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# Home Blood Pressure Monitoring

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A Paper Submitted in Partial Fulfillment of the Requirements

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by

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**Contents**

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## Executive Summary

Hypertension is prevalent worldwide and is responsible for nine million deaths annually. Despite its prevalence, a majority of patients go unmanaged or undiagnosed (Kitt et al., 2019). Health complications of hypertension can be life-altering and life-threatening; therefore, if changes are not made to improve community hypertension control rates, worsened population health and financial burden on health systems may persist. Would you believe that an effective tool exists and has been endorsed worldwide to combat hypertension, yet it is not used consistently in practice? Furthermore, can you imagine this specific tool is easy to operate, cheap, and recruits patient involvement in their care? This tool is home blood pressure monitoring (HBPM), and it has the potential to improve blood pressure control.

In caring for patients with hypertension and other cardiovascular diseases for over five years, it is astounding to realize how many patients that are treated for hypertension do not have a blood pressure monitor at home. This realization sparked interest in creating an evidence-based project that utilizes home blood pressure monitoring to improve blood pressure control. A project for change has been created based on the following PICOT question: In adult patients diagnosed with hypertension (P), how does home blood pressure monitoring (I) compared to no blood pressure monitoring (C) affect blood pressure (O) twelve weeks after diagnosis (T)?

This project outlines that patients will participate in HBPM each morning for a twelve-week (3 month) period. Patients will follow up at one-week, four-week, and twelve-week intervals either by telehealth visit or in clinic visit to ensure close monitoring and safety. To evaluate the outcomes of the intervention blood pressure readings will be calculated to determine a change in blood pressure readings and evaluate blood pressure control rates over twelve weeks.

Home Blood Pressure Monitoring

## Rationale for the Project

Hypertension is a health condition that is widely known within health care and in the public. Despite public knowledge and effective treatment options that are readily available, hypertension control rates are suboptimal (Zalloum et al., 2015). Health complications of hypertension can be life-altering and life-threatening. Furthermore, hypertension-related morbidity and mortality place a significant financial burden on health systems and society (Mills et al., 2016). These factors make hypertension management an important topic in the realm of improving population health.

Each clinical diagnosis of hypertension is unique, which can be challenging for the provider to effectively manage the disease. Equally as challenging, providers can be misguided in diagnosing or treating hypertension based on the single blood pressure that is measured in the clinic setting. A variety of factors can cause changes in blood pressure measurements that are taken at the time of evaluation. This can result in unnecessary medical therapy or negative health outcomes.

HBPM goes beyond what is seen in the clinic setting and extends a greater understanding of the overall health of the patient by revealing day to day variances in the patient's blood pressure. This can make blood pressure management more efficient and individualized to achieve optimal blood pressure control. Incorporating home blood pressure monitoring into the usual care of patients with hypertension is a more reliable method that has the potential to improve community hypertension control rates, improve population health, and decrease financial burden on health systems.

## Literature Synthesis

A literature search was conducted by using four databases: Academic Search Complete, CINAHL Complete, Health Source: Nursing/Academic Edition, and PubMed. The search was limited by applying the search terms “blood pressure AND hypertension AND home monitoring”. Further limitations included peer reviewed articles, full text, and dated between April of 2014 and September of 2020. Related words and equivalent subjects were also applied to the search. Twelve articles of varied levels of evidence were identified that provided overwhelming evidence to support the use of HBPM in the management of hypertension.

The most substantive evidence to support this project illustrates that HBPM contributes to effective blood pressure control when compared to clinic blood pressure monitoring (Cairns et al., 2018; Chmiel et al., 2014; Pan et al., 2018; Qi et al., 2017). The studies showed a significant change in blood pressure between the intervention group (HBPM) and control group over different periods of time. Cairns et al. (2018) and Chmiel et al. (2014) conducted their study over six months; whereas, Pan et al. (2018) studied patients up to 12 months, and Qi et al. (2017) conducted their study over five years. The literature also supports that HBPM is a simple cost-effective intervention that improves blood pressure control and encourages patient involvement in care management (Chmiel et al., 2014; Qi et al., 2017; Zalloum et al., 2015). Since compliance and acceptance by patients can be a barrier to evidence-based interventions, choosing an intervention that recruits patient involvement is more likely to ensure successful implementation.

Sharman et al. (2016) established a quick method for interpreting HBPM that revealed having three or more of the last ten home systolic blood pressure readings greater than 135 mmHg was a predictor for uncontrolled hypertension. This study determined that this method of HBPM allowed providers to identify patients at risk for target organ disease and intervene sooner

to reduce morbidity and mortality related to hypertension (Sharman et al., 2016). A cross-sectional correlation study by Zalloum et al. (2015) found that patients with hypertension who performed HBPM more frequently had significantly reduced blood pressure readings. Additionally, patients who performed HBPM had better compliance with their medications and reported healthier lifestyle habits such as decreased salt intake and exercise (Breaux-Shropshire, 2015; Zalloum et al., 2015). Three qualitative interview studies conducted by Bradbury et al. (2018) that found that patients viewed HBPM to be easy, beneficial, and empowering in the management of hypertension, and one mixed method study by Cairns et al. (2020) found that patients perceived a better sense of control over their health with HBPM.

## Project Stakeholders

Identifying stakeholders is essential to gain support, reduce barriers, and understand critical perspectives when implementing and evidence-based intervention. For this HBPM project, the following stakeholders have been identified: patients with hypertension and their families, organization administration, the cardiology clinic manager, doctors, nurse practitioners, physician assistants, and nursing staff. Patients with hypertension and their families are considered the most important stakeholders for this project. Without gaining support from the patients, implementation will fail, because patients will be carrying out the intervention. Organizational administration and the cardiology clinic managers are essential stakeholders because approval for the project and project funds will have to be obtained for the intervention to be implemented. Additionally, doctors, nurse practitioners, physician assistants, and nursing staff providing care for patients with hypertension are important stakeholders because they can provide unique perspectives of suitable patients, safety considerations, and realistic expectations for the intervention and evaluation of project goals.

## Planned Implementation

The successful implementation of an evidenced-based change project requires a thorough and well-prepared plan. The following plan is broken down by specific steps of the project that fit into each week through implementation. This should be followed step by step to ensure success with future implementation.

### Week One

#### Step One: Approval

During week one, implementation planning will begin by gaining approval for the project from organizational leadership officials, the cardiology clinic manager, and participating providers. A formal meeting with a presentation of data that highlights the prevalence, morbidity, and mortality rates of hypertension in the community will be presented. Financial burden of hypertension on the institution, such as hypertension-related emergency room visits, hospitalizations, and long-term health complications, will be discussed. Approval for project funds must also be obtained.

#### Step Two: Team Recruitment

Also, during week one, the project team will be recruited. Four cardiology providers, two medical office assistants, two nurses, one information technologist, and one electronic health record specialist from the cardiology clinic will be needed. Realistic expectations will be provided on the role, responsibility, and length of the project to assist in recruiting team members that will commit to complete the project in its entirety.

### Week Two

#### Step Three: Assignment of Team Roles

During week two, the project team will meet to discuss role responsibilities of each team member. The team will be provided with a presentation of the project plan, timeline, goals, and outcomes. During this meeting, collaboration by all members will allow for skill gaps to be discussed and filled. If skill gaps are identified that cannot be filled by current team members, recruitment of additional specialists is encouraged.

**Step Four: Patient Recruitment**

Also, during week two, patients will be recruited by providers in the cardiology clinic to participate in the project. For this piloted project, 30 adult patients with hypertension should be recruited to participate in HBPM. Patients must give informed consent to participate and agree to monitor their blood pressure daily for twelve weeks. At recruitment, background and contact information should be verified to assist with follow up. It should also be determined whether patients have their own blood pressure monitor or if one will need to be provided.

**Week Three**

**Step Four: Patient Recruitment (Continued)**

Week three will allow for an additional week of recruitment so that the project team is able to ensure the appropriate number of participants for the study. The recruitment process for week three will be the same as described for the previous week.

**Week Four**

**Step Five: Patient Education**

During week four, patients will be scheduled to attend educational sessions where patients are taught how to properly use their blood pressure monitor for the implementation phase of the project. Blood pressure monitors will be distributed for patients who do not have a home monitor. For patients wishing to use their own home monitor, devices must be confirmed

as a validated device intended to use on the upper arm. Blood pressure cuffs will be approved for proper fit for each individual. Standardized blood pressure logs will be provided at this visit to each participant. An example of a similar blood pressure log is located in Appendix C. Baseline blood pressures will be established the same day as the educational sessions with the same monitor that the patient will be using at home. Patients will be provided with instructions for HBPM which include the following information:

- Perform HBPM in the morning before taking medications
- Use the same arm every day to monitor blood pressure readings
- Take the blood pressure reading after five minutes of being seated and with legs uncrossed
- Take two readings at least two minutes apart
- The second reading should be recorded

**Week Five to Seventeen**

**Step Six: Implementation**

Implementation of HBPM begins the Monday after educational sessions are completed. Patients will monitor their blood pressures daily for twelve weeks. Clinic staff, including medical office assistants, nurses, and providers should be prepared to answer or return calls promptly to assist patients through the first week of monitoring if questions are to arise. On the day of project implementation, clinic nurses will schedule participants follow up appointments and determine their preference for follow up, in clinic or via telehealth.

**Step Seven: Follow Up**

Follow up appointments will be scheduled for patients at one week, four weeks, and twelve weeks after implementation. Blood pressure logs will be reviewed, and data will be

transcribed at each follow up appointment, either by direct transcription during in-clinic follow up appointments or transcribed from the patient portal for telehealth follow up appointments. Each follow up appointment should address patient perceptions, concerns, or needs. At the twelve-week follow up appointment, final blood pressure readings should be obtained and reviewed for completion.

## Timetable/Flowchart

On August 24, 2020, a project proposal meeting will be held with organizational administration, the cardiology clinic manager, and other organization officials to gain approval for the project. Recruitment of project team members will occur during August 25 through August 28. Team roles will be assigned and a formal education session for team members will be held on August 31. Patient recruitment by providers will occur during a two-week period between September 1 and September 11. Educational sessions with patients will be held in the morning for about an hour and a half from September 14 to September 18, and baseline blood pressures will be established during these sessions. Implementation of HBPM will begin on September 21 and continue through the last follow up appointment held on December 14. Follow up appointments will be held on September 28, October 19, and December 14. Evaluation and interpretation of the HBPM data will be conducted between December 14 and December 18. A meeting to debrief with the project team will be held on December 18. A presentation will be created by volunteers from the project team will be allowed during the week of December 21 through December 27. On December 28, 2020 outcomes of the project will be disseminated to all stakeholders through a formal presentation.

The flow of events depicts the suggested timeline of this benchmark study. Dates are provided to give future direction for the project to be replicated with a different population.

HBPM and the evaluation of outcomes for this project has a linear flow due to the simplicity of the intervention and the outcomes to be evaluated; therefore, there is little overlapping or simultaneous processes being evaluated. This is reflective in the flowchart and the dates provided. The flowchart for the project is located in Appendix B.

## Data Collection and Planned Evaluation

Initially, education sessions will be scheduled for all 30 patients the week prior to implementation. Baseline blood pressures will be established on the day of education sessions, and this blood pressure data will be used to compare future readings throughout follow up. Patients will be provided with a standardized blood pressure log to document their readings. The implementation phase begins with patients monitoring their blood pressure at home, and this will be continued for a total of twelve weeks. Patients will be required to follow up after implementation at specific intervals: one week, four weeks, and twelve weeks. Blood pressure data will be obtained at each follow up appointment either by direct transcription of blood pressure logs for those who choose to attend follow up by traditional clinic visits or by transcribing readings that are uploaded into the online patient portal for those choosing telehealth follow up appointments.

At the designated follow up appointment one week after implementing HBPM, nursing staff will be responsible for transcribing each patient's blood pressure values of day one through day seven into a database. This process will be the same for the four-week and twelve-week follow up appointment in which nursing staff will transcribe blood pressure data for each patient of days eight through 28 and days 29 through the completion day of the project, respectively.

After the implementation phase is complete and all data is obtained, blood pressure data will be verified for completeness and the data will be evaluated to determine if outcome goals are met.

The two primary goals for this project that gauge the project for success include:

1. Have 25 of the 30 participants complete the project entirely (83.3%).
2. Have 15 patients achieve blood pressure control by the end of the three-month period (50%).

After a review of the data, it will be determined how many patients completed the project entirely by manually counting how many participants had at least one blood pressure reading documented in the logbook for every day throughout the intervention period. Blood pressure readings for each patient will be calculated to determine each patient's mean systolic and diastolic blood pressure at one week, four weeks, and twelve weeks after implementation using the data within the follow up period described previously. Data will also be calculated to determine the percentage of patients that achieved or maintained blood pressure control after the three-month period of applying HBPM. Blood pressure control will be determined by greater than fifty percent of blood pressure readings less than 140/90. This will be conducted by identifying the number of patients with an average blood pressure for the 12-week follow up period less than 140/90 and dividing it by the number of patients that participated in the study. This will reveal the percentage of patients achieving blood pressure control. If at least 50 percent of patients achieve blood pressure control and at least 25 patients complete the study entirely, then the intervention will be successful.

## Cost/Benefit Discussion

Cost consideration is an important component of an evidence-based intervention project. Calculating the cost to plan, implement, and evaluate the project, as well as determining fees for services provided by the project team, is essential to gain support for the project by administration and determine if the investment is worth the expenditure for the organization. For this HBPM project, costs are minimal due to the simplicity of the intervention; therefore, a majority of the costs will be spent on staffing educational sessions, follow-up visits, and evaluation processes.

The following hourly rates will be used to estimate staff costs for training and services provided for the project: providers ($150/hour), nurses ($25/hour), medical office assistant ($15/hour), information technologist (IT) ($20/hour), and electronic health record (EHR) specialist ($20/hour). Four physicians, two nurses, two medical office assistants, one IT personnel, and one EHR specialist will be needed. For the planned two-hour staff training education session, costs include: $1,200 for providers, $100 for nurses, $60 for medical office assistants, $40 for the IT, and $40 for the EHR specialist for an approximate total of $1,440. To provide nursing staff for the planned patient education sessions for five days that will last one and a half hours each day, it will cost $375. Provider costs for the scheduled follow up appointments for each patient (15-minute sessions for three follow up visits) will cost approximately $3,375. Additional funding to have nursing staff assistance to transcribe blood pressure log data into the database for all three follow up appointments will cost approximately $960. Standardized blood pressure logs will need to be printed and provided for each of the 30 patients, and this is estimated to cost approximately $100. A blood pressure fund of $1,000 will allow for blood pressure monitors to be provided for all 30 patients. Some patients may have

their own monitor that they wish to use; therefore, the entire fund may not be used. For this project, the total funding needed to support this HBPM project is approximately $7,250.

According to a study by Kirkland et al. (2020), annual healthcare expenditure costs for one patient with hypertension is approximately $1,920 compared to patients without hypertension. Since the goal for this project is to have 50 percent of patients achieve blood pressure control with the use of HBPM, if 15 patients do achieve blood pressure control then HBPM has the potential to save the organization $28,800 in just one year. If the total cost of the project is approximately $7,250 and the potential savings for organization is approximately $28,800, the net savings for the institution is $21,550 annually for only 15 patients achieving and maintaining blood pressure control.

## Discussion of Results

Although this project is presented in the form of a benchmark project, support for future implementation has been expressed by multiple providers and staff within the current organization. This important to ensure successful implementation in the future. At the end of the implementation period, patients' blood pressures will be evaluated for change over time. For this project to be deemed successful, at least 25 patients must complete the project entirely and at least 15 patients must obtain blood pressure control. These specific goals have been set to improve the health of the targeted project population and offload some financial burden on the institution related to hypertension. Goals for this project are set with very realistic measures for a piloted HBPM project; therefore, it is suspected that these goals will be obtained when the project is implemented. It is also suspected that institution and participant costs, as well as adverse outcomes related to the project, will be minimal.

## Conclusions/Recommendations

In creating a benchmark HBPM project that was not actually conducted, it is important to make plans for implementation and consider future directions of the project. The next step is to move toward actual implementation. As preparations are made to implement this benchmark project, it is important to partner with an organization that supports evidence-based practice and has a quality improvement framework to ensure sustainment of the HBPM intervention (Kumar et al., 2015). Considering new technological innovations to assist in delivery and evaluation of outcomes is another important component to consider with future implementation. For example, using a blood pressure monitor that can directly upload patient data to the electronic health record patient portal could reduce errors in transcribing data and result in more accurate evaluation of data. Additionally, expansion of the HBPM intervention to a larger population of patients is ideal to provide a larger impact on population health and relieve hypertension-related financial burdens on the healthcare system.

If for some reason, the HBPM intervention were not approved by organizational leadership, formal education with providers on the importance of HBPM or proposing the establishment of a hypertension clinic could improve patient outcomes could encourage the use of HBPM in the management of hypertension without having a formal project. As a future nurse practitioner, it is recommended that HBPM be used in the management of all patients with hypertension that are physically and mentally able to perform the task based on the overwhelming evidence that already exists. It is recommended that the facility develop a protocol for HBPM patient education to be presented annually for all patients with hypertension. Colleagues, patients, and leadership are encouraged to communicate the importance of hypertension management throughout the community to encourage patients and future patients to

seek routine health exams and hypertension screening to reduce hypertension-related morbidity and mortality. These strategies encourage a healthier population for generations to come.

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# Appendix A

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| **PICOT Question:** In adult patients diagnosed with hypertension (P), how does home blood pressure monitoring (I) compared with no blood pressure monitoring (C) affect blood pressure (O) twelve weeks after diagnosis (T)? |
| **PICOT Question Type** (Circle): Intervention Etiology Diagnosis or Diagnostic Test Prognosis/Prediction Meaning |

| Citation: (i.e., author(s), date of publication, & title) | Conceptual Framework | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Study Findings | Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) |
|---|---|---|---|---|---|---|---|---|
| Author, Year, Title | Theoretical basis for study Qualitative Tradition | | Number, Characteristics, Attrition rate & why? | Independent variables (e.g., IV1 = IV2 =)<br><br>Dependent variables (e.g., DV = ) | What scales were used to measure the outcome variables (e.g., name of scale, author, reliability info [e.g., Cronbach alphas]) | What stats were used to answer the clinical question (i.e., all stats do not need to be put into the table) | Statistical findings or qualitative findings (i.e., for every statistical test you have in the data analysis column, you should have a finding) | • Strengths and limitations of the study<br>• Risk or harm if study intervention or findings implemented<br>• Feasibility of use in your practice<br>• Remember: level of evidence (See Melnyk & Finout-Overholt, pp. 32-33) + quality of evidence = strength of evidence & confidence to act<br>• Use the USPSTF grading schema http://www.ahrq.gov/clinic/3rduspstf/ratings.htm |

## Appendix A (continued)

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| Qi, Qiu, & Zhang, 2017, Home blood pressure monitoring is a useful measurement for patients with hypertension: A long-term follow-up study. | None stated | Double-blind RCT | n= 1183<br>CG: n= 596<br>SOG: n= 587<br><br>Recruited at community hypertension management center<br><br>Characteristics:<br>-**Sex**: M (SOG: 290, CG: 499); F (SOG: 243, CG: 223)<br>-**Age**: (SOG: 63.5 ± 11.4, CG: 64.5 ± 10.2)<br>-**DM**: (SOG: 23%, CG: 32%)<br>-**Smoking**: (SOG: 32%, CG: 34%)<br>-**BMI**: (SOG: 28.1 ± 3.4, CG: 27.5 ± 3.7)<br>-**CHOL**: (SOG: 6.1 ± 0.7, CG: 5.9 ± 0.6)<br><br>Attrition: relocation (SOG: 24, CG: 14), refusal follow-up (SOG: 22, CG: 76), death (SOG: 10, CG: 7) | IV: HBPM vs CBPM<br><br>DV1: BP control<br>DV2: adherence | Validated and approved automated BP device for SOG<br><br>BP recorded within 1 hour of awakening and after seated for 5 minutes | Mean (SD)<br><br>Percentages (%)<br><br>Two-tailed *t*-test | SBP ↓ for SOG: 4.3 (± 3.2)<br>SBP ↓ for CG: 3.9 (± 3.1)<br>DBP ↓ for SOG: 3.5 (± 2.5)<br>DBP ↓ for CG: 3.0 (± 2.5)<br><br>Improved at goal BP:<br>SOG: 85.37%<br>CG: 79.96%<br><br>SBP and DBP for SOG and CG: $p < 0.05$ | Strengths: HBPM endorsed by international guidelines, ↑ patient engagement, cost-effective, simple intervention, extended follow-up period<br><br>Limitations: patient adherence to intervention, attrition<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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| Sharman, Blizzard, Kosmala, & Nelson, 2016, Pragmatic method using blood pressure diaries to assess blood pressure control. | None stated | RCT | n = 286<br><br>Recruited through general practice clinics and community advertisement in Australia<br><br>Characteristics:<br>-**Age**: 64 (8)<br>-**Sex (F):** 53%<br>-**BMI**: 29.4 (4.8)<br>-**CBP**: [SBP: 134 (14), DBP: 78 (10)]<br>-**24h ABP**: [SBP: 133 (12), DBP: 77 (8)]<br>-**7d HBP**: [SBP: 128 (13), DBP: 74 (8)]<br><br>Measurement of TOD:<br>-AS: 9.4 (2.1)<br>-LVRWT: 0.47 (0.20)<br>-LVMI: 31.3 (5.5)<br>-LVEF: 62 (5)<br>-LAA: 20.4 (4.2)<br>-LVFP: 11.6 (3.6)<br><br>Attrition:<br>Not discussed | IV: HBPM vs CBP<br><br>DV: BP control, AS, LVRWT, LVMI, LVEF, LAA, EVFP | CBP: automated oscillometiric BP device (HEM-907; OMRON Europe BV) after seated for 5 minutes<br><br>7d HBP: BP device (UA767, A&D Mercury), duplicate measurements, 1 min apart, only recording the second level, 3x/day, after seated for 5 minutes, apply usual guidelines for BP<br><br>24h ABP: BP device (TM-2430, A&D Mercury), measurements every 30 min 6A-10P, every 60 min 10P-6A<br><br>AS: tomometric carotid-to-femoral pulse wave velocity (SphygmoCor 8.0, AtCor Medical)<br><br>LVMI & LVEF: real-time 3D echocardiography<br><br>LVFP: pulsed-wave Doppler. | Mean (SD)<br><br>Percentages (%)<br><br>Sensitivity<br><br>Specificity: | Last 10 readings with < 3 elevations:<br>• ABP daytime SBP: 132.7 (± 11.1)<br>• HBP SBP: 120.4 (± 9.8)<br>Last 10 readings with ≥ 3 elevations:<br>• ABP daytime SBP: 143.4 (± 11.2)<br>• HBP SBP: 147.4(± 10.5)<br><br>Controlled HBP (<135mm Hg):34%<br>Controlled daytime ABP (<135mm Hg): 44%<br><br>(≥ 3 cut point):<br>Mean 24h ABP SBP ≥ 130: 62.1%<br>Mean 24h ABP daytime SBP ≥ 130: 64.6%<br><br>(≥ 3 cut point):<br>Mean 24h ABP SBP ≥ 130: 80.2%<br>Mean 24h ABP daytime SBP ≥ 130: 77.2% | Strengths: HBPM widely used, ↑ patient adherence to therapy, standardized method for HBPM<br><br>Limitations: ↓ sample size, patient error in recording BP, not applicable to patients with BP > 180/100<br><br>Risk/harm: lack of BP control and development of target organ disease<br><br>Feasibility: feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Bradbury, Morton, Band, van Woezik, Grist, McManus,… Yardley, 2018, Using the Person-Based Approach to optimize a digital intervention for the management of hypertension. | None stated | Qualitative interview study | n = 30<br><br>Recruited from Primary Care practices in South England<br><br>Characteristics:<br>-**Age (median)**:<br>S1 (69)<br>S2 (69)<br>S3 (65)<br>-**Sex (F)**:<br>S1 (6)<br>S2 (7)<br>S3 (3)<br>-**Yr since diagnosis (median)**:<br>S1 (8)<br>S2 (20)<br>S3 (10)<br>-**Ethnicity (WB)**:<br>S1 (11)<br>S2 (10)<br>S3 (7)<br>-**Employment (retired)**:<br>S1 (9)<br>S2 (7)<br>S3 (5)<br><br>Attrition:<br>Not discussed | IV: HBPM vs CBP<br><br>DV: patients' perceptions of HBPM | HOME BP digital intervention, Band, Morton, Stuart, Raftery, Bradbury,… McManus (2016)<br><br>Interview questions | Qualitative data<br><br>Iterative analysis | Study 1 & 2:<br>• HOME BP benefit:<br>-Control over health<br>-Pleased to learn correct method of HBPM<br>-Eliminates wait for physical appointment<br>-More accurate readings than CBP<br>• HOME BP concern:<br>- ↓ quality of service for med changes<br>-impersonal<br><br>Study 3:<br>• HOME BP concern:<br>-No consideration for factors that affect BP<br>-Security risk for sending online info<br>-Distrust in online provider<br><br>Patients in all studies: general belief that HBPM is empowering, easy, beneficial.<br><br>-BP instructions made clearer, repeated<br>-Explained BP varies naturally<br>-Changed BP procedure to 1 wk of practice<br>-Added diet sodium information<br>-Added BP cuff information<br>-Reinforced that provider would adjust meds, not website<br>-Changed information to state that HOME BP Is secure | Strengths: direct quotations from patient perspective, ↑ patient engagement, easy intervention<br><br>Limitations: ↓ sample size, ↓ information regarding pt experience with medication changes, ↓ participants in study 3, ↓ variation in ethnic representation, requires computer literacy<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: feasible for use in current and future practice<br><br>Level of Evidence: Qualitative Study- Level 6<br><br>USPSTF: Grade B; Level of certainty: Low |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Zalloum, Farha, Ruqa'a, Khdair, & Basheti, 2015, Blood pressure home monitoring in hypertensive patients attending a tertiary health facility in Amman, Jordan: Effect on disease control and adherence rate. | None stated | Cross-sectional correlation study | n = 205<br><br>Recruited from cardiovascular clinics at Jordan University Hospital<br><br>Characteristics:<br>-**Age**: 50-69 years: 59%<br>-**Sex(F)**: 52.7%<br>-**Employed**: 30%<br>-**Retired**: 34%<br>-**Bachelor's degree**: 32.2%<br>-**Diagnosis 10-20 yrs**: 37.1%<br><br>Attrition: not discussed | IV: HBPM vs CBP<br><br>DV: adherence to BP meds, BP control | Questionnaire<br><br>Stringent protocol in data collection to reduce bias by researchers | Mean (SD)<br><br>Percentages (%)<br><br>Spearman's correlation (*r*)<br><br>Logistic Regression Analysis | -HBPM: 15.5 (± 7.83) times/month<br>-Low BP: 4.1 (± 1.04) times/month<br>-High BP: 3.1 (± 1.2) times/month<br><br>-Don't forget BP meds: 69.3%<br>-Don't stop BP meds for any reason: 89.4%<br>-Stopped BP meds for side effects: 25.7%<br>-↑ salt intake for low BP: 52.8%<br>-↓ salt intake for high BP: 75.6%<br>-Doctor or ER visit for BP: 54.8%<br><br>-Older age and use of air meter/mercury meter: ($r = 0.239$, $p = 0.001$)<br>-↑ frequency of BP reading and stabilized BP: ($r = -0.232$, $p = 0.002$)<br><br>-Association with adherence to medication:<br>• Education level (higher): ($p = 0.044$)<br>• BP readings (low): ($p = 0.002$) | Strengths: popular method, intervention accepted by patients and providers, ↓ observer bias, ↓ white coat effect, inexpensive intervention<br><br>Limitations: role of pharmacist was not investigated, socioeconomic factors not discussed, methodology not sufficient to draw clear conclusions<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: Descriptive Study- Level 6<br><br>USPSTF: Grade: B; Level of Certainty: Moderate |

## Appendix A (continued)

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| Chmiel, Senn, Rosemann, Del Prete, & Steurer-Stey, 2014, CoCo trial: Color-coded blood pressure control, a randomized controlled study. | None stated | RCT | n = 121<br><br>Recruited by GPs in Zurich and St. Gallen, Switzerland.<br><br>Characteristics:<br>-**Age**:<br>[IG: 61.5 (±13.1), CG: 62 (±12.6)]<br>-**Sex (M):**<br>[IG: 53.9%, CG: 44.6%]<br>-**BMI**:<br>[IG: 28.2 (±4.3), CG: 28.8 (±5.4)]<br>-**Smokers**:<br>[IG: 21.5%, CG: 23.2%]<br>-**# of BP meds**:<br>[IG: 1.3 (±0.9), CG: 1.6 (±1.0)]<br>-**SBP**:<br>[IG: 157 (±15.3), CG: 159.5 (±13.2)]<br>-**DBP**:<br>[IG: 91.8 (±7.6), CG: 92.8 (±9.6)]<br><br>Attrition:<br>-Not met inclusion criteria: (IG: 3, CG: 8)<br>-Not met exclusion criteria: (IG: 2, CG: 3) | IV1: CoCo HBPM vs Standard HBPM<br><br>DV: patients' perceptions of HBPM | Automated electronic oscillometric BP device (MioStar Cardioplus 500) was used for CBP and HBPM-validated for accuracy by EUM norm (EN1060).<br><br>Cuff sizes were chosen by GPs to fit each patient individually.<br><br>Patient BP instructions:<br>• every AM before meds<br>• seated<br>• after resting for 5 minutes<br>• left upper arm with arm resting on table | Mean (SD)<br><br>Percentages<br><br>Multi-level regression analysis | -SBP after 6 months: [IG: 141.4 (±13.0), CG: 146.4 (±17.9)]<br>-DBP after 6 months: [IG: 83.8(±9.8), CG: 84.2 (±11.7)<br><br>-BP control: (IG: 43.1%, CG: 25%)<br>-HBPM adherence: (IG: 98.6%, CG: 96.2%)<br>-BP med changed after 6 months: (IG: 59.7%, CG: 68.1%)<br><br>-Reduced SBP for IG: (regression coefficient -4.26, 95% CI -7.85, -0.68; p = 0.020)<br>-Reduced DBP for IG: (regression coefficient -1.03, 95% CI -4.22, 2.15; p = 0.53 | Strengths: randomized controlled study, ↑ patient decision-making, ↑ patient health strategies, BP improvement without medication changes, simple intervention<br><br>Limitations: ↓ sample size, lack of blinding, ↓ patient-GP interaction, no evening or daytime measurements<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Cairns, Tucker, Leeson, Mackillop, Santos, Velardo, Salvi, Mort, Mollison, Tarassenko, & McManus, 2018, Self-management of postnatal hypertension: The SNAP-HT trial. | None stated | RCT | n = 82<br><br>Recruited from five National Health Service hospital sites in England<br><br>Characteristics:<br>-**Age**:<br>[IG: 31.7 (±5.3), CG: 31.7 (±5.3)]<br>-**Mean BMI**:<br>[IG: 29.0 (±7.5), CG: 28.0 (±8.3)]<br>-**Parity**:<br>0: (IG: 32 CG: 31)<br>≥1: (IG: 13 CG: 15)<br>-**Median Gestation at Diagnosis**:<br>[IG: 35.9), CG: 34.7]<br><br>Attrition:<br>-Withdrew during follow up (IG: 5, CG: 4) | IV1: HBPM vs CBP<br><br>DV: Feasibility, BP control | Validated BP device was used for HBPM (Microlife WatchBP Home)<br><br>The same BP device was used for follow-up visits.<br><br>Cuff sizes were determined by arm circumference measurement. | Mean (SD)<br><br>Percentages<br><br>Adjusted Mean Differences (95% CI) | -SBP after 6 weeks: [IG: 121.6 (8.7), CG: 126.6 (±11.0)]<br>-DBP after 6 weeks: [IG: 80.5 (±6.6), CG: 86.0 (±9.7)]<br>-SBP after 6 months: [IG: 125.8 (±12.9), CG: 126.8 (±14.0)]<br>-SBP after 6 months: [IG: 81.0 (±8.2), CG: 85.5 (±9.9)]<br><br>-Retention rate at 6 weeks: (IG: 89%, CG: 91%)<br>-Retention rate at 6 months: (IG: 91%, CG: 94%)<br>-F/U visits attended by population that finished F/U (98%)<br>**Mean of readings 2 & 3**<br>-BP in target range at F/U (6 weeks): (IG: 93%, CG: 62%)<br>-BP in target range at F/U (6 months): (IG: 80%, CG: 62%)<br>**Mean of readings 2-6**<br>-BP in target range at F/U (6 weeks): (IG: 88%, CG: 60%)<br>-BP in target range at F/U (6 months): (IG: 75%, CG: 67%)<br><br>-SBP after 6 weeks: -5.2 (-9.3 to -1.2)<br>-DBP after 6 weeks: -5.8 (-9.1 to -2.5)<br>-SBP after 6 months: -1.0 (-6.3 to 4.4)<br>-SBP after 6 months: -4.5 (-8.1 to -0.8) | Strengths: ↑ patient decision-making, simple intervention, adequate follow-up visits and length of follow up, limited detection bias by using a validated BP monitor, convenient follow-up visits at home.<br><br>Limitations: ↓ sample size, lack of blinding, ↓ diversity in ethnicity and socioeconomic status of participants, trial was not powered to detect a difference in secondary outcomes<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| de Heus, Tumelaire, Olde Rikkert, & Claassen, 2019, Diagnostic accuracy of office blood pressure compared to home blood pressure in patients with mild cognitive impairment and dementia. | None stated | Cross-sectional study | n = 213<br><br>Recruited from a memory clinic at a university teaching hospital between 2014 and 2017.<br><br>Characteristics:<br>-**Age**:<br>DEM group: 77.3 (7.4)<br>MCI group: 74.4 (8.0)<br>CN group: 67.5 (8.8)<br>**-Sex (F):**<br>DEM group: 45.1 (37)<br>MCI group: 43.1 (28)<br>CN group: 36.4 (24)<br>**- # of Drugs:**<br>DEM group: 4 (2–7)<br>MCI group: 4 (1–7)<br>CN group: 5 (1- 8)<br>**-Use of BP meds:**<br>DEM group: 61.0 (50)<br>MCI group: 56.9 (37)<br>CN group: 56.1 (37)<br>**- History of CV disease:**<br>DEM group: 46.3 (38)<br>MCI group: 43.1 (28)<br>CN group: 56.1 (37)<br><br>Attrition:<br>-Did not meet the minimum number of twelve BP readings: 25<br>–No CBP level for comparison: 23 | IV1: HBPM vs CBP<br><br>DV: Misdiagnosis of HTN | Validated, memory equipped, automatic BP device was used for HBPM (Microlife WatchBP Home)<br><br>Demonstration and written instruction for HBPM were provided.<br><br>Duplicate morning (6A-10A) and evening (5P-9P) measurements for 7 days.<br><br>BP readings taken while sitting for 5 minutes with arm supported by table. | Mean (SD)<br><br>Percentages<br><br>Adjusted Odds Ratio | Mean home SBP compared to CBP: -16.8<br>Mean home DBP compared to CBP: -5.0<br><br><u>Disagreement in hypertension diagnosis between HBPM and CBP</u>:<br>Total sample: 31%<br>DEM group: 35.4%<br>MCI group: 38.5%<br>CN group: 18.2%<br><br><u>Disagreement in hypertension diagnosis:</u><br>MCI group: 3.7<br>DEM group: 3.4<br><br><u>WCH:</u><br>MCI group: 5.1<br>DEM group: 2.9 | Strengths: validated BP device, ↑ patient involvement, simple intervention, large age diversity, evaluated patients with varied cognitive function.<br><br>Limitations: possible bias due to variations in cognition, cannot ensure adherence to BP instructions, lacks long-term follow up.<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: Descriptive Study- Level 5<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Pan, Wu, Liu, Zhang, Peng, Wei, & Gao, 2018, Effects of home telemonitoring on the control of high blood pressure: A randomised control trial in the Fangzhuang Community Health Center, Beijing. | None stated | RCT | n = 110<br><br>Recruited from a Fangzhuang Community Health Center<br><br>Characteristics:<br>-**Age**:<br>[IG: 56.55 (±9.8), CG: 57.8 (±10.87)]<br>-**Sex (M):**<br>[IG: 26, CG: 24]<br>-**BMI**:<br>[IG: 25.25 (±3.45), CG: 25.78 (±3.07)]<br>-**Smokers**:<br>[IG: 11.5%, CG: 15.4%]<br>-**# of BP meds**:<br>[IG: 1.68 (± 0.55), CG: 1.89 (±0.53)]<br>-**SBP**:<br>[IG: 148 (±7.1), CG: 147.9 (±8.7)]<br>-**DBP**:<br>[IG: 88.0 (±7.5), CG: 87.0 (±8.4)]<br><br>Attrition: Two patients from the IG moved out of the community, and one patient from the IG withdrew from the study | IV1: Home BP telemonitoring vs CBP<br><br>DV: BP control | Automated BP device which uploaded BP levels to a hypertension management platform by a smart phone application.<br><br>The same BP device was used for clinic visits also.<br><br>Training sessions were provided on HBPM with BP device and app. | Mean<br><br>Chi squared ($\chi^2$)<br><br>Percentages (%)<br><br>Pearson's r | <u>Reduction in SBP:</u><br>- Day 30: (IG: 14.2, CG: 6.2)<br>- Day 90: (IG: 16.1, CG: 9.2)<br>- Day 180: (IG: 16.4, CG: 9.8)<br><br><u>Reduction in DBP:</u><br>- Day 30: (IG: 5.4, CG: 5.6)<br>- Day 90: (IG: 9.5, CG: 6.1)<br>- Day 180: (IG: 7.4, CG: 4.4)<br><br><u>Control Rate of BP</u><br>Day 30: 9.98<br>Day 90: 8.68<br>Day 180: 4.67<br><br><u>Control Rate of BP</u><br>Day 30: (IG: 71.2, CG: 40.0)<br>Day 90: (IG: 67.3, CG: 38.5)<br>Day 180: (IG: 63.6, CG: 41.8)<br><br>Correlation between reduction in blood pressure and use of app for IG (r = 0.302, P = 0.029). | Strengths: ↑ patient awareness, adequate length of follow up, remote monitoring extends services beyond clinic physical boundaries, better accessibility and continuity of care.<br><br>Limitations: ↓ sample size, lack of blinding, long term health outcomes not assessed, trial was not designed to assess risk of CV disease, adverse psychological effects were not measured<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Breaux-Shropshire, Judd, Vucovich, Shropshire, & Singh, 2015, Does home blood pressure monitoring improve patient outcomes? A systematic review comparing home and ambulatory blood pressure monitoring on blood pressure control and patient outcomes. | None stated | Systematic review | n = 19<br><br>Literature search performed using these databases: PubMed, CINAHL (EBSCO), Scopus, &Cochrane Central (Wiley) using a variety of search terms modified for each database. Two reviewers independently reviewed each article.<br><br>Characteristics:<br>-**Study type**:<br>Observational: 9<br>Quasi-experimental: 5<br>RCT: 5<br><br>**-Sample size range**:<br>Observational: 210 to 2,051<br>Quasi-experimental: 53 to 121<br>RCT: 51 to 426<br><br>-**Median follow up**:<br>Observational: 0 to 10.9 years<br>Quasi-experimental: 0 to 12 weeks<br>RCT: 0.5 to 12 weeks<br><br>**-Study Location**:<br>United States: 3<br>Belgium: 1<br>Japan: 3<br>Italy: 4<br>Spain: 2<br>Australia: 1<br>Brazil: 2<br>Switzerland: 1<br>Finland: 1<br>Germany: 1<br><br>Attrition: none | IV1: HBPM vs Ambulatory BP<br><br>DV: BP control, patient outcomes | Jaded scale was used to assess research methodology and scientific merit of RCTs (assigned numeric score 1 to 5).<br><br>Newcastle-Ottawa scale was used to assess observational studies. | Qualitative synthesis | HBPM is as good or better than ABP monitoring for prediction of mortality for patients ≥ 60.<br><br>Using HBPM to target antihypertensive treatment resulted in better BP control for patients receiving hemodialysis.<br><br>Using HBPM to titrate BP medication produces same level of control as ABP.<br><br>CBPM has lower sensitivity to detect optimal BP control defined by HBPM and ABP.<br><br>Correlation between HBPM and ABP is stronger than CBPM with ABP. | Strengths: comparison of multiple studies with similar findings, intervention encourages patient involvement, intervention encouraged medication adherence and adoption of healthy lifestyle habits.<br><br>Limitations: small sample size, malalignment of studies and systematic reviewers' interpretation of BP control, variability of length of monitoring and frequency of measurement,<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: Systematic review-Level 1<br><br>USPSTF: Grade: C; Level of certainty: Moderate |

## Appendix A (continued)

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|---|---|---|---|---|---|---|---|---|
| Cairns, Tucker, Crawford, McManus, Powell, 2020, Implementing self-management: A mixed methods study of women's experiences of a postpartum hypertension intervention (SNAP-HT). | None stated | Mixed methods study | n = 68<br><br>Recruited from five National Health Service hospital sites in England during pregnancy. Interviews took place after delivery.<br><br>Characteristics:<br>-**Age**:<br>[IG: 32.5 (±5.0), CG: 31.9 (±4.8)]<br>-**Mean BMI**:<br>[IG: 28.8 (±8.1), CG: 28.5 (±9.0)]<br>-**Parity**:<br>0: (IG: 22 CG: 22)<br>≥1: (IG: 12 CG: 12)<br>-**Median Gestation at Diagnosis**:<br>(IG: 36.1, CG: 34.9)<br><br>Attrition: Failure to complete second interview<br>(IG: 2, CG: 8). | IV1: HBPM vs CBPM<br><br>DV: patients' perceptions | Semi-structured interviews provided reproducible format for consistency.<br><br>Likert scale (1-5) was used for patient responses to standardized questions in both groups. | Qualitative analysis<br><br>Mean (SD)<br><br>Adjusted Difference Between Groups | • <u>Control</u><br>-IG: ↑ control, ↑ responsibility<br>-CG: variable responses regarding control, responsibility, and med adjustment<br>• <u>Convenience</u><br>-IG: variable responses on access to care, ↑ relationship with provider<br>-CG: variable responses on access to care, difficulty making appointments, ↑ relationship with provider<br>• <u>Confidence, Communication, & Knowledge</u><br>-IG: ↑ confidence in communicating with provider, knowledge of BP readings was helpful<br>-CG: variable responses regarding communication with providers and provider knowledge<br>• <u>Concern</u><br>-IG: HBPM ↓ anxiety<br><br><u>IG only questions:</u><br>-Fit with condition: [4weeks: 4.8(0.4), 6 months: 4.8 (0.5)]<br>-Ease/Difficulty of use: [4weeks: 4.9(0.3), 6 months: 4.9 (0.4)]<br>-Change in lifestyle: [4weeks: 4.1(0.9), 6 months: 4.4 (0.9)]<br>-Likely to recommend: [4weeks: 4.9(0.3), 6 months: 4.9 (0.4)]<br>-Likely to continue: [4weeks: 4.1(0.9), 6 months: 4.4 (0.9)]<br><br><u>4 weeks</u>: 0.6 (95% CI 0.2 to 1.1)<br><u>6 weeks</u>: 0.7(95% CI 0.3 to 1.2) | Strengths: ↑ patient involvement, adequate length of follow up, ↑ patient control in BP management, single reviewer for qualitative analysis of interviews, quantitative component.<br><br>Limitations: potential for bias because all who interviewed were enrolled in RCT, lack of independent researchers (members of the trial team conducted interviews), English language only for interview<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: Mixed-Methods study-Level 5<br><br>USPSTF: Grade: C; Level of certainty: Moderate |

## Appendix A (continued)

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| Aekplakorn, Suriyawongpaisal, Tansirisithikul, Sakulpipat, & Charoensuk, 2016, Effectiveness of self-monitoring blood pressure in primary care: A randomized controlled trial. | None stated | RCT | n = 224<br><br>Recruited from a community hospital registry for patients living in Bang phli district, Sautprakarn providence<br><br>Characteristics:<br>-Age:<br>[IG: 58(±9.4), CG: 60.83 (±9.0)]<br>-Sex (M):<br>[IG: 39, CG: 39]<br>-BMI:<br>[IG: 27.3 (±5.2), CG: 26.4 (±4.5)]<br>-Smokers:<br>[IG: 5.4%, CG: 12.4%]<br>-# of BP meds:<br>1: (IG: 32, CG: 39)<br>2: (IG: 51, CG: 52)<br>≥ 3: (IG: 28, CG: 22)<br>-SBP:<br>[IG: 149.4 (±11.4), CG: 147.2 (±14.9)]<br>-DBP:<br>[IG: 83.4 (±9.9), CG: 82.2 (±11.7)]<br><br>Attrition: At six months, one patient from the IG and one patient from the CG withdrew. | IV1: HBPM vs CBPM<br><br>DV: BP control | Automated BP device (Omron model HEM-7117).<br><br>Japanese Society of Hypertension guideline 2003: BP measured twice daily- morning and evening (three readings obtained each time).<br><br>Each patient was instructed individually about how to use the monitor, record, and interpret the BP data.<br><br>Uncontrolled BP was defined by SBP ≥ 140 mm Hg or DBP ≥ 90. | Mean<br><br>Mean Difference<br><br>Percentages (%)<br><br>Difference Between Groups (p value) | SBP at 6 months: (IG: 137.4, CG: 137.9)<br>DBP at 6 months: (IG: 76.4, CG: 76.0)<br>SBP at 12 months: (IG: 136.4, CG: 136.8)<br>DBP at 12 months: (IG: 78.1, CG: 78.1)<br><br>6 months: (SBP: -2.9, DBP: -0.6)<br>12 months: (SPB: -2.5, DBP-1.2)<br><br>Uncontrolled BP:<br><u>All:</u><br>-Baseline (IG: 97, CG: 88)<br>-6 Months (IG: 41, CG: 43)<br>-12 Months (IG: 51, CG: 52)<br><u>≤60:</u><br>-Baseline (IG: 47, CG: 34)<br>-6 Months (IG: 17, CG: 15)<br>-12 Months (IG: 30, CG: 18)<br><u>≥60:</u><br>-Baseline (IG: 50, CG: 54)<br>-6 Months (IG: 24, CG: 28)<br>-12 Months (IG: 21, CG: 36)<br><br><u>All</u>:<br>Baseline to 6 Months: 0.13<br>Baseline to 12 Months: 0.13<br><u>≤60:</u><br>Baseline to 6 Months: 0.28<br>Baseline to 12 Months: 0.78<br><u>≥60:</u><br>Baseline to 6 Months: 0.24<br>Baseline to 12 Months: 0.02 | Strengths: ↑ patient awareness and compliance to medications, adequate length of follow up, rules out WCH.<br><br>Limitations: ↓ sample size, lack of blinding, low percentage of complete BP records, details of meds at follow up not provided.<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: RCT- Level 2<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

## Appendix A (continued)

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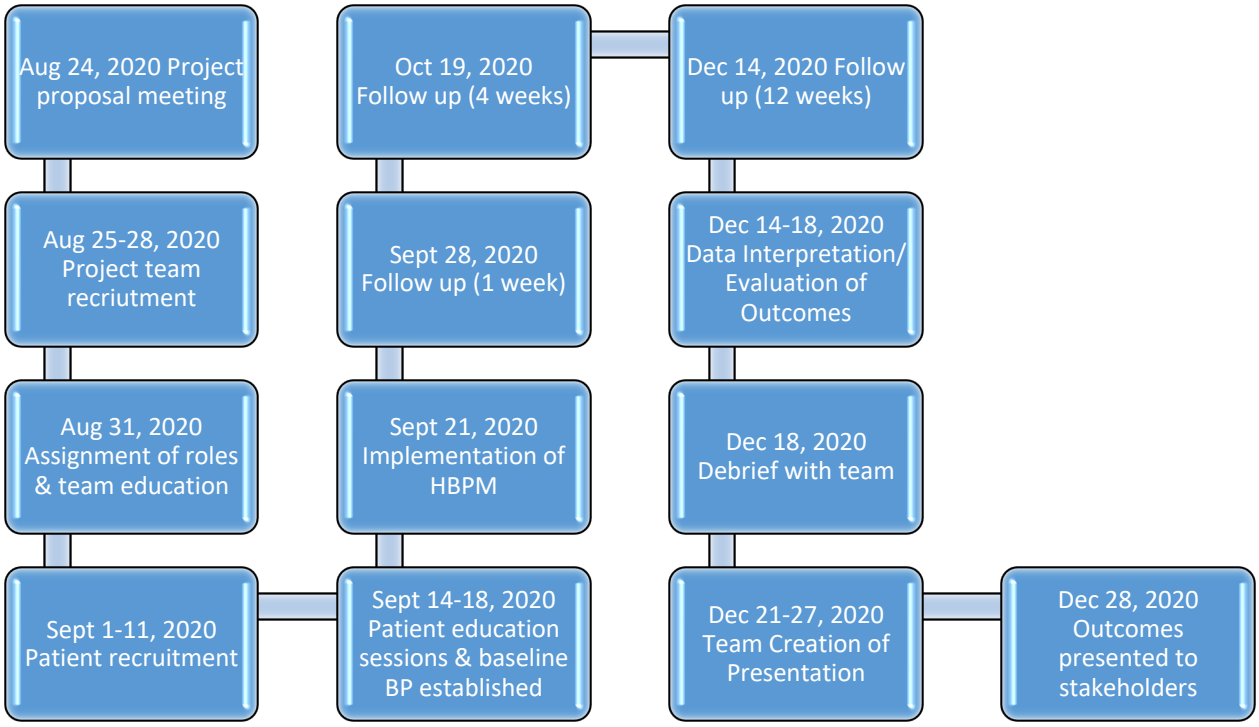
| Spirk, Noll, Burnier, Rimoldi, Noll, & Sudano, 2018, Effect of home blood pressure monitoring on patient's awareness and goal attainment under antihypertensive therapy: The factors influencing results in anti-hypertensive treatment (FIRST) study. | None stated | Cohort study | n = 1, 268<br><br>30 to 36 physicians from each of the 10 sectors in Switzerland were randomly chosen from a registry to enroll up to 5 patients in the study.<br><br>Characteristics:<br>-**Age**: 61.2 ± 12.5<br>-**Sex (F):** 48.6%<br>-**BMI**: 28.4 ±5.0<br>-**Diabetes:** 18.8%<br>-**SBP**: 161.5 ± 17.1<br>-**DBP**: 95.7 ± 10.8<br>- **HBPM**: 59.8%<br><br>Attrition: 117 did not show up for follow up appointment at 3 months | IV1: HBPM vs CBPM<br><br>DV: patients' awareness, BP control | Automated BP device (Microlife 3AC1-1PC, Average Mode)<br><br>BP levels were automatically stored on the device for physician review.<br><br>Detailed training sessions were provided on HBPM and documentation.<br><br>HBPM was performed once weekly and on the 6 consecutive days prior to each physician visit.<br><br>BP taken after resting for 5 minutes, before drug intake, in a quiet room, seated, and after > 30 minutes without smoking, caffeine, meal, or exercise. | Percentages (%)<br><br><br><br><br><br>Mean (SD) | <u>BP Goal Attainment after 3 months:</u><br>- HBPM: 64%<br>- CBPM only: 57%<br><br><u>Patient awareness of BP goals:</u><br>- HBPM: 81%<br>-CBPM only: 70%<br><br><u>SBP</u>:<br>- HBMP: 138 ± 13<br>- CBPM only: 139 ± 14<br><br><u>DBP</u>:<br>- HBMP: 83 ± 9<br>- CBPM only: 84 ± 9<br><br><u>Reduction in SBP between groups:</u><br>- Total: 23.8<br>- Irbesartan 300mg + HCTZ 12.5mg: 26.4<br><br><u>Reduction in DBP between groups</u>:<br>- Total: 13.2<br>- Irbesartan 300mg + HCTZ 12.5mg: 13.3 | Strengths: large sample size, ↑ patient awareness, ↑ patient involvement, simple intervention, cost-effective, automated BP device with storage.<br><br>Limitations: observational, short follow up period, lack of blinding and randomization, no exclusion criteria, medication therapy used alongside HBPM.<br><br>Risk/harm: lack of BP control and development of complications<br><br>Feasibility: Feasible for use in current and future practice<br><br>Level of Evidence: Cohort study- Level 4<br><br>USPSTF: Grade: B; Level of certainty: Moderate |

Legend: RCT: randomized controlled trial, SOG: self-observation group, CG: control group, IG: intervention group, DM: diabetes mellitus, CHOL: serum cholesterol, IV: independent variable, HBPM: home blood pressure monitoring, CBPM: clinic blood pressure monitoring, DV: dependent variable, BP: blood pressure, CBP: clinic blood pressure, SBP: systolic blood pressure, DBP: diastolic BP, HBP: home blood pressure, ABP: ambulatory blood pressure, TOD: target organ disease, AS: aortic stiffness, LVRWT: left ventricular relative wall thickness, LVMI: left ventricular mass index, LVEF: left ventricular ejection fraction, LAA: left atrial area, LVFP: left ventricular filling pressure, WB: White British, HOME BP: Home and online management and evaluation of hypertension, HTN: hypertension, CoCo: Color-coded, GPs: general practitioners, AM: morning, F/U: follow-up, HTN: hypertension, CV: cardiovascular, DEM: dementia, MCI: mild cognitive impairment, CN: cognitively normal, WCH: white coat hypertension

## Appendix B


Aug 24, 2020 Project proposal meeting
Aug 25-28, 2020 Project team recriutment
Aug 31, 2020 Assignment of roles & team education
Sept 1-11, 2020 Patient recruitment
Sept 14-18, 2020 Patient education sessions & baseline BP established
Sept 21, 2020 Implementation of HBPM
Sept 28, 2020 Follow up (1 week)
Oct 19, 2020 Follow up (4 weeks)
Dec 14, 2020 Follow up (12 weeks)
Dec 14-18, 2020 Data Interpretation/ Evaluation of Outcomes
Dec 18, 2020 Debrief with team
Dec 21-27, 2020 Team Creation of Presentation
Dec 28, 2020 Outcomes presented to stakeholders

**Appendix C: Instrument**

# Home Blood Pressure Log

Use this logbook to document your blood pressure readings

| | Systolic | Diastolic | Comments |
|---|---|---|---|
| Day 1 | | | |
| Day 2 | | | |
| Day 3 | | | |
| Day 4 | | | |
| Day 5 | | | |
| Day 6 | | | |
| Day 7 | | | |