

Patient Characteristics Associated with Intentions to Use Blood Pressure Telemonitoring Among Adults with Hypertension in the United States

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Introduction

- Hypertension is defined as having a blood pressure of 130/80 mm Hg or higher and is a key risk factor for cardiovascular disease.¹
- million US adults live with hypertension, of which approximately 92 million have uncontrolled hypertension.¹
- Blood pressure telemonitoring (BPT) is defined as the process of automatic blood pressure data being transmitted from the patient's location to the doctor's office or to a clinic electronically.²
- BPT may offer individuals with hypertension a convenient way to reduce cardiovascular risk.³
- Acceptability among patients is one of the challenges limiting BPT use.

Objective

This study characterized the US adult population with hypertension based on their amenability to using BPT devices.

Methods

Study Design

- This cross-sectional retrospective analysis included data from the 2022 National Health and Wellness Survey (NHWS; N=75,261).
- The NHWS is an annual internet-based survey; all data are self-reported. Recruitment is designed to represent the general adult population in terms of age, race/ethnicity, and gender distributions in the US.
- NHWS respondents reported on 1) hypertension diagnosis and treatment, 2) sociodemographic and health characteristics, 3) health-related quality of life (HRQoL), 4) work productivity and activity impairment (WPAI), 5) healthcare resource utilization (HCRU), and 6) patient activation measure-15 (PAM-13).

Inclusion criteria

- Aged ≥18 years
- Resident of the US
- Completed 2022 US NHWS
- Self-reported a diagnosis of hypertension
- Familiar with and currently not using BPT

Exclusion criteria

- Declined to answer for education and marital status

Variables

- Intention to use BPT device (BPT-Yes vs. BPT-No)
- Adults (aged ≥18 years) diagnosed with hypertension without current BPT device use were categorized based on whether they did (BPT-Yes) or did not (BPT-No) intend to use a BPT device.

Data Analysis

- The distributions of patient characteristics by intention to use BPT device were summarized as means and standard deviations (SDs) for continuous variables and counts and percentages for categorical variables.
- Groups of intention to use BPT device were compared on patient characteristics using chi-square or 2-sample t-tests.

Patient characteristics

- Sociodemographic and health characteristics include age, gender, race/ethnicity, region, marital status, education, household income, employment status, health insurance, BP treatment, and Charlson Comorbidity Index (CCI) scores.
- The CCI represents a weighted sum of multiple comorbid conditions predictive of mortality, with higher CCI scores indicating greater comorbidity burden.⁴
- HCRU outcomes included number of health care provider (HCP) visits, emergency room (ER) visits, and hospitalizations within the past 6 months.
- HRQoL includes the EQ-5D index score and visual analog scale (EQ-VAS), and RAND-36 Physical, Mental, and Global Health Composite [PHC, MHC, GHC] scores.
- Higher EQ-5D index and EQ-VAS scores represent better HRQoL.⁵
- RAND-36 scores range 0-100, with higher scores reflecting better HRQoL.⁶
- WPAI provides scores on 4 metrics (absenteeism, presenteeism, overall work productivity impairment, and activity impairment).⁷
- Scores can range from 0-100%, with higher scores reflecting greater impairment.⁷
- PAM-13 assesses an individual's activation to manage one's own health and healthcare. Higher scores indicate higher patient activation.⁸

Results

Figure 1. Study Sample Selection

Flow chart of the study sample selection is presented in Figure 1.

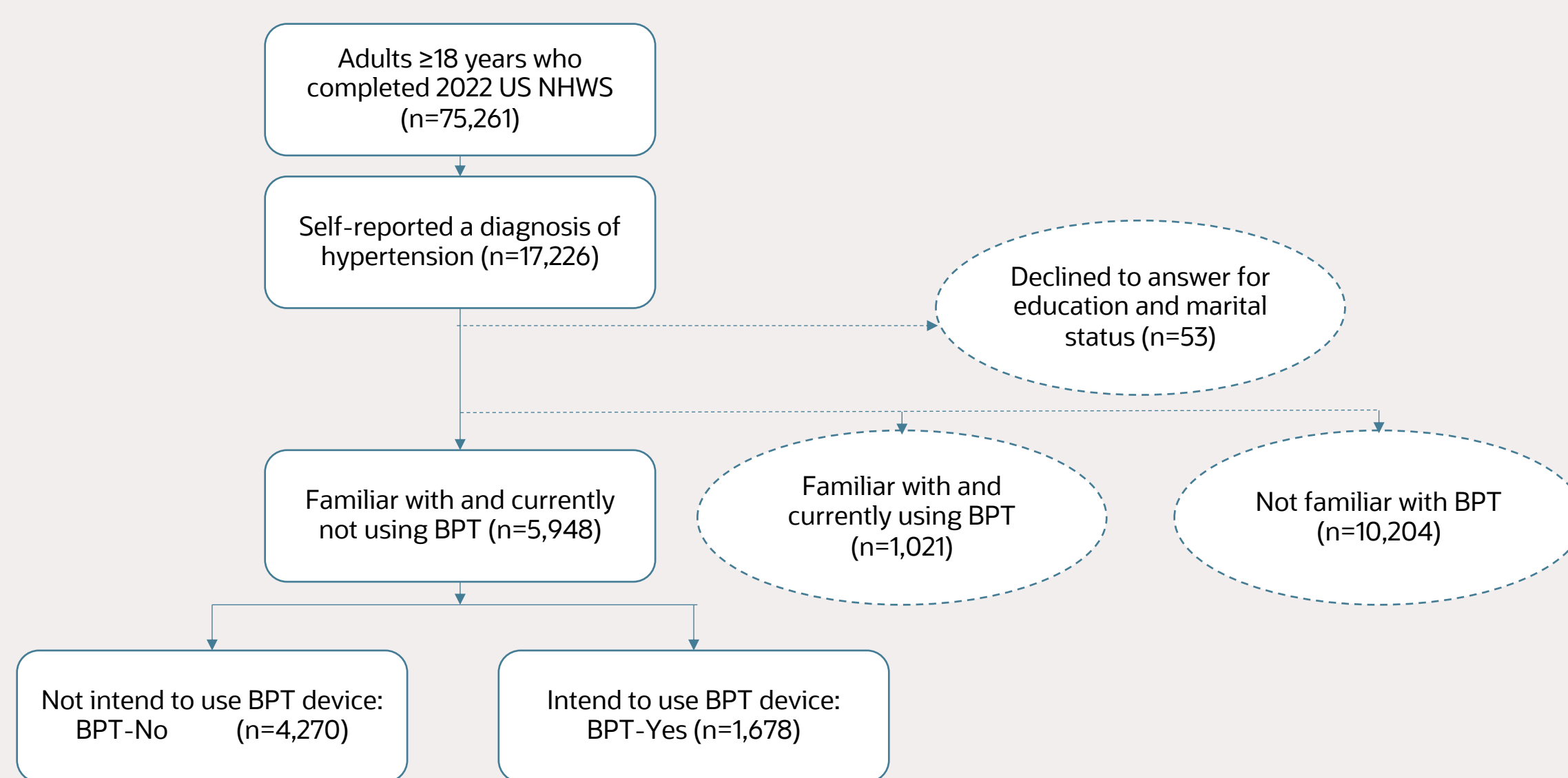
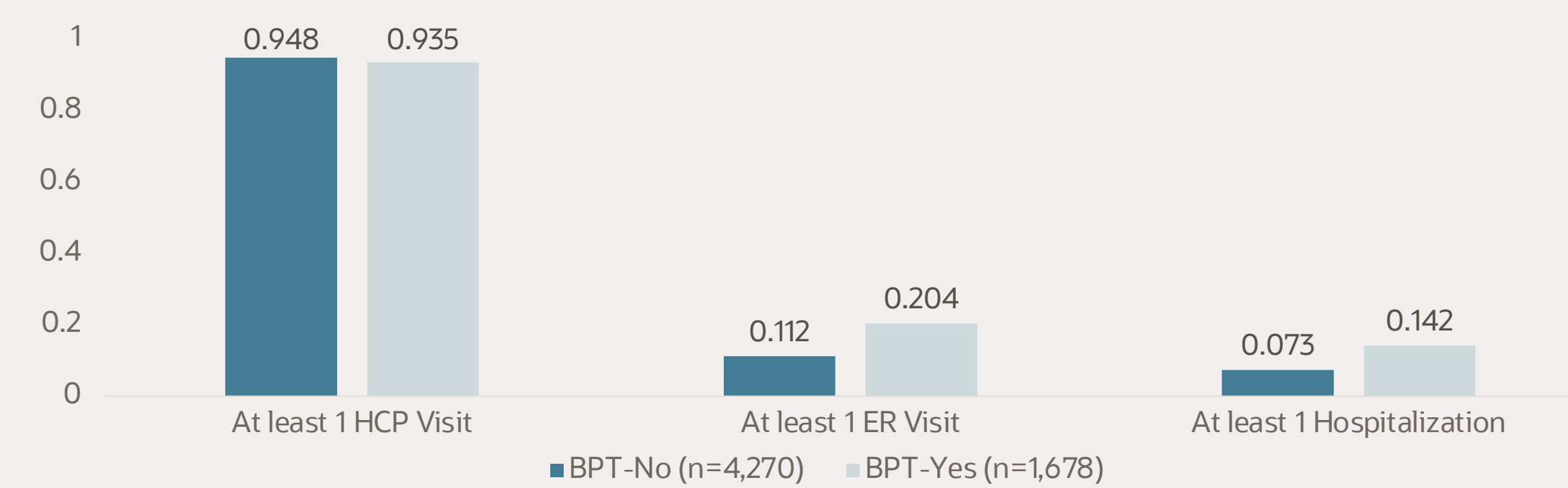


Figure 2. Healthcare Resource Utilization by Intentions to Use Blood Pressure Telemonitoring Device

- HCRU by Intentions to Use BPT Device (Figure 2)
- The proportion of respondents in each group who reported ≥1 HCP visits in the past 6 months was similar (BPT-Yes: 93.5% vs. BPT-No: 94.8%, p=0.053).
- BPT-Yes nearly twice as often had ≥1 ER visits (20.4% vs. 11.2%) and hospitalizations in the past 6 months (14.2% vs. 7.3%); both, p<0.001.



Note: HCP: health care provider; ER: emergency room; BPT: blood pressure telemonitoring

Table 1. Sociodemographic and Health Characteristics by Intentions to Use Blood Pressure Telemonitoring Device

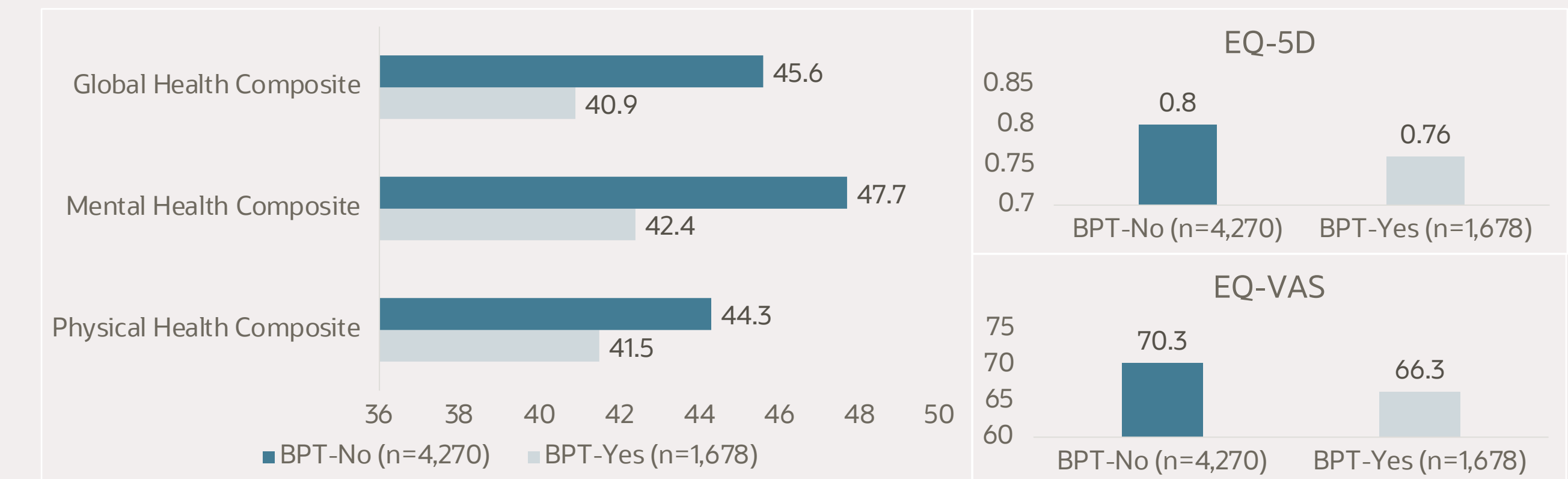
- Patient Characteristics by Intentions to Use Blood Pressure Telemonitoring Device (Table 1)
- BPT-Yes (n=1,678) was younger (mean: 57.4 vs. 65.0 years) and more often female (57.9% vs. 51.6%), Black/African American (22.8% vs. 10.2%), and Hispanic/Latino (10.1% vs. 4.8%) than BPT-No (n=4,270); all, p<0.001.

	Not intend to use BPT (BPT-No)	Intend to use BPT (BPT-Yes)	p value
n	4,270	1,678	
Age (mean, SD)	65.0 (12.3)	57.4 (14.0)	<0.001
Sex = Female (n, %)	2,203 (51.6)	971 (57.9)	<0.001
Race (n, %)			<0.001
White	3,596 (84.2)	1,163 (69.3)	
Black or African American	435 (10.2)	382 (22.8)	
Other race or origin	239 (5.6)	133 (7.9)	
Hispanic/ Latino ethnicity (n, %)	204 (4.8)	170 (10.1)	<0.001
Has college degree or higher (n, %)	2,172 (50.9)	806 (48.0)	0.053
Income (n, %)			<0.001
Less than \$75,000	2,251 (52.7)	914 (54.5)	
\$75,000 or more	1,804 (42.2)	718 (42.8)	
Decline to answer	215 (5.0)	46 (2.7)	
Region (n, %)			<0.001
Northeast	843 (19.7)	261 (15.6)	
Midwest	910 (21.3)	311 (18.5)	
South	1,641 (38.4)	781 (46.5)	
West	876 (20.5)	325 (19.4)	
Health insurance (n, %)			<0.001
No insurance	132 (3.1)	84 (5.0)	
Private/commercial	1,413 (33.1)	785 (46.8)	
Medicare	2,342 (54.8)	586 (34.9)	
Medicaid	241 (5.6)	162 (9.7)	
US military	123 (2.9)	47 (2.8)	
Not sure	19 (0.4)	14 (0.8)	
Married/living with partner (n, %)	2,551 (59.7)	1,013 (60.4)	0.678
Using BP treatment (n, %)	3,706 (86.8)	1,411 (84.1)	0.008
CCI score (mean, SD)	0.9 (1.3)	1.0 (1.7)	<0.001

Note: BPT: blood pressure telemonitoring; SD: standard deviation; CCI: Charlson Comorbidity Index

Figure 3. Health-related Quality of Life by Intentions to Use Blood Pressure Telemonitoring Device

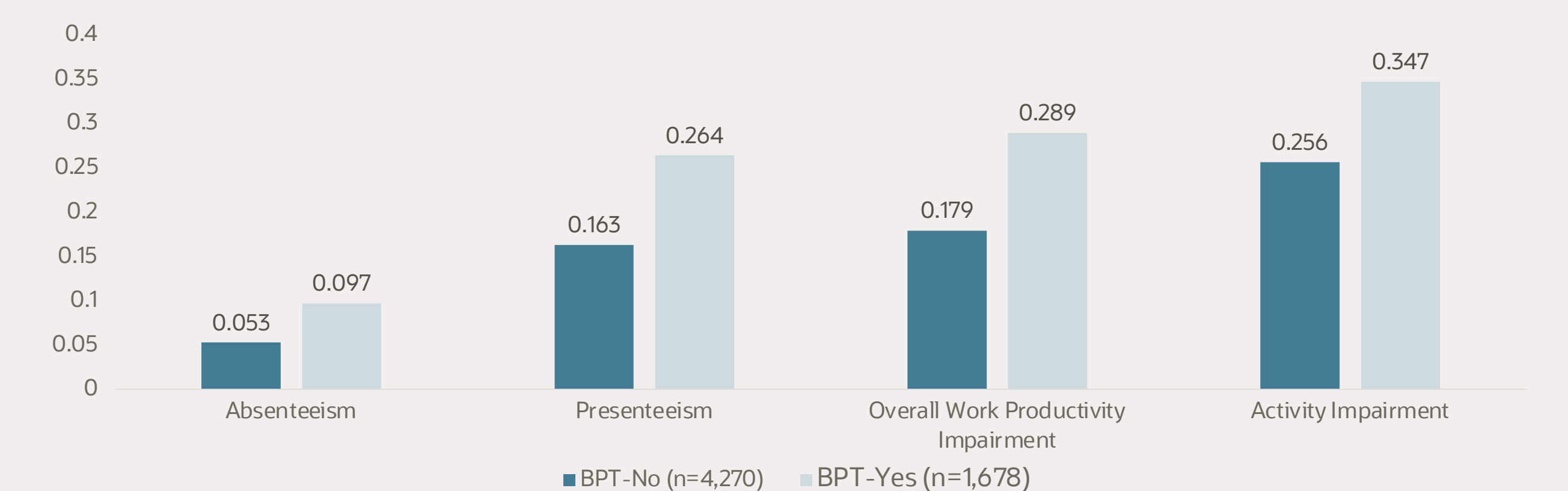
- HRQoL by Intentions to Use BPT Device (Figure 3)
- BPT-Yes had lower mean GHC (40.9 vs. 45.6), MHC (42.4 vs. 47.7), and PHC (41.5 vs. 44.3) scores than BPT-No; all, p<0.001.
- BPT-Yes had lower mean EQ-5D index (0.76 vs. 0.80) and EQ-VAS (66.3 vs. 70.3) scores than BPT-No; both, p<0.001.



Note: VAS: visual analog scale; BPT: blood pressure telemonitoring

Figure 4. Work Productivity and Activity Impairment by Intentions to Use Blood Pressure Telemonitoring Device

- WPAI by Intentions to Use BPT Device (Figure 4)
- BPT-Yes had greater mean absenteeism (9.7% vs. 5.3%), presenteeism (26.4% vs. 16.3%), overall work productivity loss (28.9% vs. 17.9%), and activity impairment (34.7% vs. 25.6%) than BPT-No; all, p<0.001.
- PAM-13 by Intentions to Use BPT Device
- Groups did not differ on PAM-13 scores (BPT-Yes: 63.2 vs. BPT-No: 63.6, p=0.261).



Note: Absenteeism, presenteeism, and overall work impairment were only applicable to those indicating they were currently working for pay. Absenteeism was not calculated for those who worked 0 hours and missed 0 hours in the last 7 days, and presenteeism was only asked among those who worked >0 hours in the last 7 days. Abbreviations: BPT: blood pressure telemonitoring

Conclusion

- Experiencing serious medical events and greater impairment to work productivity, non-work activities, and HRQoL were associated with the intention to use BPT devices.
- Findings can inform patient-clinician discussions about whether BPT devices should be incorporated as part of a multifaceted, personalized approach to hypertension management.

Limitations

- Our study is cross-sectional and exploratory; thus, results cannot provide evidence of temporality and causality for the associations of patient characteristics with intention to use BPT device.
- All data collected in the survey were self-reported, and survey responses may potentially be affected by recall error or other response biases.

Strengths

- This study adds to the limited existing knowledge of BPT use in patients with hypertension, with validated scales used to evaluate patient characteristics in a real-world setting.
- The large representative sample allows for greater generalizability of the findings.
- Several patient-centered outcomes were compared to discern the perspectives from patients with hypertension who intend to use BPT device vs. those who do not.

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