Community Guide Blood Pressure Self-Monitoring Economics Systematic Review Literature Search

Database: Medline (OVID) (Includes Medline In-Process)
Date Searched: 4/5/2021
Results: 432/432 after duplicates removed
Search Strategy: date limits 2015-March 2021

1. exp blood pressure monitoring, ambulatory/
2. exp blood pressure monitors/
3. exp blood pressure/
4. exp hypertension/
5. exp self care/
6. ((blood pressure or hypertens$) and self and (measure$ or monitor$ or care or manage$)).mp.
7. randomized controlled trial.pt.
8. controlled clinical trial.pt.
9. randomized controlled trials/
10. random allocation/
11. double-blind method/
12. single-blind method/
13. clinical trial.pt.
14. clinical trials.mp. or exp clinical trial/
15. (clinic$ adj25 trial$).tw.
16. ((singl$ or doubl$ or trebl$ or tripl$) adj (mask$ or blind$)).tw.
17. placebo$.tw.=
18. Placebos/
19. random$.tw.
20. trial$.tw.
21. (randomized contro$l trial$l or clinical control$ trial$).mp.
22. (latin adj square).tw.
23. comparative study.tw. or comparative study.pt.
24. exp evaluation studies/
25. follow-up studies/
26. prospective studies/
27. (control$ or prospectiv$ or volunteer$).tw.
28. Cross-Over Studies/
29. exp cohort studies/ or exp prospective studies/ or exp retrospective studies/ or exp epidemiologic studies/ or exp case-control studies/
30. (cohort or retrospective or prospective or longitudinal or observational or follow-up or followup or registry).af.
31. case-control.af. or (case adj10 control).tw.
32. ep.fs.
33. (home adj20 blood pressure).mp.
34. exp telemedicine/
35. exp self-examination/
36. exp blood pressure/

37. exp hypertension/
38. (cost or costs or economic or economics).mp.
39. exp Economics/
40. exp "Costs and Cost Analysis"/
41. 3 or 4
42. 5 and 41
43. 1 or 2 or 6 or 42
44. 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28
45. 29 or 30 or 31 or 32
46. 44 or 45
47. 43 and 46
48. 44 or 45 or 47
49. 33 and 48
50. 34 or 35
51. 36 or 37
52. 50 and 51
53. 48 and 52
54. 47 or 49 or 53
55. 38 or 39 or 40
56. 54 and 55

Database: Cochrane Central Register of Controlled Trials
Date Searched: 4/5/2021
Results: 714/624 after duplicates removed
Search Strategy: Date limit 2015-March 2021

1. (hypertension or "blood pressure") and (self or telemedicine):ti,ab,kw or (hypertension or "blood pressure") near/20 home:ti,ab,kw or "ambulatory blood pressure monitoring":ti,ab,kw in Trials (Word variations have been searched)
2. cost or costs or economic*
3. #1 and #2

Database: Cochrane Database of Systematic Reviews
Date Searched: 4/5/2021
Results: 460/460 after duplicates removed
Search Strategy: Date limit 2015-March 2021

1. (hypertension or "blood pressure") and (self or telemedicine):ti,ab,kw or (hypertension or "blood pressure") near/20 home:ti,ab,kw or "ambulatory blood pressure monitoring":ti,ab,kw
2. cost or costs or economic*
3. #1 and #2

Database: Cochrane Economic Evaluations
Date Searched: 4/5/2021

Results: 0/0 after duplicates removed
Search Strategy: Date limit 2015-March 2021

1. (hypertension or "blood pressure") and (self or telemedicine):ti,ab,kw or (hypertension or "blood pressure") near/20 home:ti,ab,kw or "ambulatory blood pressure monitoring":ti,ab,kw

Database: EconLit (EBSCOhost)
Date Searched: 4/5/2021
Results: 43/41 after duplicates removed
Search Strategy: Date limit 2015-March 2021

Search modes - Boolean/Phrase

S6
S4 OR S5
S5
(S1 AND S2)
S4
(S1 AND S3)
S3
TX ambulatory
S2
TX self OR TX home OR TX telemedicine
S1
TX "blood pressure" OR TX hypertension

SMBP Economics Estimate Quality Assessment Tool

Study Information
Primary Study Author (Year): _____

Secondary Study Author (Year): _____

Intervention Description
Consult the abstracted intervention narratives and intervention Methods sections to determine how well the authors clarify each of the characteristics listed below.

If you find there is missing information (i.e., a limitation) for any characteristic, enter "1" under the Limitation? column. If you feel that the authors have adequately addressed the characteristic, enter "0" Limitation? column.

Intervention		Limitation	Notes
Abbreviation	**Description**		
Staffing	Number and/or type of staff		
Activities	Patient and staff activities		
Materials	Materials (education materials) and devices (BP device, smart phones, computers)		
Frequencies	Frequency of activities		
Setting	Where intervention occurs		
Communications	Mode of communications between patients and staff		
Time	Time horizons and follow-ups for measurements		
Other	Please name the limitation in the appropriate cell		
Fatal flaw	Describe (e.g., Description of methods and protocols wholly inadequate to determine the content of the intervention)		
	TOTAL LIMITATIONS		
	QUALITY GRADE	☐ Good (0-2) ☐ Fair (3-5) ☐ Limited (6-8)	

Intervention Cost Estimates

Part 1. Cost Drivers

Consult the abstracted intervention narratives and intervention Methods sections to determine the components that are likely to be cost drivers. Compare the list of cost drivers to what the study explicitly states are included in intervention cost.

If you find there is missing information (i.e., a limitation) for any unaccounted cost drivers, enter "1" under the Limitation? column and the abbreviation under the Notes column. If you feel that the authors have adequately addressed the cost driver, enter "0" under the Limitation? column.

Cost Driver		**Limitation?**	**Notes**
Abbreviation	**Description**		
BPDevice	SMBP device		
Labor	Healthcare professional interacting with patient for: training; recording and responding to home BP readings; summarizing BP readings for primary care provider; counseling, where it is included; or additional interventions such as team-based care with other healthcare professionals, where included.		
Communications	Web portals and communications infrastructure		
OtherDevices	E.g., smartphones, computers, blood glucose monitoring devices		
Other	Other drivers not listed in this table		
Fatal Flaw	Describe (e.g., Reported estimate for intervention cost almost certainly excludes all or most of the components known to be delivered based on methods described in the study).		
TOTAL LIMITATIONS			
QUALITY GRADE		☐ Good (0-1) ☐ Fair (2) ☐ Limited (3-4)	

Part 2. Measurement Shortfalls

If you find there is missing information (i.e., a limitation) for any measurement shortfalls, enter "1" under the Limitation? column and the abbreviation under the Notes column. If you feel that the authors have adequately addressed the measurement shortfall, enter "0" under the Limitation? column.

Shortfall		**Limitation?**	**Notes**
Abbreviation	**Description**		
Size	Small sample (<20 at baseline)		
Scaling	Trial cost inappropriately scaled up to a much larger population		
External Source	Based on other studies or trials		
Healthcare Mixed	Intervention cost is mixed in with healthcare cost		
Other	Please name the limitation in the Notes column		
Fatal flaw	Describe (e.g., Inadequate information to derive intervention cost where an explicit estimate was not provided)		
Total limitations			
QUALITY GRADE		☐ Good (0-2) ☐ Fair (3-4) ☐ Limited (4-5)	

Blood Pressure Outcomes

If you find there is missing information (i.e., a limitation) for the characteristics- reported in study based on information about how the measurements were made, enter "1" under the Limitation? column. If you feel that the authors have adequately addressed the limitation enter "0" under the Limitation? column.

Characteristic	Limitation?	Notes
Population		
Baseline blood pressure is close to normal, according to that study (± 10pts)		
Young patients (mean age is <50 years at baseline)		
Sampling and Analysis		
Small sample size (<20 at baseline)		
Selection bias (self-selection, convenience sample, etc.),		
No description of the randomization process, allocation concealment, or description of blinding		
Penalize if demographic differences between intervention and control were not controlled for **OR** comparability of study groups is not statistically verified		
Intervention Design and Time Follow-Up		
Duration: Short intervention length (≤6 months)		
Not randomized		
No comparison		
Post-only measure		
Penalize if follow-up is less than 80% (attrition is more than 20%) **OR** studies didn't impute data from patients lost to follow-up (ITT) Intention To Treat		
Penalize for minimal, unclear, or lack of intervention description		
Other		
Please name the limitation(s) in appropriate cell (e.g., measurement, reporting/publication, response, confirmation, recall, interviewer, confounders, or omission of key covariates that may have confounded results)		
Fatal Flaw		
Describe (e.g., Impossible to even approximate mmHg change in blood pressure achieved by intervention from the information provided)		
TOTAL LIMITATIONS		
QUALITY GRADE	☐ Good (0-3) ☐ Fair (4-6) ☐ Limited (7-9)	

Appendix Table 1. Estimate Quality Assessment

Study (intervention arm)	Intervention description		Intervention cost		Blood pressure outcomes	
	Quality	Limitations (n)	Quality	Limitations (n)	Quality	Limitations (n)
Artinian 2001 (Community)[43]	Good	0	Limited	3	Fair	4
Artinian 2001 (Home)[43]	Good	0	Good	0	Fair	4
Billups 2014[a,44] & Magid 2013[b,45]	Good	0	Good	0	Good	1
Bondmass 2000[42]	Good	0	Fair	2	Fair	5
Davidson 2015[50]	Good	0	Good	0	Good	2
Dehmer 2018[a,60] & Margolis 2012[b,58] & 2013[b,59]	Good	0	Good	0	Good	0
Dixon 2016[a,68] & Salisbury 2016[b,67]	Good	1	Good	0	Good	0
Fishman 2013 (Home+Pharmacist)[a,51] & Green 2008[b,52]	Good	0	Good	0	Good	0
Fishman 2013 (Home)[a,51] & Green 2008[b,52]	Good	0	Good	0	Good	0
Friedman 1996[53]	Good	0	Fair	2	Good	2
He 2017[54]	Good	0	Good	0	Good	0
Kaambwa 2014[a,62] & McManus 2010[b,61]	Good	0	Good	2	Good	0
Katon 2012[55]	Good	0	Good	1	Good	1
Madsen 2011[a,57] & 2008[b,56]	Good	0	Good	2	Good	0
McManus 2021[63]	Good	0	Good	1	Good	0
Monahan 2019[a,64] & McManus 2018[b,65]	Good	0	Good	0	Good	0
Monahan 2019[b,64] & McManus 2018[b,65]	Good	0	Good	0	Good	0
Moultry 2015[74]	Good	0	Limited	3	Fair	4
Palmas 2010[a,70] & Shea 2006[b,69]	Good	1	Good	0	Good	0
Parati 2009[73]	Good	1	Limited	2	Good	0
Pezzin 2011[a,66]	Good	0	Good	1	Good	2
Pezzin 2011[b,66]	Good	0	Good	1	Good	2
Reed 2010[a,47] & Bosworth 2009[b,46]	Good	1	Good	0	Good	3
Stoddart 2013[71]	Good	0	Good	0	Good	0
Trogdon 2012[72]	Good	0	Good	0	Limited	5
Wang 2012[a,49] & Bosworth 2011[b,48] (Behavioral)	Good	1	Good	0	Good	2

Wang 2012[a,43] & Bosworth 2011[b,48] (Behavioral and Medication)	Good	1	Good	0	Good	2
Wang 2012[a,49] & Bosworth 2011[b,48] (Medication)	Good	1	Good	0	Good	2

[a]Primary study.
[b]Secondary study.

Appendix Table 2. Description of Intervention Activities

Study	Description (intervention arm)
Artinian 2001[43]	Intervention focused on HTN medication adherence and patient education delivered by trained nurses. Patients attended a baseline clinic visit to confirm eligibility and collect baseline data. Patients recorded their BP three times a week in the morning. The study investigator received the report the same time as the physician. The study investigator sent report to the intervention nurse who called patients on Monday every week to provide feedback. Feedback included reports on their BP control, BP education counseling, and medication adherence counseling. Weekly reports on BP control sent to personal physicians. Intervention delivered in two arms, Home and Community. (Community) Patients recorded their BP at community center within one to five miles from home. Consultations with nurse also occurred at community center. (Home) Patients received HBPM monitors and training on installation and use by nurse. Consultations with nurse were conducted by telephone.
Billups 2014[a,44] & Magid 2013[b,45]	Intervention focused on HTN medication management and patient lifestyle delivered by clinical pharmacists assisting PCPs with MTM within primary care clinics. Patients provided with educational materials and HBPM devices for BP readings uploaded to a web interface as the baseline clinic visit. They were also assisted in creating accounts on the web interface and shown how to upload their BP readings. Pharmacists received BP readings and worked with PCP under pre-approved CDTM program that permitted them to initiate or change medications, change dosage, and order lab tests. Pharmacist met initially with patients to review medication regimen, discuss lifestyle changes, and adjust medications. As needed based on weekly BP report, patients and providers communicated through secured website or phone call.
Bondmass 2000[42]	Intervention focused on HTN medication management and patient education staffed by telemetry technicians and nurses. The technicians installed the telemetry devices in the patients' homes and trained the patients on how to use them. HBPM devices connected to a central computer and network server connections. HBPM reminded patients to record vitals which were transmitted, stored, and displayed as a patient profile in central computer. Technicians staffed telemetry and data monitoring. Nurses phoned patients on education and medication titration when notified by technicians. Extreme values triggered technician call to patient or 911 notification via algorithm.
Davidson 2015[50]	Intervention focused on HTN medication adherence and patient encouragement delivered by research assistants and nurse managers. Patients were provided with Bluetooth-enabled HBPM and electronic medication tray, which connected to a smartphone via an application, at a baseline clinic visit. Smartphones

	with an active data package were loaned if the patients did not have one. Research assistants trained patients in using the monitors and software. Patients measured BP levels every three days and transmitted to the study server. Medication adherence was recorded by the medication tray and transmitted to the server. Phone application sent tailored text messages of encouragement and reminders to the patient according to their recorded BP levels and medication adherence. Research assistants informed the personal PCP or nurse manager if levels were considered out of bounds or dangerous. Weekly BP readings summarized and emailed to PCPs.
Dehmer 2018[a,60] & Margolis 2012[b,58] & 2013[b,59]	Intervention delivered by trained pharmacist in collaborative practice agreement with physicians. Study staff discussed clinic BP goal based on the patient's age and co-morbidities and provided them with a report on lowering BP. Patients received HBPM and MTM services and care from pharmacist. Patients transmitted BP measurements weekly, three in morning and three in evening and readings. Pharmacist initial one-hour in-person visit covered history, education about hypertension, training on use of HBPM, and personalized BP goals. Pharmacist followed up with patients by phone every two weeks until BP control sustained over six weeks and monthly thereafter during first six months and every month during last six months. Pharmacist calls focused on lifestyle and medication adherence. Medications adjusted based on algorithm. Pharmacist communicated with primary care team through EMRs after each visit.
Dixon 2016[a,68] & Salisbury 2016[b,67]	Intervention focused on CVD risk factors including BP, smoking, and body weight delivered by Health Information Advisers (HIA) from the United Kingdom's National Health Service trained by nurses. For the initial assessment, health advisors called each participant to discuss their health needs and goals. Core feature of scripted telephone support and responsive advice delivered by HIAs with free home BP monitors offered to those with high blood pressure. Access provided to an online web portal to upload readings and with summaries of progress and online resources. Blood pressure reviewed by HIA during each encounter and targets based on NICE guidelines. Support included goal setting, stimulus control and problem solving to address modifiable risk factors tailored to patient needs. Primary care provider advised if patients were not adherent to medication. Up to 13 scheduled telephone encounters delivered approximately every 4 weeks over the course of 12 months.
Fishman 2013[a,51] & Green 2008[b,52]	(Home) Intervention focused on patient education about HTN and self-management, with no additional provider support beyond usual care. Patients had access to a website and were provided HBPM devices along with training on use at their initial visit. Patients recorded BP at least twice a week through e-mail. Patients instructed to contact personal physician if BP not under control. (Home + Pharmacist) In addition to activities and services of the Home arm, patients received hypertension-related support from trained clinical pharmacist for medication adherence, education about HTN, and

	lifestyle modifications. Pharmacist's initial secure message by e-mail and phone call to patient consisted of record of BP history and medications; agreement on BP control plan; instructions on home BP monitoring; agreed goals for lifestyle modification. Plan shared with patient and personal physician. Pharmacist communicated bi-weekly by web with patients and less frequently after BP control achieved, with focus on medication issues; progress in lifestyle goals; mutually agreed modifications to BP control plan. Clinical decisions deferred to personal physician.
Friedman 1996[53]	Intervention focused on medication adherence with interactive phone system connected patient's telephones to central computer system that connected patients and their physicians between office visits. The phone system was set up by field technicians who also trained patients on its use at the initial visit. Once a week, the computer speaks with patients over the phone via computer-controlled speech and the patients respond using touch-tones from the keypads on their phones along with BP measurements taken using an automated sphygmomanometer prior to call. Patients reported their blood pressure and their understanding of their medication regimen. Questions ascertaining patient clinical status were asked and feedback was provided to the patient to promote treatment regimen adherence. All summary of BP readings and communications were transmitted to the patient's physician.
He 2017[54]	Intervention focused on HTN medication adherence and patient lifestyle delivered in primary healthcare centers by trained CHWs who received intervention-specific certification. Patients received HBPM device and pill organizer. CHWs visited patients and their family members who were also enrolled in the study to discuss methods of hypertension control, including lifestyle modification, home BP monitoring, and medication adherence skills. CHWs trained patients and family members on use of HBPM for weekly readings. CHWs also assisted with scheduling appointments and delivered medications for those without transport. Other components included physician education and training on hypertension management, BP feedback, and weekly text messaging for patients encouraging lifestyle changes and medication adherence.
Kaambwa 2014[a,62] & McManus 2010[b,61]	Intervention focused on HTN medication management and patient lifestyle staffed by study personnel. Patients received HBPM device, literature on non-pharmacological methods to reduce BP, and received training on use of device to transmit readings by modem to research team for the first week of each month. Initial visit with PCP to discuss symptoms, medications, and lifestyle. Monthly summaries sent to personal physician. Abnormal readings triggered phone call to patients by research team or patient could request a clinic-based BP check. Patients could request dose-change, based on schedule and readings for 2 months. Patients provided toll-free phone contact for trial-related questions.
Katon 2012[55]	Physician-supervised nurse care manager (CM) to enhance patient self-management, treatment intensification, coordination, and continuity of care in primary care setting. CM and patient collaborated on clinical goals and care plans and CM educated patients with behavioral activation, motivational

	interviewing, and problem-solving strategies for self-care including SMBP, adherence to medication, diet, and exercise regimens. CM tracked progress in electronic information system and reviewed caseloads weekly with a consulting psychiatrist and internist or family physician. Treatment recommendations based on treat-to-target algorithms communicated by care managers to the PCPs. Patients at goal provided formulated with maintenance plan for follow-up with their primary care team. CM reviewed BP readings, glucose, and labs contacting patients 2-3 times a month initially and followed up with patients every 4 to 6 weeks over 12 months, with more frequent call or visit for not at target or relapses. Mean in-person visits with CM was 10 and for telephone visit was 10.8 over 12 months.
Madsen 2011[a,57] & 2008[b,56]	Intervention focused on medication management and delivered by physicians. Patients were provided validated BP measurement device connected to a PDA with software interface developed for BP measurement. Measurements take three times a week during the first three months and once a week during the last three months. Measurements were transferred to a central server by a PDA-embedded mobile phone unit. Physicians and patients could log in to a website to view BP measurements and communicate through e-mail. For patients with no Internet access, the PDA could record and send spoken messages to the general practitioner, who could respond by written messages via the PDA. Patients informed physician if there were adverse side effects. Physicians contacted patients and/or changed medication treatment if weekly BP not at goal.
McManus 2021[63]	Intervention that adds telemonitoring to SMBP along with optional choice of lifestyle modification through online support in primary care setting. Patients provided a BP measurement device with access to a website to record their home readings. BP medication review by physician or nurse practitioner at baseline and an individualized drug titration plan collaboratively agreed with patient. Online digital self-management integrated platform for patient and provider for BP readings entry that are summarized for the provider plus optional patient-chosen lifestyle modification support. Online training video for patients and providers. 7-day rehearsal to practice use of device and online resources. Patients to take 2 morning readings at least 7 days per month. Patient reminders by e-mail. Feedback from readings to provider. All drug titrations are provider supervised. Two consecutive readings above target prompt e-mail to provider to modify drugs. Very high or low BP triggers prompt provider and patient to see provider. Three consecutive months of BP at normal prompts patients to reduce readings to once every 8 weeks. Nine weeks after randomization, optional lifestyle modules made available covering healthy eating, physical activity, losing weight where needed, and salt and alcohol reduction. Additional optional behavioral support available from nurse practitioners and healthcare assistants by brief face-to-face, telephone, or e-mail for self-management or lifestyle.

Monahan 2019[a,64] & McManus 2018[b,65]	(SMBP) Patients were instructed on how to use of BP monitor. Patients monitored their BP twice a week for the first week of every month. Readings were recorded on paper and mailed to the physician via postal mail using pre-paid envelopes. Physician titrated hypertension medication once a month based on readings. (SMBP + Telemnonitoring) Patients were trained to use the same BP monitor as those in the SMBP arm and measured their BP twice a week for the first week of every month. Readings were sent to physicians via a free SMS text-based telemonitoring services with a web-based data entry back-up. The system alerted patients to contact their physicians if they had abnormal readings. Physician titrated hypertension medication once a month based on readings.
Moultry 2015[74]	Intervention focused on medication management delivered by trained pharmacists, senior pharmacy students, public health professional, and health educator who served as program manager. Patients received a HBPM device to record BP daily and a kit containing clinical assessment form, a gift card, and health education tools. Patients received MTM services for two one-hour home visit by pharmacist including medication record, medication plan, recommendations to physician for medication change, the first at start of the intervention and six months after start of intervention. Follow-up biweekly twenty-minute phone calls were made by pharmacy students to encourage adherence, self-care, and life-style changes.
Palmas 2010[a,70] & Shea 2006[b,69]	Intervention with focus on diabetes treatment with medication management delivered by diabetes-trained nurse case managers, project case manager, endocrinologist, and primary care providers. Frequencies of interactions not provided. Patients provided with: HBPM and blood glucose monitors; telemedicine equipment enabling video conferencing with case managers and PCPs; telemedicine equipment featuring BP and glucose data transmission; web portal with dial-up modem enabling secure messaging with nurse case managers who used case management software; and educational website. Patients engaged with case managers through videoconferencing, dial-up secure messaging, or by access to EMR, under endocrinologist supervision. Full responsibility of care retained by PCP.
Parati 2009[73]	Intervention focused on HTN medication management. HBPM device prompts patients to measure their BP between scheduled clinic visits, and BP readings are regularly transmitted via modem and phone line to a central database in referral center. Values over threshold triggered call by referral center nurse to patients, with physician in charge alerted and non-routine clinic visit scheduled, if necessary. Physicians made changes to medication treatment as necessary.
Pezzin 2010[66]	(Basic) Delivered by home care nurses in New York City program, providing medication management and support for medication adherence and lifestyle behavior changes. Two emails were sent to patients one week apart by the home care nurse, detailing HTN-specific recommendations. Patients were mailed a HBPM, a HTN guide, and a BP log. Readings were recorded regularly and shared with the home care nurse and PCP.

	(Augmented) In the augmented arm, patients received same services as the basic arm plus a study nurse and health educator providing extensive feedback to home nurse and patient. These supports were to enhance self-management skills, adherence, and communication with PCP. Bi-weekly phone calls were made over a 12-week period with patients to discuss blood pressure logs and to review medications with study nurse and PCP.
Reed 2010[a,47] & Bosworth 2009[b,46]	Study had three arms: HBPM alone, Behavioral and Lifestyle counseling, and combination of the two. Patients in all arms were on HTN medication. Only the combination arm is relevant to the present review. (Combination) Intervention focused on adherence to recommended lifestyle changes delivered by nurses and research assistants. Patients received an HBPM device. Research assistants trained patients on how to record BP three times a week and mail the data every two months in pre-paid envelope. Nurse delivered behavioral intervention in bi-monthly calls covering specific components of a core group of modules, including those to address: medication and side effects, adherence to each of the recommended changes in dietary patterns, weight loss, sodium intake, physical activity, smoking cessation, and alcohol use. Nurse did not examine home BP values.
Stoddart 2013[71]	Intervention focused on HTN medication management and patient education delivered by nurses and physicians. Nurses trained patients on use of HBPM to record BP and transmit via Bluetooth through cell phone to central server. BP readings taken twice in morning and evening every day in the first week and at least weekly thereafter. Patients and physicians access readings and data via secured website. Automated texts or emails informed patients about their BP control. Patients and physicians could contact each other if there were concerns about BP levels and if therapy modifications were required.
Trogdon 2012[72]	Intervention focused on hypertension-related patient education and self-management. Staffing included a data analyst, nurse, and clerical and quality consultant and two health program specialists but unclear if they supported patients directly. Collaboration between a commercial HMO and state health department for health plan members with uncontrolled BP, identified as high risk from claims data. Patients who agreed to participate received HBPM devices to record BP twice a week, education through an interactive phone system, and a self-management kit. The kit contained information in print and a 10-minute DVD for motivation and awareness about hypertension, importance of BP control, tool for tracking BP, tools to improve medication adherence, a DASH nutrition guide, a pedometer, and a brochure on a state health department walking program.

Wang 2012[a,49] & Bosworth 2011[b,48]	All intervention arms delivered by nurse and study physician. Study had 3 arms: HBPM with medication counseling; HBPM with behavioral counseling; combination. Patients received an HBPM device and readings were taken and transmitted automatically to a secure server once every other day. (Behavioral) Nurse delivered software-driven, pre-determined scripts and tailored algorithms in eleven modules by telephone. Each call was 12-14 minutes covering 3-4 modules. Topics included: hypertension knowledge; medication side effects and medication memory; resources to increase access to care; provider-patient relations; dietary relating to salt intake, healthy weight, stress, smoking cessation, and alcohol use. (Medication) Nurse alerted by HBPM device if 2 weeks of BP greater than or equal to 135/80 mmHg for patients with T2DM. Study physician and nurse made changes to medication using decision-support software based on medication, BP level. Prescriptions were electronic and co-signed by personal PCP. (Behavioral and Medication) Activities from medication and behavioral arms merged.

[a]Primary study.
[b]Secondary study.

BP, blood pressure; CDTM, collaborative drug therapy management; CHW, community health worker; DASH, Dietary Approaches to Stop Hypertension; DVD, digital versatile disc or digital video disc; EMR, electronic medical record; HBPM, home blood pressure monitoring; HMO, health maintenance organization; HTN, hypertension; PCP, primary care providers; PDA, personal digital assistant; MTM, medication therapy management; T2DM, type 2 diabetes mellitus.

Appendix Table 3. Intervention Funding Sources

Study	Funding source
Artinian 2001[43]	In part by Summer Research Initiative monies, Center for Health Research, College of Nursing, Wayne State University
Billups 2014[a,44] & Magid 2013[b,45]	Kaiser Permanente Colorado Pharmacy Department
Bondmass 2000[42]	National Institutes of Health
Davidson 2015[50]	National Institutes of Health
Dehmer 2018[a,60] & Margolis 2012[b,58] & 2013[b,59]	National Heart, Lung, and Blood Institute
Dixon 2016[a,68] & Salisbury 2016[b,67]	National Institute for Health Research under its Programme Grant for Applied Research Salisbury 2016: NIHR Collaboration for Leadership in Applied Health Research and Care West at University Hospitals Bristol NHS Foundation Trust
Fishman 2013[a,51] & Green 2008[b,52]	National Heart, Lung, and Blood Institute
Friedman 1996[53]	National Heart, Lung, and Blood Institute
He 2017[54]	National Heart, Lung, and Blood Institute and partially by the National Institute of General Medical Sciences
Kaambwa 2014[a,62] & McManus 2010[b,61]	Department of Health Policy Research Programme, National Coordinating Centre for Research Capacity Development, and Midlands Research Practices Consortium
Katon 2012[55]	Services Division of the National Institute of Mental Health
Madsen 2011[a,57] & 2008[b,56]	Danish government and Danish Heart Foundation
McManus 2021[63]	National Institute for Health Research under its Programme Grants for Applied Research Programme
Monahan 2019[a,64] & McManus 2018[b,65]	National Institute for Health Research Programme Grant
Moultry 2015[74]	Centers for Medicare and Medicaid Services
Palmas 2010[a,70] & Shea 2006[b,69]	Centers for Medicare and Medicaid Services
Pezzin 2011[66]	National Heart, Lung and Blood Institute
Parati 2009[73]	Author institutions and unrestricted research grant from Boehringer Ingelheim, Italy

Reed 2010[a,47] & Bosworth 2009[b,46]	National Heart, Lung, and Blood Institute, Pfizer Foundation Health Communication Initiative award, and Established Investigator Award from the American Heart Association to Dr. Bosworth
Stoddart 2013[71]	Bupa Foundation with additional support from High Blood Pressure Foundation and National Health Service Lothian
Trogdon 2012[72]	Intervention: Utah Heart Disease and Stroke Prevention Program; Research: Centers for Disease Control and Prevention
Wang 2012[a,49] & Bosworth 2011[b,48]	Veterans Affairs, Health Services Research and Development, a career scientist award and an Established Investigator Award from American Heart Association to Dr. Bosworth. ATHENA-HTN development and testing was supported in part by Veterans Affairs Health Services Research and Development

[a]Primary study.
[b]Secondary study.

ATHENA-HTN, Assessment and Treatment of Hypertension: Evidence-based Automation Decision Support System.