Hypertension

ORIGINAL ARTICLE

Self-Measured Blood Pressure–Guided Pharmacotherapy: A Systematic Review and Meta-Analysis of US-Based Telemedicine Trials

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BACKGROUND: The optimal approach to implementing telemedicine hypertension management in the United States is unknown.

METHODS: We examined telemedicine hypertension management versus the effect of usual clinic-based care on blood pressure (BP) and patient/clinician-related heterogeneity in a systematic review/meta-analysis. We searched US-based randomized trials from Medline, Embase, CENTRAL, CINAHL, PsycINFO, Compendex, Web of Science Core Collection, Scopus, and 2 trial registries. We used trial-level differences in BP and its control rate at ≥6 months using random-effects models. We examined heterogeneity in univariable metaregression and in prespecified subgroups (clinicians leading pharmacotherapy [physician/nonphysician], self-management support [pharmacist/nurse], White versus non-White patient predominant trials [>50% patients/trial], diabetes predominant trials [≥25% patients/trial], and White patient predominant but not diabetes predominant trials versus both non-White and diabetes patient predominant trials].

RESULTS: Thirteen, 11, and 7 trials were eligible for systolic and diastolic BP difference and BP control, respectively. Differences in systolic and diastolic BP and BP control rate were −7.3 mm Hg (95% CI, −9.4 to −5.2), −2.7 mm Hg (−4.0 to −1.5), and 10.1% (0.4%–19.9%), respectively, favoring telemedicine. Greater BP reduction occurred in trials where nonphysicians led pharmacotherapy, pharmacists provided self-management support, White patient predominant trials, and White patient predominant but not diabetes predominant trials, with no difference by diabetes predominant trials.

CONCLUSIONS: Telemedicine hypertension management is more effective than clinic-based care in the United States, particularly when nonphysicians lead pharmacotherapy and pharmacists provide self-management support. Non-White patient predominant trials achieved less BP reduction. Equity-conscious, locally informed adaptation of telemedicine interventions is needed before wider implementation. ***(Hypertension.* 2024;81:00–00. DOI: 10.1161/HYPERTENSIONAHA.123.22109.)** • **Supplement Material**.

Key Words: adult ■ blood pressure ■ humans ■ self-management ■ United States

Approximately 47% of American adults have hypertension, but only a quarter achieve blood pressure (BP) control, with worse control among Blacks and Hispanics than White Americans.[1] Managing hypertension using a clinic-based model has several challenges.[2] To confidently assess BP control, 5 to 6 clinic measurements may be required,[3] which is unrealistic. Self-measured BP (SMBP) by patients offers more BP data improving the confidence of clinicians in BP control assessment.[4,5] Furthermore, enhancing the hypertension self-care skills of patients requires ongoing and organized support, which is difficult from brief and infrequent primary care visits.[6] Telemedicine management of hypertension (TM-HTN) employs a focused team-based approach, where SMBP guides pharmacotherapy, and ideally has telemedicine-based self-management

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NOVELTY AND RELEVANCE

What Is New?

In this systematic review and meta-analysis of US-based clinical trials, we found that telemedicine management of hypertension was more effective in reducing and controlling blood pressure compared with clinic-based hypertension care.

What Is Relevant?

The blood pressure reduction was more evident when pharmacotherapy was led by nonphysicians compared with physicians and hypertension self-management support was provided by clinical pharmacists compared with nurses.

Non-White patient predominant trials achieved lesser blood pressure reductions than White patient predominant trials.

Clinical/Pathophysiological Implications?

Before wider implementation of telemedicine management of hypertension intervention in the United States, locally informed adaptation, such as optimizing the hypertension care team and equity-conscious tailoring, should be considered.

Nonstandard Abbreviations and Acronyms

BP	blood pressure
DBP	diastolic blood pressure
SBP	systolic blood pressure
SMBP	self-measured blood pressure
SS	self-management support
TM-HTN	telemedicine management of hypertension

support (SS).[2] Self-management enhances hypertension knowledge of patients, skills in medication adherence, lifestyle modifications, and chronic disease management.[6] TM-HTN is a team-based hypertension-focused approach that can overcome the shortcomings of clinic-based care, offering effective SS, integrating multiple home BP data to enhance the confidence of clinicians in assessing BP control and overcoming clinical inertia.[2] Therefore, understanding TM-HTN effectiveness and how patient- and clinician-related factors influence its effect on BP is important before wider implementation.

Prior meta-analyses including data outside the United States have shown that SMBP with additional support can improve BP.[7–9] Such support included heterogeneous levels of SS with or without SMBP-guided pharmacotherapy. SMBP-guided pharmacotherapy is the essential core of TM-HTN. We are not aware of any meta-analysis limited to SMBP-guided pharmacotherapy. Accordingly, we conducted a systematic review and meta-analysis of US-based trials that used SMBP-guided pharmacotherapy. US-based data are more relevant for implementation in the United States because of the global differences in health care systems and practices. For example, the authority of clinical pharmacists to prescribe BP medications may be limited in some countries. In the United States, pharmacists and nurse practitioners can prescribe medications under collaborative care agreement with physicians, but their independent prescriptive authority varies across states and nurses typically do not have any prescriptive authority.[10–12] Furthermore, little is known whether patient- and other clinician-related factors in the United States influence the effectiveness of TM-HTN. Generally, BP control is better when the prescription is led by nonphysicians such as pharmacists versus physicians,[13,14] but it is unknown whether such heterogeneity exists with TM-HTN or when various clinicians provide SS. Similarly, whether the effect of TM-HTN varies by patient characteristics is unknown. For example, although Black and non-Black patients derive similar benefits from BP control,[15] there is a disparity in BP control by race.[1] Therefore, without a purposeful equity-conscious implementation plan, TM-HTN can exacerbate inequities in BP control. Accordingly, using a systematic review and meta-analysis of US-based trials, we examined the effect of TM-HTN versus clinic-based care on BP and heterogeneity by patient and clinician characteristics.

METHODS

We registered our study protocol on PROSPERO (CRD42022324076) and Open Science Framework.[16] Study data and analytic codes can be available upon request.

Data Sources and Searches

We developed and used a search strategy in 6 bibliographic databases until July 7, 2023 (Medline [Ovid], Embase [Ovid], CENTRAL [Ovid], CINAHL [Ebsco], PsycINFO [Ebsco], and Compendex); 2 citation indexes (Web of Science Core Collection and Scopus), and trial registries (https://www.clinicaltrials.gov and International Clinical Trials Registry Platform). We examined broader telemedicine and telehealth terminologies (Table S1).[2,17]

Trial Selection

We selected US-based clinical trials using SMBP-guided pharmacotherapy. SS was optional. We excluded trials with SMBP but without SMBP-guided pharmacotherapy. The usual care group had clinic-based hypertension management where pharmacotherapy was not guided by SMBP.

Data Extraction and Quality Assessment

Two reviewers (S.A. and G.N.) independently performed title, abstract, and full-text screening and data abstraction. A third reviewer (Y.P.) resolved any disagreements and confirmed trial eligibility and data.

We collected trial-level data and found that the clinicians leading pharmacotherapy were either physicians, pharmacists, or nurses. Similarly, the clinicians providing SS were either pharmacists or nurses. We further defined clinicians leading pharmacotherapy (physicians versus nonphysicians) and SS (pharmacists versus nurses). We defined White versus non-White patient predominant trials (>50% White or non-White patients/trial) and diabetes predominant trials (≥25% versus <25% of participants with diabetes/trial).

Two authors (M.K.C. and Y.P.) independently assessed the quality of trials with the Cochrane risk of bias tool[18] and the Agency for Healthcare Research and Quality strength of evidence criteria[19] and resolved differences by consensus. Table S2 shows the PRISMA checklist.

Data Synthesis and Statistical Analysis

Our primary outcomes of interest were differences in systolic BP (SBP), diastolic BP (DBP), and trial-defined BP control rate between TM-HTN and usual clinic-based care after ≥6 months of intervention.[15] We used random-effects models, with Hartung-Knapp adjustment for between-study heterogeneity. We ensured randomized comparisons between TM-HTN and usual care as conducted in individual trials. We calculated standard errors for each trial from CIs or *P* values. We conducted analyses in R (4.0.2) using meta, metafor, and dmetar packages. We considered 2-sided $P<0.05$ as statistically significant and did not adjust for multiple comparisons. We quantified between-study heterogeneity using I^2 statistic. We used a comparison-adjusted funnel plot with the Egger test for publication bias. We performed a leave-one-out analysis to estimate the influence of each trial on the pooled effect.

Our secondary outcomes of interest were patient- and clinician-related heterogeneity in SBP and DBP differences. In univariable metaregression, we used mean age, sex (percentage of women/trial), race (White versus non-White patient predominant trials), education (percentage of participants/trial with ≤high school education), baseline SBP or DBP, diabetes (diabetes patient predominant trials), clinicians leading pharmacotherapy (physicians versus nonphysicians), SS (pharmacists versus nurses), and TM-HTN intervention duration of patients. We considered subgroup analyses when univariable analyses showed significant differences. As defined prior, we performed subgroup analyses by clinicians leading pharmacotherapy and SS, White versus non-White patient predominant trials, and diabetes predominant versus nondominant trials and in trials that have the majority of both non-White patients and patients with diabetes versus White patient predominant but not diabetes predominant trials.

We identified trials with well-developed SS focused on enhancing the self-care skills of the patient. Such trials required that SS was tailored for individual patients and had a considerable emphasis on SS assessed by frequency, content, and duration of contact.[20] We further noted that home BP data were transferred either by mail or telemonitoring device. To provide insights into using contemporary TM-HTN programs, in sensitivity analyses, we repeated the analysis limiting to trials that used telemonitoring.

RESULTS

Trial Characteristics

We identified 13 eligible trials for SBP, 11 trials for DBP, and 7 trials for BP control, published between 1992 and 2019, with 5330, 4243, and 3766 participants, respectively (Figure 1).[21–33] Two trials had cluster randomized design[21,26] and others randomized individual participants (Table S3–S5). The proportion of non-White patients/trial ranged from 4% to 100%. Seven were non-White patient predominant trials (4 had >50% and the other 2 trials had 39%–48% Black participants/trial; 1 trial was exclusively in Hispanic adults). Similarly, the proportion of patients with diabetes/trial ranged from 14% to 100%, and 8 were diabetes patient predominant trials (5 were both non-White patient and diabetes patient predominant trials; 3 were both White and diabetes patient predominant trials). None of the non-White patient predominant trials had pharmacotherapy led by nonphysicians or SS provided by pharmacists. Seven trials had well-developed SS, and 9 trials used telemonitoring (patients were asked to mail home BP logs in 4 trials; Tables S3 and S5). Well-developed SS was present in 2 White and 5 non-White patient predominant trials, respectively.

Risk of bias, publication bias, heterogeneity, and strength of evidence assessments are presented in Figures S1 through S3 and Table S6.

BP Outcomes

The pooled SBP difference was −7.3 mm Hg (95% CI, −9.4 to −5.2), favoring TM-HTN (Figure 2). In univariable metaregression, the only variables significantly associated with SBP difference were clinicians leading pharmacotherapy and race. SBP reduction was 4.4 mm Hg more when pharmacotherapy was led by nonphysicians versus physicians ($P<0.01$). For every 10% more non-White patients per trial, the SBP difference achieved was 0.6 mm Hg lower ($P=0.03$) or 5.0 mm Hg lower SBP reduction in non-White versus White patient predominant trials ($P<0.01$). In subgroup analyses, SBP reductions were −9.3 (−11.9 to −6.6) versus −4.9 (−7.3 to −2.5) mm Hg when pharmacotherapy was led by nonphysician versus physician ($P<0.01$) and −5.6 (−7.8 to −3.3) versus −9.3 (−13.1 to −5.6) mm Hg when SS was provided by nurses versus pharmacists ($P=0.01$), respectively,

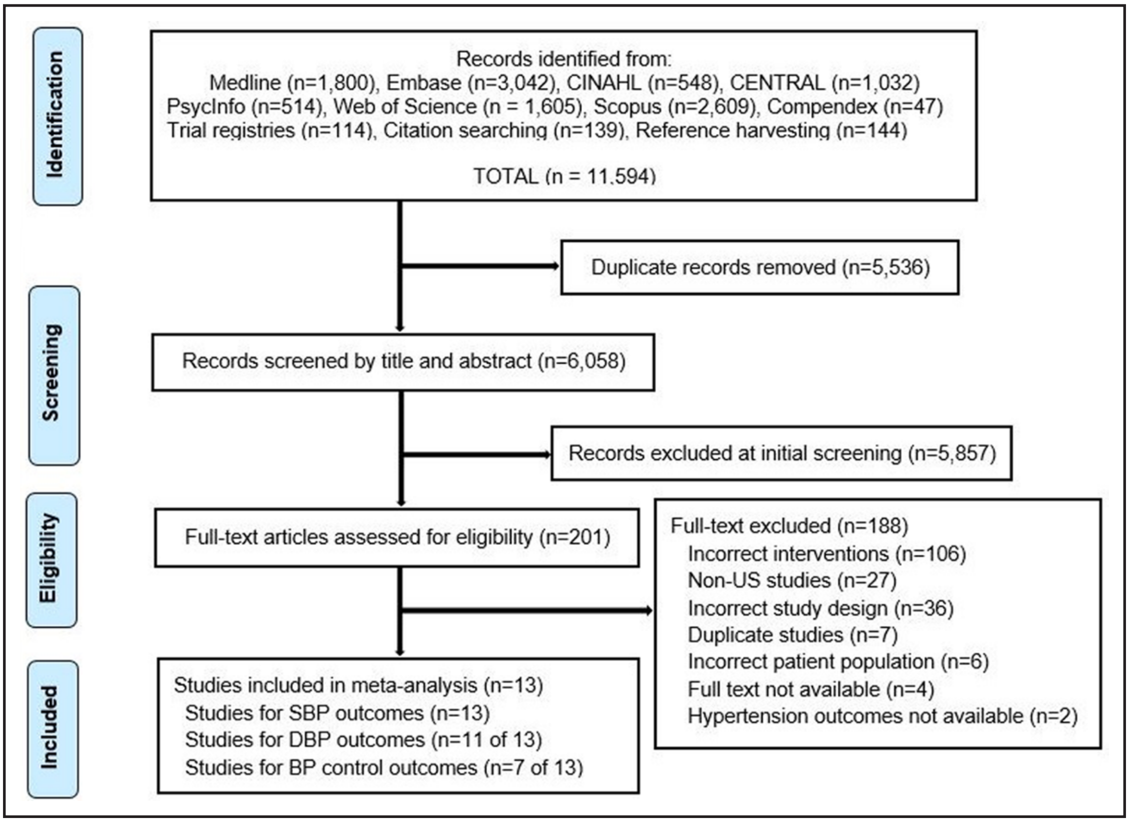

Figure 1. PRISMA flow diagram of search results and eligible articles.
BP indicates blood pressure; DBP, diastolic blood pressure; SBP, systolic blood pressure; and US indicates United States.

all favoring TM-HTN (Figures 3 and 4). Similarly, SBP reductions were −4.4 (−6.6 to −2.2) versus −9.3 (−11.4 to −7.2) mm Hg in non-White versus White patient predominant trials (P<0.01), respectively, favoring TM-HTN (Figure 5). There were no significant subgroup differences by diabetes predominant trials (P=0.14). Both diabetes and non-White patient predominant trials achieved −4.5 (−5.9 to −3.1) mm Hg SBP reduction versus −9.6 (−12.7 to −6.4) mm Hg in White patient predominant but not diabetes predominant trials (P<0.01), favoring TM-HTN.

The pooled DBP difference was −2.7 (−4.0 to −1.5) mm Hg, favoring TM-HTN intervention (Figure 2). In univariable metaregression, the only variables significantly associated with DBP difference were clinicians leading pharmacotherapy and SS, and race. DBP reduction was 2.8 mm Hg more when pharmacotherapy was led by nonphysicians versus physicians (P<0.01). Similarly, DBP reduction was 3.1 mm Hg more when SS was provided by pharmacists versus nurses (P=0.01). For every 10% more non-White patients per trial, DBP reduction was 0.3 mm Hg lower (P=0.04) or 2.7 mm Hg lower DBP reduction in non-White versus White patient predominant trials (P<0.01). In subgroup analyses, DBP reductions were −4.0 (−5.7 to −2.3) versus −1.1 (−2.3 to −0.04) mm Hg when pharmacotherapy was led by nonphysician versus physician (P<0.01) and −1.0 (−2.1, 0.03) versus −4.1 (−6.4 to −1.8) mm Hg when SS was provided by nurses versus pharmacists (P<0.01), respectively, all favoring TM-HTN (Figures 3 and 4). Similarly, DBP reductions were −1.1 (−2.3 to −0.04) versus −4.0 (−5.7 to −2.3) mm Hg in non-White versus White patient predominant trials (P<0.01), respectively, favoring TM-HTN (Figure 5). There were no significant subgroup differences by diabetes predominant trials (P=0.20). Both diabetes and non-White patient predominant trials achieved −0.9 (−1.8 to 0.06) mm Hg DBP reduction versus −4.2 (−6.8 to −1.6) mm Hg in White patient predominant but not diabetes predominant trials (P<0.01), favoring TM-HTN.

The mean difference in BP control rate between TM-HTN intervention and usual care was 10.1% (0.4%–19.9%), favoring TM-HTN (Figure 2). We did not consider metaregression and subgroup analysis for BP control due to only seven eligible trials.

To explore the differential effect of SS on BP, in post hoc analyses, we conducted subgroup analyses according to whether SS was well-developed or not. We did not find any significant difference for SBP (−7.1 [−10.4 to −3.9] versus −8.5 [−12.5 to −4.5] mm Hg; P=0.49) or DBP (−2.0 [−4.3 to 0.4] versus −3.9 [−5.9 to −1.8] mm Hg; P=0.10) in trials with and without well-developed SS, respectively.

To further understand the differences seen by race, in post hoc analyses, we examined the interaction of race

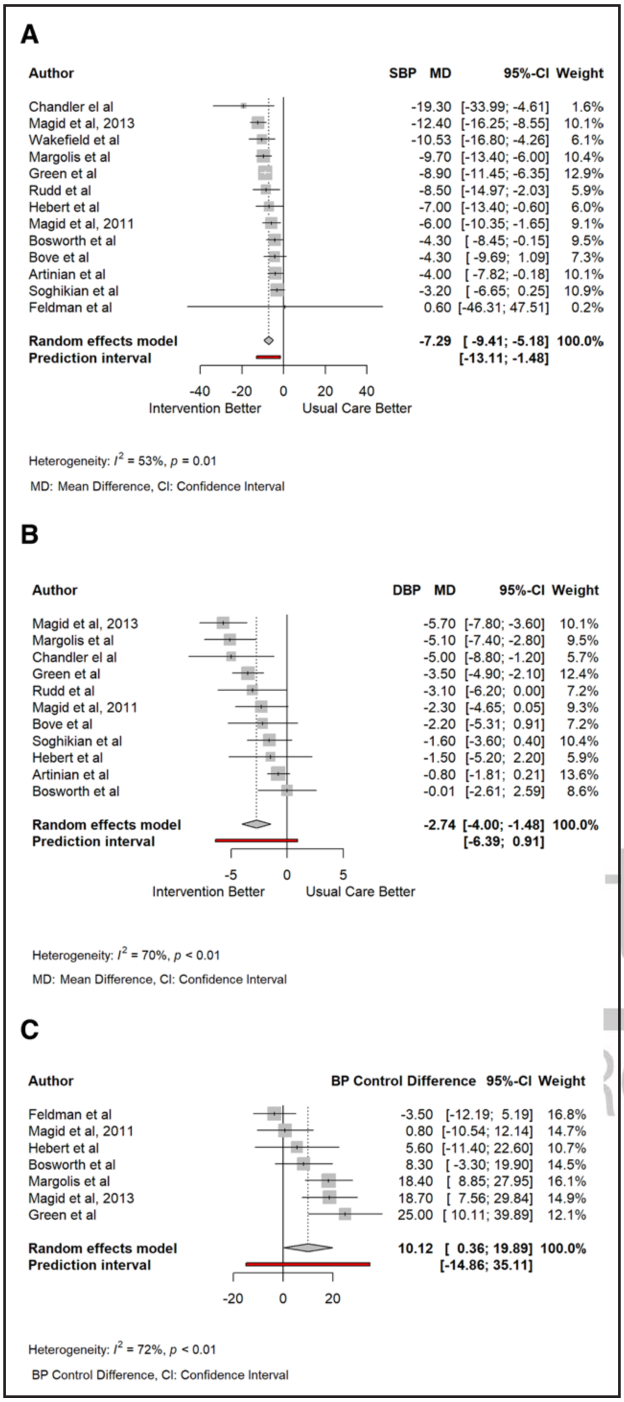

Figure 2. Mean overall pooled difference in systolic blood pressure (SBP), diastolic blood pressure (DBP), and blood pressure (BP) control rate.
A, SBP difference. **B**, DBP difference. **C**, BP control rate difference.

with clinicians leading pharmacotherapy and SS and whether the SS was well-developed or not. We found that the only group achieving lower BP reduction was non-White patient predominant trials (Table S7). Any group with White patient predominant trials achieved higher BP reduction.

When limiting the analyses to the 9 trials that used telemonitoring of SMBP, the pooled SBP and DBP differences were −7.8 (−10.6 to −5.0) and −3.0 (−4.7 to −1.2) mm Hg, respectively, favoring TM-HTN (Figure S4), which were not significantly different than the 4 trials without telemonitoring, SBP (−5.3 [−9.6 to −0.9] mm Hg; P=0.16] and DBP (−1.9 [−3.9 to 0.04] mm Hg; P=0.24), respectively. TM-HTN trials using telemonitoring of SMBP were 13.9% (2.3%–25.5%) more likely to control BP than usual care (Figure S4). In univariable metaregression, the only variable significantly associated with SBP difference was race and, for DBP difference, was SS (data not shown). Results from subgroup analyses were similar to the main analyses.

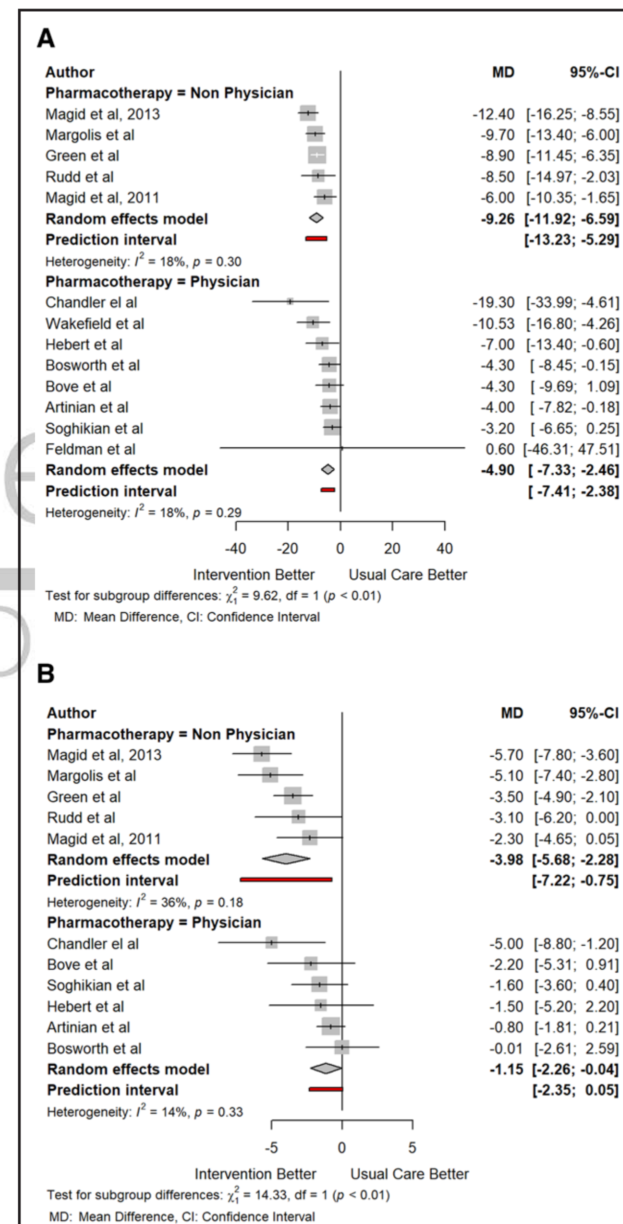

Figure 3. Mean blood pressure (BP) difference according to clinicians leading pharmacotherapy.
A, Systolic blood pressure (SBP) difference. **B**, Diastolic blood pressure (DBP) difference.

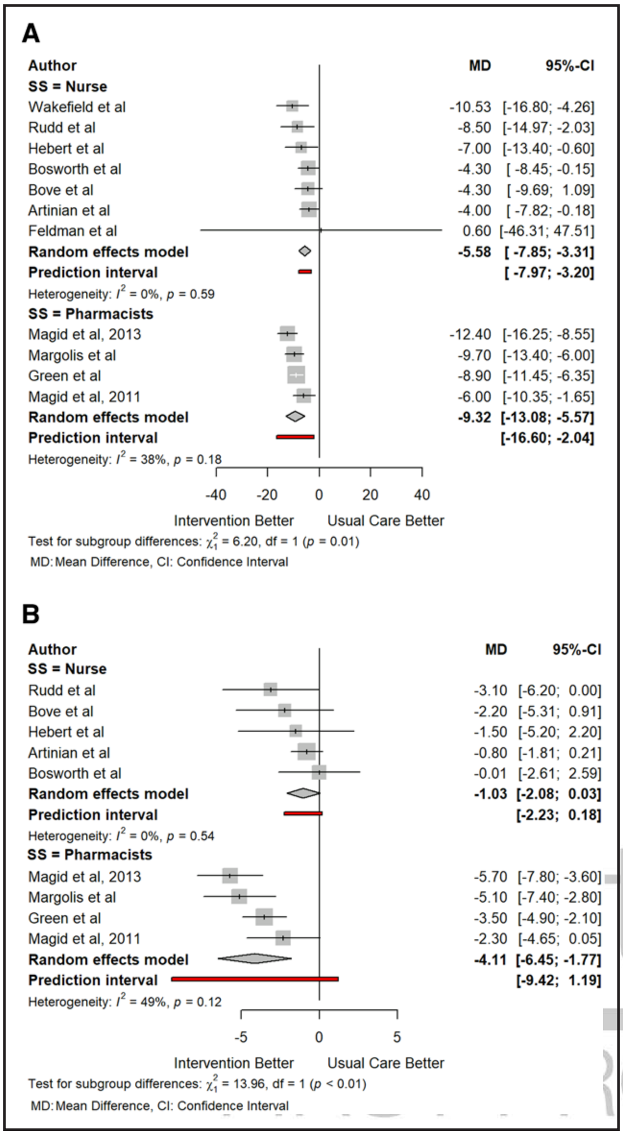

Figure 4. Mean blood pressure (BP) difference according to clinicians providing self-management support (SS).
A, Systolic blood pressure (SBP) difference. **B**, Diastolic blood pressure (DBP) difference.

DISCUSSION

We conducted a systematic review and meta-analysis of US-based telemedicine trials using SBMP-guided pharmacotherapy. We found a high strength of evidence for TM-HTN lowering BP by 7.3/2.7 mm Hg compared with usual clinic-based care, based on direct evidence, with mostly low study limitations and without reporting bias (Table S6). Pharmacotherapy was more effective if led by nonphysicians (9.3/4.0 mm Hg) than by physicians (4.9/1.1 mm Hg). SS was more effective when delivered by pharmacists (9.3/4.1 mm Hg) than by nurses (5.6/1.0 mm Hg). TM-HTN was more effective in reducing BP in trials primarily enrolling White patients (9.3/4.0 mm Hg) than non-White patients (4.4/1.1 mm Hg). There were no subgroup differences by diabetes patient predominant trials. Both diabetes and non-White patient predominant trials achieved lower BP reduction (4.5/0.9 mm Hg) than in White patient predominant but not diabetes predominant trials (9.5/4.2 mm Hg). Results were similar when limiting the analysis to trials using telemonitoring of SMBP. Taken together, our study provides important insights for effective and equity-conscious TM-HTN implementation in the United States (Figure 6).

Multilevel, multicomponent strategies, such as team-based care with medication titration by nonphysicians, are the most effective approaches for BP control in

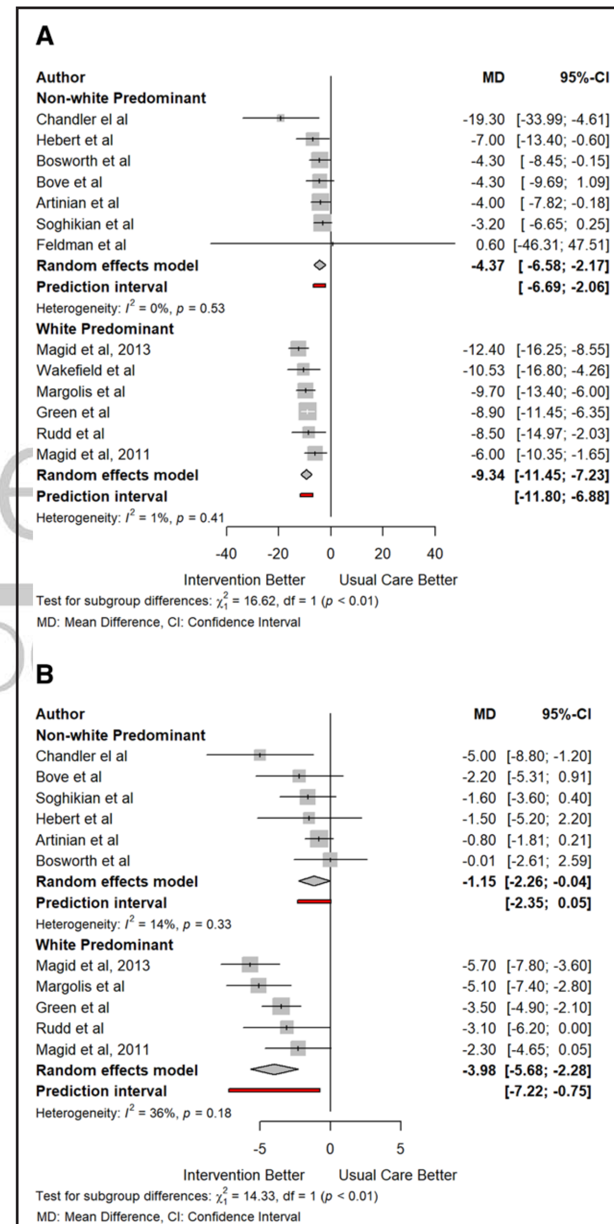

Figure 5. Mean blood pressure (BP) difference between majority non-White vs White patient predominant trials.
A, Systolic blood pressure (SBP) difference. **B**, Diastolic blood pressure (DBP) difference.

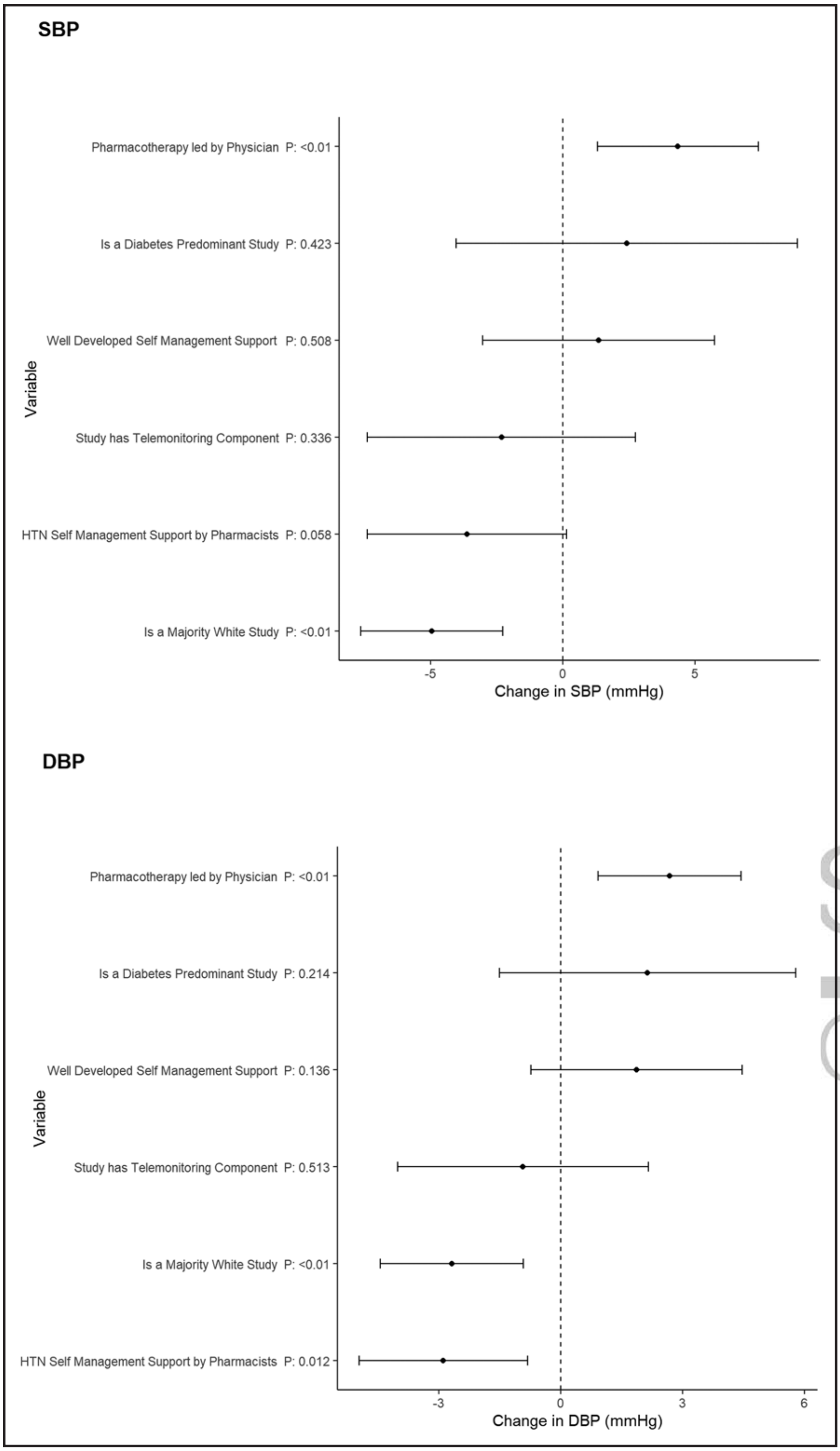

Figure 6. Univariable regression forest plot.
More negative blood pressure (BP) values reflect greater BP reduction with TM-HTN compared with usual care. DBP indicates diastolic blood pressure; HTN, hypertension; SBP, systolic blood pressure; and TM-HTN, telemedicine management of hypertension.

clinics.[13,14,34] We found a similar theme with the telemedicine approach where nonphysician-led pharmacotherapy was more effective than when directly led by physicians. Allowing nonphysicians to offer pharmacotherapy without needing routine approval from physicians will streamline workflow and offer patient-centered collaborative care, and focused algorithmic care by nonphysicians encourages guideline-concordant care while allowing physicians to focus on complex cases.[35] In reality, heterogeneity by physician versus nonphysician may be a system-level issue. When a clinician has a single disease to manage, they are more focused and able to appropriately escalate treatment intensification.[36] In practice, nonphysicians providing pharmacotherapy for a single condition is a matter of economy and scalability. The reason for the differential effect by the SS provider is unclear. Future studies should explore the reason. Pharmacists and advanced practice providers, such as physician assistants and nurse practitioners, can prescribe medications under collaborative care agreements with physicians in the United States. However, their ability to independently prescribe, adapt, and administer medications varies widely across US states.[10–12] Nurses typically do not have any prescriptive authority. These heterogeneities in practice even within the United States pose challenges for TM-HTN implementation. Outside the United States, where pharmacists may have limited prescription authority for BP medications, other contextually feasible TM-HTN care teams can be considered. Adopting effective TM-HTN programs requires considering these practical considerations, optimizing care teams, and conducting initial local formative assessments to create equitable programs.

Racial differences were notable throughout our analyses. We found no single non-White patient predominant trial that had nonphysician leading pharmacotherapy or pharmacists delivering SS, which were both associated with the highest BP reduction. It is possible that the TM-HTN program implemented as such can exacerbate inequities in hypertension care in non-White patients. The attenuated BP difference in non-White patient predominant trials (most of whom were Black patients) is likely because the current TM-HTN programs were not designed and tailored to meet the needs of these patients or the clinics they attend.[21] For example, Black patients have reported several factors contributing to poor BP control, including limited hypertension knowledge, cultural factors, racism-related stress, limited access to community resources, and social determinants of health.[37–39] Structural factors contributing to racial disparities in telemedicine use for diabetes care have been described previously.[40] Accordingly, non-White patients will need proper support for effective TM-HTN use.[41] A barber shop-based, pharmacist-managed hypertension care intervention was highly effective, supporting the importance of a contextually appropriate intervention.[42] To improve equity in hypertension care, TM-HTN programs can adapt the intervention considering patient, clinician, and system-level barriers and enhance the skills of patients to use SMBP.[41] We found that both non-White patient and diabetes predominant trials achieved smaller BP reduction than White patient predominant but not diabetes predominant trials. The additional complexity of addressing diabetes in the non-White population perhaps adds to the support needed for optimal use of SMBP. Although we also found more well-developed SS programs in non-White patient predominant trials, we did not find differences in whether SS was well-developed or not. Future studies could consider individual patient data to further explain the heterogeneity by race.

To our knowledge, this is the first meta-analysis limited to trials using SMBP-guided pharmacotherapy. There are several meta-analyses of trials conducted both in and outside the United States using SMBP with or without additional support.[7–9] The additional support comprised either SS only or SMBP-guided pharmacotherapy only or both. By exclusively limiting trials with SMBP-guided pharmacotherapy, which is an essential component of TM-HTN intervention, we showed various patient, provider, and system-level factors relevant to implementing TM-HTN intervention. We did not find heterogeneity in the effectiveness of TM-HTN by age, sex, education, diabetes status, baseline BP, TM-HTN intervention duration, and telemonitoring of SMBP of the patient but noted variations by care team composition and race of the patient. Prior studies found that SMBP alone can lead to some reductions in SBP (3–5 mm Hg) and DBP (2–3 mm Hg) at 6 months without difference at 12 months.[7–9,43,44] When SMBP is accompanied by cointerventions, such as SS, there can be moderate reductions in BP and improved BP control at 12 months.[8] The SBP difference of 7.3 mm Hg seen in our study is comparable to the 6.1-mm Hg reduction seen in a meta-analysis including trials outside the United States when SMBP was combined with intensive support.[8]

Although our study provides important insights into TM-HTN implementation, there are other potential patient, clinician, and system-level challenges in using TM-HTN. For example, uptake of telemedicine intervention was 98% in a TM-HTN efficacy trial,[26] but in a subsequent pragmatic trial with similar intervention, telemedicine uptake was only 27%,[45] highlighting the practical challenges in TM-HTN implementation.[46] Some patient-related barriers to using TM-HTN intervention include digital literacy, internet, smartphone access, and sociocultural factors.[41,43] A 2021 survey of nationally representative Americans aged 50 to 80 years showed that ≈77% of adults with hypertension have a home BP device with an arm cuff, but only ≈25% share their home BP readings with clinicians.[47] For effective use, patients should receive proper training on SMBP, which should be integrated into the overall system of care.[2] Another survey of primary care clinics showed that only 27.6% of clinics had written policies to train patients in using SBMP and 48.8% designated a team member to provide training to patients.[48] A pragmatic trial showed that only 38% of patients were able to bring home BP diaries to clinicians, highlighting real-world challenges in using SMBP.[49] Therefore, understanding and addressing barriers to SMBP and seamlessly transferring home BP values to clinics are important.[43,49] In this context, similar results that we noted with trials using telemonitoring of SMBP should encourage the adoption of telemonitoring in TM-HTN programs. Telemonitoring facilitates efficient SMBP communication with clinicians and can expedite clinical decisions.[9] Other relevant factors include the availability of trained personnel to provide SS, acceptability, and readiness among patients and clinicians in adopting a new model of care and having a technical infrastructure to integrate home BP data into electronic medical records.

We caution interpretation of our results considering the following potential limitations. Despite our efforts to reduce and address heterogeneity between trials during trial selection and data analysis, some heterogeneity exists. Nevertheless, the CI of the effect size of each individual trial overlapped the point estimate or the CI of the pooled effect, suggesting the plausibility of the variation in effect size among trials.[19] Our subgroup findings imply associations and not causations. One trial had a high risk of bias from missing data. Three additional trials had some concerns about the risk of bias from lack of prespecified protocols as they were published when reporting protocols were not routine. The heterogeneity in the definition of BP control across trials reflected contemporary practice guidelines suggesting appropriate practice standards in both intervention and control arms. There was also wide variability in the methods and frequencies of SMBP, BP transmission, numbers of SS, and follow-up visits among trials (Table S5) because we did not consider these factors when selecting trials. A more frequent SMBP, SS contact, and assessment for BP control could yield earlier BP control than less frequent intervention, and accordingly, our study might have introduced a bias. Future studies should consider standardization of these procedures to establish best practice guidelines. Finally, although informative, the applicability of our findings outside the United States may be limited.

PERSPECTIVES

TM-HTN is more effective than clinic-based care for BP management in the United States. The benefit appears to be pronounced if pharmacotherapy is led by nonphysicians rather than physicians and SS is provided by clinical pharmacists rather than nurses although the reason for the latter should be first clarified in future studies. Trials enrolling the majority of non-White patients seemed to achieve lower BP reduction than trials enrolling the majority of White patients. As health systems plan to use TM-HTN programs in the United States, locally informed, patient-centered adaptation of TM-HTN is needed to provide equitable hypertension care.

ARTICLE INFORMATION

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Disclosures

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