 0.05		2.51 ± 0.04	
Hispanic	503 (16.5)	67 (30.1)	436 (15.2)		1.52 ± 0.05		2.10 ± 0.04	
Non-Hispanic Asian-east/Southeast <sup>1</sup>	693 (4.6)	135 (10.7)	558 (4.0)		1.69 ± 0.04		2.30 ± 0.03	
Non-Hispanic Asian- South <sup>1</sup>	176 (1.2)	18 (1.5)	158 (1.2)		1.53 ± 0.07		1.81 ± 0.07	
Non-Hispanic other	138 (4.0)	30 (12.4)	108 (3.2)		1.44 ± 0.10		2.18 ± 0.09	
<i>Educational attainment</i>								
Less than high school	141 (9.6)	28 (18.5)	113 (8.8)	<0.001	1.48 ± 0.09	<0.001	1.88 ± 0.08	0.039
High school	405 (28.1)	75 (31.6)	330 (27.7)		1.37 ± 0.06		1.79 ± 0.06	
Some college	1008 (27.8)	147 (30.3)	861 (27.6)		1.33 ± 0.03		1.81 ± 0.03	
Bachelor and above	998 (34.4)	124 (19.5)	874 (35.9)		1.30 ± 0.05		1.76 ± 0.04	
<i>Marital status</i>								
Married/living with partner	1254 (54.3)	140 (38.9)	1114 (55.8)	<0.001	1.27 ± 0.03	<0.001	1.69 ± 0.03	<0.001
Separated/divorced/never married	1298 (45.7)	234 (61.1)	1064 (44.2)		1.44 ± 0.04		1.92 ± 0.04	
<i>Region</i>								
New England	67 (4.0)	8 (3.5)	59 (4.0)	0.179	1.58 ± 0.22	0.799	1.86 ± 0.21	0.004
Mid-Atlantic	294 (13.3)	46 (10.4)	248 (13.5)		1.36 ± 0.07		1.75 ± 0.07	
East north central	321 (14.2)	57 (11.8)	264 (14.4)		1.27 ± 0.06		1.75 ± 0.05	
West north central	130 (6.8)	17 (4.4)	113 (7.0)		1.17 ± 0.05		1.61 ± 0.08	
South Atlantic	488 (21.3)	59 (19.1)	429 (21.5)		1.33 ± 0.06		1.75 ± 0.05	
East south central	111 (6.3)	24 (11.9)	87 (5.8)		1.52 ± 0.14		2.01 ± 0.09	
West south central	260 (10.4)	43 (14.3)	217 (10.0)		1.38 ± 0.06		1.88 ± 0.08	
Mountain	205 (9.0)	36 (9.1)	169 (9.0)		1.34 ± 0.09		1.73 ± 0.09	
Pacific	676 (14.8)	84 (15.5)	592 (14.7)		1.34 ± 0.05		1.90 ± 0.05	
<i>Urban/rural status (zip-code level)</i>								
Metropolitan area	2306 (82.8)	336 (86.7)	1970 (82.4)	0.159	1.35 ± 0.03	0.189	1.81 ± 0.03	<0.001
Nonmetropolitan urban	143 (8.9)	24 (9.0)	119 (8.9)		1.30 ± 0.07		1.83 ± 0.06	
Nonmetropolitan rural	103 (8.3)	14 (4.3)	89 (8.7)		1.31 ± 0.10		1.56 ± 0.09	

(continued on next page)



Table 1 (continued)

Characteristic	Full sample (N = 2552) Sample N (weighted %)	Experienced racial discrimination			Score of race-related cyberbullying experience (N = 2552)		Score of coronavirus racial bias (N = 2552)	
		Yes (N = 374) Sample N (weighted %)	No (N = 2178) Sample N (weighted %)	P-value <sup>2</sup>	Mean ± Std	P-value <sup>2</sup>	Mean ± Std	P-value <sup>2</sup>
		<i>Enabling factors</i>						
<i>Insurance coverage before pandemic</i>								
18–64 employer-sponsored private insurance	1213 (45.2)	159 (41.2)	1054 (45.6)	<0.001	1.27 ± 0.03	0.391	1.73 ± 0.03	0.761
18–64 self-purchased private insurance	127 (4.0)	22 (3.1)	105 (4.1)		1.35 ± 0.09		1.85 ± 0.12	
18–64 Medicaid or other public	401 (16.0)	70 (20.7)	331 (15.5)		1.54 ± 0.08		1.98 ± 0.06	
18–64 Medicare/dual	175 (4.9)	52 (13.9)	123 (4.0)		1.62 ± 0.09		2.14 ± 0.09	
18–64 uninsured	202 (8.3)	35 (12.9)	167 (7.9)		1.58 ± 0.12		1.92 ± 0.11	
65+ Medicare	434 (21.6)	36 (8.0)	398 (22.9)		1.20 ± 0.05		1.66 ± 0.06	
<i>Employment status before pandemic</i>								
Yes	1670 (62.5)	259 (68.1)	1411 (62.0)	0.267	1.36 ± 0.03	0.019	1.83 ± 0.03	0.001
No	409 (17.2)	60 (17.0)	349 (17.3)		1.37 ± 0.05		1.79 ± 0.05	
Not in labor force	473 (20.2)	55 (15.0)	418 (20.7)		1.26 ± 0.05		1.70 ± 0.05	
Score of personal protection behaviors Mean ± Std	2.8 ± 0.01	2.7 ± 0.04	2.8 ± 0.01	0.035		0.017		0.412
<i>Need factors</i>								
<i>Self-rated current health</i>								
Excellent	346 (12.4)	52 (11.3)	294 (12.5)	0.119	1.32 ± 0.06	0.039	1.72 ± 0.07	<0.001
Very good	968 (42.4)	124 (35.5)	844 (43.0)		1.35 ± 0.04		1.74 ± 0.04	
Good	878 (31.8)	126 (33.0)	752 (31.7)		1.31 ± 0.04		1.81 ± 0.04	
Fair	304 (11.1)	56 (15.6)	248 (10.6)		1.41 ± 0.08		1.93 ± 0.07	
Poor	56 (2.3)	16 (4.5)	40 (2.1)		1.64 ± 0.21		2.21 ± 0.21	

<sup>1</sup> East/southeast Asian includes Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese; south Asian includes Asian Indian, Bangladeshi, Nepalese and Pakistani.

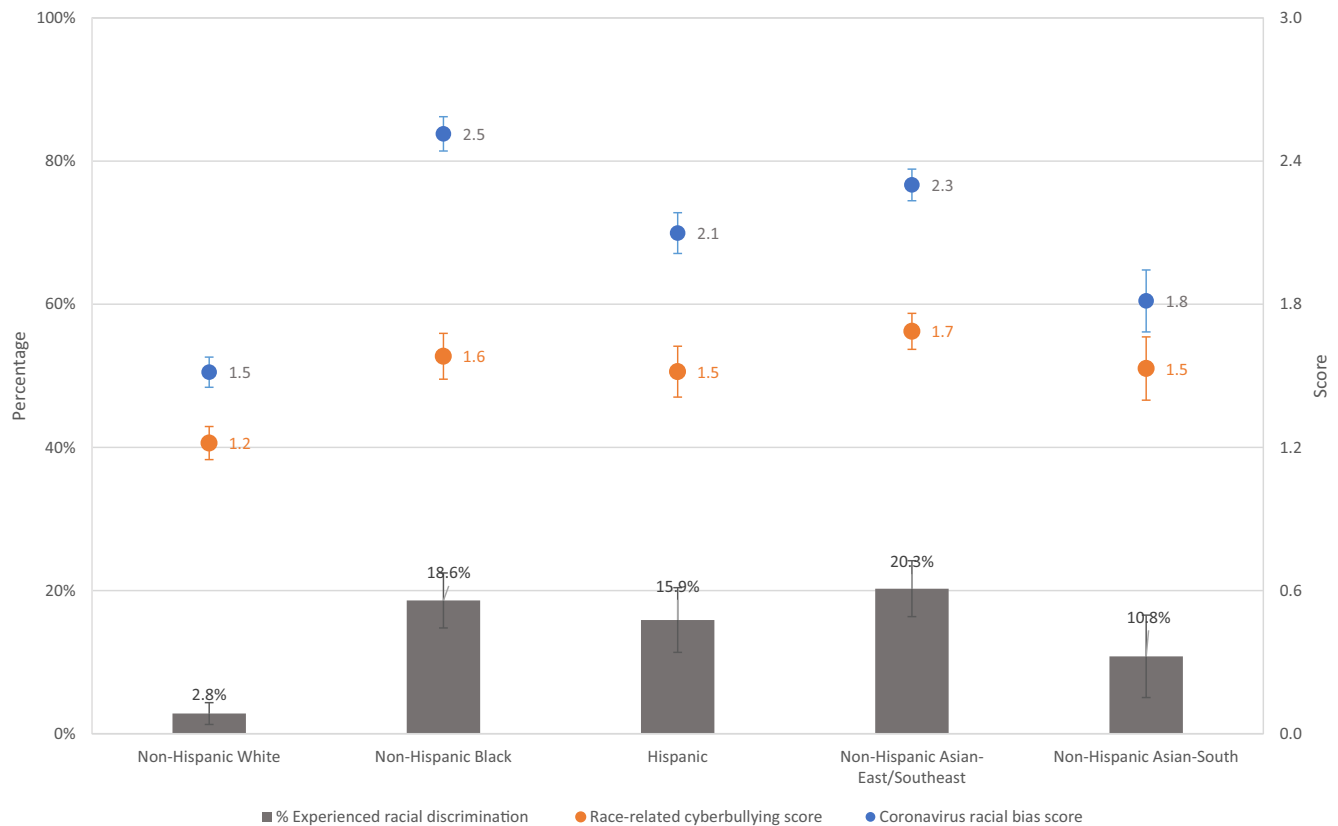
<sup>2</sup> P-values are from chi-square tests for categorical variables and t-tests or ANOVA for continuous variables; p-values for score of personal protection behaviors vs. scores of race-related cyberbullying and perceived racial discrimination are for correlation tests.

pandemic time than the two above-mentioned reports, our study measures dental care, vision care, and prescription medicine (which the two above-mentioned reports did not), which is a methodological difference that could have explained our higher prevalence. Delaying critical care such as emergency department visits for myocardial infarction (Gale et al., 2021), or forgoing preventive care such as breast cancer screening or follow-up care for chronic conditions due to worry of contracting COVID-19 (Alagoz et al., 2021) could lead to excess morbidity and mortality during the pandemic and beyond (Alagoz et al., 2021). Although certain types of care—including elective dental surgery—may be considered as non-essential, the long-term consequences of delaying these types of services remain unclear (Jacobs et al., 2020).

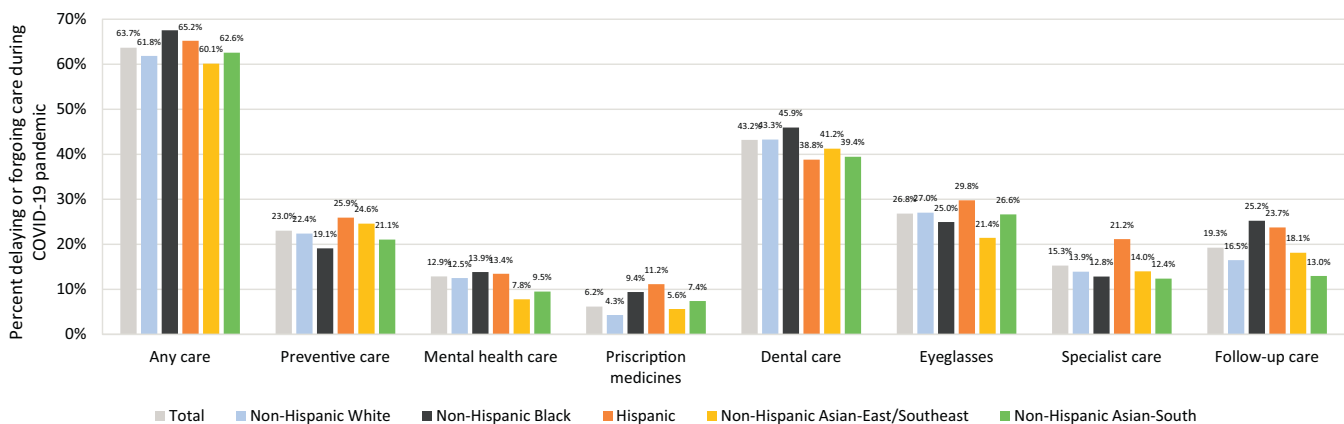
Racial and ethnic minority groups are known to have lower access to health care (Tai et al., 2021), yet this disparity might have worsened during the pandemic partly due to the escalated racially discriminative incidents. Our results showed that racial discrimination was associated with increased odds of delaying/forgoing health care. Several psychological pathways may explain these associations: Racial minority patients may avoid contact with the health care systems due to fear of discrimination by healthcare providers and other patients, particularly if the racial discrimination was linked to the risk for COVID-19 infection (Yaya et al., 2020). For example, the belief that Asian-looking individuals are more likely to carry and spread the virus may lead to anti-Asian reactions and behaviors from other racial groups in healthcare settings (Yang et al., 2021), which elevates the racism-related stress

among Asians (Selden and Berdahl, 2020). As such, racial discrimination created a vicious cycle for minorities to seek timely health care—patients who experienced racial discrimination demanded more health care but skipped needed care due to fear of discrimination, which may exacerbate racial disparities in health. Furthermore, racial discrimination experiences could lead to rumination, which is commonly associated with depression (Bernard et al., 2021; Gee et al., 2007), and patients with depression are more likely to delay prescriptions and medical tests (Van Houtven et al., 2005). An alternative explanation for the observed associations could be that unmeasured prior experience influences both Coronavirus racial bias and care-seeking behaviors, which may potentially lead to reverse causation. For instance, it could be that those who are more acutely aware of racism, also happen to be most economically dispossessed, and thus they are less likely to access healthcare or seek healthcare during the pandemic when needed. In this case, it may not be that interpersonal racism leads to delaying or forgoing care, but that previously-experienced racism fundamentally shapes both patients' awareness of the racial climate during the pandemic and their financial and structural vulnerability in seeking healthcare (Malawa et al., 2021; Phelan and Link, 2015).

Prior studies often lacked data on specific Asian American ethnic subgroups. Our study contributed to the literature by adding detailed data on discrimination and health care utilization among Asian ethnic subgroups. Not surprisingly, we found that East/Southeast Asians



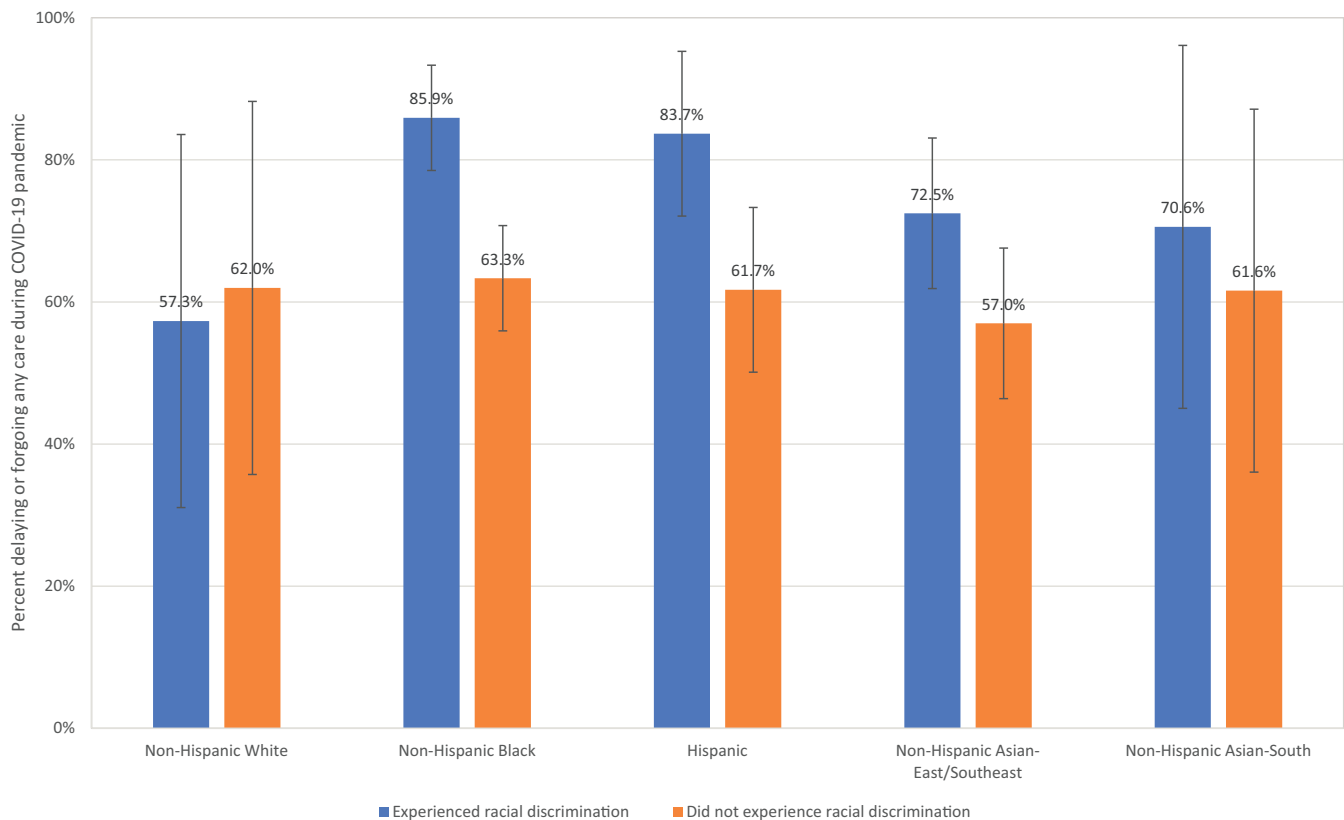
**Fig. 1.** Percent experienced racial discrimination and average scores of race-related cyberbully and Coronavirus racial bias by race/ethnicity, HEAP October 2020. East/Southeast Asian includes Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese; South Asian includes Asian Indian, Bangladeshi, Nepalese and Pakistani. Bars indicate 95% confidence intervals.



**Fig. 2.** Percent delaying or forgoing care during COVID-19 pandemic by care type and race/ethnicity, HEAP October 2020. East and Southeast Asian includes Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese; South Asian includes Asian Indian, Bangladeshi, Nepalese and Pakistani. P-values of Chi-square tests comparing forgoing/delaying care among racial/ethnic groups were < 0.05 for any care, prescription medicines, specialist care and follow-up care.

reported the highest rates of experienced racial discrimination and race-related cyberbullying experiences during the pandemic. It is worth noting that racial discrimination against East/Southeast Asians was associated with higher odds of delaying/forgoing mental health care compared with all other racial/ethnic groups. Asian Americans underutilized mental health services even before the pandemic due to the stigmatization of mental health disorders within Asian families, Asian communities, and language barriers among recent Asian immigrants (Augsberger et al., 2015). Xenophobia and anti-Asian attitudes

amid the pandemic augmented allostatic load (i.e., the cumulative physiological burden due to chronic stress) related to multi-layered discriminatory experiences among Asian Americans (McMurtry et al., 2019). Moreover, Asians are the most heterogeneous ethnic group, and not all Asian subgroups are equally affected by the pandemic and racial discrimination (Le et al., 2020). In our study, South Asians were not experiencing the same level of racial discrimination as East/Southeast Asians during the pandemic, but Coronavirus racial bias among South Asians was associated with increased odds of delaying/forgoing



**Fig. 3.** Percent delaying or forgoing any care during COVID-19 pandemic among racial/ethnic minorities, HEAP October 2020. East and Southeast Asian includes Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese; South Asian includes Asian Indian, Bangladeshi, Nepalese and Pakistani. P-values of Chi-square tests comparing forgoing/delaying care between those experienced and did not experience racial discrimination were  $< 0.05$  for non-Hispanic Black, Hispanic and non-Hispanic Asian-East and Southeast.

prescriptions, reinforcing the importance of eliminating racial discrimination for all.

Another novel contribution of our study was that we included a question on race-related cyberbullying experiences. During the pandemic, when physical distancing was encouraged, people depended more on the internet and social media for social connections. It created an opportunity for people to socialize but also increased the threat of cyberbullying (Evans et al., 2021). Studies have suggested a link between social media use, cyberbullying, and mental distress among adolescents and young adults (Hamm et al., 2015). Our study of adults aged 18 and over observed an association of race-related cyberbullying experience with a higher likelihood of delaying/forgoing all types of health care among non-Hispanic Blacks and East/Southeast Asians. In fact, these two racial groups were most likely to develop depressive symptoms and anxiety due to racial discrimination on social media (Tao and Fisher, 2021). Policy strategies to mitigate the effects of race-related cyberbullying on health are needed.

Findings from the present study highlight the fact that racial discrimination is not only a social determinant of health that could increase the allostatic load and generate poor health through diverse pathways, but also a determinant that hinders healthcare utilization. Although our study focused primarily on interpersonal and individual beliefs about Coronavirus racial bias, the roots of interpersonal discrimination stem from a broader context of structural and institutional racism (Bailey et al., 2017). Screening for racial discrimination experiences and providing culturally appropriate outreach services in health care systems may help improve access to and utilization of essential health care among ethnic minority patients (Simons et al., 2018). At the societal level, initiatives to combat racial discrimination in society can ultimately improve population health and save health care

spending in the long term (National Academies of Sciences and Medicine, 2019). For example, studies showed that both contact interventions and media/instruction interventions could effectively reduce racial discrimination in early childhood (Aboud et al., 2012), signaling a promising approach to reducing systematic racism among future generations.

Our study has several limitations. First, the survey did not ask respondents whether they had chronic conditions (e.g., hypertension, diabetes). Thus, we cannot differentiate between essential/emergency care and elective health services, which is important given that skipping certain elective care may not necessarily affect health outcomes. Second, the cross-sectional study design limits our ability to infer a causal relationship between racial discrimination and access to care. Future studies should assess the causal effect of racial discrimination experiences on health care utilization using longitudinal data and in-depth qualitative and mixed methods studies to understand the mechanisms between discrimination, rumination, mental health, and health care avoidance. Third, despite the oversampling of minorities and the use of both English and Spanish, we may have undersampled minorities who primarily use a foreign language other than Spanish. Finally, self-reported measures could be subject to recall error. Future research based on insurance claims or medical records collected in 2020–2021 is warranted to estimate the impact of the pandemic and racial discrimination on health care utilization among patients with different diseases.

In conclusion, our study found that almost two thirds of American adults reported delaying or forgoing health care utilization due to the pandemic. Racial discrimination was associated with delaying/forgoing health care among racial/ethnic minorities during the COVID-19 pandemic, which may worsen existing health disparities. Evidence-based policies and interventions are urgently needed to address racial



**Table 2**

Association of experienced racial discrimination, race-related cyberbullying experience and perceived racial discrimination with delaying or forgoing care due to COVID-19 pandemic by race, HEAP October 2020.

	Any care	Preventive care	Mental health care	Prescription medicines	Dental care	Eyeglasses	Specialist care	Follow-up care
<b>Experienced racial discrimination</b>								
	<b>4.58</b>	1.66	<b>2.87</b>		<b>2.02</b>	1.10	<b>2.33</b>	<b>2.03</b>
Non-Hispanic black	<b>(2.22–9.45)</b>	(0.90–3.05)	<b>(1.47–5.59)</b>	<b>2.77 (1.21–6.33)</b>	<b>(1.12–3.65)</b>	(0.61–1.96)	<b>(1.20–4.53)</b>	<b>(1.13–3.65)</b>
	<b>3.88</b>	1.70	2.20	<b>4.91</b>	<b>2.07</b>	1.36	1.35	<b>2.61</b>
Hispanic	<b>(1.51–9.98)</b>	(0.76–3.79)	(0.94–5.16)	<b>(2.09–11.53)</b>	<b>(1.03–4.16)</b>	(0.64–2.90)	(0.57–3.21)	<b>(1.22–5.57)</b>
Non-Hispanic Asian-east/Southeast <sup>1</sup>	<b>2.14</b>	<b>2.62</b>	<b>2.57</b>		<b>2.70</b>	<b>2.62</b>	1.39	1.27
	<b>(1.22–3.77)</b>	<b>(1.52–4.52)</b>	<b>(1.25–5.28)</b>	1.85 (0.71–4.80)	<b>(1.63–4.48)</b>	<b>(1.52–4.51)</b>	(0.71–2.74)	(0.70–2.31)
Non-Hispanic Asian-South <sup>1</sup>	1.99	0.31	5.72	14.40	0.98	0.85	2.12	1.27
	<b>(0.42–9.32)</b>	<b>(0.04–2.28)</b>	<b>(0.88–37.09)</b>	<b>(0.30–700.46)</b>	<b>(0.27–3.57)</b>	<b>(0.20–3.53)</b>	<b>(0.47–9.52)</b>	<b>(0.29–5.62)</b>
<b>Race-related cyberbullying experience</b>								
	<b>1.34</b>	1.09	1.15		1.08	0.96	1.07	1.25
Non-Hispanic black	<b>(1.02–1.77)</b>	(0.79–1.50)	(0.80–1.65)	1.22 (0.83–1.80)	(0.83–1.40)	(0.68–1.34)	(0.75–1.52)	(0.94–1.67)
	1.22	0.88	1.30		0.85	0.93	1.24	1.08
Hispanic	<b>(0.87–1.73)</b>	(0.65–1.19)	(0.89–1.91)	1.36 (0.90–2.05)	(0.60–1.19)	(0.68–1.27)	(0.82–1.86)	(0.78–1.48)
Non-Hispanic Asian-east/Southeast <sup>1</sup>	<b>1.51</b>	1.25	<b>1.46</b>		1.17	1.39	1.19	<b>1.49</b>
	<b>(1.19–1.90)</b>	<b>(0.95–1.65)</b>	<b>(1.03–2.07)</b>	1.37 (0.81–2.29)	<b>(0.94–1.46)</b>	<b>(1.08–1.79)</b>	<b>(0.83–1.69)</b>	<b>(1.14–1.94)</b>
Non-Hispanic Asian-South <sup>1</sup>	1.00	0.60	0.63		0.61	0.90	1.23	0.61
	<b>(0.57–1.75)</b>	<b>(0.28–1.29)</b>	<b>(0.27–1.46)</b>	<b>0.98 (0.44–2.21)</b>	<b>(0.36–1.04)</b>	<b>(0.53–1.56)</b>	<b>(0.66–2.29)</b>	<b>(0.34–1.12)</b>
<b>Coronavirus racial bias</b>								
	1.37	1.34	1.61		1.39	1.35	1.45	1.36
Non-Hispanic black	<b>(0.97–1.92)</b>	(0.85–2.10)	(0.96–2.72)	0.99 (0.58–1.71)	(0.98–1.96)	(0.88–2.07)	(0.90–2.35)	(0.91–2.04)
	1.24	0.95	1.20		1.00	0.85	1.09	1.00
Hispanic	<b>(0.85–1.80)</b>	(0.67–1.35)	(0.71–2.05)	1.12 (0.62–2.05)	(0.68–1.46)	(0.57–1.27)	(0.69–1.72)	(0.66–1.49)
Non-Hispanic Asian-east/Southeast <sup>1</sup>	<b>1.55</b>	<b>1.90</b>	1.54		<b>1.57</b>	<b>1.53</b>	1.44	<b>1.58</b>
	<b>(1.16–2.07)</b>	<b>(1.22–2.96)</b>	<b>(0.83–2.86)</b>	0.60 (0.32–1.12)	<b>(1.17–2.09)</b>	<b>(1.08–2.18)</b>	<b>(0.89–2.35)</b>	<b>(1.08–2.32)</b>
Non-Hispanic Asian-South <sup>1</sup>	1.47	1.71	2.29		0.80	1.19	1.57	0.89
	<b>(0.81–2.65)</b>	<b>(0.90–3.27)</b>	<b>(0.89–5.86)</b>	<b>3.21 (1.06–9.75)</b>	<b>(0.46–1.38)</b>	<b>(0.66–2.16)</b>	<b>(0.73–3.38)</b>	<b>(0.49–1.60)</b>

Presented in the table are adjusted Odds Ratios of delaying or forgoing care during the COVID-19 pandemic associated with racial discrimination experiences and perceptions. Models adjusted for age, sex, educational attainment, marital status, region, urban/rural status, insurance status before pandemic, employment status before pandemic, score of personal protective behaviors, and self-rated health.

Analyses were not conducted for non-Hispanic Whites given the small number of individuals reporting experience of racial discrimination; analyses were not conducted for non-Hispanic Other given the heterogeneity of the group and thus lack of meaningful interpretation.

<sup>1</sup> East/southeast Asian includes Burmese, Cambodian, Chinese, Filipino, Hmong, Indonesian, Japanese, Korean, Vietnamese; south Asian includes Asian Indian, Bangladeshi, Nepalese and Pakistani. Associations with a p value smaller than 0.05 are in bold.

discrimination as an important barrier to care access among racial and ethnic minority populations.

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**CRedit authorship contribution statement**

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**Declaration of Competing Interest**

None.

**References**

Aboud, F.E., Tredoux, C., Tropp, L.R., Brown, C.S., Niens, U., Noor, N.M., 2012. Interventions to reduce prejudice and enhance inclusion and respect for ethnic differences in early childhood: a systematic review. *Dev. Rev.* 32, 307–336.

Addo, I.Y., 2020. Double pandemic: racial discrimination amid coronavirus disease 2019. *Social Sciences & Humanities Open* 2, 100074.

Alagoz, O., Lowry, K.P., Kurian, A.W., Mandelblatt, J.S., Ergun, M.A., Huang, H., Lee, S. J., Schechter, C.B., Tosteson, A.N., et al., 2021. Impact of the COVID-19 pandemic on breast cancer mortality in the US: estimates from collaborative simulation modeling. *JNCI: Journal of the National Cancer Institute* 113, 1484–1494.

Alang, S., McAlpine, D.D., Hardeman, R., 2020. Police brutality and mistrust in medical institutions. *J. Racial Ethn. Health Disparities* 7, 760–768.

Alsan, M., Chandra, A., Simon, K., 2021. The great unequalizer: initial health effects of COVID-19 in the United States. *J. Econ. Perspect.* 35, 25–46.

Andersen, R., Newman, J.F., 1973. Societal and individual determinants of medical care utilization in the United States. *Milbank Mem Fund Q Health Soc* 51, 95–124.

Augsberger, A., Yeung, A., Dougher, M., Hahn, H.C., 2015. Factors influencing the underutilization of mental health services among Asian American women with a history of depression and suicide. *BMC Health Serv. Res.* 15, 1–11.

Bailey, Z.D., Krieger, N., Agénor, M., Graves, J., Linos, N., Bassett, M.T., 2017. Structural racism and health inequities in the USA: evidence and interventions. *Lancet* 389, 1453–1463.

- Bernard, D.L., Halliday, C.A., Are, F., Banks, D.E., Danielson, C.K., 2021. Rumination as a mediator of the association between racial discrimination and depression among black youth. *J. Racial Ethn. Health Disparities* 1–9. <https://doi.org/10.1007/s40615-021-01132-2>.
- Brown, E.E., Kumar, S., Rajji, T.K., Pollock, B.G., Mulsant, B.H., 2020. Anticipating and mitigating the impact of the COVID-19 pandemic on Alzheimer's disease and related dementias. *Am. J. Geriatr. Psychiatry* 28, 712–721.
- Burgess, D.J., Ding, Y., Hargreaves, M., van Ryn, M., Phelan, S., 2008. The association between perceived discrimination and underutilization of needed medical and mental health care in a multi-ethnic community sample. *J. Health Care Poor Underserved* 19, 894–911.
- Chen, L., Li, J., Xia, T., Matthews, T.A., Tseng, T.S., Shi, L., Zhang, D., Chen, Z., Han, X., et al., 2021. Changes of exercise, screen time, fast food consumption, alcohol, and cigarette smoking during the COVID-19 pandemic among adults in the United States. *Nutrients* 13.
- Cobb, R.J., Erving, C.L., Carson Byrd, W., 2021. Perceived COVID-19 health threat increases psychological distress among black Americans. *Ethn. Racial Stud.* 44, 806–818.
- Czeisler, M.E., Marynak, K., Clarke, K.E., Salah, Z., Shakya, I., Thierry, J.M., Ali, N., McMillan, H., Wiley, J.F., et al., 2020. Delay or avoidance of medical care because of COVID-19–related concerns—United States, June 2020. *Morb. Mortal. Wkly Rep.* 69, 1250.
- Devakumar, D., Shannon, G., Bhopal, S.S., Abubakar, I., 2020. Racism and discrimination in COVID-19 responses. *Lancet* 395, 1194.
- Evans, Y., Hutchinson, J., Ameenuddin, N., 2021. Opportunity, challenge, or both? Managing adolescent socioemotional and mental health during web-based learning. *JMIR Mental Health* 8, e26484.
- Fisher, C.B., Tao, X., Yip, T., 2022. The Effects of Coronavirus Victimization Distress and Coronavirus Racial Bias on Mental Health Among Black, Indigenous and Latinx Young Adults in the United States. *Cult. Divers. Ethn. Minor. Psychol.* <https://doi.org/10.1037/cdp0000539>. <https://psycnet.apa.org/fulltext/2022-50919-001.html>.
- Gale, R., Eberlein, S., Fuller, G., Khalil, C., Almario, C.V., Spiegel, B.M., 2021. Public perspectives on decisions about emergency care seeking for care unrelated to COVID-19 during the COVID-19 pandemic. *JAMA Netw. Open* 4 (e2120940-e40).
- Galea, S., Merchant, R.M., Lurie, N., 2020. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA Intern. Med.* 180, 817–818.
- Gee, G.C., Spencer, M., Chen, J., Yip, T., Takeuchi, D.T., 2007. The association between self-reported racial discrimination and 12-month DSM-IV mental disorders among Asian Americans nationwide. *Soc. Sci. Med.* 64, 1984–1996.
- Gonzalez, D., Karpmann, M., Kenney, G.M., Zuckerman, S., 2021. Delayed and Forgone Health Care for Nonelderly Adults during the COVID-19 Pandemic. Urban Institute, Washington, DC.
- Hamm, M.P., Newton, A.S., Chisholm, A., Shulhan, J., Milne, A., Sundar, P., Ennis, H., Scott, S.D., Hartling, L., 2015. Prevalence and effect of cyberbullying on children and young people: a scoping review of social media studies. *JAMA Pediatr.* 169, 770–777.
- Hughes, D.L., 2002. Quality of health care for Asian Americans: findings from the commonwealth fund 2001 health care quality survey. *Commonwealth Fund*, 525. [https://www.commonwealthfund.org/sites/default/files/documents/\\_\\_\\_media\\_files\\_publications\\_other\\_2002\\_mar\\_quality\\_of\\_health\\_care\\_for\\_asian\\_americans\\_a\\_fact\\_sheet\\_hughes\\_factsheetasam.pdf.pdf](https://www.commonwealthfund.org/sites/default/files/documents/___media_files_publications_other_2002_mar_quality_of_health_care_for_asian_americans_a_fact_sheet_hughes_factsheetasam.pdf.pdf). (Accessed 8 July 2022).
- Jacobs, E.A., Ogedegbe, O., Fihn, S.D., 2020. Elective care and health services research in the COVID-19 era. *JAMA Netw. Open* 3 (e2025731-e31).
- Jeffery, M.M., D'Onofrio, G., Paek, H., Platts-Mills, T.F., Soares, W.E., Hoppe, J.A., Genes, N., Nath, B., Melnick, E.R., 2020. Trends in emergency department visits and hospital admissions in health care systems in 5 states in the first months of the COVID-19 pandemic in the US. *JAMA Intern. Med.* 180, 1328–1333.
- Klatsky, A.L., Tran, H.N., 2020. The south Asian paradox. *Perm J* 24.
- Lauderdale, D.S., Wen, M., Jacobs, E.A., Kandula, N.R., 2006. Immigrant perceptions of discrimination in health care: the California health interview survey 2003. *Med. Care* 44, 914–920.
- Le, T.K., Cha, L., Han, H.-R., Tseng, W., 2020. Anti-Asian Xenophobia and Asian American COVID-19 Disparities. American Public Health Association.
- Lee, S., Waters, S.F., 2021. Asians and Asian Americans' experiences of racial discrimination during the COVID-19 pandemic: impacts on health outcomes and the buffering role of social support. *Stigma and Health* 6, 70–78.
- Lee, C., Ayers, S.L., Kronenfeld, J.J., 2009. The association between perceived provider discrimination, health care utilization, and health status in racial and ethnic minorities. *Ethnicity & disease* 19, 330.
- Lee, S.Y., Martins, S.S., Lee, H.B., 2015. Mental disorders and mental health service use across Asian American subethnic groups in the United States. *Community Ment. Health J.* 51, 153–160.
- Malawa, Z., Gaarde, J., Spellin, S., 2021. Racism as a root cause approach: a new framework. *Pediatrics* 147.
- Matthews, T.A., Chen, L., Zhuo Han, X., Shi, L., Li, Y., Wen, M., Zhang, D., Li, H., Su, D., et al., 2021. Negative employment changes during the COVID-19 pandemic and psychological distress: evidence from a nationally representative survey in the U.S. *J. Occup. Environ. Med.* 63 (11), 931–937. <https://doi.org/10.1097/JOM.0000000000002325>.
- McMurtry, C.L., Findling, M.G., Casey, L.S., Blendon, R.J., Benson, J.M., Sayde, J.M., Miller, C., 2019. Discrimination in the United States: experiences of Asian Americans. *Health Serv. Res.* 54, 1419–1430.
- National Academies of Sciences, E., Medicine, 2019. Investing in Interventions that Address Non-medical, Health-Related Social Needs: Proceedings of a Workshop. National Academies Press.
- Phelan, J.C., Link, B.G., 2015. Is racism a fundamental cause of inequalities in health? *Annu. Rev. Sociol.* 41, 311–330.
- Rattani, A., 2021. Interpersonal racism in the healthcare workplace: examining insidious collegial interactions reinforcing structural racism. *Journal of Law, Medicine & Ethics* 49, 307–314.
- Romano, S.D., Blackstock, A.J., Taylor, E.V., Felix, S.E.B., Adjei, S., Singleton, C.-M., Fuld, J., Bruce, B.B., Boehmer, T.K., 2021. Trends in racial and ethnic disparities in COVID-19 hospitalizations, by region—United States, march–December 2020. *Morb. Mortal. Wkly Rep.* 70, 560.
- Selden, T.M., Berdahl, T.A., 2020. COVID-19 and racial/ethnic disparities in health risk, employment, and household composition: study examines potential explanations for racial-ethnic disparities in COVID-19 hospitalizations and mortality. *Health Aff.* 39, 1624–1632.
- Shavers, V.L., Fagan, P., Jones, D., Klein, W.M., Boyington, J., Moten, C., Rorie, E., 2012. The state of research on racial/ethnic discrimination in the receipt of health care. *Am. J. Public Health* 102, 953–966.
- Shioda, K., Weinberger, D.M., Mori, M., 2020. Navigating through health care data disrupted by the COVID-19 pandemic. *JAMA Intern. Med.* 180, 1569–1570.
- Simons, R.L., Lei, M.-K., Beach, S.R., Barr, A.B., Simons, L.G., Gibbons, F.X., Philibert, R. A., 2018. Discrimination, segregation, and chronic inflammation: testing the weathering explanation for the poor health of black Americans. *Dev. Psychol.* 54, 1993.
- Sorkin, D.H., Ngo-Metzger, Q., De Alba, I., 2010. Racial/ethnic discrimination in health care: impact on perceived quality of care. *J. Gen. Intern. Med.* 25, 390–396.
- Steinman, M.A., Perry, L., Perissinotto, C.M., 2020. Meeting the care needs of older adults isolated at home during the COVID-19 pandemic. *JAMA Intern. Med.* 180, 819–820.
- Sy, S.L., Munshi, M.N., 2020. Caring for older adults with diabetes during the COVID-19 pandemic. *JAMA Intern. Med.* 180, 1147–1148.
- Tai, D.B.G., Shah, A., Doubeni, C.A., Sia, I.G., Wieland, M.L., 2021. The disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clin. Infect. Dis.* 72, 703–706.
- Tao, X., Fisher, C.B., 2021. Exposure to social media racial discrimination and mental health among adolescents of color. *Journal of youth and adolescence* 1–15.
- Van Houtven, C.H., Voils, C.I., Oddone, E.Z., Weinfurt, K.P., Friedman, J.Y., Schulman, K.A., Bosworth, H.B., 2005. Perceived discrimination and reported delay of pharmacy prescriptions and medical tests. *J. Gen. Intern. Med.* 20, 578–583.
- Williams, D.R., Lawrence, J.A., Davis, B.A., Vu, C., 2019. Understanding how discrimination can affect health. *Health Serv. Res.* 54, 1374–1388.
- Yang, J.P., Nhan, E.R., Tung, E.L., 2021. COVID-19 anti-Asian racism and race-based stress: a phenomenological qualitative media analysis. *Psychol. Trauma Theory Res. Practice Policy.* <https://doi.org/10.1037/tra0001131>. <https://psycnet.apa.org/fulltext/2021-87923-001.pdf>.
- Yaya, S., Yeboah, H., Charles, C.H., Otu, A., Labonte, R., 2020. Ethnic and racial disparities in COVID-19-related deaths: counting the trees, hiding the forest. *BMJ Glob. Health* 5 (6), e002913. <https://doi.org/10.1136/bmjgh-2020-002913>. <http://gh.bmj.com/content/bmjgh/5/6/e002913.full.pdf>.
- Zhang, D., Shi, L., Han, X., Li, Y., Jalajel, N.A., Patel, S., Chen, Z., Chen, L., Wen, M., et al., 2021. Disparities in telehealth utilization during the COVID-19 pandemic: findings from a nationally representative survey in the United States. *J. Telemed. Telecare.* <https://doi.org/10.1177/1357633X211051677>.