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RESEARCH ARTICLE

Ethnic and Racial Disparities in Self-Reported Personal Protective Equipment Shortages Among New York Healthcare Workers During the COVID-19 Pandemic

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Introduction: To assess the association of race and ethnicity with self-reported personal protective equipment shortages during the COVID-19 pandemic among healthcare workers in New York.

Methods: The COVID-19 Healthcare Personnel Study of New York was a prospective cohort study of HCWs with baseline data collected in April 2020 and follow-up data collected in February 2021. Multivariable logistic regression modeling was used to estimate the adjusted OR and 95% CIs of personal protective equipment shortages associated with race and ethnic minority status.

Results: Healthcare workers of racial and ethnic minority status (n=361) were more likely than non-Hispanic White respondents (n=1,858) to report having experienced personal protective equipment shortages in the last week at baseline (36.0% vs 27.5%; p=0.001) and follow-up (13.6% vs 8.8%; p=0.005). With adjustment for demographic and clinical characteristics, racial and ethnic minority status was associated with 44% and 49% increased odds of experiencing PPE shortages at baseline (adjusted OR=1.44; 95% CI=1.10, 1.88) and follow up (adjusted OR=1.49; 95% CI=1.01, 2.21), respectively.

Conclusions: Healthcare workers of racial and ethnic minority status in New York experienced more pervasive personal protective equipment shortages than their non-Hispanic White counterparts during the COVID-19 pandemic.

INTRODUCTION

Racial and ethnic disparities in COVID-19-related morbidity and mortality among healthcare workers (HCWs) have been well documented.[1–3] From February 12 through July 16, 2020, the Centers for Disease Control and Prevention recorded a total of 100,570 COVID-19 cases among HCWs; of them, 53% were among self-identified ethnic and racial minorities.[3] Non-Hispanic Black individuals made up 16% of the U.S. healthcare workforce but accounted for 26% of confirmed COVID-19 cases among HCWs.[1] Moreover, HCWs of racial and

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ethnic minorities had greater case fatality of COVID-19 than their non-Hispanic White counterparts.[3] The risk factors for COVID-19 infection among HCWs include the shortage of personal protective equipment (PPE) and occupational exposure such as providing direct care to COVID-19 patients.[1,2,4]

Launched at the initial stage of the pandemic, the COVID-19 Healthcare Personnel Study of New York (CHPS) collected longitudinal data from HCWs about PPE access immediately after the first surge and follow-up data a year later when major supply chain issues had been resolved. The purpose of this study was to assess racial and ethnic disparities in self-reported PPE shortages among HCWs licensed in New York.

METHODS

Study Sample

The CHPS was a prospective cohort study designed to understand the health impact of the COVID-19 pandemic on HCWs in New York.[5] The study was approved by the Columbia University Irving Medical Center IRB, and electronic informed consent was obtained from all participants at enrollment. The survey questionnaires were sent to all physicians, nurses, and allied health providers (e.g., physician assistants, social workers, and clinical psychologists) licensed in New York State by the state health commissioner's office. The baseline survey was conducted in April 2020 and the first follow-up survey in February 2021. In the baseline survey, there were 139,109 emails sent, of which 38,090 (27.4%) were opened by the intended recipients.[6] A total of 6,892 consented HCWs completed the baseline survey, representing a response rate of 5.0%. Of the HCWs who completed the baseline survey, 2,293 (33.3%) participated in the follow-up survey in February 2021. Included in this study were 2,219 HCWs who participated in both the baseline and the follow-up surveys and who had identified their race and ethnicity. Data for the study sample were over 95% complete. Because of the small numbers of HCWs who identified themselves as non-Hispanic Black (n=69), Hispanic (n=119), non-Hispanic Asian (n=130), and non-Hispanic other minorities (n=43), and because all these individual minority groups reported a higher prevalence of PPE shortages than their non-Hispanic White counterparts, self-reported racial and ethnic minorities were collapsed into the same group (n=361).

Measures

The outcome measure of primary interest was self-reported PPE shortages in the past week, based on responses to the question, *In the last week, have you experienced a shortage of PPE such as an N95 mask?* An affirmative answer to the question indicated that the respondent had experienced a shortage of PPE in the last week. Other outcome measures included self-reported re-use of disposable PPE in an unsafe manner, being worried about PPE shortage in the future, and having tested positive for COVID-19.

Statistical Analysis

Differences in the prevalence of self-reported PPE shortage and related outcome measures between non-Hispanic White HCWs and HCWs of racial and ethnic minority status were assessed by χ^2 tests according to respondent characteristics. Multivariable logistic regression models were used to assess the association of race and ethnicity with PPE shortages and other outcome measures with adjustment for gender, age, profession, and geographic location. Statistical analyses were performed separately for baseline data and follow-up data through the Statistical Analysis Software (the SAS Institute, Cary, NC).

RESULTS

Of the 2,219 HCWs studied, 48.4% were 40−59 years of age (mean = 50.5±12.4 years), 69.2% were female, 83.7% were non-Hispanic White, 29.3% worked in the New York City metropolitan area, and 34.7% were involved directly in the care of patients with COVID-19. Nurses and physicians made up 30.9% and 27.9% of the study sample, respectively, with the remaining 41.2% being physician assistants, social workers, psychologists, respiratory therapists, and others. Compared to non-Hispanic White HCWs, HCWs of racial and ethnic minority status were significantly younger (mean age 45.6±11.2 years vs 51.5±12.4 years; $p<0.001$), more likely to be working in the New York City metropolitan area (53.8% vs 24.5%; $p<0.001$), more likely to be physicians (34.4% vs 26.6%; $p=0.01$), and more likely to work directly with patients with COVID-19 (51.3% vs 31.5%; $p<0.001$). The 2 groups were similar in gender distributions.

At baseline, HCWs of racial and ethnic minority status were more likely than non-Hispanic White HCWs to report having experienced a shortage of PPE in the last week (36.0% vs 27.5%; $p=0.001$), having reused disposable PPE in an unsafe manner (55.9% vs 46.2%; $p=0.003$), being worried about future PPE shortages (67.9% vs 57.1%; $p<0.001$), and having tested positive for COVID-19 (9.1% vs 4.5%; $p<0.001$) (Figure 1A).

At follow-up, the prevalence of self-reported shortages of PPE declined in both groups, but the racial and ethnic disparities remained. Racial and ethnic minority HCWs

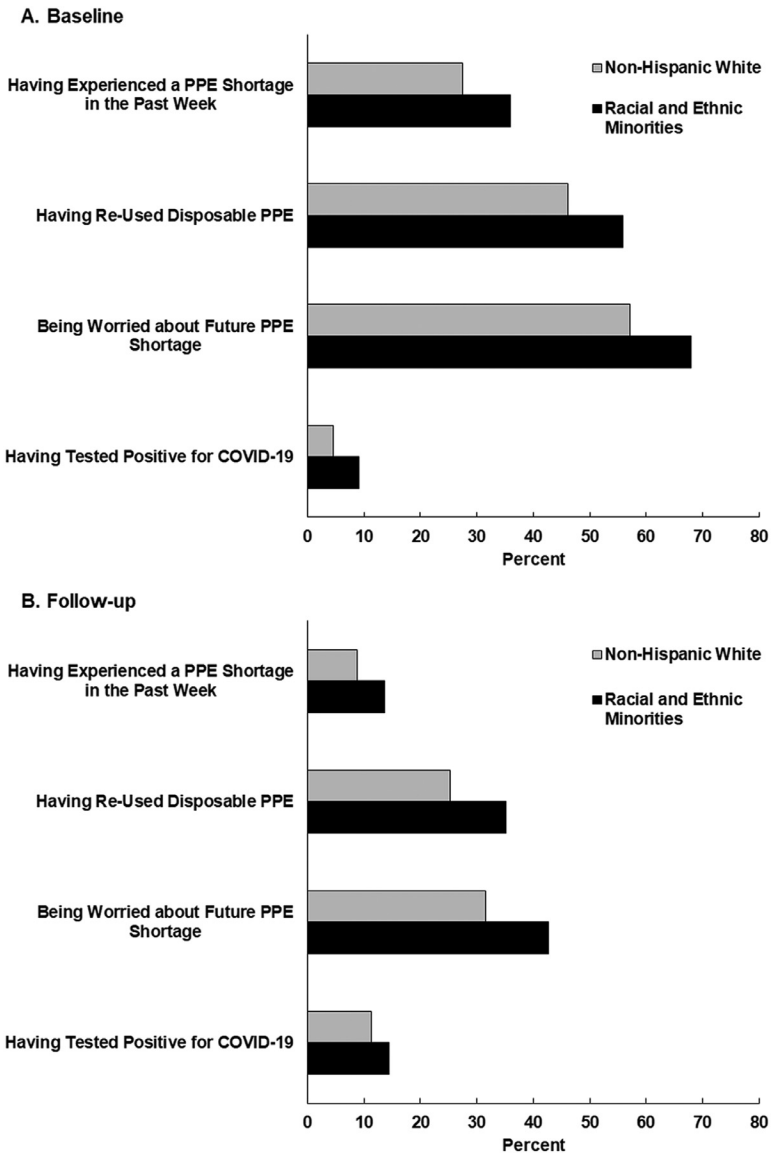

Figure 1. Prevalence of self-reported personal protective equipment (PPE) shortage and related outcomes at baseline (A) and follow-up (B) by race and ethnicity, the COVID-19 Healthcare Personnel Study of New York.

were still more likely than their non-Hispanic White counterparts to report having experienced a shortage of PPE in the last week (13.6% vs 8.8%; p=0.005), having reused PPE in an unsafe manner (35.2% vs 25.2%; p<0.001), and being worried about future PPE shortages (42.7% vs 31.5%; p<0.001). Racial and ethnic disparity in the prevalence of self-reported infection with COVID-19 decreased and became statistically insignificant (14.4% vs 11.3%; p=0.095) (Figure 1B).

Multivariable logistic regression modeling revealed that at baseline, HCWs of racial and ethnic minority status were 44% more likely to report experiencing a PPE shortage (adjusted OR [AOR]=1.44; 95% CI=1.10, 1.88) and 46% more likely to report being worried about future PPE shortages (AOR 1.46; 95% CI=1.11, 1.93) than their non-Hispanic White counterparts. At follow-up, HCWs of racial and ethnic minority status were 49% more likely to report experiencing a PPE shortage (AOR 1.49; 95% CI=1.01, 2.21) and 42% more likely to report being worried about future PPE shortages (AOR 1.42; 95% CI=1.10, 1.85) than their non-Hispanic White counterparts.

DISCUSSION

This study indicates that between April 2020 and February 2021, New York HCWs of racial and ethnic minority status were significantly more likely than their non-

Hispanic White counterparts to report experiencing PPE shortages, reusing disposable PPE in an unsafe manner, and being worried about future PPE shortages. Despite the improvement in PPE supplies during the start of the second year of the COVID-19 pandemic, these racial and ethnic disparities persisted. These findings provide compelling evidence that racial and ethnic disparity in PPE shortages might be a contributory cause of the excess COVID-19 morbidity and mortality among HCWs of racial and ethnic minority status. The heightened likelihood of PPE shortages among HCWs of racial and ethnic minority status is likely contributed to by a multitude of factors, including less seniority that may limit their advocacy for resources and greater involvement in direct COVID-19 patient care that would increase their PPE needs.[7]

Limitations

Among the limitations of this study are low response rates, reliance on self-reported data, the collapsing of all racial and ethnic minorities into a single group because of the modest sample size, and unmeasured confounding factors such as work environment characteristics. These limitations could adversely affect the validity and reliability of our findings.

CONCLUSIONS

This study provides empirical evidence about racial and ethnic disparities in self-reported PPE shortages among HCWs in New York during the first year of the COVID-19 pandemic and sheds light on the role of systemic racism in the excess COVID-19–related morbidity and mortality among racial and ethnic minority HCWs.

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