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A Case Series Study Assessing an Equity-Focused Implementation of Self-monitoring Blood Pressure Programs Using Telehealth

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Abstract

Context: Self-monitoring blood pressure (SMBP) programs are an evidence-based hypertension management intervention facilitated through telehealth. SMBP programs can provide a continuum of care beyond a clinical setting by facilitating hypertension management at home, however equitable access to SMBP is a concern.

Objectives: To evaluate the implementation of telehealth SMBP programs using an equity lens in five federally qualified health centers (FQHC) in Massachusetts (MA).

Design: Prospective case series study.

Setting: Five FQHCs.

Participants: The MA Department of Public Health (MDPH) selected five FQHCs to implement SMBP programs using telehealth. FQHCs were selected if their patient population experiences inequities due to social determinants of health and has higher rates of cardiovascular disease. Each of the five FQHCs reported data on patients enrolled in their SMBP programs totaling 241 patients examined in this study.

Intervention: SMBP programs implemented through telehealth.

Main Outcome Measure: systolic blood pressure (SBP), diastolic blood pressure (DBP).

Results: Approximately 53.5% of SMBP participants experienced a decrease in blood pressure. The average blood pressure decreased from 146/87 mmHg to 136/81 mmHg. Among all patients

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across the five FQHCs, the average blood pressure decreased by 10.06/5.34 mmHg ($p<0.001$). Blood pressure improved in all racial, ethnic, and language subgroups.

Conclusions: Five MA FQHCs successfully implemented equitable telehealth SMBP programs. The SMBP participants enrolled in the programs demonstrated notable improvements in their blood pressure at the conclusion of the program. A flexible, pragmatic study design that was adjusted to meet unique patient needs; engaging non-physician team members, particularly community health workers (CHW); adapting health information technology (HIT); and partnerships with community-based organizations were critical facilitators to program success.

Keywords

Self-monitoring blood pressure; telehealth; cardiovascular disease; health equity; social determinants of health; health-related social needs

Introduction

Cardiovascular disease (CVD) is the leading cause of death in the United States (US)[1–3] to which hypertension is a major contributing cause.[4] The burden of CVD varies widely across race, ethnicity, socio-economic status, and other subpopulations due to inadequate access to CVD care and prevention; experiences of racism and other forms of oppression; and a lack of access to individual and environmental resources to prevent and mitigate CVD.[5–10]

The outbreak of the COVID-19 pandemic in 2020 exacerbated CVD burden and inequities. In Massachusetts (MA), executive orders implementing social distancing measures were necessary to control the spread of the virus and prevent overwhelming acute care providers.[11] However, as a result, ambulatory care access among MA patients with hypertension and other chronic diseases declined substantially.[12] To mitigate this, an additional MA executive order required insurers to reimburse telehealth services at the same rate as in-person services, which led to a large increase in telehealth visits during the same period.[12,13]

Self-monitoring of blood pressure (SMBP) is an evidence-based practice facilitated by telehealth, in which patients monitor their blood pressure using a home blood pressure monitoring device to diagnose or manage hypertension.[14,15] While the effectiveness of SMBP is well documented in literature[16,17], there are multiple barriers to accessing SMBP in populations marginalized by poverty, racism, and adverse social determinants of health. Barriers include purchasing an expensive blood pressure cuff; access to reliable broadband internet; and overcoming health literacy challenges.[18–21] Studies should evaluate equity-focused implementations of SMBP during the COVID-19 pandemic in populations that are marginalized to ensure equitable access to this evidence-based intervention.

The MA Department of Public Health (MDPH) engaged with five FQHCs to implement innovative methods to promote the management of hypertension through SMBP programs and telehealth using funding from the Centers for Disease Control and Prevention (CDC). We report findings from this study, including improvements in blood pressure, how SMBP via telehealth was equitably implemented, and lessons-learned for healthcare providers.

Methods

Using a health equity approach for program design and preparing for SMBP implementation

The implementation of SMBP followed a health equity approach during the five-year program funding period (2018–2023) by leading (although not exclusively) with race and being explicit about how racism and other forms of oppression impact patients and their communities. The framework informed health center selection, data collection, and program design and implementation. In selecting the health centers, we deliberately partnered with five MA FQHCs that serve populations experiencing significant inequities. More than 90% of patients at these locations have a household income below 200% of the federal poverty level and many patients are uninsured or houseless.[22] Most of the population of focus are also of Black and Hispanic or Latino populations experiencing barriers to adequate CVD care, particularly racism, discrimination, and inequitable access to resources.[22] Our program design and implementation were pragmatic and flexible rather than relying on a standardized, rigid protocol to ensure that health centers had the flexibility to best serve their patients. However, the FQHCs were expected to implement key strategies: 1) Health centers must use patient registries or reports from the electronic health record (EHR) to identify and engage patients who could benefit from SMBP; 2) Patients enrolled in SMBP should be from populations that experience multiple barriers to management of blood pressure; 3) Health centers should screen patients for unmet social needs and may use complimentary strategies to increase effectiveness of SMBP and hypertension management, such as distributing tablets, providing food vouchers, linking to community resources (e.g., food pantries, housing assistance), and providing cell phones; 4) Health centers must provide blood pressure cuffs to patients and not place the burden on the patient to purchase one; 5) Non-physician team members should be engaged with patient outreach and follow up, especially community health workers (CHWs); 6) the FQHCs must engage with a vendor with healthcare quality improvement expertise to update their EHRs to support telehealth, improve in-person and telehealth clinic workflows, and increase the completeness and quality of the documentation of patient data; and 7) Non-physician team member staff must complete free blood pressure trainings offered by MDPH to ensure accurate recording of blood pressure and to facilitate training of patients.

Telehealth implementation

Telehealth use increased across MA due to the onset of the COVID-19 pandemic. In addition to the 1817 cooperative agreement, the 5 FQHCs along with other healthcare organizations across the state collaborated under the FQHC Telehealth Consortium to build a sustainable, patient-centered telehealth model in FQHCs across MA.[23] The FQHC Telehealth Consortium focused on equitable integration of telehealth practices at the FQHCs, including identification of practices for strategy and leadership, clinical integration, people, and reimbursement policy.[24] We leveraged these broader capacity-building efforts to further facilitate implementation at telehealth at the five FQHCs.

SMBP implementation and enrollment

To be eligible for enrollment, patients must be at least 18 years of age and have consistently elevated blood pressure (≥140/90 mmHg), which included both patients with uncontrolled hypertension and undiagnosed hypertension. To conduct outreach, the health centers leveraged non-physician team members, especially CHWs, with identifying candidates for SMBP enrollment. All health centers used their EHR to identify patients by reviewing retrospective blood pressure values using registries and reports during a six-month to one-year timeframe. To facilitate accurate and valid blood pressure values, baseline blood pressure measurements were obtained after patient completed training on proper blood pressure technique and measurement, which was typically within one week to a month after enrollment. MDPH did not require a strict timeline on when the baseline blood pressure measurement needed to be recorded to provide the FQHCs with flexibility during the pandemic.

The goal of enrollment in the SMBP program was to achieve blood pressure control. The blood pressure goal was set as <140/90 mmHg, however health centers could set a lower target goal based on the patient's individual needs.

As recommended in SMBP clinical guidelines, the duration of patients' enrollment in the SMBP program was based on the discretion of physicians at the health centers.[14] On average, the participants in our case series study stayed in SMBP programs for 106.81 days (SD=7.56). Each FQHC had a target of enrolling and collecting study data for 50 patients over two years (n=250 total). Given that the program was pragmatic in nature and the numerous challenges the health centers faced during the pandemic, the sample size of 50 per FQHC was selected based on the capacity of the health centers rather than statistical considerations.

Blood pressure cuffs were either given to patients without an expectation of return or through a loaner program depending on the funding source that the five FQHCs used to purchase the cuffs (purchasing of cuffs is not authorized under thise study's federal funding source). The health centers would provide the cuffs to the patient at an in-person visit to provide a lesson on how to properly use it and then schedule a telehealth follow-up visit with a non-physician team member such as a nurse or CHW. When informing patients on how best to manage their blood pressure at home, staff also provided a patient education tool developed by MDPH entitled "On the Path to a Healthy Heart" which advised patients on how to lower their blood pressure and cholesterol through daily eating and exercise habits. This fact sheet was available in English, Spanish, Haitian Creole, Portuguese, and Traditional and Simplified Chinese. Figure S1 displays this education tool.

Synchronous telehealth visits were conducted by phone call or video conferencing. Additionally, patients were able to report blood pressure readings to their care team through the EHR patient portal, such as MyChart, in some subawardee health centers. During the telehealth visit, blood pressure measurements from SMBP enrollees were then reviewed by a member of the clinical team, such as a physician, nurse, or CHW and documented in the EHR ideally in a structured field or as a note.

Expanding the role of CHWs—Non-physician team members were an integral part of SMBP implementation in the five FQHCs, especially CHWs given their unique understanding of the culture, experiences, and needs of priority populations. Many CHWs across the five FQHCs were multilingual which supported the enrollment of patients who preferred languages other than English. In most of the FQHCs, CHWs were heavily involved in patient outreach, engagement, and follow-up. In addition to their role in SMBP programs, CHWs linked patients to various community resources to promote blood pressure management or other unmet social needs, such as food, housing, financial insecurity, and legal assistance.

Staff adjustments with other non-physician team members—The impact of the COVID-19 pandemic demanded flexibility among all staff at the FQHCs resulting in many workflow adjustments for CVD management, beyond just CHWs. Operations teams collaborated with the clinical care teams to adjust workflows and staffing to adhere to rapid telehealth deployment and manage in-person visits while considering COVID-19 restrictions and safety. Information Technology (IT) teams provided substantial technical support for FQHCs with telehealth deployment and SMBP program development. Consequently, they helped the clinical care team provide focused CVD care to patients through hypertension and hyperlipidemia reports and enhanced EHR systems. Medical assistants played a key role in pre-visit planning such as confirming appointments or any technological issues prior to joining virtual visits. This prepared patients and staff to see their providers more efficiently for telehealth and in-person visits. They also supported CHWs in teaching patients how to use their blood pressure cuffs. Nurses took on more responsibilities in one-on-one chronic disease management. For CVD, nurses monitored the SMBP readings directly and communicated necessary information to physicians.

Data collection and statistical analysis

We conducted a prospective case series study to evaluate the effectiveness of the SMBP programs implemented in the five FQHCs. Patients were prospectively enrolled from November 2021 to July 2023. The five FQHCs reported the first and last home blood pressure cuff readings from the participants along with the dates of the readings and demographics of the participant including age (continuous), sex (male, female, not reported), race (Asian, Black, Native American/Alaskan Native, Native Hawaiian/Pacific Islander, White, not reported), ethnicity (Hispanic or Latino, non-Hispanic or Latino, not reported), and language (English, Haitian Creole, Spanish, Portuguese, Chinese, Russian, Vietnamese, French, Cape Verdean Creole, Khmer/Cambodian, Nepali, Arabic, American Sign Language (ASL), Laotian, and other specified languages). The first blood pressure was after enrollment into the SMBP program taken at home after the patient received training on proper blood pressure measurement. The last blood pressure is after the patients' completion of the SMBP program or at six months after enrollment, whichever came first. Study data were collected in REDCap.

In alignment with the a priori racial equity lens, we conducted subpopulation analyses of systolic and diastolic blood pressure changes by the race, ethnicity, and language of the participants. Blood pressure was treated as a continuous variable and evaluated using a

paired t-test after ensuring test assumptions were met. A Shapiro-Wilk test was conducted to evaluate whether a data was normally distributed. If the normality assumption of the t-test was violated, the Wilcoxon signed ranks test was conducted instead. To account for varying times in which the patient was enrolled in the SMBP program, we also evaluated overall changes stratified by length of SMBP enrollment. Due to multiple pairwise comparisons, we set alpha a priori at 0.01 to reduce the risk of a type 1 error. All statistical analyses were conducted using R Studio version 4.2.1.

Results

Characteristics of the study population

We analyzed 241 SMBP participants in total. These participants were mostly Black (61.8%), non-Hispanic (70.5%), female (51.5%), English-speaking (50.6%), 45 years or older (83.6%), and were enrolled in their SMBP program for less than 90 days (54.8%). Table 1 summarizes these data.

Blood pressure changes among SMBP participants—Table 2 summarizes the blood pressure changes among SMBP participants. The average decrease in systolic blood pressure was 10.06 mmHg ($p<0.001$) and the average decrease in diastolic blood pressure was 5.34 mmHg ($p<0.001$) across all five FQHCs, thus, the average blood pressure decreased from 146/87 mmHg to 136/81 mmHg. The sample standard error and range of blood pressure values was higher in the initial measurements compared to the final blood pressure measurements, which may be due to patients improving the quality and reliability of their blood pressure measurements taken at home.

Blood pressure changes by race—Native American/Alaskan Native and Native Hawaiian/Pacific Islander participants experienced the largest drop in blood pressure during their enrollment in SMBP programs, however, all racial subgroups experienced a decrease in blood pressure. The average blood pressure of Asian participants decreased by 6.00/6.80 mmHg ($p=0.38$, $p=0.22$); among Black participants decreased by 8.85/4.80 mmHg ($p<0.001$); among Native American/Alaskan Native and Native Hawaiian/Pacific Islander (Other) participants decreased by 15.32/10.22 mmHg ($p<0.001$, $p=0.002$); among White participants decreased by 13.68/6.07 mmHg ($p=0.16$, $p=0.33$); and among participants whose race was unknown decreased by 6.77/2.36 mmHg ($p<0.001$). Figure 1 depicts changes in blood pressure by race.

Blood pressure changes by ethnicity—In terms of ethnicity, Hispanic or Latino participants experienced the largest drop in blood pressure during their enrollment in SMBP programs. The average blood pressure of Hispanic or Latino participants decreased by 11.95/7.29 mmHg ($p<0.001$). The blood pressure of non-Hispanic or Latino participants decreased by 9.70/4.97 mmHg ($p<0.001$). The blood pressure of participants whose ethnicity was unknown decreased by 6.23/1.38 mmHg ($p=0.34$, $p=0.71$). Figure 2 depicts changes in blood pressure by ethnicity.

Blood pressure changes by language—Participants who spoke languages under the other category experienced the largest decrease in blood pressure, however, all language

subgroups experienced a decrease in blood pressure. The average blood pressure of English-speaking participants decreased by 8.76/5.46 mmHg ($p<0.001$);Spanish-speaking participants decreased by 11.21/6.35 mmHg ($p=0.001$, $p<0.001$); Haitian Creole-speaking participants decreased by 10.28/2.79 mmHg ($p=0.003$, $p<0.001$); and the blood pressure of participants that spoke other languages, including Portuguese, Chinese, Russian, Vietnamese, French, Cape Verdean Creole, Khmer/Cambodian, Nepali, Arabic, American Sign Language (ASL), Laotian, or other specified languages, decreased by 13.51/7.45 mmHg ($p<0.001$). Figure 3 depicts changes in blood pressure by language.

Blood pressure changes by the length of SMBP enrollment—Participants that were enrolled for at least 90 days experienced the largest drop in blood pressure with their blood pressure decreasing by 12.35/5.95 mmHg ($p<0.001$). The average blood pressure of participants enrolled for less than 90 days decreased by 8.16/4.84 mmHg ($p<0.001$). Figure S2 depicts changes in blood pressure by the length of SMBP enrollment.

Discussion

Our pragmatic study suggests that SMBP programs can be made accessible to and be effective in populations that are marginalized. Further, our analysis indicates that blood pressure of SMBP participants decreased significantly for most participants enrolled in the program, in line with previous published findings of this evidence-based intervention. This decrease is also present across all categories of each of the demographic groups tested.

Health impact of SMBP programs through telehealth

The five FQHCs were successfully able to engage with their patients to equitably implement telehealth SMBP programs during a global pandemic. Further, at the conclusion of the data collection period, over half of SMBP participants experienced a decrease in their blood pressure. Improvements in blood pressure were also observed by race, ethnicity, and language. Our findings indicate that a holistic, equity-focused implementation of SMBP via telehealth can effectively reach populations marginalized by multiple adverse social determinants of health. These populations are often underserved by the healthcare system and may be overlooked in implementation of SMBP programs. Our study demonstrates that these populations can be successfully engaged in SMBP programs under settings with limited resources.

Lessons learned

The health centers reported that there has been a newfound appreciation for CHWs and their unique ability to connect with and understand the social needs of the priority population. They were a key part of patient identification, enrollment, and follow-up in the SMBP programs. Due to the rapid transition to telehealth, the health centers had to re-train staff on adjusted workflows for providing CVD care in a remote environment. Non-physician team members, particularly CHWs, had enhanced roles among the CVD care team and needed further education on blood pressure management. MDPH providing free non-physician blood pressure trainings was critical to ensure that blood pressures were accurate and to facilitate training of patients to take their blood pressure at home. Furthermore, the

critical partnerships leveraged by the five FQHCs with community-based organizations (CBOs) helped to fill in the gap in providing resources for health related social needs that FQHCs cannot provide, including food pantries, YMCAs, and non-profit organizations that specialize in reducing barriers to healthy living including insecurities around food, housing, finances, transportation, and childcare. The health centers reported that their most successful partnerships were due to an openness to discussion regarding patient needs, a reliable workflow for providing resources, and bidirectional communication.

Observed challenges and successes

FQHCs reported that challenges to SMBP implementation largely centered around implementing telehealth technology and workflows. This required updating EHR systems, adjusting clinical workflows, overcoming unfamiliarity of telehealth models, adopting an equitable and standardized form of blood pressure cuff distribution, and connecting with patients that had an unreliable form of remote communication such as internet issues or lack of access to a smart device. In the initial stages of the COVID-19 pandemic and SMBP program implementation, non-physician staff did report challenges with provider engagement in care plans for SMBP participants. Additionally, there was high staff turnover during the pandemic, thus it was difficult for health centers to prioritize who received SMBP and telehealth trainings.

However, there are multiple successes to note derived from the challenges. Health centers reported that the support of their information technology (IT) teams to revamp their EHRs to be more user-friendly in remote care was invaluable, which greatly assisted with having a patient's information organized and ready to be used at each SMBP telehealth visit. Additionally, despite the difficulties with blood pressure cuff distribution, health centers reported that they were able to develop workflows for patient distribution and education on how to use them. Further, using pre-existing registries and EHR reports for identifying patients with uncontrolled and/or undiagnosed hypertension eased challenges in identification of patients for enrollment. Non-physician blood pressure trainings provided by MDPH increased physicians' confidence in their teams to conduct accurate blood pressure readings and provide education to patients on how to manage their hypertension at home.

Limitations

Our study has limitations to note. There was heterogeneity in SMBP implementation across the five FQHCs because the patient populations had unique needs and resource availability at the health centers varied. Consequently, our evaluation strategy had to reflect this heterogeneity and our findings should be interpreted in this context. The time between the initial and final blood pressure measurements varied for each patient as the length of time the patient was enrolled in the SMBP program was at the discretion of the provider. Additionally, one health center provided data on only 41 SMBP participants due to limited staffing. Although we note significant improvements in blood pressure, regression to the mean may partially be responsible for the observed reductions in blood pressure because patients' technique of taking their own blood pressure likely improved over the duration of the program. However, the study requiring that patients have consistently elevated blood pressure prior to enrollment may partially mitigate this.

Conclusion

Implementing SMBP programs using a racial equity framework lens allows healthcare professionals to develop a program and workflow that provides adequate care for hypertensive individuals who are marginalized and otherwise may not benefit from SMBP programs. A flexible, pragmatic implementation of SMBP at the five FQHCs that holistically considered the individual patient's needs demonstrates that equity in this evidence-based intervention is achievable. Future research using rigorous study designs should elucidate the effect size and impact of SMBP in marginalized populations, including how addressing unmet health-related social needs contribute to SMBP success. Our study demonstrates that it is feasible to reach and engage these populations, including achieving improvements in blood pressure, although the pragmatic study design should be taken into consideration in the application of our findings in other settings.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Implications for Policy and Practice

Healthcare organizations seeking to implement or improve SMBP programs should consider the following:

- **Use an explicit equity lens or framework.** Healthcare organizations should lead the implementation and improvement of their SMBP programs using a health equity lens or framework to ensure that their programs reach those most affected by structural drivers of health. This includes assessing unmet health-related social needs, access to a smart device and broadband internet, and providing a blood pressure cuff.
- **Integrate Community Health Workers (CHW) into team-based care.** Healthcare organizations that seek to expand SMBP programs using a health equity lens should integrate CHWs into all team-based care due to their unique understanding and experience with underserved populations.
- **Standardized protocols and workflows.** Healthcare organizations that implement a standardized workflow for patient identification, enrollment, and follow-up for SMBP programs are likely to maintain appropriate care plans for their patients. This can ensure proper communication among all staff members and reduce losing patients to follow-up.
- **Develop external partnerships in the community.** Healthcare organizations alone are not able to address all the needs of patients. As such, they should develop partnerships with community-based organizations (CBOs) that can provide the resources that patients may need. Successful partnerships require a bidirectional pathway of communication and should be driven by the patient-informed, documented needs of their patient population.

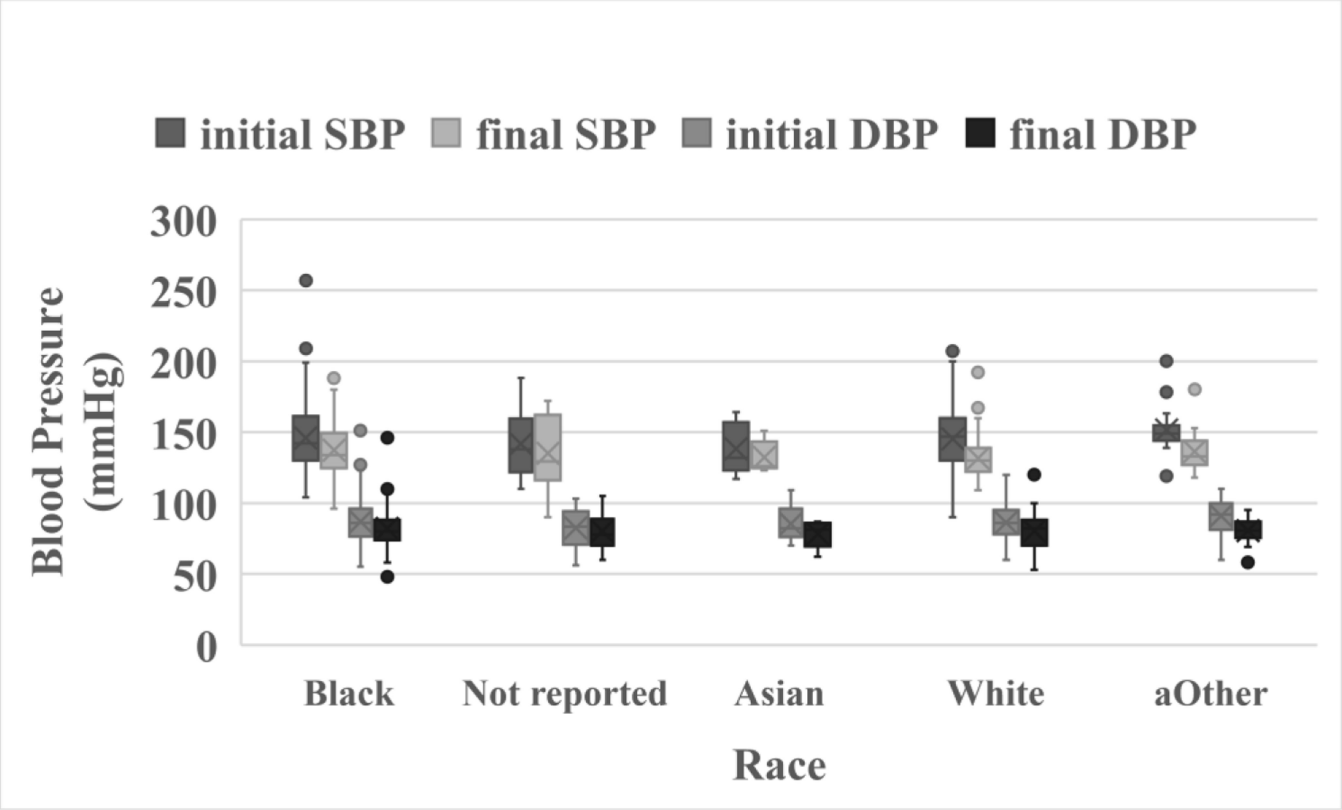

Figure 1. Changes in Blood Pressure Among SMBP Participants by Race.

Abbreviations: SMBP = self-monitoring of blood pressure; SBP: = systolic blood pressure; DBP = diastolic blood pressure

aOther race category includes Native American/Alaskan Native and Native Hawaiian/Pacific Islander

Figure 1 depicts boxplots of initial and final systolic and diastolic blood pressure by race. The box represents the interquartile range (quartile 1 and quartile 3). The horizontal line indicates the mean, the 'X' indicates the median, the length of the bars represents the range of values between the upper and lower extremes, and the outliers are the data points that lie in both extremes of the data.

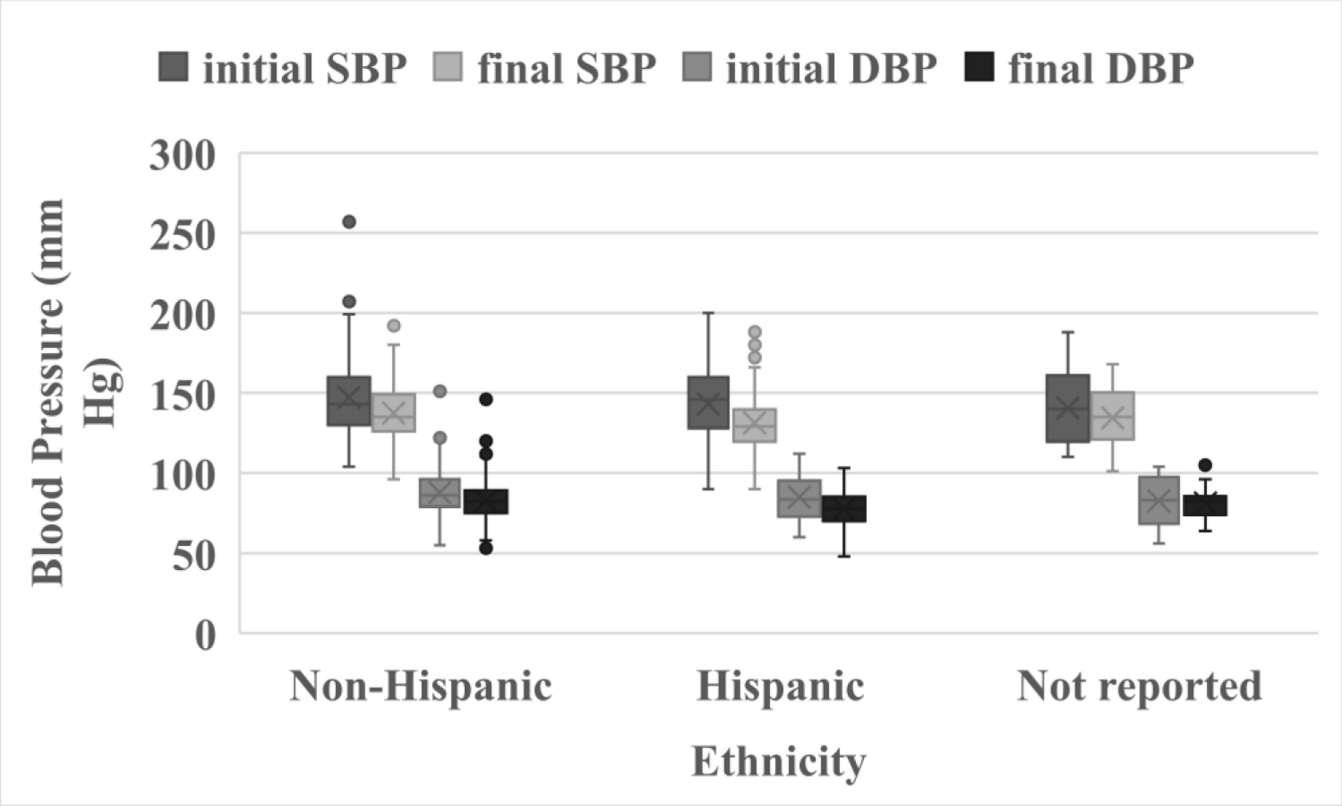

Figure 2. Changes in Blood Pressure Among SMBP Participants by Ethnicity.

Figure 2 depicts boxplots of initial and final systolic and diastolic blood pressure by ethnicity. The box represents the interquartile range (quartile 1 and quartile 3). The horizontal line indicates the mean, the 'X' indicates the median, the length of the bars represents the range of values between the upper and lower extremes, and the outliers are the data points that lie in both extremes of the data.

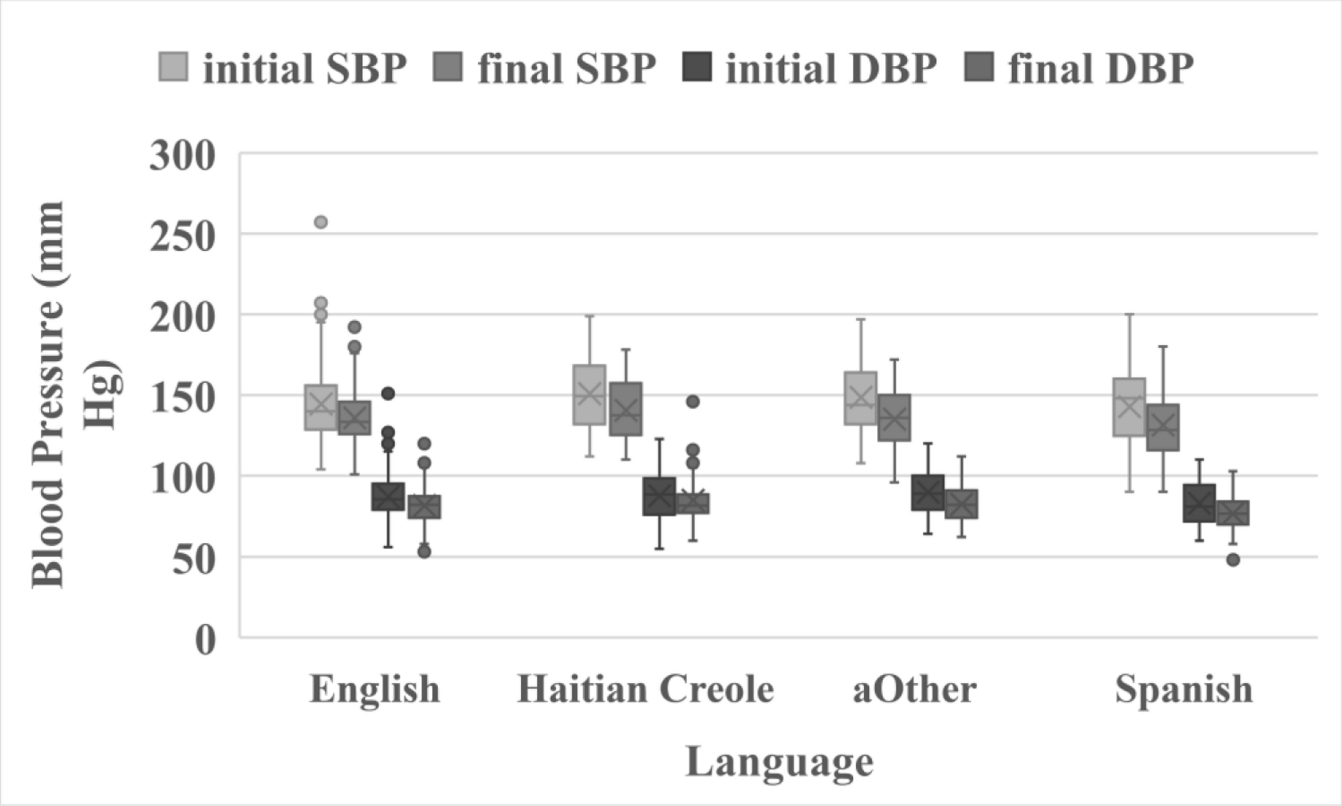

Figure 3. Changes in Blood Pressure Among SMBP Participants by Language.

Abbreviations: SMBP indicates self-monitoring of blood pressure; SBP indicates systolic blood pressure; DBP indicates diastolic blood pressure.

aOther language category includes Portuguese, Chinese, Russian, Vietnamese, French, Cape Verdean Creole, Khmer/Cambodian, Nepali, Arabic, American Sign Language (ASL), Laotian, other specified language, language is missing/not reported

Figure 3 depicts boxplots of initial and final systolic and diastolic blood pressure by language. The box represents the interquartile range (quartile 1 and quartile 3). The horizontal line indicates the mean, the 'X' indicates the median, the length of the bars represents the range of values between the upper and lower extremes, and the outliers are the data points that lie in both extremes of the data.

Table 1.

Characteristics of the SMBP Participants at Five Massachusetts FQHCs, 2021–2023.

Characteristics	Total SMBP Sample, N=241
Initial Blood Pressure (mean (SD))	146/87 (23/15)
Final Blood Pressure (mean (SD))	136/81 (18/12)
Age, years (%)	
25 to 34	14 (5.9)
35 to 44	25 (10.5)
45 to 54	42 (17.7)
55 to 64	67 (28.3)
At least 65	89 (37.6)
Sex (%)	
Female	124 (51.5)
Male	111 (46.1)
Not reported	6 (2.5)
Race (%)	
Asian	5 (2.1)
Black	149 (61.8)
Not reported	22 (9.1)
Other [a]	22 (9.1)
White	43 (17.8)
Ethnicity (%)	
Hispanic	58 (24.1)
Non-Hispanic	170 (70.5)
Not reported	13 (5.4)
Language (%)	
English	122 (50.6)
Haitian Creole	46 (19.1)
Other [b]	27 (11.2)
Spanish	46 (19.1)
Length of Enrollment in SMBP Program, days (%)	
Less than 90	132 (54.8)
At least 90	109 (45.2)

Data source: REDCap

Abbreviation: SD = standard deviation; SMBP = self-monitoring of blood pressure programs; FQHC = federally qualified health center

[a]Other race category includes Native American/Alaskan Native and Native Hawaiian/Pacific Islander

[b]Other language category includes Portuguese, Chinese, Russian, Vietnamese, French, Cape Verdean Creole, Khmer/Cambodian, Nepali, Arabic, American Sign Language (ASL), Laotian, other specified language, language is missing/not reported

Table 2.

Blood Pressure Changes for SMBP Participants by Race, Ethnicity, Language, and Length of SMBP Enrollment (N=241)

SYSTOLIC BLOOD PRESSURE (SBP)					
	Initial SBP	**Final SBP**	**Mean SBP Difference**	**p-value**	**99% CI of the Difference**
Total Sample	145.88	135.82	−10.06	<0.001 *	−12.00, −6.50
Race					
Asian	138.40	132.40	−6.00	0.38	−23.09, 11.09
Black	146.06	137.21	−8.85	<0.001 *	−11.50, −4.50
Not reported	141.91	135.14	−6.77	<0.001 *	−18.00, −6.50
Other [a]	151.59	136.27	−15.32	0.001 *	−23.31, −7.33
White	145.21	131.53	−13.68	0.16	−16.45, 2.90
Ethnicity					
Hispanic	143.24	131.29	−11.95	0.001 *	−17.50, −5.50
Non-Hispanic	147.17	137.47	−9.70	<0.001 *	−12.00, −5.50
Not reported	140.69	134.46	−6.23	0.33	−19.55, 7.09
Language					
English	144.54	135.78	−8.76	<0.001 *	−11.50, −4.00
Haitian Creole	150.85	140.57	−10.28	0.003 *	−16.77, −3.79
Other [b]	148.70	135.19	−13.51	<0.001 *	−20.40, −6.63
Spanish	142.78	131.57	−11.21	0.001 *	−18.50, −4.50
Length of SMBP enrollment, days					
Less than 90	145.60	137.44	−8.16	<0.001 *	−11.00, −4.00
At least 90	146.21	133.86	−12.35	<0.001 *	−16.00, −7.00
DIASTOLIC BLOOD PRESSURE (DBP)					
	Initial DBP	**Final DBP**	**Mean DBP Difference**	**p-value**	**99% CI of the Difference**
Total Sample	86.73	81.39	−5.34	<0.001 *	−7.00, −3.50
Race					
Asian	85.20	78.40	−6.80	0.23	−19.98, 6.38
Black	86.89	82.09	−4.80	<0.001 *	−7.00, −2.50
Not reported	82.50	80.14	−2.36	0.001 *	−9.30, −2.84
Other [a]	90.86	80.64	−10.22	0.002 *	−16.21, −4.25
White	86.37	80.30	−6.07	0.33	−7.30, 2.58
Ethnicity					
Hispanic	85.00	77.71	−7.29	<0.001 *	−11.00, −4.00
Non-Hispanic	87.62	82.65	−4.97	<0.001 *	−7.00, −3.00
Not reported	82.69	81.31	−1.38	0.71	−9.16, 6.40

SYSTOLIC BLOOD PRESSURE (SBP)					
	Initial SBP	**Final SBP**	**Mean SBP Difference**	**p-value**	**99% CI of the Difference**
Language					
English	87.13	81.67	−5.46	<0.001 *	−7.50, −2.00
Haitian Creole	87.59	84.80	−2.79	<0.001 *	−7.00, −3.50
Other [b]	89.78	82.33	−7.45	<0.001 *	−11.03, −3.86
Spanish	83.00	76.65	−6.35	0.001 *	−9.86, −2.84
Length of SMBP Enrollment, days					
Less than 90	87.96	83.12	−4.84	<0.001 *	−7.50, −3.00
At least 90	85.23	79.28	−5.95	<0.001 *	−8.50, −3.00

* statistically significant, $\alpha = 0.01$

Data source: REDCap

Abbreviation: SMBP = self-monitoring of blood pressure programs; SBP = systolic blood pressure, DBP = diastolic blood pressure, CI = confidence interval

[a] Other race category includes Native American/Alaskan Native and Native Hawaiian/Pacific Islander

[b] Other language category includes Portuguese, Chinese, Russian, Vietnamese, French, Cape Verdean Creole, Khmer/Cambodian, Nepali, Arabic, American Sign Language (ASL), Laotian, other specified language, language is missing/not reported