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SHORT REPORT

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Racial and ethnic differences in blood pressure before and after the 2016 United States general election

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Abstract

Objectives: The 2016 U.S. presidential election was a major source of stress among many adults. Psychosocial stress can manifest physiologically in elevated blood pressure (BP). Little is known regarding the association of macro-level sociopolitical events with BP changes at the population-level. This study sought to characterize population-level changes in BP following the 2016 U.S. presidential election.

Methods: Using 2015–2018 National Health and Nutrition Examination Survey, we included participants aged ≥18 years during the same periods prior to (May to October 2015/2016) and after (May to October 2017/2018) the election. Survey-weighted data were analyzed to compare population-level systolic BP (SBP) and diastolic BP (DBP) pre- and post-election, stratified by race/ethnicity. Sex differences were also investigated.

Results: We observed significant increases in SBP among non-Hispanic (NH) Asian participants (+3.4 mmHg; $p = .046$), but not among other racial/ethnic participants. DBP increased among NH Black participants (+2.3 mmHg; $p = .049$) and Mexican American participants (+2.9 mmHg; $p = .007$), but not among other racial/ethnic participants. These changes appeared attributable to differential BP changes by sex.

Conclusions: At the population-level, variable changes in BP were observed by race/ethnicity following the 2016 U.S. presidential election, possibly driven by SBP elevations among women.

1 | INTRODUCTION

Politics is a major source of stress among many adults in the United States. National surveys, conducted by the American Psychological Association (2017), indicate the 2016 U.S. presidential election was especially stressful. During the months leading up to the election, approximately 52% of adults reported that the election contributed substantially to psychosocial stress. This proportion remained consistent following the election, with nearly half of adults reporting that the outcome of the election was significantly stressful (American Psychological Association, 2017). Election-related stress also appears to vary among racial/ethnic groups. For example, racial/ethnic minorities (i.e., non-Hispanic [NH] black participants, hispanic participants, and NH Asian participants) have reported higher psychosocial stress compared to NH White participants in response to the outcome of the 2016 presidential election (American Psychological Association, 2017).

Psychosocial stress can manifest physically through elevations in cortisol and blood pressure (BP), potentially increasing risk for cardiovascular (CV) events (Lagraauw et al., 2015; Pimple et al., 2019). These stressors may also affect CV reactivity differentially across racial/ethnic groups (Kapuku et al., 2017; Spruill et al., 2009), contributing to disparities in CV disease (CVD). Previous studies have observed associations between distress related to the U.S. presidential elections and acute changes in cortisol (Hoyt et al., 2018; Stanton et al., 2010), and more recent data suggest that major sociopolitical stressors may be associated with increased risk for acute CVD (Mefford et al., 2020). BP reactivity in response to election-related stress may be a potential contributing factor to the development of acute CV events following the election. Therefore, we examined population-level BP changes, stratified by race and ethnicity, following the 2016 U.S. presidential election. We hypothesized that population-level BP differences may exist among racial/ethnic groups, and that such differences may have occurred following the 2016 U.S. presidential election.

2 | METHODS

This study used cross-sectional data from the United States. National Health and Nutrition Examination Survey (NHANES), a nationally representative survey employing a complex sampling design to assess the health and nutritional status of adults and children in the United States. Data are made publicly available by the National Center for Health Statistics after removal of patient identifiers. This study was considered exempt from human subject research from the institutional review board at High Point University.

We identified participants aged ≥18 years with ≥1 systolic BP (SBP) and diastolic BP (DBP) measurements from the continuous 2015/2016 and 2017/2018 cycles. Demographic information was collected by trained interviewers as part of the household interview conducted at the participant's home. Trained clinicians obtained BP measurements during physical examinations conducted at the Mobile Examination Center using a standard protocol that was identical in both cycles. BP measurements were obtained using a mercury sphygmomanometer and a BP cuff that was appropriately sized to the participant's arm circumference. Participants were seated and allowed to rest for 5 min before obtaining BP readings. Up to 4 BP measurements were recorded at 30-s intervals. We used the mean of all available BP recordings to establish the SBP and DBP level for each participant.

Participants were included if their NHANES examination was performed during the periods prior to the 2016 presidential election, occurring on November 8, 2016, or the next period following the same election. The publicly available NHANES datasets categorize participants' examination dates into 6-month periods, that is, November through April and May through October. We chose the 6-month examination periods between May and October in each 2-year cycle since these covered the months leading up to the election date. The same 6-month examination periods were used for comparison between the pre- and post-election periods to limit the possibility of seasonal variations in BP. Thus, the pre-election period included examinations from May to October 2015/2016, and the post-election period from May to October 2017/2018. Self-reported race and ethnicity information was used to categorize participants into four mutually exclusive cohorts: NH White participants, NH black participants, Mexican American participants, and NH Asian participants.

Differences in mean SBP and DBP between time periods, stratified by race and ethnicity, were assessed using Student's *t*-test. Subgroup analysis was performed to assess associations of sex on SBP and DBP changes pre-election versus post-election. A p-value <.05 was considered statistically significant for all analyses. Appropriate sample weights were applied to account for the complex survey design and survey non-response. All analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC).

3 | RESULTS

An overall sample of 4660 participants were included in the analysis, after excluding 211 participants due to missing SBP or DBP measurements. Demographic characteristics were mostly similar between pre-election and post-election periods among each racial/ethnic group (Table 1), apart from a few notable differences. A higher prevalence of overweight/obesity was observed among Mexican American participants and NH Asian participants in the post-election period compared to those in the pre-election period. Mexican American participants in the post-election period had higher income level than those in the pre-election period.

A significant increase in SBP was seen among NH Asian participants (+3.4 [95% CI, 0.1–6.7] mmHg; $p = .046$), but not among NH black participants (+1.9 [95% CI, −0.6–4.3] mmHg; $p = .127$), Mexican American participants (+1.4 [95% CI, −1.9–4.7] mmHg; $p = .398$), nor NH White participants (−0.6 [95% CI, −2.4–1.3] mmHg; $p = .542$) (Figure 1). DBP increased significantly among NH black participants (+2.3 [95% CI, 0.01–4.6] mmHg; $p = .049$) and Mexican American participants (+2.9 [95% CI, 0.9–4.9] mmHg; $p = .007$); whereas no significant changes were observed among NH Asian

TABLE 1 Demographic characteristics pre- and post-election of racial/ethnic groups. Data represent percent (95% confidence interval), weighted according to NHANES complex sampling design. *p*-values represent comparison between pre-election versus post-election.

	NH white			NH black			Mexican American			NH Asian		
	Pre-election ($n = 1091$)	Post-election ($n = 1090$)	*p*-value	Pre-election ($n = 772$)	Post-election ($n = 633$)	*p*-value	Pre-election ($n = 238$)	Post-election ($n = 205$)	*p*-value	Pre-election ($n = 277$)	Post-election ($n = 354$)	*p*-value
Age, years												
18–39	34.3 (31.8, 36.9)	33.4 (30.1, 36.8)	0.54	43.3 (38.5, 48.1)	41.7 (36.9, 46.6)	0.32	59.3 (56.8, 61.9)	52.8 (47, 58.6)	0.06	46.2 (38.9, 53.6)	43.3 (39.3, 47.2)	0.64
40–59	34.8 (32.1, 37.5)	32.9 (28.3, 37.6)		36.5 (33.3, 39.8)	33.8 (26.7, 40.9)		34.9 (31.4, 38.4)	37.1 (29.8, 44.4)		33.3 (29.6, 37.1)	33.5 (28.9, 38)	
≥60	30.9 (27, 34.8)	33.6 (28.2, 39.1)		20.2 (16.5, 23.9)	24.5 (20.3, 28.7)		5.8 (3.7, 7.8)	10.1 (5.2, 15)		20.5 (14.4, 26.5)	23.2 (18.3, 28.2)	
Sex												
Women	50.9 (48.4, 53.4)	51.8 (48.3, 55.4)	0.66	56.9 (55.1, 58.8)	55.5 (52.8, 58.3)	0.37	48 (43.3, 52.7)	45.9 (42.2, 49.6)	0.45	53.7 (49.2, 58.2)	53.1 (47.5, 58.6)	0.85
Men	49.1 (46.6, 51.6)	48.2 (44.6, 51.7)		43.1 (41.2, 44.9)	44.5 (41.7, 47.2)		52 (47.3, 56.7)	54.1 (50.4, 57.8)		46.3 (41.8, 50.8)	46.9 (41.4, 52.5)	
BMI category												
Normal (<25)	29.5 (26.6, 32.3)	26.8 (22.5, 31)	0.09	26.8 (23.9, 29.7)	27.1 (23.5, 30.5)	0.66	25 (17.7, 32.4)	15.4 (11.9, 18.8)	0.03	55 (49.8, 60.2)	43.2 (38.6, 47.8)	0.01
Overweight (25–29)	31.3 (29.9, 32.7)	28.8 (25.7, 31.9)		26.1 (23.5, 28.8)	24 (19.8, 28.6)		31.6 (21.7, 41.6)	33.2 (28.4, 38)		29.1 (22.9, 35.3)	38.3 (31.7, 44.9)	
Obese (≥30)	39.2 (36.3, 42.1)	44.4 (39.2, 49.6)		47.1 (42.6, 51.6)	48.9 (44.3, 53.5)		43.4 (36.9, 49.9)	51.4 (45.4, 57.5)		15.9 (11, 20.8)	18.5 (14.8, 22.2)	
Poverty-to-income ratio												
Low income (≤1.3)	18.2 (15.8, 20.6)	20.8 (17.1, 24.4)	0.34	42.1 (39.9, 44.3)	47.2 (39.2, 55.2)	0.24	58.9 (48.7, 69.2)	40.5 (36.2, 44.7)	<0.0001	30.6 (20.5, 40.6)	25 (17.6, 32.5)	0.38
Middle income (1.3–3.5)	31.4 (28.2, 34.6)	32.9 (28.1, 37.8)		36.2 (30.7, 41.6)	28.9 (24.3, 33.4)		35.9 (27.1, 44.6)	44.8 (.3, 50.3)		28.3 (19.9, 36.7)	23.1 (9.6, 36.6)	
High income (>3.5)	50.4 (46.6, 54.2)	46.3 (39.9, 52.8)		21.7 (15.7, 27.7)	23.9 (15.5, 32.4)		5.2 (2.3, 8.1)	14.7 (9.5, 19.9)		41.1 (33.1, 49.1)	51.9 (32.4, 71.4)	

Abbreviations: NHANES, national health and nutrition examination survey; NH, non-Hispanic.

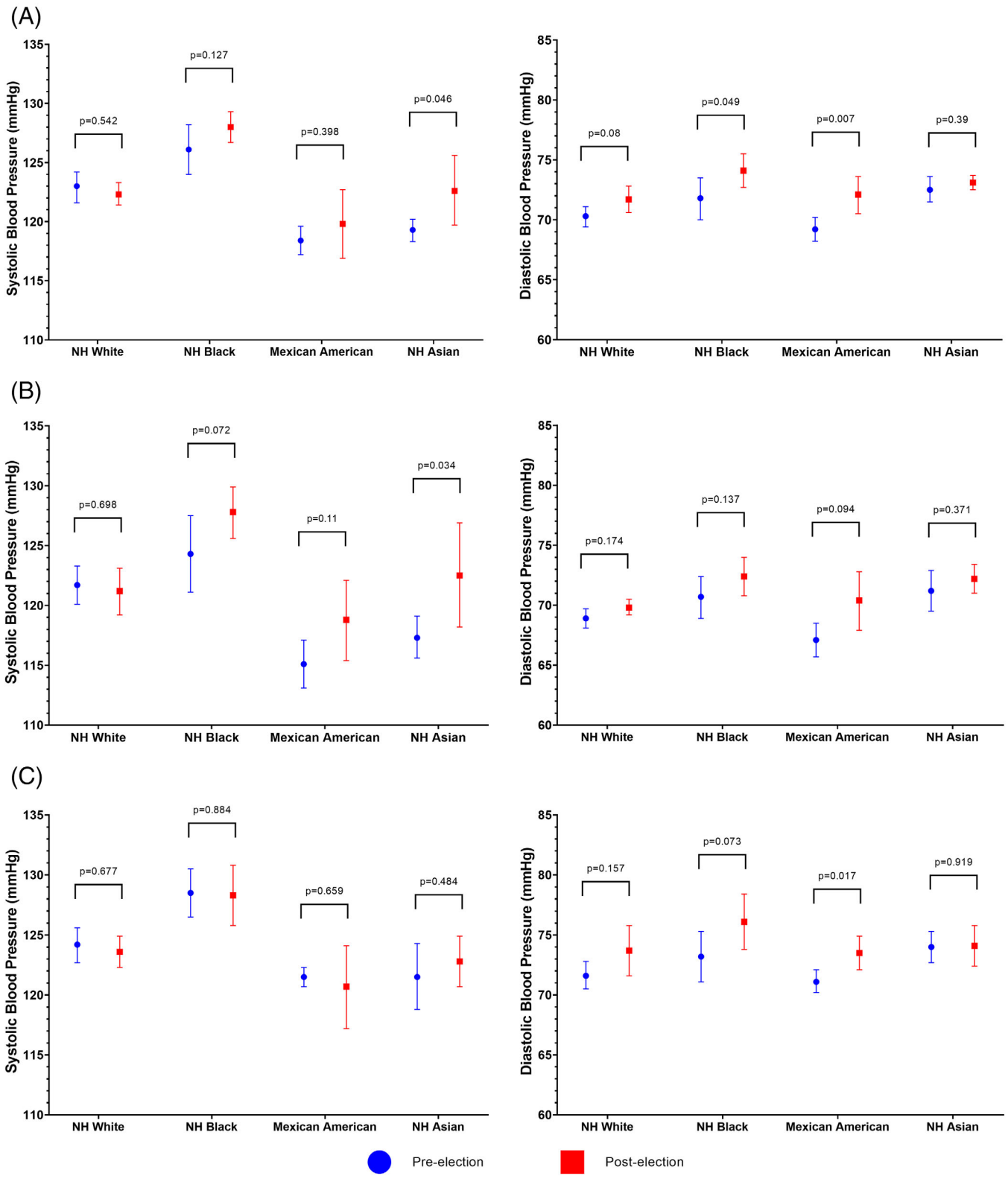

FIGURE 1 Systolic and diastolic blood pressures (BP) pre- and post-election, stratified by race and ethnicity. Data represented as mean (95% confidence interval) BP among (A) overall population, (B) women, and (C) men, weighted according to National Health and Nutrition Examination Survey complex sampling design.

participants (+0.6 [95% CI, −0.8–2] mmHg; $p = .39$) and NH White participants (+1.5 [95% CI, −0.2–3.1] mmHg; $p = .08$) (Figure 1).

Subgroup analysis showed differential trends in SBP and DBP changes pre- and post-election by sex (Figure 1). Significantly greater SBP change was observed

among NH Asian women (+5.2 [95% CI, 0.4–10] mmHg; $p = .034$), whereas NH Black women (+3.5 [95% CI, −0.3–7.2] mmHg; $p = .072$) and Mexican American women (+3.7 [95% CI, −0.9–8.3] mmHg; $p = .11$) had non-significant increases in SBP. No significant changes were observed among NH White women or men of any race and ethnicity. Diastolic BP increased significantly among Mexican American men (+2.4 [95% CI, 0.5–4.3] mmHg; $p = .017$); whereas no significant changes in DBP were observed in other racial/ethnic groups by sex.

4 | DISCUSSION

The 2016 U.S. presidential election was a major sociopolitical event that contributed to stress among a considerable proportion of U.S. adults (American Psychological Association, 2017). Using nationally representative survey data, we found differences in elevations in both SBP and DBP by race and ethnicity following the election. In previous studies, major sociopolitical events were associated with significant changes in self-rated health status, mental health, and cortisol levels (Brown et al., 2021; Hoyt et al., 2018; Malat et al., 2011). Recent data also suggests that incidence of cardiac arrythmias and CVD hospitalizations increased during the 2016 presidential election (Mefford et al., 2020; Rosman et al., 2021); however, the underlying mechanisms driving these increases, including potentially stress-related increases in BP, remain unknown. Our findings suggest that population-level BP, particularly among racial/ethnic minorities, may have increased following the election. These changes may have stemmed from the polarizing sociopolitical context throughout the 2016 election season, which may have contributed to stress differently among racial/ethnic groups.

Population-level changes in SBP among racial/ethnic minorities appeared to differ between men and women, the latter of whom, seemed to exhibit a greater increase in SBP following the election. Previous studies indicate that women tend to report higher levels of stress during the presidential election compared to men (DeJonckheere et al., 2018; Hagan et al., 2020), possibly contributing to decreased mental health (Brown et al., 2021). Our results appear consistent with these data and suggest that population-level SBP among racial/ethnic minority women may have increased in the months following the election, possibly because of increased stress.

This study has notable limitations. First, specific geographic information is not available in the public NHANES datasets. Therefore, we were unable to account for potential BP changes related to geography, which may affect BP irrespective of sociopolitical events, but also could modify our hypothesized psychosocial stress–hypertensive effect pathway. Second, due to the specific timing of the NHANES examinations, we were limited to defining the pre- and post-election periods to the months between May and October for each 2-year cycle; therefore, our sample size may have had limited power to detect BP changes across multiple strata (i.e., race and ethnicity within sex). Third, political affiliation data is unavailable in NHANES; and thus, we were unable to adjust for political party preference. Nevertheless, race and ethnicity, and to a lesser extent, sex, are known to be correlated with party preference (Pew Research Center, 2018), and previous studies have shown that individuals who voted for the losing candidate in the general elections generally reported higher levels of distress (Pitcho-Prelorentzos et al., 2018). Finally, due to the cross-sectional design of NHANES, the relationships observed in this study may not necessarily be causal.

In conclusion, our data suggest that, at the population-level, variable BP elevations occurred following the 2016 U.S. presidential election by race and ethnicity. Sex differences appeared to drive, in part, the elevations in population-level SBP and DBP. Patient-level data, linked with political affiliation, may provide further insights into BP reactivity from stress related to major sociopolitical events.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in NHANES at https://wwwn.cdc.gov/nchs/nhanes/Default.aspx.

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