

## Trends In Blood Pressure Control And Associated Risk Factors Among US Adults With Hypertension From 2013 To 2020: Insights From NHANES Data

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**Abstract :** Controlling blood pressure is critical to reducing the risk of cardiovascular disease. However, BP control rates (systolic BP < 140 mm Hg and diastolic BP < 90 mm Hg) have declined since 2013, warranting further analysis to identify contributing factors and potential interventions. This study investigates the factors associated with the decline in blood pressure (BP) control among U.S. adults with hypertension over the past decade. Data from the U.S. National Health and Nutrition Examination Survey (NHANES) were used to assess BP control trends between 2013 and 2020. The analysis included 18,927 U.S. adults with hypertension aged 18 years and older who completed study interviews and examinations. The dataset, obtained from the cardioStatsUSA and RNHANES R packages, was merged based on survey IDs. Key variables analyzed included demographic factors, lifestyle behaviors, hypertension status, BMI, comorbidities, antihypertensive medication use, and cardiovascular disease history. The prevalence of BP control declined from 78.0% in 2013-2014 to 71.6% in 2017-2020. Non-Hispanic Whites had the highest BP control prevalence (33.6% in 2013-2014), but this declined to 26.5% by 2017-2020. In contrast, BP control among Non-Hispanic Blacks increased slightly. Younger adults (aged 18-44) exhibited better BP control, but control rates declined over time. Obesity prevalence increased, contributing to poorer BP control. Antihypertensive medication use rose from 26.1% to 29.2% across the study period. Lifestyle behaviors, such as smoking and diet, also affected BP control, with nonsmokers and those with better diets showing higher control rates. Key findings indicate significant disparities in blood pressure control across racial/ethnic groups. Non-Hispanic Black participants had consistently higher odds (OR ranging from 1.84 to 2.33) of poor blood pressure control compared to Non-Hispanic Whites, while odds among Non-Hispanic Asians varied by cycle. Younger age groups (18-44 and 45-64) showed significantly lower odds of poor blood pressure control compared to those aged 75+, highlighting better control in younger populations. Men had consistently higher odds of poor control compared to women, though this disparity slightly decreased in 2017-2020. Medical comorbidities such as diabetes and chronic kidney disease were associated with significantly higher odds of poor blood pressure control across all cycles. Participants with chronic kidney disease had particularly elevated odds (OR=5.54 in 2015-2016), underscoring the challenge of managing hypertension in these populations. Antihypertensive medication use was also linked with higher odds of poor control, suggesting potential difficulties in achieving target blood pressure despite treatment. Lifestyle factors such as alcohol consumption and physical activity showed no consistent association with blood pressure control. However, dietary quality appeared protective, with those reporting an excellent diet showing lower odds (OR=0.64) of poor control in the overall sample. Increased BMI was associated with higher odds of poor blood pressure control, particularly in the 30-35 and 35+ BMI categories during 2015-2016. The study highlights a significant decline in BP control among U.S. adults with hypertension, particularly among certain demographic groups and those with increasing obesity rates. Lifestyle behaviors, antihypertensive medication use, and socioeconomic factors all played a role in these trends.

**Keywords :** diabetes, blood pressure, obesity, logistic regression, odd ratio

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