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## Supporting self-management for people with hypertension: A meta-review of quantitative and qualitative systematic reviews

Orjola SHAHAJ<sup>a</sup> (OS), Diarmuid DENNENY<sup>b,c</sup> (DD), Anna SCHWAPPACH<sup>d</sup> (AS), Gemma PEARCE<sup>e</sup> (GP), Eleni EPIPHANIOU<sup>f</sup> (EE), Hannah L PARKE<sup>g</sup> (HLP), Stephanie JC TAYLOR<sup>b</sup> (SJT), Hilary PINNOCK<sup>a</sup> \* (HP)

- a. Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, Edinburgh
- b. Barts and the London School of Medicine and Dentistry, Queen Mary University of London
- c. University College London Hospitals NHS Foundation Trust
- d. Public Health Wales, Cardiff
- e. Centre for Advances in Behavioural Science, Coventry University, Coventry
- f. University of Nicosia, Cyprus
- g. University of Exeter

**\*Corresponding author:** Professor Hilary Pinnock,  
Usher Institute of Population Health Sciences and Informatics,  
The University of Edinburgh  
Doorway 3, Medical School, Teviot Place,  
Edinburgh EH8 9AG  
Tel: 0131 650 9474 Fax: 0131 650 9119  
E-mail: [hilary.pinnock@ed.ac.uk](mailto:hilary.pinnock@ed.ac.uk)

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- The final report of PRISMS review (including the original hypertension meta-review, but not the update, is published): Taylor SJC, Pinnock H, Epiphaniou E, Pearce G, Parke H, *et al.* A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions. *Health Serv Deliv Res* 2014; 2:54
- Abstracts of the original hypertension meta-review have been presented at the Public Health Science Conference, November 19<sup>th</sup> 2014, Glasgow (by AS); Division of Health Psychology Annual Conference, September 10<sup>th</sup> 2014, York (by GP); and Society for Academic Primary Care Conference, July 3<sup>rd</sup> 2013, Nottingham (by AS)

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**Abstract**

**Objectives:** Globally, healthcare policy promotes supported self-management as a strategy for people with long-term conditions. This meta-review aimed to explore how people with hypertension make sense of their condition, to assess the effectiveness of supported self-management in hypertension, and to identify effective components of support.

**Methods:** From a search of eight databases (Jan 1993-Oct 2012; update June 2017) we included systematic syntheses of qualitative studies of patients' experiences, and systematic reviews of randomised controlled trials evaluating the impact of supported self-management on blood pressure and medication adherence. We used meta-ethnography, meta-Forrest plots and narrative analysis to synthesise the data.

**Results:** Six qualitative and 29 quantitative reviews provided data from 98 and 446 unique studies, respectively. Self-management support consistently reduced systolic BP (by between 2 and 6mmHg), and diastolic BP (by between 1 and 5mmHg). Information about hypertension and treatment, home BP monitoring (HBPM) and feedback (including telehealth) were widely used in effective interventions. Patients' perceptions of a disease with multiple symptoms contrasted with the professional view of an asymptomatic condition. HBPM, in the context of a supportive patient-professional relationship, changed perceptions of the significance of symptoms and fostered confidence in ability to self-manage hypertension.

**Conclusions:** Our systematic qualitative and quantitative meta-reviews tell complementary stories. Supported self-management can improve blood pressure control. Interventions are complex and encompass a broad range of support strategies.

HBPM (with or without telehealth) within the context of a supportive patient-professional partnership can bridge the gap between medical and lay perspectives of hypertension and enable effective self-management.

**Key words**

Hypertension; supported self-management; home blood pressure monitoring; telehealth; systematic meta-review; systematic review; meta-analysis; qualitative synthesis;

**Condensed Abstract**

Our meta-review synthesised the findings of 6 qualitative (98 studies) and 29 quantitative (446 Randomised Controlled Trials) reviews. Self-management support for hypertension consistently reduced blood pressure. Interventions are complex, encompassing support strategies such as information about hypertension/treatment, home BP monitoring (HBPM) and feedback (including telehealth). Patients' perceptions of a disease with multiple symptoms contrasted with the professional view of an asymptomatic condition. HBPM, in the context of a supportive patient-professional relationship, increased patients' understanding of hypertension, potentially bridging the gap between medical and lay perspectives of hypertension and enabling effective self-management.

**Abbreviations definitions**

BP	Blood pressure
HBPM	Home blood pressure monitoring
LTCs	Long-term conditions
MeSH	Medical subject headings
PICOS	Population, Intervention, Comparator, Outcome, Setting
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMS	Practical systematic Review of Self-Management Support for long-term conditions
RCTs	Randomised Controlled Trials
R-AMSTAR	Revised Assessment of Multiple Systematic Reviews

## **Introduction**

Hypertension is an important public health problem globally, with an estimated 1.56 billion adults predicted to have the disease by 2025 [1]. As a major risk factor for renal failure, ischaemic heart disease, stroke, and other cardiovascular diseases[1], poorly controlled hypertension contributes to substantial morbidity and mortality. Ischaemic heart disease and stroke were leading causes of death globally in 2010 [2] and predicted to remain so in 2030 [3]. This represents a large, and increasing, burden of potentially preventable and treatable disease and one that, alongside other long-term conditions (LTCs), healthcare systems around the world need to address[1].

One response to the mounting global challenge of managing LTCs, is the promotion of supported self-management[4-6], with a shift from paternalistic to partnership models of care[7]. Self-management has been defined as *'..the tasks that individuals must undertake to live with one or more chronic conditions'* and includes having the *'confidence to deal with medical management, role management and emotional management of their conditions'*[8]. Self-management support includes *'any activities that support people in their self-management'*[9] and a broad range of strategies have been used to meet the support needs of people living with LTCs[9,10]. Some strategies are common to all conditions (such as provision of information and professional support) whilst others will be specific to diverse conditions or contexts. For example, variable conditions such as asthma benefit from provision of 'action plans' to support timely self-management of attacks[11]; whereas therapy rehabilitation and psychosocial support are more important for people living with the disabling but stable impact of a stroke[12,13]. The evidence for self-management support for hypertension, an asymptomatic condition in which the key objective is reducing the risk of complications

[1,14] is less clear, though there is increasing interest in promoting lifestyle change and the role of telehealth to monitor blood pressure[14].

As part of a large systematic meta-review of the literature completed in 2013 on self-management support for LTCs (PRISMS - Practical systematic Review of Self-Management Support for long-term conditions)[15], we synthesised the evidence around self-management support interventions for people with hypertension; this paper reports an update undertaken in 2017. Meta-reviews provide broad perspectives, ideal for informing policy-makers, commissioners and providers of healthcare services[16]. We reviewed qualitative systematic reviews to explore how people with hypertension make sense of their condition and understand self-management strategies, and quantitative systematic reviews to identify which self-management support interventions are effective.

## **Methods**

This update followed the methods used in the PRISMS meta-review[15], which was based on Cochrane methodology[17]. (The study could not be registered because PROSPERO does not register meta-reviews)

**Search strategy:** We used a 'PICOS' search strategy, with basic search terms of 'self-management support' AND 'hypertension' AND 'systematic review'. The full search protocol, search terms and MeSH terms are available in Supplementary Digital Content (SDC) file 1. The original PRISMS search was from January 1993 (when systematic review methodology was defined by the Cochrane collaboration) until October 2012; the update search was undertaken in June 2017. We searched eight electronic databases: MEDLINE, EMBASE, CINAHL, PsychINFO, AMED, BNI, Cochrane Database of Systematic Reviews and Database of Abstracts of Reviews of Effects, checked the bibliographies of eligible reviews and undertook a forward citation search (Web of Science).

**Screening and selection criteria:** Following training, title and abstract screening was carried out by AS or GP/EE (PRISMS review) and OS (Update). Full text screening was then performed by AS (PRISMS) and OS/DD (Update). At all stages of screening, a random 10% sample of titles were independently examined by GP/EE (PRISMS review) and GP/AS (Update), as a quality check. Discussion with SJCT/HP resolved disagreements.

*Population:* We included studies from all healthcare settings where self-management support was delivered to populations with diagnosed hypertension, with no exclusions made for age, gender, or ethnicity. Reviews were excluded when they focussed solely



on secondary hypertension, children or pregnant women because we considered that they might not be representative of the general supported self-management of hypertension.

*Intervention:* We included quantitative systematic reviews if they searched for interventions that met our definition of self-management support[8]. We excluded reviews focussing solely on mono-component interventions (such as meditation, relaxation, exercise), other than interventions described as providing only 'education' which we regarded as an essential component of supported self-management[15]. We included qualitative reviews which informed strategies to support self-management (including general experiences of living with hypertension and using hypertension services).

*Comparator:* All comparators (typically 'usual care') were included; we noted details of the control service in our analysis.

*Outcomes:* Our primary clinical outcome was mean difference in blood pressure (systolic and diastolic) and, reflecting the mechanism by which hypertension is controlled, adherence to medication was the key process outcome.

*Study design:* We included quantitative systematic reviews of Randomised Controlled Trials (RCTs) or mixed method reviews in which the RCT data could be extracted. Qualitative systematic reviews were included if they provided a synthesis of qualitative primary studies. We excluded reviews that were unpublished, if they were not in English, if we were unable to extract data about people with hypertension, or if a more recent updated version had been published. See SDC file 1 for detailed exclusion criteria.

**Data extraction and quality assessment:** Data were extracted by AS/GP (PRISMS review), OJ/DD (Update) using a piloted data extraction table; 10% of the completed data extraction tables were checked by a second reviewer (GP/HLP for PRISMS; GP/AS for the update). All numerical data in tables or figures were checked by HP prior to publication.

We used the Revised Assessment of Multiple Systematic Reviews (R-AMSTAR) quality appraisal tool to assess the quality of all included systematic reviews[18].

- For qualitative reviews, an adapted R-AMSTAR was used with high quality defined as those scoring of  $\geq 30$  (out of possible R-AMSTAR score of 40) and low quality if  $< 30$ .
- For quantitative reviews, we applied a weighting system, taking into consideration both the quality score (high quality, defined as a score of  $\geq 31$  (out of possible R-AMSTAR score of 44) or low quality, a score  $< 31$ ) and number of participants (large  $\geq 3,000$  or small  $< 3,000$ ). Studies were rated from 1 star (small, low-quality reviews) to 3 stars (large, high-quality reviews). Small, high-quality or large, low-quality reviews were rated 2-star. Assessments of publication bias in the include reviews was noted.

Quality assessment was undertaken by AS or GP (PRISMS) and OJ or DD (Update), with a random 10% checked independently by a second reviewer (HLP/GP for PRISMS; GP/AS for update). Disagreements were resolved by discussion and, if necessary, with the involvement of a third reviewer (HP/SJT/EE).

**Data synthesis:** Initially, data from the included quantitative and qualitative reviews were analysed and synthesised separately.

- We employed a meta-ethnographic framework to synthesise the qualitative review data (GP/DD building on initial work by AS)[19]. Reciprocal translation was first used to examine patterns and identify metaphors arising within the included reviews. A lines-of-argument synthesis then interpreted the findings into a broader understanding to inform future development of self-management support interventions in a healthcare context[19].
- For the quantitative analysis (AS/OS) we performed a narrative synthesis (overlap of included RCTs between reviews precludes meta-analysis), using the PRISMS taxonomy to categorise components of self-management support[9]. We illustrated the results of included meta-analyses in meta-Forrest plots.

Synthesis of the data from the quantitative and qualitative reviews involved discussion amongst the multidisciplinary study team to ensure balanced interpretation.

### **Pre-publication check**

We undertook a pre-publication check in April 2018 using the 'efficient and effective' approach of forward citation of all included reviews using Google Scholar[20]. We undertook focused data extraction of key outcomes (HP checked by GP) which we cite as corroborative data. Had we identified studies that substantially changed our conclusions we planned full duplicate data extraction, quality assessment and revision of our synthesis.

## **Results**

The screening process is illustrated in the PRISMA flow diagram (Figure 1). The PRISMS meta-review identified 11,098 references from which two qualitative and ten quantitative systematic reviews were selected. The update search yielded 13,055 citations from which we selected an additional four qualitative and 19 quantitative reviews.

### **Review characteristics**

Summaries of included studies are in Tables 1 (qualitative) and 2 (quantitative) with quality scores and quantitative star ratings in column 1. SDC file 1 has details of the R-AMSTAR scores and tables summarising the degree of overlap between the studies included in the reviews.

The six qualitative systematic reviews (2007 to 2017)[21-26], reported 98 unique primary qualitative studies, published between 1980 and 2015, and undertaken in at least 27 countries. Three reviews were scored as being of high quality[23-25].

The 29 quantitative systematic reviews[27-56], were published between 1998 [35] and 2017 [27,34,48], included 446 unique RCTs dating from 1973 to 2016, and were conducted in at least 12 different countries including high- middle- and low- income settings. Total numbers of participants in the RCTs, where reported, ranged from 382 to more than 87,000 [36]. Fourteen reviews undertook meta-analyses of blood pressure data[30,31,33-36,39,41,43,47,48,51,53,55]; the remainder presented narrative synthesis only. The R-AMSTAR scores ranged from 18 [32] to 41 [48] with seven reviews allocated 3-star ratings[30,34,36,39,43,48,50]. We identified two additional quantitative reviews in the pre-publication check[56,57].

## Overview of results

We first describe the qualitative findings which explore patients' *understanding of hypertension* and perceptions of *working together* with healthcare professionals to manage the condition. We then present the findings of the quantitative systematic reviews which assess the impact of different self-management support strategies on BP control and medication adherence. Finally, we present an over-arching synthesis of the findings of the qualitative and quantitative meta-reviews.

## Synthesis of qualitative findings

We identified two overarching metaphors (Figure 2): 'Understanding Hypertension' and 'Working Together'. See Table 1 for a summary table of qualitative reviews and SDC file 2 for more detail and illustrative quotes to support these metaphors and the sub-themes.

### *Understanding hypertension*

People with hypertension reported a wide variety of factors contributing to their experience and understanding of the condition. A range of beliefs about the definition and causes of hypertension, influenced by cultural factors[21,24,26], were identified, including that it was a 'temporary' condition that was not serious[21,24,26], or being two distinct conditions: '*high-pertension*', resulting from intense emotions or anxiety, and '*high blood*', a chronic condition due to genetics and diet[21]. Stress (for example financial or family problems, racism and stressful life events) was commonly believed to cause/worsen hypertension[21,23,24,26]. Diet, such as high salt intake, was also recognised by many as a cause[21,23,26]. Participants frequently described a range of

different symptoms associated with high blood pressure, and in particular headache and dizziness[21,24,26]. Most clinicians believe hypertension is symptomless, and therefore the presence of symptoms provided a source of confusion to patients[23].

How people manage their hypertension, and particularly medication adherence, was influenced by a range of factors. Deliberately choosing to avoid or reduce medication (intentional non-adherence), rather than forgetfulness, was a theme in some studies[24]. For some patients, symptoms acted as a guide for the seriousness of their hypertension and guided their medication use; for example, they stopped treatment if symptoms disappeared[22-24,26]. Some were guided by stress, using medication to manage worry or anxiety rather than hypertension[24,26]. For others, fear of dependency affected the amount of medication they took[24]. A range of individual and social factors including; familial (lack of support, need for separate meals), and environmental (sense of security, local amenities, healthy food availability) were identified as challenges to treatment adherence[23]. Financial status[23,26], and logistical issues (frequency of appointments, work schedules, accessibility)[23], also posed challenges to self-management.

### **Working together**

The impact of the patient-professional relationship on (self-)management of hypertension, and the influence of home blood pressure monitoring (HBPM) was highlighted. People with hypertension valued individualised targeted treatment that took account of their circumstances[22]. Differences between clinicians' and patients' beliefs were potential sources of confusion and mistrust[22,23,25,26], and were related to both cultural and individual beliefs[21,23,26]. These included differences about perceptions of symptoms, disease management, and treatment expectations[22]. More adherent

patients tended to describe their healthcare professional as caring and listening, and the relationship as a partnership with joint goal setting and holding individuals accountable for their behaviour[26].

Ambiguity about management and prognosis emerged across studies[22-24,26], with the importance of information clarity identified. Fear for the future was reported, including ability to manage physically and afford care[23]. Tailored management plans with more information regarding risk factors, prevention, management, and complications of hypertension, as well as group sessions with information about hypertension and diet were frequently requested[23].

Self-monitoring of BP could foster a therapeutic alliance[22], specifically changing perceptions of the significance of symptoms and fostering a sense of self-control, motivation, and increased confidence in managing hypertension[22,25]. Patients perceived HBPM as allowing more accurate and regular monitoring than healthcare professionals could provide[22,25], though some perceived that clinicians were negative about HBPM[22,23,25]. Concern about technical skills, differences between home and clinic measurements, and uncertainty interpreting and acting upon measurements could be problematic[22,23,25], echoing the importance of clarity with treatment advice and information.

### **Synthesis of quantitative findings**

The quantitative analysis summarises the impact of supported self-management on BP control, identifies the support components employed mapped to the PRISMS taxonomy[9], and the evidence of effectiveness for the commonest components (information, monitoring with feedback, strategies to improve adherence, support for

lifestyle change). See Table 2 for the summary table and SDC3 for mapping to the PRISMS taxonomy[13].

### *Impact of supported self-management on BP control*

The impact of supported self-management on systolic and diastolic BP is illustrated in a meta-Forest plot (Figure 3). The results of the 11 meta-analyses (five 3\*; five 2\*; one 1\*) that presented the results as mean differences suggest that provision of self-management support reduces systolic BP by between 2 and 6 mmHg, and diastolic BP by between 1 and 5 mmHg[30,31,33-36,39,41,43,47,55]. The two outliers with considerably greater effect sizes (Lu 2012[39] and Xu 2014[55]) included only trials conducted in China where 'usual care' may be different to other healthcare contexts.

Nine of the 14 reviews (one 3\*; seven 2\*; five 1\*) using a narrative synthesis reported positive impact on BP in the majority of their included RCTs[32,37,40,42,44,46,49,51].

### *Components of self-management support*

SDC file 3 shows the interventions described in the systematic reviews mapped to the components of the PRISMS taxonomy of self-management support[9] and illustrates the frequency with which they are encountered in self-management support interventions. Almost all components of the PRISMS taxonomy were reported in one or more of the hypertension self-management support interventions, most commonly *Information about condition and/or its management (Education) (A1)*; *Monitoring of condition with feedback (A5)*; *Provision of equipment (A6)*; *Lifestyle advice and support (A14)*; *Regular clinical review (A4)* and *Provision of access to professional support when needed (A7)*. The only components not featured were *Training/rehearsal to*



*communicate with healthcare professionals (A9) and Training/rehearsal for everyday activities (A10).*

### *Effectiveness of specific components*

The effect of interventions including the commoner components is described below:

- *“Information about hypertension and its management”* was a substantial component of self-management support in all but two interventions. The exceptions were reviews of dietary recommendations[47] or lifestyle interventions[33] for people with hypertension, but which did not specify provision of disease-specific information. The content and mode of delivery varied. Although ‘education alone’ was generally ineffective[35,36,50], strategies including tailoring of information[34,38,48,52], interactive group education sessions[39,45,55], linking with HBPM[35,36], or behavioural strategies[50] could improve outcomes.
- *Monitoring of blood pressure with feedback* was a feature of self-management support in 17 out of 29 reviews, though the monitoring process varied. Home BP monitoring[28,31,35,36,42,46,48,50], was often mediated by telehealth[27,29,32,34,37,41,43,52,53], and in some reviews also included monitoring of medication intake, weight, physical activity and smoking[40,52]. The impact of monitoring on blood pressure control varied, with evidence that monitoring associated with feedback from healthcare professionals (including via telehealth) or as part of a complex intervention to promote medication adherence was more likely to be effective than self-monitoring as an unsupported intervention[27,31,34,42]. An individual patient data meta-analysis identified in the pre-publication check similarly showed HBPM worked best when combined with more intensive self-management interventions but had little or no effect on its own[56].

- *Practical help with adherence* encompassed a range of strategies (reminders, packaging, scheduling of appointments, regime simplification) with no one approach being consistently effective. In 9 out of 14 interventions this component had no effect or a small effect of doubtful clinical significance[27,28,35,38,40,42,43,50,51]. Interventions tailored to the specific needs of the target group (e.g. African American communities[48]) or delivered within the context of case-management[54] or supported by HPBP[57] may be effective.
- *Lifestyle advice and support* was included in 13 reviews and was the focus of investigation in one review[33], which concluded that when lifestyle advice and support is included within a complex intervention, it can have an impact on reducing BP.

### **Over-arching synthesis**

Table 3 uses the PRISMS taxonomy of self-management support[9] to map insights from the qualitative lines-of-argument synthesis and components of the interventions reported in the quantitative systematic review. Central to these themes is the potential barrier of discordant beliefs between patients and their clinicians, and the need to address these beliefs within the context of a supportive therapeutic relationship. A specific intervention, which was perceived to have influenced this relationship, is the introduction of HPBM[22]. Six of the effective interventions illustrated in the meta-Forrest plot (Figure 3)[31,34-36,41,43], included HBPM (three mediated via telehealth)[34,41,43].

## **Discussion**

### **Summary of main findings**

Our meta-review summarises the findings of six qualitative syntheses (98 unique qualitative studies) and 29 systematic reviews (446 unique RCTs). Overall, there was consistent evidence (from 11 meta-analyses and 9 narrative reviews) that self-management for hypertension reduces systolic and diastolic BP. Interventions targeted most of the 14 components of supported self-management described in the PRISMS taxonomy, with 'information about hypertension and treatment', and 'home monitoring and feedback (including telehealth)' being widely used in effective interventions. Strategies to improve adherence, and lifestyle interventions could be effective if individually tailored and delivered in the context of complex interventions.

The qualitative meta-review highlighted conflicting health beliefs between people with hypertension, who considered stress to be an important cause of hypertension and attributed a range of symptoms to high blood pressure, and health professionals who considered hypertension to be an asymptomatic physical condition. Strategies suggested to bridge this gap included identifying individual and cultural beliefs, provision of tailored information, and supported use of HBPM, which enables people to increase their understanding and awareness of their condition. The success of these strategies was strongly influenced by a collaborative relationship between patient and professional.

### **Strengths and limitations**

Using robust methodology, this meta-review is the first to synthesise both qualitative and quantitative evidence on supported self-management hypertension. Meta-reviews

facilitate synthesis of a very broad literature (we included evidence from 452 studies) but have some inherent limitations. Data are not extracted from the individual RCTs or qualitative studies, so we were reliant upon the detail and accuracy provided by the systematic review authors. This enables a high-level overview of the literature in the field (ideal for informing policy and healthcare service development) but re-synthesis of material already synthesised risks loss of granularity. In addition, studies are only included if they have been included in a systematic review, which imposes a delay, though our update and pre-publication check included reviews published in 2017 and papers as recent as 2016.

We applied our definition of self-management support to be consistent and inclusive across the literature[8], and included interventions that empowered the patient to take decisions about their management. This explicitly included education in the context of interventions supporting people to cope with the medical, emotional and role challenges of living with hypertension. However, in the context of hypertension, the terminology of 'supported self-management' is not widely used, and we may have missed some papers. The reviews included studies reporting complex interventions, and limited descriptions may mean that we have overlooked some components relevant to the PRISMS taxonomy. We did, however, include data about individual studies from the review tables and included all relevant details. Our training, quality check and multi-disciplinary team approach reduced the potential subjectivity of these decisions. Of the nine reviews reporting publication bias, only five considered that there may have been some bias[31,39,48,53,55].

Reflexivity describes the fundamental concept in qualitative synthesis, that readers approach the data from different perspectives and will thus interpret data differently [58].

We used repeated discussion within our multidisciplinary team to ensure a balanced interpretation

### **Interpretation of findings in relation to previously published work**

In LTCs with a well-established evidence base for supported self-management, such as asthma[11,59], disease presence and severity can be monitored by the presence or absence of symptoms. As an asymptomatic condition[14], hypertension has traditionally been managed by clinicians measuring blood pressure at intervals. This has limited patients to passively complying with the clinicians' instructions. The findings of our qualitative meta-review, however, challenge this medical viewpoint, as patients perceive symptoms which confirm (or not) the presence of high blood pressure and which some people described using to monitor their treatment regimes[22-24,26].

The recent Lancet Commission on hypertension identifies 'sustained education using new technologies' as a key action and calls for 'RCTs to assess the effectiveness of empowering patients to take control'[1]. Our synthesis of qualitative and quantitative studies offers insights into these recommendations. HBPM (with or without telehealth) enables patients to take measurements hitherto part of a clinical assessment potentially challenging the dynamics of the patient-professional relationship. HBPM can be used to prove – or challenge – the diagnosis, and enhances the potential for supported self-management. Patients described how monitoring their blood pressure changed their understanding of their condition and empowered them to engage in lifestyle changes and self-management[22,25]. Self-monitoring and titration of medication can reduce blood pressure[60], and is a postulated mode of action in effective telehealth trials[61]. The 'therapeutic alliance' between patient and professional, underpinned by good

interpersonal communication skills, were highlighted as crucial in realising the benefits of HBPM.

Our findings of inconsistent outcomes from interventions designed to empower lifestyle and medication adherence change corroborates previous research[62]. Even in a condition such as hypertension, where treatment is (comparatively) straightforward, our qualitative meta-review reveals how patient beliefs vary and influence their adherence, in keeping with the 'perceptions and practicalities model' discussed by Horne et al[63]. The breadth of support interventions described in the PRISMS taxonomy of self-management support – almost all of which were represented in both the quantitative and qualitative meta-reviews – highlights that one size does not fit all. Complex interventions need to be tailored to individuals, their demographic and cultural beliefs as well as clinical context in keeping with the findings of the wider PRISMS meta-review of LTCs[15].

There is a strong dose response association between blood pressure and cardiovascular mortality,[1] with cited benefits of 'an approximate halving in risk for each 10 mm Hg diastolic reduction'[64]. The magnitude of effect reported in the included systematic reviews suggest that supported self-management might be expected to reduce stroke risk by 20% and coronary heart disease risk by 10%[65].

### **Conclusion:**

Our novel synthesis of systematic qualitative and quantitative meta-reviews tells a consistent story. Supported self-management can improve control of blood pressure control. Interventions are complex and encompass a broad range of support strategies. HBPM (with or without telehealth) within the context of a supportive patient/professional

partnership helps bridge the gap between medical and lay perspectives of hypertension and enable effective self-management.

**Ethics approval:** Not applicable: meta-review of published data

**Consent for publications:** Not applicable: no individual person's data

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**Author contribution:** ST and HP initiated the idea for the PRISMS study, led the development of the protocol, securing of funding, study administration, data analysis, interpretation of results and writing of the paper. EE, HLP and GP were systematic reviewers who undertook searching, selection of papers and data extraction of the PRISMS study with ST and HP. DD with GP updated the qualitative synthesis; OS with AS updated the quantitative review. All authors had full access to all the data, and were involved in interpretation of the data. OS and DD with HP wrote the initial draft of the paper with GP, EE, HLP and ST to which all the authors contributed. ST and HP are study guarantors.

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**Figures, Tables and Supplementary Digital Content**

Figure 1. PRISMA flow diagram of the screening process for the qualitative and quantitative meta-review

Figure 2. Metaphors and sub-themes from the qualitative synthesis; self-management support interventions

Figure 3. Meta-Forest plot of mean difference in BP

Table 1. Summary of the included qualitative systematic reviews

Table 2. Summary of the characteristics and key findings of included quantitative reviews

Table 3. Synthesis of the qualitative and quantitative findings mapped to the PRISMS taxonomy

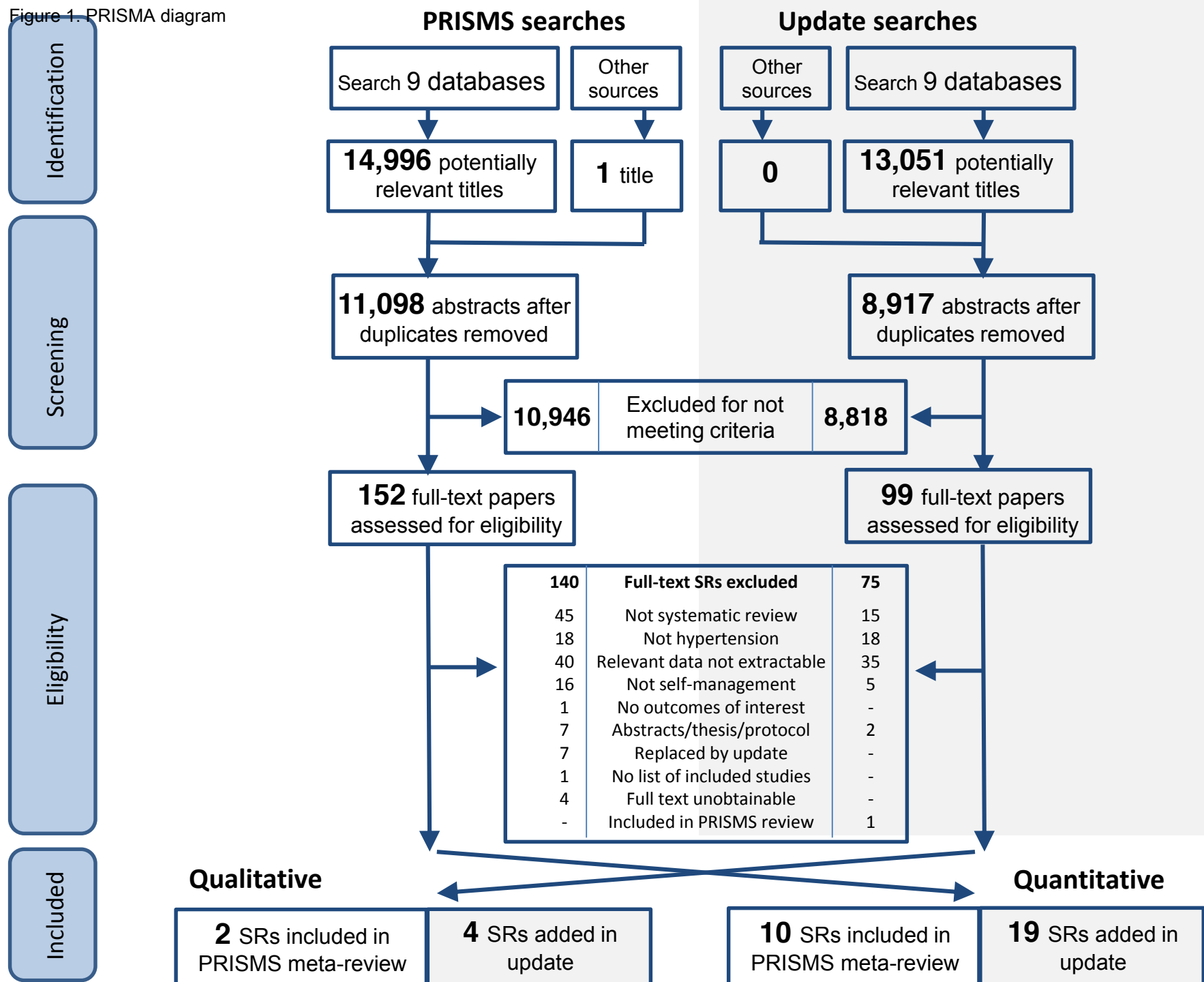
**Supplementary digital content files.**

File SDC1 Search, selection, overlap, and quality

File SDC2. Qualitative summary and quotes

File SDC3. Mapping and pre-publication check, heterogeneity and publication bias.

Figure 1. PRISMA diagram



**Figure 2. Metaphors and sub-themes from the qualitative synthesis, mapped to widely used components of self-management support interventions**

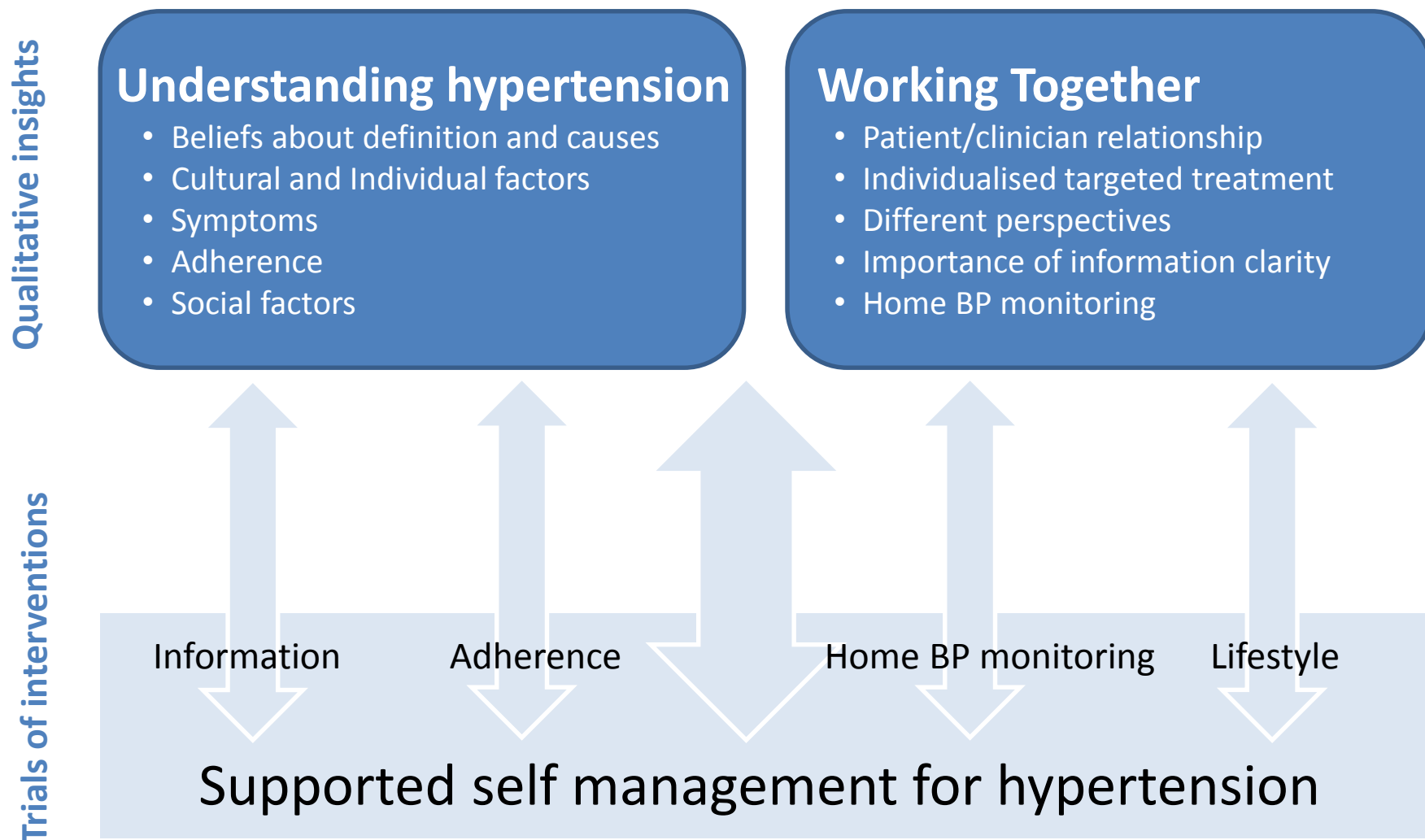
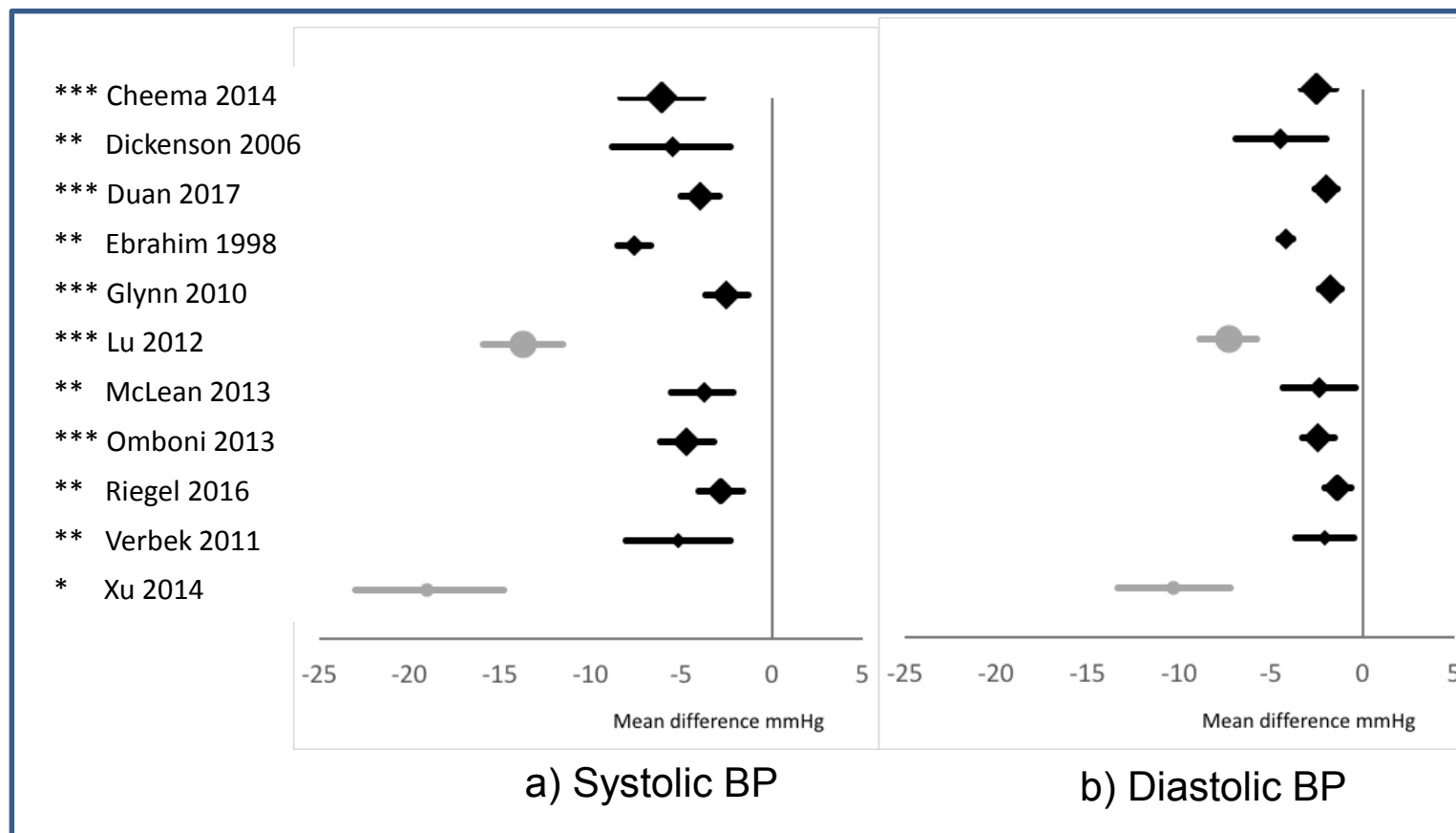


Figure 3. Meta-Forest plots illustrating mean difference in BP



This meta-Forest plot illustrates the summary statistics of the included meta-analyses; overlap of included RCTs precludes further meta-analysis. Details of assessments of heterogeneity and publication bias, if reported by the individual systematic reviews, are given in SDC file 3.

The two studies illustrated in grey included only trials conducted in China

**Table 1. Summary of the included qualitative systematic reviews.**

Review; Number of BP studies R-AMSTAR	Review aim	Populations studied	Key themes
Buckley 2016 <sup>21</sup> 8 studies (of 22 papers) R-AMSTAR = 29	To identify beliefs about hypertension that are prevalent among African Americans.	African American participants	Health beliefs concerning hypertension may differ from those of HCPs. HCPs should elicit and discuss the patient's perspective. Interventions designed to reconcile these differences may improve adherence to prescribed health behaviours and patient outcomes.
Fletcher 2016 <sup>22</sup> 11 studies (of 12 papers) R-AMSTAR = 29	To investigate motivation, barriers and facilitators, and how patients/HCPs use and communicate about HBPM	Ambulatory patients with hypertension and their HCPs from primary care, outpatient clinics or the community.	HBPM, in conjunction with education about hypertension improves: <ul style="list-style-type: none"> <li>• Patients understanding, enables them to act, empowers interaction with clinicians.</li> <li>• HCPs picture of BP control, but raised concern about patients reaction to readings</li> </ul> Uncertainty could be reduced by providing information about interpreting HBPM, what variation is acceptable, adjustment for home-clinic difference, when patients should be concerned, and how to act.
Khatib 2014 <sup>23</sup> 16 studies (of 25 papers) R-AMSTAR = 33	To review the barriers reported by patients and HCPs that may impede awareness, treatment, or follow up of hypertension.	Patients with, or at risk of, hypertension. HCPs (doctors, nurses, other), in primary care or hospital.	There was a wide range of barriers facing patients and HCPs pursuing hypertension control, indicating the need for targeted multi-faceted interventions. More methodologically rigorous studies addressing known barriers (including in LMICs) are required in order to inform policies to improve hypertension control.
<b>Morton 2016</b> <sup>25</sup> 8 studies (of 30 papers) R-AMSTAR = 34	To understand the experiences of patients and HCPs using self-management digital interventions for LTCs	Adults with LTCs and HCPs involved in their care.	Self-management digital interventions were perceived to: <ul style="list-style-type: none"> <li>• Patients perceived closer contact with HCPs, and felt better cared for. Monitoring their BP increased self-awareness of their condition, motivated lifestyle change.</li> <li>• HCPs perceived clinical benefits, but raised concerns about the burden for them of monitoring patient data.</li> </ul>
<b>Marshall 2012</b> <sup>24</sup> 53 studies (of 59 papers) R-AMSTAR = 33	To explore lay understandings and experiences (including in different cultures) about BP and medication, and how these affect adherence and BP control.	People with uncomplicated hypertension, 16 countries (USA, UK, Brazil, Sweden, Ghana, Canada, New Zealand, Denmark, Finland, Iran, Israel, Netherlands, Korea, Spain, Tanzania Thailand)	Common perceptions, consistent across countries and ethnic group, were: <ul style="list-style-type: none"> <li>• BP was caused by stress, produced symptoms (headaches, dizziness, sweating).</li> <li>• BP improved (and treatment was not needed) when symptoms abated or stress reduced</li> </ul> Participants disliked treatment and its side effects and feared addiction. They commonly reduced/stopped treatment without consulting their doctor. External factors preventing adherence included no time to take drugs or see HCP; no health insurance, unable to afford clinical care, cost of healthy food; forgetfulness
Schlomann 2007 <sup>26</sup> 11 studies R-AMSTAR = 22	To explore lay beliefs about BP and its treatment in order to develop a foundation for better partnership with patients.	People with hypertension in the US	HCPs and patients' have incongruent beliefs about BP regarding the presence of symptoms, and the need to take medications for the rest of one's life. Many patients, especially African Americans, distrust providers impeding effective treatment. Improved professional-patient partnerships, considering discrepancies in beliefs, are necessary to improve BP control.

Note: HBPM = Home Blood Pressure Monitoring. HCPs = healthcare professionals. LTCs = long term conditions. LMICs = Low and Middle Income Countries

Table 2. Summary of the characteristics and key findings of included quantitative reviews

Star rating; Review; RCTs, Participants, R-AMSTAR, Duration,	Review focus; Target group; Setting; Comparator,	Components of the interventions mapped to PRISMS taxonomy[9]	Methods of analysis: Effectiveness on BP (mean diff inmmHg (95%CI); adherence	Comments of authors/ reviewers
* <b>Beratarrechea 2017</b> , <sup>27</sup> 4 RCTs, n=1667 R-AMSTAR = 28 Duration 6w-12m	<b>The impact of mHealth on hypertension</b> in adults in LMICs. mHealth interventions included: HBPM; feedback (SMS or TCs); HCP alerts; information <b>Comparator: UC</b>	A1: Information about BP A5: HBPM (telehealth) A6: Reminders (re HBP readings, medication, appointments, lifestyle) A13: Social support (feedback to carer) self-care (A13);	<b>Narrative synthesis:</b> <b>BP:</b> Of 4 trials only one showed a small reduction in SBP but not DBP. The other interventions had no effect. <b>Adherence:</b> 1 SR reported adherence: no effect	The authors do not use the term 'self-management support' to refer to the interventions.
** <b>Bosch-Capblanch 2007</b> , <sup>28</sup> 4 RCTs, n= 382, R-AMSTAR = 32 Duration: 6w- 12m	<b>Contracts between practitioners and patients</b> , potentially in the context of multi-component intervention <b>Comparator: Education</b>	A1: Education A3: Adherence (contracts, calendar packs) A5: BP monitoring A12: Relaxation	<b>Narrative synthesis</b> <b>BP:</b> Of 3 trials, 1 showed reduction in DBP; 2 reported no between-group difference. <b>Adherence:</b> 2 trials: 1 reported fewer discontinued treatments in intervention; 1 favoured control	Authors conclude 'insufficient evidence' to recommend the use of patient contracts
* <b>Chandak-2015</b> , <sup>29</sup> 12 RCTs, n-N/R R-AMSTAR = 19 Duration: 6w – 2y	<b>IT interventions</b> in adults with hypertension. Technologies used: telemonitoring; CDSS, video-consultations; PHR. <b>Comparator: UC</b>	A1: Education for patients and/or HCPs A5: Telemonitoring of BP + PHR A8: On-line communication with HCP A11: Taught HBPM	<b>Narrative synthesis.</b> <b>BP:</b> 2/9 telemonitoring interventions reduced SBP; 1/9 reduced DBP. Combined HCP-patient interventions reduced SBP and DBP.	Uses and defines the term self-management. Publication bias not reported.
*** <b>Cheema-2014</b> , <sup>30</sup> 16 RCT, n=3034 R-AMSTAR= 36 Duration: 3-13m	<b>Community pharmacist interventions for adults (53-72y)</b> in HICs and Thailand) <b>Comparator: UC</b>	A1: Education on BP and drug treatment A6: Advice to improve adherence A14: Lifestyle advice	<b>Meta-analysis (11RCTs).</b> <b>BP:</b> Pharmacist reduced SBP: -6.1mmHg (-3.8 to -8.4); & DBP: -2.5mmHg (-1.5 to -3.4) <b>Narrative synthesis (7RCT):</b> <b>Adherence:</b> 6/7 RCTs reported intervention increased adherence: OR 12.1% (4.2% to 34.6%)	Subgroup analysis: greater effect in patients without CVD. Does not use the term self-management. One positive outlier from Thailand. Publication bias not reported.
** <b>Chodosh 2005</b> , <sup>31</sup> 13 RCTs, n=1,557, R-AMSTAR = 36 Duration N/R	<b>Self-management</b> within chronic disease programmes in older adults <b>Comparator: UC</b>	A1: Education A5: Self-monitoring A12: Anxiety management/relaxation A14: Lifestyle support/exercise	<b>Meta-analysis</b> Compared to control, the intervention reduced: • SBP: ES - 0.39 (-0.51 to -0.28) [≅ -5mmHg] • DBP: ES -0.51 (-0.73 to -0.3)	Possible publication bias: Begg test: p=0.091; Egger test: p=0.004
* <b>Crabtree- 2013</b> , <sup>32</sup> 2 RCTs, n=1163, R-AMSTAR = 18 Duration 12-24 mo,	<b>HBPM as a self-management tool</b> for patients with hypertension in context of team-based care. <b>Comparator: UC</b>	A1: Education (Nurse TCs) A3: Self-adjustment of medication A5: HBPM (telemonitoring)	<b>Narrative synthesis:</b> <b>BP:</b> 2/2 trial showed a reduction in SBP	Small, low quality review. Term self-management used. Publication bias not reported.

<p><b>** Dickinson 2006,</b><sup>33</sup> 6 RCTs, n=413, R-AMSTAR = 35 Duration N/R</p>	<p><b>Combined lifestyle interventions</b> (e.g. salt restriction, exercise, relaxation) <b>Comparator: UC</b></p>	<p>A12: Relaxation A14: exercise, weight loss; salt restriction</p>	<p><b>Meta-analysis</b> <b>BP:</b> Compared to controls, combined lifestyle intervention reduced:  <ul style="list-style-type: none"> <li>• SBP: -5.5 mmHg (95% CI -8.8 to -2.3)</li> <li>• DBP: -4.5 mmHg (95% CI -6.9 to -2.0)</li> </ul> </p>	<p>Individual components (diet, exercise, alcohol restriction, sodium restriction, and fish oil supplements) reduced BP by between 2– 6 mmHg</p>
<p><b>*** Duan-2017,</b><sup>34</sup> 46 RCTs n= 13,875, R-AMSTAR =36 Duration: 3-24m</p>	<p><b>HBPM via telehealth</b> in adults with BP and no comorbidities, mean age 61.2 yrs; primary care, community, outpatient (HICs), <b>Comparator: UC, or HBPM without telehealth</b></p>	<p>A1: Education A3: Medication management A5: Monitoring (telehealth) with feedback A6: Adherence contracts A8: Counselling/telehealth support A14: Behavioural management</p>	<p><b>Meta-analysis.</b> <b>BP:</b> Compared with UC, HBPM:  <ul style="list-style-type: none"> <li>• reduced SBP: -3.99 mmHg (-5.06 to -2.93)</li> <li>• reduced DBP: -1.99 mmHg (- 2.60 to -1.39)</li> <li>• increased %normal BP: RR: 1.16 (1.08–1.25)</li> </ul> </p>	<p>HBPM is more effective if supported by interactive communication with HCP Term self-management not used. No publication bias detected.</p>
<p><b>** Ebrahim 1998,</b><sup>35</sup> 46 RCTs, n&gt;32,000 R-AMSTAR = 28 Duration: 2m-5y</p>	<p><b>Multi-component</b> (HBPM, reminders, regular reviews, education) and mono-component interventions: <b>Comparator: UC</b></p>	<p>A1: Education A5: HBPM A6: Medication reminders</p>	<p><b>Meta-analysis:</b> <b>BP:</b> Compared to controls, multi-component self-management interventions reduced:  <ul style="list-style-type: none"> <li>• SBP -7.6 mmHg (-8.5 to -6.7)</li> <li>• DBP -4.2mmHg (-4.6 to -3.8))</li> </ul> <b>Narrative analysis:</b> <b>Adherence:</b> Compared to controls, 4/19 multi-component interventions improved adherence.</p>	<p>Effective interventions were multi component and included self-monitoring, and increased professional reviews. Sub-groups: Education alone had no effect on SBP or DBP; HBPM alone had a small effect on DBP: -1.5mmHg (- 0.3 to -2.7)</p>
<p><b>*** Glynn 2010,</b><sup>36</sup> 72 RCTs. n&gt;87,000 R-AMSTAR = 35 Duration: 8w-6m</p>	<p><b>Multi-component interventions including HBPM, or education only</b> <b>Comparator: UC</b></p>	<p>A1: Education A5: HBPM A6: Appointment reminder systems</p>	<p><b>Meta-analysis</b> <b>BP:</b> Compared to controls, HBPM reduced:  <ul style="list-style-type: none"> <li>• SBP: -2.5 mmHg (-3.7 to -1.3) (n=12)</li> <li>• DBP: -1.8 mmHg (-2.4 to -1.2) (n=14)</li> </ul> Education alone had no effect on SBP: -0.57 (-1.22 to 0.08); increased DBP: 0.46 (0.07 to 0.86) (n=13)</p>	<p>Education alone is unlikely to produce clinically important reductions in BP; HBPM require further development and evaluation. Publication bias not reported</p>
<p><b>** Gwadry-Sridhar 2013,</b><sup>37</sup> 58 RCTs, n=N/R R-AMSTAR= 30 Duration=2d-14y</p>	<p><b>Interventions to improve medication adherence</b> in adults prescribed antihypertensive medications <b>Comparator: UC</b></p>	<p>A1: Education (individual/group; IT/audio/video-based; handouts) A4: Review (TC/clinic/home) A5: HBPM (telemonitoring) A6: Adherence (reminders, packaging)</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> 18/24 RCTs showed significant reduction in SBP and/or DBP <b>Adherence:</b> 26/34 RCTs showed significant improvement in medication adherence</p>	<p>No data from the multiple sub-groups of individual components. Term self-management not used. Publication bias not reported.</p>
<p><b>** Lee 2012,</b><sup>38</sup> 3 RCTs, n=780, R-AMSTAR= 33 Duration: 12 m,</p>	<p>Strategies (specifically <b>tailored counselling for BP</b>) to improve the health outcomes among patients low health literacy. <b>Comparator: UC</b></p>	<p>A1: Tailored information (text, videos) and feedback A8: Patient-HCP interaction (TC) A14: Nutritional education</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> Nutritional education improved BP (n=1) <b>Adherence:</b> Tailored counselling had no effect on medication adherence. (n=3)</p>	<p>Targeted low self-literacy. Pictorial handouts increased effect on adherence. Term self-management not used. Publication bias not reported</p>



<p><b>*** Lu-2012,</b><sup>39</sup> 94RCTs n=24,667 R-Amstar = 38 Duration: unclear</p>	<p><b>Community interventions in China</b> specifically including self-management strategies <b>Comparator: unclear</b></p>	<p>A1: Education/self-management A4: Review/monitoring A13: Social/family support Professional training/organisational change</p>	<p><b>Meta-analysis:</b> <b>BP:</b> Compared to controls, interventions reduced</p> <ul style="list-style-type: none"> <li>• SBP -13.73 mmHg (-11.53 to -15.93)</li> <li>• DBP - 7.33 mmHg (-5.76 to -8.9)</li> <li>• Adequately controlled: OR 4.13 (3.5 to 4.87).</li> </ul>	<p>Authors highlight: poor quality of RCTs and high risk of bias; poor 'usual care'; intervention increased BP prescribing; some publication bias for SBP</p>
<p><b>* Mansoor 2013,</b><sup>40</sup> 10 RCTs, n= 2,345, R-Amstar = 24 Duration: 6m-27m</p>	<p><b>Multi-professional interventions targeting medication adherence</b> in adults with CVD: Information (n=5), behavioural (n=2) or combined (n=3) interventions <b>Comparator: UC</b></p>	<p>A1: Education/information A4; Review/monitoring A6: Strategies to improve adherence A11: Self-management resources A13: Family support with adherence A14: Lifestyle advice</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> control improved in 3/4 informational; 2/2 behavioural; 3/3 combined interventions <b>Adherence:</b> improved in 0/4 informational; 2/2 behavioural; 0/1 combined interventions.</p>	<p>Context of healthcare teams. Term self-management not used.</p>
<p><b>** McLean-2013,</b><sup>41</sup> 8 RCTs, n=1,259, R-AMSTAR=32 Duration: 6-24m</p>	<p><b>Digital Interventions to support patient self-management</b> of hypertension: (Mobile, internet, e-mail, interactive telephone system) <b>Comparator: UC</b></p>	<p>A1: Education A2: Information on community resources A5: HBPM with feedback A11: Behavioural skills training A14: Tips for lifestyle change,</p>	<p><b>Meta-analysis.</b> <b>BP:</b> Compared to controls, interventions reduced</p> <ul style="list-style-type: none"> <li>• SBP: -3.74mmHg (-2.19 to -5.58)</li> <li>• DBP: -2.37 mmHg (-0.4 to -4.35)</li> </ul>	<p>HBPM increased effect on DBP: -4.02 mmHg (-2.93 to -5.12). Term self-management used and defined. No publication bias.</p>
<p><b>* Ogedegbe 2006,</b><sup>42</sup> 11 RCTs, n=1,550 R-AMSTAR = 27 Duration: 8w-2y</p>	<p><b>HBPM within multi-component interventions to improve adherence.</b> <b>Comparator: UC</b></p>	<p>A1: Education A4: Regular reviews A5: HBPT A6: Reminders, adherence counselling A8: Patient-HCP interaction (TC)</p>	<p><b>Narrative synthesis</b> <b>BP:</b> 7/11 reported improved BP control <b>Adherence:</b> 6/11 reported improved adherence.</p>	<p>HBPM was more effective in multi-component interventions. Publication bias not reported</p>
<p><b>*** Omboni 2013,</b><sup>43</sup> 23 RCTs, n=7,037, R-AMSTAR= 37 Duration: 8w-24y</p>	<p><b>HBPM with telemonitoring</b> including: telephone, mobile phone or, Internet transmission <b>Comparator: UC.</b></p>	<p>A1: Education A4: Regular nurse management A5: HBPM + telemonitoring A14: Lifestyle behavioural support</p>	<p><b>Meta-analysis</b> <b>BP:</b> Compared to controls, telemonitoring reduced:</p> <ul style="list-style-type: none"> <li>• SBP -4.72mmHg (-6.18 to -3.24)</li> <li>• DBP -2.45 mmHg (-3.33 to -1.57).</li> <li>• ABPM SBP -3.48 mmHg (- 5.32 to -1.64)</li> <li>• ABPM DBP -1.43 (-2.86 to 0).</li> </ul> <p><b>Adherence:</b> No effect on medication adherence</p>	<p>HBPM groups were prescribed more medication. Term self-management not used. Publication bias not reported</p>
<p><b>** Proia 2014,</b><sup>44</sup> 52 RCTs, n=N/R R-Amstar 31 Duration: 6-12 m</p>	<p><b>Team based interventions</b> for improving BP control (GPs, nurses, pharmacists, dietitians, social workers, CHWs) <b>Comparator: UC</b></p>	<p>A1: education about BP/medication A6: adherence support A11: self-management resources A14: lifestyle behaviour change</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> Compared to controls, the change in mean BP in intervention group was greater:</p> <ul style="list-style-type: none"> <li>• SBP: median 5.4 mmHg (IQR.2.0 to 7.2)</li> <li>• DBP: median 1.8 mmHg (IQR 0.7 to 3.2)</li> </ul>	<p>Teams including a pharmacist had greater effect. Self-management term used but not defined. Publication bias not reported</p>

<p><b>** Quinones 2014,</b><sup>45</sup> 7 RCTs, n=1,332 R-AMSTAR 39 Duration N/R</p>	<p><b>Group education (self-management or didactic) for people with LTCs</b> <b>Comparator: UC (or didactic education)</b></p>	<p>A1: Didactic or self-management education A11: Practical skills training</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> compared to UC: 3/3 SM education groups and 1/3 didactic education group reduced BP Didactic education vs SM education (1 study): no difference in BP reduction, but more SM education patients had BP controlled (70% vs 44%, p=0.04)</p>	<p>Publication bias assessed, but not reported for hypertension.</p>
<p><b>** Radhakrishnan 2012,</b><sup>46</sup> 1 RCT; n=634, R-Amstar 32 Duration: 6-12m,</p>	<p><b>Tailored interventions</b> on self-management behaviours in patients with LTCs <b>Comparator: UC</b></p>	<p>A1: Education A4: Nurse/GP reviews (TC) A5: HBPM A14: Lifestyle (exercise) counselling</p>	<p><b>Narrative synthesis</b> <b>BP:</b> compared to UCs, 11% (1.9 to19.8) more people using HBPM gained control of BP <b>Adherence:</b> 'Improvement in self-reported medication adherence.</p>	<p>Only one of the RCTs addressed hypertension Self-management term used and defined. Publication bias not reported.</p>
<p><b>** Riegel 2016,</b><sup>47</sup> 13 RCT, 2,050, R-AMSTAR = 31 Duration: 2m-39m</p>	<p><b>Nutritional interventions</b> given by a registered dietitian in a multidisciplinary team to reduce BP <b>Comparator: UC</b></p>	<p>A14: Nutritional advice (sodium restriction, weight loss, fruit and vegetables)</p>	<p><b>Meta-analysis:</b> <b>BP:</b> Compared to UC, interventions reduced: • SBP: -2.82 mmHg (-4.03 to -1.62) • DBP: -1.37 mmHg (-2.11 to -0.62)</p>	<p>Subgroups: Sodium restriction calorie restriction were effective. Self-management term not used. No significant publication bias</p>
<p><b>*** Ruppap-2017,</b><sup>48</sup> 37 RCTs, n= 5,228, R-AMSTAR=41 Duration: N/R</p>	<p><b>Medication adherence Interventions</b> using multiple behaviour change strategies; for black adults (US, South Africa) <b>Comparator: UC</b></p>	<p>A1: Education (disease and medication) A5: HBPM and medication monitoring A6: Reminders and packaging A8: Counselling re medication A12: Problem solving (adherence) A13: Social support</p>	<p><b>Meta-analysis:</b> <b>Adherence:</b> Compared to control, interventions increased adherence. ES: 0.325 (0.195 to 0.454) Individual components: Only medication packaging increased effect size ES: 1.02 vs. 0.23, P=0.006;</p>	<p>Term self-management not used. Some publication bias among studies with very large positive effect sizes. Findings reflect health disparities in US.</p>
<p><b>* Saksena 2010,</b><sup>49</sup> 4 RCTs, n=1,319 R-AMSTAR = 28 Duration: N/R</p>	<p><b>Computer-based education</b> (computer or internet-based) <b>Comparator: UC</b></p>	<p>A1: Education A4: Pharmacist support</p>	<p><b>Narrative synthesis</b> <b>BP</b> (n=1). Compared to UC, computer based education did not improve BP control (p=0.23), but pharmacist-supported computer-based education improved proportion with BP control (p&lt;0.001)</p>	<p>Self-management term not used. Publication bias not assessed</p>
<p><b>*** Schroeder 2008,</b><sup>50</sup> 38 RCTs, n=15,519 R-AMSTAR = 34 Duration: 2m-60m</p>	<p><b>Medication adherence Interventions</b> (education only and multi-component interventions) <b>Comparator: UC</b></p>	<p>A1: Educational programme A5: HBPM A6: Reminders, packaging and regimes A8: Computer counselling A12: Teaching self-determination</p>	<p><b>Narrative synthesis</b> <b>BP:</b> Compared to UC, BP improved in 13/58 interventions <b>Adherence:</b> Compared to UC, adherence improved in 19/58 interventions</p>	<p>Sub-groups: Compared to UC, adherence improved in 10/24 motivational strategies; 1/6 educational; 7/9 simple dosage regimes; 8/18 multi-component interventions.</p>

<p><b>* Takiya 2004,</b><sup>51</sup> 16 RCTs, n=2,446 R-AMSTAR = 29 Duration: 1-6m</p>	<p><b>Educational +/- behavioural (n=9) interventions</b> to improve adherence. <b>Comparator: UC</b></p>	<p>A1: Education A6: Reminders, dosage schedule</p>	<p><b>Meta-analysis</b> <b>Adherence:</b> Compared to controls, overall the interventions had no effect: 0.12 (0.08 to 0.16)</p>	<p>Sub-groups: Behavioural/combined interventions had no effect; improved in 1/3 educational; No significant publication bias</p>
<p><b>** Vargas 2017,</b><sup>52</sup> 6 RCTs, n= 1466 R-AMSTAR= 32 Duration: 2m-12m</p>	<p><b>SMS interventions (one-way SMS and two-way SMS)</b> <b>Comparator: UC</b></p>	<p>A1: Education (individual/group) A4: Review scheduling A5: HBPM with GP feedback A6: Medication reminders A14: weight loss and smoking cessation</p>	<p><b>Narrative synthesis:</b> <b>BP:</b> Compared to control, SMS interventions: • one-way SMS: 2/2 had no effect • two way SMS: 3/4 improved BP control</p>	<p>Substantial heterogeneity precluded meta-analysis. Self-management term not used. Publication bias not assessed.</p>
<p><b>* Verbek 2011,</b><sup>53</sup> 9 RCTs, n=2,501 R-AMSTAR = 24 Duration: 2m-12m</p>	<p><b>Telehealth</b> for the management of hypertension <b>Comparator: UC.</b></p>	<p>A1: Education (individual/group) A3: Algorithm for adjusting dose A4: Review (Clinic, TC, Pharmacist) A5: HBPM with feedback (TC, reports) A6: Reminders A11: Training in telemonitoring A14: Lifestyle advice</p>	<p><b>Meta-analysis</b> <b>BP:</b> Compared to usual care, telecare reduced: • SBP: -5.19 (-2.31 to -8.07) • DBP: -2.11 (-0.52 to -3.69) The effect was greater when treatment was not adjusted during the trial</p>	<p>Some publication bias among studies with small sample sizes.</p>
<p><b>** Viswanthan 2012,</b><sup>54</sup> 18 RCTs, n=9,691, R-AMSTAR=28 Duration: 6m-24m</p>	<p><b>Medication adherence Interventions</b> in US (Face to face, phone, telehealth, computer mail, written material) <b>Comparator: UC</b></p>	<p>A1: Education (from pharmacist) A4: Collaborative/case management A6: Blister packs A13: Social support</p>	<p><b>Narrative synthesis:</b> <b>Adherence:</b> Compared to control, adherence was improved in 3/3 trials of case management, and 3/3 pharmacist-delivered education. Low evidence for blister packaging, and behavioural support. No benefit from collaborative care.</p>	<p>US studies only. Self-management term not used. Publication bias not assessed.</p>
<p><b>* Xu 2014,</b><sup>55</sup> 14 RCTs, n=2,469 R-AMSTAR =30 Duration: 1m-2y</p>	<p><b>Health education interventions</b> in China (Individualised /group education); <b>Comparator: UC</b></p>	<p>A1: Education (Individual/collective)</p>	<p><b>Meta-analysis</b> <b>BP:</b> Compared to control, education reduced: • SBP: -19.03 to (-23 to -14.8) • DBP -10.33 (-13.4 to -7.26)</p>	<p>All studies from China. 13/14 were of low quality: details of randomisation not reported.. Effect attenuated over time 'Some publication bias'</p>

**Abbreviations:** HBPM = Home Blood Pressure Monitoring. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure. ABPM = Ambulatory BP Monitoring. LTCs = long term conditions. CVD = cardiovascular disease. PHR = Personal Health Record. SM = Self-Management. HCPs = healthcare professionals. GPs = General Practitioners. CHWs = Community Health Workers. LMIC=Low and Middle Income Country. HIC = High Income Country. IT = Information Technology. DI=Digital Interventions. TC = Telephone Consultation. CDSS Computerised Decision Support System. SMS = Short Messaging Service. RCT= Randomised Controlled trial. SR= Systematic Review. UC = Usual Care OR = Odds Ratio. ES = Effect Size. d = day; w = week; m = month; y = year. N/R = not recorded.

**Table 3. Lines of Argument synthesis and components of the quantitative interventions mapped to the PRISMS taxonomy**

PRISMS taxonomy	Qualitative review: • <b>Lines of Argument synthesis</b>	Quantitative reviews including component in their intervention
A1. Information about condition and /or its management	<ul style="list-style-type: none"> <li>Differences in understanding of hypertension need to be considered and addressed when delivering any training and treatment <sup>24</sup></li> <li>It is important to address the uncertainty relating to the management and prognosis of hypertension <sup>22-24,26</sup> with clear patient friendly language</li> </ul>	27 reviews included information about hypertension and treatment (the remaining two focused on information about lifestyle change <sup>33,47</sup> )
A2. Information about available resources		One review included information about community resources <sup>41</sup>
A3. Provision of/agreement on specific clinical action plans and/or rescue medication	Although 'action plans' were not discussed by name, the need for patients to know how to interpret HBPM readings was mentioned <sup>22</sup>	4 reviews mentioned agreement on management plans <sup>28,32,34,53</sup>
A4. Regular clinical review	<ul style="list-style-type: none"> <li>Symptoms are commonly reported and should be acknowledged <sup>21,23,26</sup></li> </ul>	9 reviews included regular clinical reviews <sup>37,39,40,42,43,46,49,52,53</sup>
A5. Monitoring of condition with feedback	<ul style="list-style-type: none"> <li>Interventions like self-monitoring of BP (HBPM) can foster therapeutic alliance <sup>22</sup> and promote a more internal locus of control</li> </ul>	18 reviews included HBPM <sup>27-29,31,32,34-37,41-43,46,48,50,52,53,56</sup> with evidence that feedback (e.g. via telehealth) improved effectiveness <sup>27,29,32,34,37,41,43,52,53,56</sup>
A6. Practical support with adherence (medication or behavioural)	<ul style="list-style-type: none"> <li>Adherence, particularly to medication, may be affected by factors including symptom guided use and fear of dependence rather than simply forgetting to take medication <sup>23,24</sup>. It is important to explore and address these issues with patients.</li> <li>Cultural differences may be important although this remains unclear. Respecting cultural beliefs is considered necessary by some to improve adherence <sup>21</sup> whilst others found the principal themes identified were remarkably similar across cultural and ethnic groups <sup>24</sup></li> </ul>	15 reviews addressed adherence <sup>27,34-37,40,42,44,48,50-54,57</sup> with varied results. Targeted interventions <sup>38,48</sup> and those involving HBPM <sup>57</sup> maybe be more effective.

A7. Provision of equipment	Although equipment was not specifically discussed, HBPM (which would require a sphygmomanometer) was considered as important.	19 interventions provided HBPM equipment <sup>27-29,31,32,34-37,41-43,46,48,50,52,53,56,57</sup>
A8. Provision of easy access to advice or support when needed	Telehealth was described as a strategy for providing access to support <sup>22</sup>	6 interventions explicitly enhanced access to support <sup>27,29,34,38,42,50</sup>
A9. Training/rehearsal to communicate with health care professionals	<ul style="list-style-type: none"> <li>• Clinicians need to address the underlying concerns of patients and work within the patient's understanding of hypertension rather than 'correcting' their knowledge to a biomedical model <sup>24,26</sup> Patients may have different interpretations regarding the causes of hypertension <sup>21,24,25</sup> and this should be considered.</li> <li>• Mismatch in understanding and management, between the person with hypertension and the healthcare professional, was evident across studies <sup>22-26</sup>. The importance of the therapeutic alliance and need for good interpersonal communication skills is evident.</li> </ul>	
A10. Training/ rehearsal for everyday activities		
A11. Training/rehearsal for practical self-management activities	<ul style="list-style-type: none"> <li>• It is important that both patients and clinicians are clear how to interpret HBPM readings otherwise this may increase anxiety <sup>22</sup></li> </ul>	6 interventions described training in practical self-management strategies <sup>29,40,41,44,45,53</sup>
A12. Training/ rehearsal for psychological strategies		5 interventions described psychological support <sup>28,31,33,48,50</sup>
A13. Social support	<ul style="list-style-type: none"> <li>• Social and environmental barriers to treatment adherence, including family influences, financial issues, need to be considered when managing people with hypertension <sup>22,23</sup></li> </ul>	5 interventions included social support <sup>27,39,40,48,54</sup>
A14. Lifestyle advice and support	<ul style="list-style-type: none"> <li>• Access to exercise equipment/facilities, access to healthy food need to be considered when managing people with hypertension<sup>22,23</sup></li> </ul>	Lifestyle support was included in 13 interventions, and was the focus of one review <sup>33</sup>

## Supplementary Digital Content file 1

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## 1a: Search strategies

### MEDLINE

1. exp Self Care/
2. exp Communication/
3. exp Professional-Family Relations/
4. exp Telephone/
5. exp Professional-Patient Relations/
6. exp Health Education/
7. exp "Attitude of Health Personnel"/
8. exp Cell Phones/
9. exp Patient Education as Topic/
10. exp Computers, Handheld/
11. exp Self Efficacy/
12. exp "Activities of Daily Living"/
13. exp Self-Help Devices/
14. exp Community Health Services/
15. exp Rehabilitation/
16. ((Self adj2 (car\* or manag\* or help or administ\* or monitor\* or medicat\*)) or self-car\* or self-manag\* or self-help or self-administ\* or self-monitor\* or self-medicat\* or selfcar\* or selfmanagement or selfhelp or selfadminist\* or selfmonitor\* or selfmedicat\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
17. (SM or SMS).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
18. (Responsib\* or Autonom\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
19. (Manag\* or copes or coping).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
20. "Disease management".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
21. "expert patient".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
22. ((professional or clinician) adj2 development).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
23. (Educat\* or training or skill\* or knowledge).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
24. (Confidence or self-efficacy).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
25. ((Access\* or provi\*) adj3 (information or records or results)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
26. (Monitor\* or self-monitor\* or selfmonitor\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
27. ((patient or individual\* or person\* or client\*) adj3 (remind\* or feedback)).mp. [mp=title, abstract,

original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

28. ((Tele adj2 (health or medicine or care)) or tele-health or tele-medicine or tele-care or telehealth or telemedicine or telecare).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

29. ("Short message service" or SMS or "mobile phone" or "text message\*").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

30. ((home or environment\* or living or assistive) adj2 (adaptation or modif\* or equipment or technolog\*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

31. "Care plan\*".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

32. "Action plan\*".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

33. (Hypno\* adj1 (self or home)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

34. ((cognitive or psychological or interpersonal or relaxation or biofeedback) adj3 (therap\* or intervention\* or program\*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

35. CBT.m.p. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

36. Psychoeducation\*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

37. ((Peer or patient or emotional or social or psychosocial) adj1 (support or group)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

38. (Financial adj1 control).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

39. "personal health budget\*".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

40. ((Financial or monetary or payment\* or discount or service\*) adj5 incentiv\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

41. ((Reduc\* or restrict\* or control\* or limit\* or avoid) adj (alcohol or coffee or caffeine or salt)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

42. ((Smok\* or nicotine or tobacco) adj3 (cessation or quit\*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

43. (Exercise or training or rehabilitati\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

44. ((Lifestyle or occupational) adj1 (intervention\* or modification\* or therapy)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

45. or/1-44



46. Hypertension
47. Hypertens\*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
48. (Blood adj1 pressure).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
49. or/46-48
50. Meta-Analysis/
51. Meta-Analysis as Topic/
52. "Review Literature as Topic"/
53. MEDLINE.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
54. (systematic review\* or meta-analy\* or metaanaly\* or "research synthesis" or "literature review").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
55. (systematic adj3 literature).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
56. (data adj2 extract\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
57. ((information or data) adj3 synthesis).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
58. cochrane.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
59. ((qualitative or narrative or thematic or evidence or realist or interpret\* or induct\* or refutational or framework or systematic or textual) adj2 (approach or review\* or synthes\* or meta-summary or "meta summary" or summary)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
60. (Meta adj1 (summary or narrative or synthesis or ethnograph\* or study or data or interpretation or aggregation or needs-assessment or "needs assessment")).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
61. (meta-summary or meta-narrative or meta-synthesis or meta-ethnograph\* or meta-study or meta-data-analysis or meta-data-synthesis or meta-interpretation or meta-aggregation).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
62. "reciprocal translational analysis".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
63. ("lines-of-arg?ment synthesis" or "lines of arg?ment synthesis").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
64. "LOA synthesis".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
65. "grounded formal theory".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
66. "grounded theory synthesis".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

67. (ecological adj2 (triangulation or sentence or synthesis)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
68. Phenomenography.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
69. ((mixed or multi\* or cross) adj1 (method\* or design\* or research or strategy) adj2 (synthesis or review)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
70. ((mixed-method\* or multi-method\* or mixed-design or multi-design or multiple-methods or multi-strategy or cross-design) adj2 (synthesis or review)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
71. (Bayesian adj1 (meta-analysis or "meta analysis")).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
72. "case survey".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
73. "qualitative comparative analysis".mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
74. or/50-73
75. letter.pt.
76. comment.pt.
77. editorial.pt.
78. or/75-77
79. 74 not 78
80. 45 and 49 and 79
81. 80 and 45 and 49 and 79
82. limit 81 to (english language and humans and yr="2012 -Current")

## AMED

1. exp Self care/
2. exp Education professional/
3. exp Education nonprofessional/
4. exp Human activities/
5. exp Self concept/
6. exp Self help groups/
7. exp Telemedicine/
8. exp Communication/
9. exp Rehabilitation/
10. exp Professional patient relations/
11. exp Professional family relations/
12. ((Self adj2 (car\* or manag\* or help or administrat\* or monitor\* or medicat\*)) or self-car\* or self-manag\* or self-help or self-adminisrat\* or self-monitor\* or self-medicat\* or selfcar\* or selfmanagement or selfhelp or selfadministrat\* or selfmonitor\* or selfmedicat\*).mp. [mp=abstract, heading words, title]
13. (SM or SMS).mp. [mp=abstract, heading words, title]
14. (Responsib\* or Autonom\*).mp. [mp=abstract, heading words, title]
15. (Manag\* or copes or coping).mp. [mp=abstract, heading words, title]
16. "Disease management".mp.
17. "expert patient".mp.
18. ((professional or clinician) adj2 development).mp. [mp=abstract, heading words, title]
19. (Educat\* or training or skill\* or knowledge).mp. [mp=abstract, heading words, title]
20. (Confidence or self-efficacy).mp. [mp=abstract, heading words, title]
21. ((Access\* or provi\*) adj3 (information or records or results)).mp. [mp=abstract, heading words, title]
22. (Monitor\* or self-monitor\* or selfmonitor\*).mp. [mp=abstract, heading words, title]
23. ((patient or individual\* or person\* or client\*) adj3 (remind\* or feedback)).mp. [mp=abstract, heading words, title]
24. ((Tele adj2 (health or medicine or care)) or tele-health or tele-medicine or tele-care or telehealth or telemedicine or telecare).mp. [mp=abstract, heading words, title]
25. ("Short message service" or SMS or "mobile phone" or "text message").mp. [mp=abstract, heading words, title]
26. ((home or environment\* or living or assistive) adj2 (adaptation or modif\* or equipment or technolog\*)).mp. [mp=abstract, heading words, title]
27. "Care plan\*".mp.
28. "Action plan\*".mp.
29. (Hypno\* adj1 (self or home)).mp. [mp=abstract, heading words, title]
30. ((cognitive or psychological or interpersonal or relaxation or biofeedback) adj3 (therap\* or intervention\* or program\*)).mp. [mp=abstract, heading words, title]
31. CBT.m.p.
32. Psychoeducation\*.mp.
33. ((Peer or patient or emotional or social or psychosocial) adj1 (support or group)).mp. [mp=abstract, heading words, title]
34. "Expert patient".mp.
35. (Financial adj1 control).mp. [mp=abstract, heading words, title]
36. "personal health budget\*".mp.
37. ((Financial or monetary or payment\* or discount or service\*) adj5 incentiv\*).mp. [mp=abstract, heading words, title]
38. ((Reduc\* or restrict\* or control\* or limit\* or avoid) adj (alcohol or coffee or caffeine or salt)).mp. [mp=abstract, heading words, title]
39. ((Smok\* or nicotine or tobacco) adj3 (cessation or quit\*)).mp. [mp=abstract, heading words, title]
40. (Exercise or training or rehabilitati\*).mp. [mp=abstract, heading words, title]

41. ((Lifestyle or occupational) adj1 (intervention\* or modification\* or therapy)).mp. [mp=abstract, heading words, title]
42. or/1-41
43. hypertension/
44. Hypertens\*.mp.
45. (Blood adj1 pressure).mp.
46. or/43-45
47. meta analysis/
48. MEDLINE.mp.
49. (systematic review\* or meta-analy\* or metaanaly\* or "research synthesis" or "literature review").mp. [mp=abstract, heading words, title]
50. (systematic adj3 literature).mp. [mp=abstract, heading words, title]
51. (data adj2 extract\*).mp. [mp=abstract, heading words, title]
52. ((information or data) adj3 synthesis).mp. [mp=abstract, heading words, title]
53. cochrane.mp.
54. ((qualitative or narrative or thematic or evidence or realist or interpret\* or induct\* or refutational or framework or systematic or textual) adj2 (approach or review\* or synthes\* or meta-summary or "meta summary" or summary)).mp. [mp=abstract, heading words, title]
55. (Meta adj1 (summary or narrative or synthesis or ethnograph\* or study or data or interpretation or aggregation or needs-assessment or "needs assessment")).mp. [mp=abstract, heading words, title]
56. (meta-summary or meta-narrative or meta-synthesis or meta-ethnograph\* or meta-study or meta-data-analysis or meta-data-synthesis or meta-interpretation or meta-aggregation).mp. [mp=abstract, heading words, title]
57. "reciprocal translational analysis".mp.
58. ("lines-of-arg?ment synthesis" or "lines of arg?ment synthesis").mp. [mp=abstract, heading words, title]
59. "LOA synthesis".mp.
60. "grounded formal theory".mp.
61. "grounded theory synthesis".mp.
62. (ecological adj2 (triangulation or sentence or synthesis)).mp. [mp=abstract, heading words, title]
63. Phenomenography.mp.
64. ((mixed or multi\* or cross) adj1 (method\* or design\* or research or strategy) adj2 (synthesis or review)).mp. [mp=abstract, heading words, title]
65. ((mixed-method\* or multi-method\* or mixed-design or multi-design or multiple-methods or multi-strategy or cross-design) adj2 (synthesis or review)).mp. [mp=abstract, heading words, title]
66. (Bayesian adj1 (meta-analysis or "meta analysis")).mp. [mp=abstract, heading words, title]
67. "case survey".mp.
68. "qualitative comparative analysis".mp.
69. or/47-68
70. Letter.pt.
71. (Comment or commentary).pt.
72. editorial.pt.
73. or/70-72
74. 69 not 73
75. 42 and 46 and 74
76. limit 75 to (english and yr="2012 -Current")

## EMBASE

1. exp self care/
2. exp health education/
3. exp patient education/
4. exp telehealth/
5. exp interpersonal communication/
6. exp empowerment/
7. exp self concept/
8. exp patient participation/
9. ((Self adj2 (car\* or manag\* or help or administ\* or monitor\* or medicat\*)) or self-car\* or self-manag\* or self-help or self-administ\* or self-monitor\* or self-medicat\* or selfcar\* or selfmanagement or selfhelp or selfadminist\* or selfmonitor\* or selfmedicat\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
10. (SM or SMS).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
11. (Responsib\* or Autonom\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
12. (Manag\* or copes or coping).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
13. "Disease management".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
14. "expert patient".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
15. ((professional or clinician) adj2 development).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
16. (Educat\* or training or skill\* or knowledge).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
17. (Confidence or self-efficacy).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
18. ((Access\* or provi\*) adj3 (information or records or results)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
19. (Monitor\* or self-monitor\* or selfmonitor\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
20. ((patient or individual\* or person\* or client\*) adj3 (remind\* or feedback)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
21. ((Tele adj2 (health or medicine or care)) or tele-health or tele-medicine or tele-care or telehealth or telemedicine or telecare).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
22. ("Short message service" or SMS or "mobile phone" or "text message\*").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
23. ((home or environment\* or living or assistive) adj2 (adaptation or modif\* or equipment or technolog\*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
24. "Care plan\*".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
25. "Action plan\*".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]
26. (Hypno\* adj1 (self or home)).mp. [mp=title, abstract, heading word, drug trade name, original title,

device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

27. ((cognitive or psychological or interpersonal or relaxation or biofeedback) adj3 (therap\* or intervention\* or program\*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

28. CBT.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

29. Psychoeducation\*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

30. ((Peer or patient or emotional or social or psychosocial) adj1 (support or group)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

31. (Financial adj1 control).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

32. "personal health budget\*".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

33. ((Financial or monetary or payment\* or discount or service\*) adj5 incentiv\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

34. ((Reduc\* or restrict\* or control\* or limit\* or avoid) adj (alcohol or coffee or caffeine or salt)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

35. ((Smok\* or nicotine or tobacco) adj3 (cessation or quit\*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

36. (Exercise or training or rehabilitati\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

37. ((Lifestyle or occupational) adj1 (intervention\* or modification\* or therapy)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

38. or/1-37

39. hypertension/

40. Hypertens\*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

41. (Blood adj1 pressure).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

42. or/39-41

43. "systematic review"/

44. meta analysis/

45. MEDLINE.mp.

46. (systematic review\* or meta-analy\* or metaanaly\* or "research synthesis" or "literature review").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

47. (systematic adj3 literature).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

48. (data adj2 extract\*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

49. ((information or data) adj3 synthesis).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

50. cochrane.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

51. ((qualitative or narrative or thematic or evidence or realist or interpret\* or induct\* or refutational or framework or systematic or textual) adj2 (approach or review\* or synthes\* or meta-summary or "meta summary" or summary)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

52. (Meta adj1 (summary or narrative or synthesis or ethnograph\* or study or data or interpretation or

aggregation or needs-assessment or "needs assessment").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

53. (meta-summary or meta-narrative or meta-synthesis or meta-ethnograph\* or meta-study or meta-data-analysis or meta-data-synthesis or meta-interpretation or meta-aggregation).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

54. "reciprocal translational analysis".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

55. ("lines-of-argument synthesis" or "lines of argument synthesis").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

56. "LOA synthesis".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

57. "grounded formal theory".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

58. "grounded theory synthesis".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

59. (ecological adj2 (triangulation or sentence or synthesis)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

60. Phenomenography.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

61. ((mixed or multi\* or cross) adj1 (method\* or design\* or research or strategy) adj2 (synthesis or review)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

62. ((mixed-method\* or multi-method\* or mixed-design or multi-design or multiple-methods or multi-strategy or cross-design) adj2 (synthesis or review)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

63. (Bayesian adj1 (meta-analysis or "meta analysis")).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

64. "case survey".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

65. "qualitative comparative analysis".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word]

66. or/43-65

67. letter.pt.

68. editorial.pt.

69. or/67-68

70. 66 not 69

71. 38 and 42 and 70

72. limit 71 to (human and english language and yr="2012 -Current")

## PSYCINFO

1. exp Self-Care Skills/
2. exp Self-Management/
3. exp Health Behavior/
4. exp Self-Efficacy/
5. exp Self-Help Techniques/
6. exp Coping Behavior/
7. exp Behavior Modification/
8. exp Self-Monitoring/
9. exp Health Knowledge/
10. exp Health Education/
11. exp TELEMEDICINE/
12. exp Client Education/
13. ((Self adj2 (car\* or manag\* or help or administrat\* or monitor\* or medicat\*)) or self-car\* or self-manag\* or self-help or self-administrat\* or self-monitor\* or self-medicat\* or selfcar\* or selfmanagement or selfhelp or selfadministrat\* or selfmonitor\* or selfmedicat\*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
14. (SM or SMS).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
15. (Responsib\* or Autonom\*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
16. (Manag\* or copes or coping).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
17. "Disease management".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
18. "expert patient".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
19. ((professional or clinician) adj2 development).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
20. (Educat\* or training or skill\* or knowledge).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
21. (Confidence or self-efficacy).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
22. ((Access\* or provi\*) adj3 (information or records or results)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
23. (Monitor\* or self-monitor\* or selfmonitor\*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
24. ((patient or individual\* or person\* or client\*) adj3 (remind\* or feedback)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
25. ((Tele adj2 (health or medicine or care)) or tele-health or tele-medicine or tele-care or telehealth or telemedicine or telecare).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
26. ("Short message service" or SMS or "mobile phone" or "text message\*").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
27. ((home or environment\* or living or assistive) adj2 (adaptation or modif\* or equipment or technolog\*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
28. "Care plan\*".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
29. "Action plan\*".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
30. (Hypno\* adj1 (self or home)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]



31. ((cognitive or psychological or interpersonal or relaxation or biofeedback) adj3 (therap\* or intervention\* or program\*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
32. CBT.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
33. Psychoeducation\*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
34. ((Peer or patient or emotional or social or psychosocial) adj1 (support or group)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
35. (Financial adj1 control).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
36. "personal health budget\*".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
37. ((Financial or monetary or payment\* or discount or service\*) adj5 incentiv\*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
38. ((Reduc\* or restrict\* or control\* or limit\* or avoid) adj (alcohol or coffee or caffeine or salt)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
39. ((Smok\* or nicotine or tobacco) adj3 (cessation or quit\*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
40. (Exercise or training or rehabilitati\*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
41. ((Lifestyle or occupational) adj1 (intervention\* or modification\* or therapy)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
42. or/1-41
43. HYPERTENSION/
44. Hypertens\*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
45. (Blood adj1 pressure).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
46. Meta Analysis/
47. "Literature Review"/
48. MEDLINE.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
49. (systematic review\* or meta-analy\* or metaanaly\* or "research synthesis" or "literature review").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
50. (systematic adj3 literature).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
51. (systematic adj3 literature).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
52. ((information or data) adj3 synthesis).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
53. cochrane.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
54. ((qualitative or narrative or thematic or evidence or realist or interpret\* or induct\* or refutational or framework or systematic or textual) adj2 (approach or review\* or synthes\* or meta-summary or "meta summary" or summary)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
55. (Meta adj1 (summary or narrative or synthesis or ethnograph\* or study or data or interpretation or aggregation or needs-assessment or "needs assessment")).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
56. (meta-summary or meta-narrative or meta-synthesis or meta-ethnograph\* or meta-study or meta-data-analysis or meta-data-synthesis or meta-interpretation or meta-aggregation).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
57. "reciprocal translational analysis".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
58. ("lines-of-arg?ment synthesis" or "lines of arg?ment synthesis").mp. [mp=title, abstract, heading

word, table of contents, key concepts, original title, tests & measures]

59. "LOA synthesis".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

60. "grounded formal theory".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

61. "grounded theory synthesis".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

62. (ecological adj2 (triangulation or sentence or synthesis)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

63. Phenomenography.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

64. ((mixed or multi\* or cross) adj1 (method\* or design\* or research or strategy) adj2 (synthesis or review)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

65. ((mixed-method\* or multi-method\* or mixed-design or multi-design or multiple-methods or multi-strategy or cross-design) adj2 (synthesis or review)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

66. (Bayesian adj1 (meta-analysis or "meta analysis")).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

67. "case survey".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

68. "qualitative comparative analysis".mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

69. 43 or 44 or 45

70. or/46-68

71. 42 and 69 and 70

72. limit 71 to (human and english language and yr="2012 -Current")

# CINAHL

- S129 S73 AND S77 AND S128  
Limiters - Publication Year: 2012-2017; English Language
- S128 S123 NOT S127
- S127 S124 OR S125 OR S126
- S126 PT Editorial
- S125 PT Commentary
- S124 PT Letter
- S123 S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118 OR S119 OR S120 OR S121 OR S122
- S122 TI ( "Bayesian meta-analysis" OR "Bayesian meta analysis" ) OR AB ( "Bayesian meta-analysis" OR "Bayesian meta analysis" )
- S121 TI "qualitative comparative analysis" OR AB "qualitative comparative analysis"
- S120 TI "case survey" OR AB "case survey"
- S119 TI Data N2 extract\* OR AB Data N2 extract\*
- S118 TI "research synthesis" OR AB "research synthesis"
- S117 TI ( "multi-method\* synthesis" OR "multi-method\* review" ) OR AB ( "multi-method\* synthesis" OR "multi-method\* review" )
- S116 TI ( "mixed-method\* synthesis" OR "mixed-method\* review" ) OR AB ( "mixed-method\* synthesis" OR "mixed-method\* review" )
- S115 TI ( "multi\* method\* synthesis" OR "multi\* method\* review" ) OR AB ( "multi\* method\* synthesis" OR "multi\* method\* review" )
- S114 TI ( "Mixed method\* synthesis" OR "Mixed method\* review" ) OR AB ( "Mixed method\* synthesis" OR "Mixed method\* review" )
- S113 TI Phenomenography OR AB Phenomenography
- S112 TI "ecological synthesis" OR AB "ecological synthesis"
- S111 TI "ecological sentence" OR AB "ecological sentence"
- S110 TI "grounded formal theory" OR AB "grounded formal theory"
- S109 TI ( "lines-of-arg?ment synthesis" OR "lines of arg?ment synthesis" ) OR AB ( "lines-of-arg?ment synthesis" OR "lines of arg?ment synthesis" )
- S108 TI ( meta-interpretation or "meta interpretation" ) OR AB ( meta-interpretation or "meta interpretation" ) S107 TI ( meta-data-analysis OR "meta data analysis" ) OR AB ( meta-data-analysis OR "meta data analysis" )
- S106 TI ( meta-study OR "meta study" ) OR AB ( meta-study OR "meta study" )
- S105 TI ( meta-ethnograph\* OR "meta ethnograph\*" ) OR AB ( meta-ethnograph\* OR "meta ethnograph\*" ) S104 TI ( meta-synthes\* OR "meta synthes\*" ) OR AB ( meta-synthes\* OR "meta synthes\*" )
- S103 TI ( meta-narrative OR "meta narrative" ) OR AB ( meta-narrative OR "meta narrative" )
- S102 TI "Framework approach" OR AB "Framework approach"
- S101 TI "interpret\* review\*" OR AB "interpret\* review\*"
- S100 TI "Evidence synthes\*" OR AB "Evidence synthes\*"
- S99 TI "Realist synthes\*" OR AB "Realist synthes\*"
- S98 TI ( meta-summary OR "meta summary" ) OR AB ( meta-summary OR "meta summary" )
- S97 TI Narrative N2 summary OR AB Narrative N2 summary
- S96 TI Narrative N22 synthes\* OR AB Narrative N22 synthes\*
- S95 TI Narrative N2 review\* OR AB Narrative N2 review\*
- S94 TI Qualitative N2 summary OR AB Qualitative N2 summary

S93 TI Qualitative N2 synthes\* OR AB Qualitative N2 synthes\*  
 S92 TI Qualitative N2 review\* OR AB Qualitative N2 review\*  
 S91 TI cochrane OR AB cochrane  
 S90 TI Data N3 synthesis OR AB Data N3 synthesis  
 S89 TI Information N3 synthesis OR AB Information N3 synthesis  
 S88 TI data N2 extract\* OR AB data N2 extract\*  
 S87 TI systematic N3 literature OR AB systematic N3 literature  
 S86 TI "literature review" OR AB "literature review"  
 S85 TI "research synthesis" OR AB "research synthesis"  
 S84 TI metaanaly\* OR AB metaanaly\*  
 S83 TI "meta-analy\*" OR AB "meta-analy\*"  
 S82 TI "systematic review\*" OR AB "systematic review\*"  
 S81 TI MEDLINE OR AB MEDLINE  
 S80 (MH "Literature Review")  
 S79 (MH "Meta Analysis")  
 S78 (MH "Systematic Review")  
 S77 S74 OR S75 OR S76  
 S76 TI Blood N1 pressure OR AB Blood N1 pressure  
 S75 TI Hypertens\* OR AB Hypertens\*  
 S74 (MH "Hypertension")  
 S73 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13  
 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24  
 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35  
 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46  
 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57  
 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68  
 OR S69 OR S70 OR S71 OR S72  
 S72 TI Smok\*N3 cessation OR AB Smok\*N3 cessation  
 S71 TI Restrict\* N1 salt OR AB Restrict\* N1 salt  
 S70 TI Restrict\* N1 alcohol OR AB Restrict\* N1 alcohol  
 S69 TI Lifestyle N1 modification\* OR AB Lifestyle N1 modification\*  
 S68 TI Lifestyle N1 intervention\* OR AB Lifestyle N1 intervention\*  
 S67 TI training OR AB training  
 S66 TI rehabilitati\* OR AB rehabilitati\*  
 S65 TI Exercise OR AB Exercise  
 S64 TI Monetary N5 incentiv\* OR AB Monetary N5 incentiv\*  
 S63 TI Financial N5 incentiv\* OR AB Financial N5 incentiv\*  
 S62 TI "personal health budget\*" OR AB "personal health budget\*"  
 S61 TI Financial N1 control OR AB Financial N1 control  
 S60 TI Patient N3 group OR AB Patient N3 group  
 S59 TI Peer N3 support OR AB Peer N3 support  
 S58 TI Psychoeducation\* OR AB Psychoeducation\*  
 S57 TI CBT OR AB CBT  
 S56 TI Relaxation N3 program\* OR AB Relaxation N3 program\*  
 S55 TI Psychological N3 intervention\* OR AB Psychological N3 intervention\*  
 S54 TI Cognitive N3 therap\* OR AU Cognitive N3 therap\*  
 S53 TI Hypno\* N1 self OR AB Hypno\* N1 self  
 S52 TI "Action plan\*" OR AB "Action plan\*"  
 S51 TI "Care plan\*" OR AB "Care plan\*"  
 S50 TI Assistive N2 technolog\* OR AB Assistive N2 technolog\*  
 S49 TI Home N2 modif\* OR AB Home N2 modif\*

S48 TI Home N2 adaptation OR AB Home N2 adaptation  
 S47 TI "text message\*" OR AB "text message\*"  
 S46 TI Tele N2 care OR AB Tele N2 care  
 S45 TI Tele N2 medicine OR AB Tele N2 medicine  
 S44 TI Tele N2 health OR AB Tele N2 health  
 S43 TI Individual\* N3 feedback OR AB Individual\* N3 feedback  
 S42 TI Individual\* N3 remind\* OR AB Individual\* N3 remind\*  
 S41 TI Patient N3 feedback OR AB Patient N3 feedback  
 S40 TI Patient N3 remind\* OR AB Patient N3 remind\*  
 S39 TI Monitor\* OR AB Monitor\*  
 S38 TI Access\* N3 results OR AB Access\* N3 results  
 S37 TI Access\* N3 records OR AB Access\* N3 records  
 S36 TI Access\* N3 information OR AB Access\* N3 information  
 S35 TI Confidence OR AB Confidence  
 S34 TI self-efficacy OR AB self-efficacy  
 S33 TI training OR AB training  
 S32 TI skill\* OR AB skill\*  
 S31 TI knowledge OR AB knowledge  
 S30 TI Educat\* OR AB Educat\*  
 S29 TI Clinician N2 development OR AB Clinician N2 development  
 S28 TI Professional N2 development OR AB Professional N2 development  
 S27 TI "expert patient" OR AB "expert patient"  
 S26 TI "Disease management" OR AB "Disease management"  
 S25 TI coping OR AB coping  
 S24 TI copes OR AB copes  
 S23 TI Manag\* OR AB Manag\*  
 S22 TI Responsib\* OR AB Responsib\*  
 S21 TI Autonom\* OR AB Autonom\*  
 S20 TI SMS OR AB SMS  
 S19 TI SM OR AB SM  
 S18 TI self-manag\* OR AB self-manag\*  
 S17 TI self-car\* OR AB self-car\*  
 S16 TI Self N2 medicat\* OR AB Self N2 medicat\*  
 S15 TI Self N2 monitor\* OR AB Self N2 monitor\*  
 S14 TI Self N2 administrat\* OR AB Self N2 administrat\*  
 S13 TI Self N2 help OR AB Self N2 help  
 S12 TI Self N2 manag\* OR AB Self N2 manag\*  
 S11 TI Self N2 car\* OR AB Self N2 car\*  
 S10 (MH "Rehabilitation+")  
 S9 (MH "Support Groups+")  
 S8 (MH "Assistive Technology Devices+")  
 S7 (MH "Communication Skills")  
 S6 (MH "Telehealth+")  
 S5 (MH "Attitude of Health Personnel+")  
 S4 (MH "Health Education+")  
 S3 (MH "Patient Education+")  
 S2 (MH "Self Concept+")  
 S1 (MH "Self Care+")

## BNI

1. exp SELF CARE/
2. exp SELF MEDICATION/
3. PATIENTS EDUCATION/
4. exp PERSONAL CARE/
5. exp SELF HELP GROUPS/
6. PATIENTS EMPOWERMENT/
7. exp INTERPERSONAL RELATIONS/
8. exp TECHNOLOGY IN HEALTH CARE/
9. Disabilities, aids AND APPLIANCES/
10. TELEMEDICINE/
11. (Self ADJ2 (car\* OR manag\* OR help OR admistrat\* OR monitor\* OR medicat\* OR self-car\* OR self-manag\* OR self-help OR self-administrat\* OR self-monitor\* OR self-medicat\*)).ti,ab
12. (SM OR SMS).ti,ab
13. (Responsib\* OR Autonom\*).ti,ab
14. (Manag\* OR copes OR coping).ti,ab
15. ("Disease management").ti,ab
16. ("expert patient").ti,ab
17. ((professional OR clinician) ADJ2 development).ti,ab
18. (Educat\* OR training OR skill\* OR knowledge).ti,ab
19. (Confidence OR self-efficacy).ti,ab
20. ((Access\* OR provi\*) ADJ3 (information OR records OR results)).ti,ab
21. (Monitor\* OR self-monitor\* OR selfmonitor\*).ti,ab
22. ((patient OR individual\* OR person\* OR client\*) ADJ3 (remind\* OR feedback)).ti,ab
23. ((Tele ADJ2 (health OR medicine OR care)) OR tele-health OR tele-medicine OR tele-care OR telehealth OR telemedicine OR telecare).ti,ab
24. ("Short message service" OR SMS OR "mobile phone" OR "text message").ti,ab
25. ((home OR environment\* OR living OR assistive) ADJ2 (adaption OR modif\* OR equipment OR technolog\*)).ti,ab
26. ("Action plan").ti,ab
27. (Hypno\* ADJ1 (self OR home)).ti,ab
28. ((cognitive OR psychological OR interpersonal OR relaxation OR biofeedback) ADJ3 (therap\* OR intervention\* OR program\*)).ti,ab
29. (CBT).ti,ab
30. (Psychoeducation\*).ti,ab
31. ((Peer OR patient OR emotional OR social OR psychosocial) ADJ1 (support OR group)).ti,ab
32. (Financial ADJ1 control).ti,ab
33. ("personal health budget").ti,ab
34. ((Financial OR monetary OR payment\* OR discount OR service\*) ADJ5 incentiv\*).ti,ab
35. (Exercise OR training OR rehabilitati\*).ti,ab
36. ((Lifestyle OR occupational) ADJ1 (intervention\* OR modification\* OR therapy)).ti,ab
37. ((Reduc\* OR restrict\* OR control\* OR limit\* OR avoid) ADJ1 (alcohol OR coffee OR caffeine OR salt)).ti,ab
38. ((Smok\* OR nicotine OR tobacco) ADJ3 (cessation OR quit\*)).ti,ab
39. (1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 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 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 38)
40. exp BLOOD PRESSURE/
41. (Hypertens\*).ti,ab
42. (Blood ADJ1 pressure).ti,ab

43. (40 OR 41 OR 42)
44. (MEDLINE).ti,ab
45. ("systematic review" OR "meta-analy\*" OR metaanaly\* OR "research synthesis" OR "literature review").ti,ab
46. (systematic ADJ3 literature).ti,ab
47. (data ADJ2 extract\*).ti,ab
48. ((information OR data) ADJ3 synthesis).ti,ab
49. (cochrane).ti,ab
50. ((qualitative OR narrative OR thematic OR evidence OR realist OR interpret\* OR induct\* OR refutational OR framework OR systematic OR textual) ADJ2 (approach OR review\* OR synthes\* OR meta-summary OR "meta summary" OR summary)).ti,ab
51. (Meta ADJ1 (summary OR narrative OR synthesis OR ethnograph\* OR study OR data OR interpretation OR aggregation OR needs-assessment OR "need assessment")).ti,ab
52. (meta-summary OR meta-narrative OR meta-synthesis OR meta-ethnograph\* OR meta-study OR meta-data-analysis OR meta-data-synthesis OR meta-interpretation OR meta-aggregation).ti,ab
53. ("reciprocal translational analysis").ti,ab
54. (RTA).ti,ab
55. ("lines-of-arg?ment synthesis" OR lines of arg?ment synthesis").ti,ab
56. ("LOA synthesis").ti,ab
57. ("grounded formal theory").ti,ab
58. ("grounded theory synthesis").ti,ab
59. (ecological ADJ2 (triangulation OR sentence OR synthesis)).ti,ab
60. (Phenomenography).ti,ab
61. (((mixed OR multi\* OR cross) ADJ1 (method\* OR design\* OR research OR strategy)) ADJ2 (synthesis OR review)).ti,ab
62. ((mixed-method\* OR multi-method\* OR mixed-design OR multi-design OR multiple-methods OR multi-strategy OR cross-design) ADJ2 (synthesis OR review)).ti,ab
63. ("research synthesis").ti,ab
64. (Data ADJ2 extract\*).ti,ab
65. ((information OR data) ADJ3 synthesis).ti,ab
66. (Bayesian ADJ1 (meta-analysis OR "meta analysis")).ti,ab
67. ("case survey").ti,ab
68. ("qualitative comparative analysis").ti,ab
69. (44 OR 45 OR 46 OR 47 OR 48 OR 49 OR 50 OR 51 OR 52 OR 53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63 OR 64 OR 65 OR 66 OR 67 OR 68)
70. (39 AND 43 AND 69)
71. 70 [DT 2012-2017]

## 1b: Selection criteria

### Exclusion criteria

Exclusion criteria must be applied in order, so papers are excluded on the first of these criteria that applies. For example, if not a systematic review or about self-management then it is excluded on 4 rather than 6.

If the paper is not excluded on any criteria, then it is included into the meta-review.

#### Exclude 1

Exclude if the review is not written in English.

#### Exclude 2

Exclude if the review does not include human participants.

#### Exclude 3

Exclude reviews published before 1993.

#### Exclude 4

Exclude if the review is not a systematic review of the literature.

Searches at least two sources, one of which must be an electronic database (e.g. Cochrane database, MEDLINE, EMBASE, PsycINFO, BNI, CINAHL), the other may be a second electronic database, or one of the following: manual searching of one or more journal(s), checking reference lists; and consulting with experts.

Provides reasoning for the inclusion/exclusion of studies.

Provides some explanation of how they synthesised the data (e.g. systematic data extraction, meta-analysis, narrative synthesis meta-ethnography).

#### Exclude 5

Exclude if the review does not focus on or include one or more of the LTCs you are interested in.

#### Exclude 6

Exclude if the focus of the review is not about:

*Quantitative*: self-management support interventions, *or*

*Qualitative*: the lived experience of the condition that can be used to inform self-management support, the experience of self-management of the condition, or the experience/feedback of self-management services/provision either as an intervention or in the real-world community.



## Exclude 7

Exclude if the systematic review does not attempt to identify:

*Quantitative*: RCTs, *or*

*Qualitative*: qualitative primary studies.

## Exclude 8

Exclude if the review does not:

*Quantitative*: measure one of the following outcomes: use of health-care services; health outcomes (including biological markers of disease); symptoms; health behaviours; QoL; self-efficacy/empowerment, *or*

*Qualitative*: if findings cannot be used to inform self-management support.

## Exclude 9

Exclude if the paper is a published conference abstract, thesis, protocol, book, book chapter or summary of other reviews.

## Exclude 10

Exclude if the paper is a shorter and less detailed version of a review or if there has been an updated version of the review published.

Often authors do one review, publish it as a Cochrane review first and then about 1 year later exactly the same thing gets published in a journal article. However, this is in less depth because of the restricted word limit for journals. Therefore the journal article version gets excluded on criteria 10 for being a shorter, less detailed version of a review.

If there is a Cochrane review that includes a mixture of designs, such as RCTs, controlled clinical trials and observational studies, and does not separate them out in the results *but* there is a journal article version of the same thing that only writes up the RCTs, exclude the Cochrane review on criteria 11 and keep the journal article version in.

A review is considered being an updated review if it includes an updated re-search, so, for example, if a Cochrane review is done in 2002 and then the same thing is re-searched in 2006, the 2002 version is excluded under criteria 10.

## Exclude 11

Exclude if unable to data extract.

*Different study designs*: where systematic reviews include a range of study designs these reviews will only be included in our meta-review if they report or comment the findings of the RCTs/qualitative studies separately, either under separate subheadings, or in separate

paragraphs, or in whole sections of text. Where results across the RCT/qualitative design studies are not clearly distinguished from those of other study designs in the results or conclusions sections – for example necessitating referral to a table to identify the actual study design of individual studies or where the findings from studies of different designs are combined or interdigitated – these reviews will not be included in the meta-review.

*Different LCTs:* where systematic reviews include both the condition of interest and other conditions these reviews will only be included in our metareview if they report or comment the findings of the RCTs/ qualitative studies on our index conditions separately, either under separate subheadings, or in separate paragraphs, or in whole sections of text. Where it is not possible to easily extract results for our conditions of interest from those for other conditions – for example necessitating referral to a table to identify the underlying condition in a particular study, or where the findings from studies on different conditions are combined or interdigitated – these reviews will not be included in the meta-review.

## Exclude 12

Exclude if the review does not report somewhere in the review the list of studies included. If the review provides references in the text, and includes the studies in a reference list at the end of review, this is fine.

1c: Overlap of studies included in the systematic reviews

**Qualitative reviews overlap table**

	Buckley	Fletcher	Khatib	Marshall	Morton	Schlomann
Buckley						
Fletcher	-					
Khatib	1	-				
Marshall	3	-	5			
Morton	-	2	-	-		
Schlomann	1	-	-	2	-	

## Quantitative reviews overlap table

	Ref	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	52	53	54	55
Beratarrechea 2017	26																													
B-Capblanch 2007	27																													
Chandak 2015	28	1																												
Cheema 2014	29																													
Chodosh 2005	30		1																											
Crabtree 2013	31			2																										
Dickinson 2006	32					2																								
Duan 2017	33	1		4																										
Ebrahim- 1998	34		1		1	1			1																					
Glynn 2010	35				2	1			5	24																				
G-Sridhar 2013	36		1		2	1				6	9																			
Lee 2012	37											2																		
Lu 2012	38																													
Mansoor 2013	39											4																		
McLean 2016	40	1		2					3		1																			
Ogedegbe 2006	41		1						1	2	4	3				1														
Omboni 2013	42			2			1		18		4					1	1													
Proia 2014	43			4	2		1		6		5	6			3	1	1	6												
Quinone 2014	44			1						1		1						1												
Radhakrishnan 2012	45			1			1											1												
Riegel 2016	46																													
Ruppar 2017	47				2					2	2	5	1		1				3											
Saksena 2010	48								1									1	1											
Schroeder 2004	49				2				1	16	13	8				1	5	1		1			3							
Takiya 2004	50								1	8	3	5				1	4	1		1			2			14				
Vargas 2017	52								2		1	1						2												
Verbek 2011	53			1			1		8		3					1	1	9	2					1		1	1			
Visanathan 2012	54								2		2	5	2		2	1	2	2	6				2		2	1		1		
Xu 2014	55													5																
	Ref	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	52	53	54	55

1d: R-AMSTAR scores for included studies

Qualitative reviews

<b>R-AMSTAR Criteria</b>	<b>Morton et al, 20117</b>	<b>Marshall et al, 2012</b>	<b>Khatib et al, 2014</b>	<b>Fletcher et al, 2016</b>	<b>Buckley et al, 2016</b>	<b>Schlomann et al, 2007</b>
Was an appropriate and detailed design provided?	3	4	4	4	4	4
Was there duplicate study selection and data extraction?	3	4	4	1	2	1
Was a comprehensive literature search performed?	3	4	4	3	4	4
Was the status of publication (i.e. grey literature) used as an inclusion criterion?	2	4	4	1	2	1
Was a list of studies (included and excluded) provided?	4	1	1	4	2	1
Were the characteristics of the included studies provided?	2	3	3	3	3	3
Was the scientific quality of the included studies assessed and documented?	4	4	4	4	2	1
Was the scientific quality of the included studies used appropriately in formulating conclusions?	4	4	4	4	4	2
Were the methods used to combine the findings of the studies appropriate?	4	4	1	3	3	4
Was the conflict of interest stated?	4	1	3	2	2	1
<b>Total score/40</b>	<b>34</b>	<b>33</b>	<b>33</b>	<b>29</b>	<b>29</b>	<b>22</b>
<b>Quality Rating</b>	<b>High</b>	<b>High</b>	<b>High</b>	<b>Low</b>	<b>Low</b>	<b>Low</b>

**Note: Highest to lowest rated from left to right – scores under 30 given lower weighting**

## Qualitative reviews

Reference in main paper	1. Was an a priori design provided?	2. Was there duplicate study selection and data extraction?	3. Was a comprehensive literature search performed?	4. Was the status of publication used as an inclusion criterion?	5. Was a list of studies (included and excluded) provided?	6. Were the characteristics of the included studies provided?	7. Was the scientific quality of the included studies assessed and documented?	8. Was the scientific quality of the included studies used appropriately in formulating	9. Were the methods used to combine the findings of studies appropriate?	10. Was the likelihood of publication bias assessed?	11. Was the conflict of interest included?	Total score /44	Population size	Star rating
26 Beratarrechea 2017	4	4	3	2	3	2	2	2	2	1	3	28	1,667	*
27 Bosch- Capblanch 2007	4	4	3	4	4	3	4	1	1	1	3	32	382	**
28 Chandak 2015	4	0	3	1	2	3	1	2	1	1	1	19	N/R	*
29 Cheema 2014	4	4	4	1	3	4	4	3	4	2	3	36	3,034	***
30 Chodosh 2005	4	4	4	1	3	4	4	2	4	4	2	36	1,557	**
31 Crabtree 2013	3	1	3	1	2	3	1	2	1	0	1	18	1,163	*
32 Dickinson 2006	4	4	3	1	3	4	4	2	4	4	2	35	413	**
33 Duan 2017	4	4	4	2	3	0	4	3	4	4	4	36	13,875	***
34 Ebrahim 1998	4	4	3	1	4	2	4	2	1	1	2	28	>32,000	**
35 Glynn 2010	4	4	4	4	3	3	4	1	4	1	3	35	>87,000	***
36 Gwadry-Sridhar 2013	3	4	3	2	1	1	3	3	3	3	4	30	N/R	**
37 Lee 2012	4	4	3	1	2	4	3	4	4	0	4	33	780	**
38 Lu 2012	3	4	4	2	2	3	4	4	4	4	4	38	24,667	***
39 Mansoor 2013	4	0	4	1	1	4	0	0	2	4	4	24	2,345	*
40 McLean 2016	4	0	3	2	2	4	4	2	4	3	4	32	1,259	**

41	Ogedegbe 2006	4	4	3	2	3	3	3	1	1	1	2	<b>27</b>	<b>1,550</b>	<b>*</b>
42	Omboni 2013	4	4	4	2	2	3	4	4	4	4	2	<b>37</b>	<b>7,037</b>	<b>***</b>
43	Proia 2014	3	1	3	2	2	4	4	2	4	3	3	<b>31</b>	<b>N/R</b>	<b>**</b>
44	Quinones 2014	4	4	3	1	3	4	4	4	4	4	4	<b>39</b>	<b>1,332</b>	<b>**</b>
45	Radhakrishnan 2012	3	4	4	1	3	4	3	2	4	1	3	<b>32</b>	<b>634</b>	<b>**</b>
46	Riegel 2016	3	4	3	2	1	1	3	3	4	3	4	<b>31</b>	<b>2,050</b>	<b>**</b>
47	Ruppar 2017	4	4	4	4	4	4	4	1	4	4	4	<b>41</b>	<b>5,228</b>	<b>***</b>
48	Saksena 2010	4	4	4	4	3	3	1	1	1	2	1	<b>28</b>	<b>1,319</b>	<b>*</b>
49	Schroeder 2004	4	4	4	4	4	2	4	2	1	2	3	<b>34</b>	<b>15,519</b>	<b>***</b>
50	Takiya 2004	4	4	4	1	1	3	2	1	4	3	2	<b>29</b>	<b>2,446</b>	<b>*</b>
52	Vargas 2017	3	4	4	1	3	4	3	2	4	1	3	<b>32</b>	<b>1,446</b>	<b>**</b>
53	Verbek 2011	4	1	2	1	3	4	1	1	2	4	1	<b>24</b>	<b>2,501</b>	<b>*</b>
54	Visanathan 2012	4	4	2	1	3	2	2	2	4	1	3	<b>28</b>	<b>9,691</b>	<b>**</b>
55	Xu 2014	4	2	3	1	2	4	4	2	3	3	2	<b>30</b>	<b>2,469</b>	<b>*</b>

## **Supplementary Digital Content file 2: Qualitative reviews**

2a: Table of aims and key findings Page 2

2b: Quotes to support the metaphors and sub-themes Page 4



**2a: Table of the aim and key findings of the included qualitative systematic reviews**

Author, Year, BP studies (total) R-AMSTAR score	Review aim	Populations studied	Brief summary of key findings
<b>Buckley 2016</b> <sup>21</sup> 8 studies (of 22 papers) R-AMSTAR = 29	To identify beliefs about hypertension that are prevalent among African Americans.	African American participants	African American (and other ethnicities') health beliefs concerning hypertension may differ from those of HCPs. HCPs should elicit and discuss the patient's perspective. Interventions designed to reconcile these differences may improve adherence to prescribed health behaviours and patient outcomes.
<b>Fletcher 2016</b> <sup>22</sup> 11 studies (of 12 papers) R-AMSTAR = 29	To investigate: the motivation for patients to start HBPM; how patients and clinicians use HBPM to promote behaviour change; perceived barriers and facilitators to HBPM use by patients and clinicians; the communication and interaction between the two parties.	Ambulatory patients with hypertension or the healthcare professionals managing their care; based in primary care, outpatient clinics or the community	Whilst patients are often aware of the risks of high BP, they can find BP readings and targets confusing. HBPM, often in conjunction with education about hypertension: <ul style="list-style-type: none"> <li>• gives patients a better understanding of their health state, and a proxy for symptoms in order to be able to act.</li> <li>• empowers patients and facilitates discussion with clinicians.</li> </ul> HCPs recognise the benefits of: <ul style="list-style-type: none"> <li>• having the more accurate picture of patients' BP that is provided by HBPM</li> <li>• are concerned about how their patients may react to HBPM</li> </ul> HBPM facilitated the interaction in consultations about hypertension, bridging a potential gap in the traditional patient-clinician relationship. Uncertainty could be reduced by providing information about how to interpret HBPM, what variation is acceptable, adjustment for home-clinic difference, and for patients what they should be concerned about and how to act.
<b>Khatib 2014</b> <sup>23</sup> 16 studies (of 25 papers) R-AMSTAR = 33	To systematically review the literature on barriers reported by patients and HCPs that may impede optimal awareness, treatment, or follow up of hypertension.	Patients with or at risk of hypertension. HCPs (doctors, nurses, other), in primary care or hospital.	There was a wide range of barriers facing patients and HCPs pursuing hypertension control, indicating the need for targeted multi-faceted interventions. More methodologically rigorous studies that encompass the range of barriers and that include low- and middle-income countries are required in order to inform policies to improve hypertension control.
<b>Morton 2016</b> <sup>25</sup> 8 studies (of 30 papers) R-AMSTAR = 34	To understand the experiences of patients and HCPs using self-management Digital Interventions (DIs) for LTCs	Adults with LTCs and HCPs involved in their care.	Patients using self-management DIs perceived closer contact with HCPs, and felt better cared for. Monitoring their own health data gave patients a greater self-awareness of their condition and motivated them to engage in lifestyle behaviours to help improve their data. HCPs perceived clinical benefits to self-management DIs, but raised some concerns about the burden of monitoring patient data.

<p><b>Marshall 2012</b> <sup>24</sup> 53 studies (of 59 papers) R-AMSTAR = 33</p>	<p>To examine lay understandings about the causes of hypertension and perspectives on medication. To investigate how perspectives varied among different cultures and ethnic groups. To explore how understanding and experiences of hypertension contributes to poor adherence and blood pressure control.</p>	<p>People with uncomplicated hypertension, 16 countries (USA, UK, Brazil, Sweden, Ghana, Canada, New Zealand, Denmark, Finland, Iran, Israel, Netherlands, Korea, Spain, Tanzania Thailand)</p>	<p>Findings were consistent across countries and ethnic group:</p> <ul style="list-style-type: none"> <li>• Participants thought hypertension was principally caused by stress and produced symptoms, particularly headaches, dizziness and sweating.</li> <li>• Participants widely intentionally reduced or stopped treatment without consulting their doctor.</li> <li>• Participants commonly perceived that their blood pressure improved when symptoms abated or when they were not stressed, and that treatment was not needed at these times.</li> <li>• Participants disliked treatment and its side effects and feared addiction.</li> </ul> <p>External factors that prevented adherence included being unable to find time to take the drugs or to see the doctor; having insufficient money to pay for treatment; the cost of appointments and healthy food; a lack of health insurance; forgetfulness.</p>
<p><b>Schlomann 2007</b> <sup>26</sup> 11 studies R-AMSTAR = 22</p>	<p>To explore lay beliefs about hypertension and its treatment in order to develop a foundation for better partnering with patients.</p>	<p>US based qualitative studies describing patients' perspectives about hypertension and its treatment.</p>	<p>Professional and lay beliefs about hypertension are not congruent. Historical factors, lack of congruence between belief systems and poor relationships with providers lead many patients, especially African Americans, to distrust providers and impede the effectiveness of treatment plans.</p> <p>The most problematic discrepancies were related to beliefs about:</p> <ul style="list-style-type: none"> <li>• the presence of symptoms,</li> <li>• the need to take medications for the rest of one's life,</li> <li>• race-specific treatment plans.</li> </ul> <p>The interactions between nurse practitioners and hypertensive patients have not been explored. Professional-patient interactions based on partnership models, with specific consideration for the above-stated discrepancies in beliefs, are necessary to improve hypertension control.</p>

Note: DI=Digital Interventions. HBPM = Home Blood Pressure Monitoring. HCPs = healthcare professionals. LTCs = long term conditions.

2b: Thematic Analysis of Qualitative Papers

Metaphor	Sub-theme	Journal article/section from journal theme name/page number
<p><b>Understanding Hypertension</b></p>	<p><b>Beliefs about definition and causes</b></p>	<p><b>Marshall 2012 / Causes of hypertension and the role of stress / p2-3</b>                      The main causes of hypertension reported by participants were stress, food, being overweight, family history, and alcohol. Participants widely and strongly connected stress and worries with hypertension: as a cause, an exacerbating factor, and a consequence. A participant from a Dutch study seemed to regard worry and blood pressure as synonymous [Beune 2006]</p> <p><b>Schlomann 2006 / Definition, etiology and mechanism / p 360</b>                      Stress or emotional factors (including racism, interpersonal issues, and financial difficulties) were viewed as a major cause of high blood pressure in a number of the studies [Boutain 2001a; Lukoschek 2003; Schoenberg 2002].</p> <p>The relationship between high blood pressure and food, especially pork, was also consistently noted in those studies that explored the causes of high blood pressure</p> <p><b>Buckley 2016/Conceptualizations of Hypertension/p3</b>                      Two (9%) studies found that participants considered the condition of hypertension different from the condition of elevated blood pressure [Wison 2002; Lukoschek 2003]. These included “high-pertension”, a disease resulting from states of intense emotion or anxiety that caused blood to rush unexpectedly to the head [Heurtin-Roberts 1992; Schoenberg 1997; Bailey 1988], and “high blood”, a chronic condition of “thickened” or “rich” blood due to genetics and diet [Bailey 1998; Lukoschek 2003].</p> <p><b>Buckley 2016/Causes of Hypertension/p3</b>                      In ten (46%) studies, African American participants reported that diet was the primary cause of hypertension</p> <p>Stress was also identified by African American participants in several studies seven studies (32%)</p> <p>Genetics as a cause of hypertension were described by participants from six (27%) studies. Poor rest, weather changes, smoking, religion, racism, germs, and pollution were also reported causes of hypertension</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Capability barriers/P6</b>                      Knowledge of hypertension risk factors varied by study and within study; some participants were aware that a poor diet, high salt and fat intake, and lack of physical activity might be a risk factor for HYPERTENSION [Pham 1999], whereas others reported less knowledge of such risk factors [Kusuma 2010; Pham 1999]. Smoking and alcohol were reported as risk factors in one study only [Machado 2012].</p>

	<p><b>Marshall 2012 / Causes of hypertension and the role of stress / p3</b>  In seven studies (Canada, Netherlands, Thailand, United States, and United Kingdom) hypertension was seen by some participants as a temporary or curable condition that would not require long term treatment</p> <p>In five studies (Tanzania, United Kingdom, and United States), some participants perceived hypertension to be a distinct condition from high blood pressure. Most participants understood that hypertension caused serious complications, such as stroke (18 studies: Brazil, Sweden, South Korea, Thailand, United Kingdom, United States), death (13 studies: Brazil, Canada, Denmark, Netherlands, Sweden, United Kingdom, and United States), and heart disease (14 studies: Brazil, Sweden, United Kingdom, and United States).</p> <p><b>Schlomann 2006 / Definition, etiology and mechanism / p360</b>  Hypertension, high blood pressure, thick blood, and high blood were terms used by study participants to label the health problem. For some, these words were used interchangeably, but for others, they referred to different diseases.</p> <p>Wilson et al. (2002), in a population that included non-hypertensive individuals, found few participants related hypertension to pressure in the vessels and none defined it in terms of actual blood pressure readings. Some attributed it to the blood traveling too fast to the brain.</p> <p>High blood pressure was not viewed as pathological by all. Some of the participants in Lukoschek’s (2003) study considered it as a necessary adjustment for African Americans in response to a stressful life. Similarly, Ogedegbe, Harrison, et al. (2004) reported that some viewed it as self-regulating and hence believed it did not require medications for treatment.</p> <p><b>Schlomann 2006 / Treatment / p361-362</b>  For some, hypertension was viewed as a self-regulating process and therefore not pathological. Attitudes included denial of the diagnosis and irresponsibility for one’s health.</p> <p><b>Buckley 2016/Conceptualizations of Hypertension/p3</b>  non-biomedical beliefs about hypertension remain common among African Americans, as three (14%) studies have found that participants admitted to a poor understanding of hypertension [Fongwa 2008; Boutin-Foster 2007; Russell 2010] and 6 (27 %) provided an inaccurate description of hypertension as an acute, but not chronic, condition [Heurtin-Roberts 1992; Wilson 2002; Schoenberg 1997; Bailey 1998; Lukoschek 2003; Kronish 2012].</p> <p><b>Buckley 2016/ Hypertension related complications/p7</b>  Hypertension was either considered not serious or less serious than other diseases by participants from two (9 %) studies. Three (14%) studies indicated that participants thought hypertension was serious</p>
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		<p><b>Khatib 2014/ Intention and determinants of intention strength/P6</b>  ....they denied the diagnosis and viewed it as a reaction to stressful events and not necessarily a chronic disease [Anthony 2012].</p> <p><b>Buckley 2016/ Hypertension-Related Complications/p7</b>  Stroke and heart disease both recognized as potential complications by participants 5 studies or (23%)  Five studies (23%) reported that participants considered hypertension a potentially fatal disease</p>
	<p><b>Individual and cultural factors</b></p>	<p><b>Buckley 2016/Comparison with other ethnicities/p7</b>  Discordant health beliefs may be found in all patients, across a wide range of characteristics, as demonstrated by Marshall et al. However, meaningful differences across ethnicities may exist.</p> <p>Bailey found that African American participants were more likely to attribute hypertension to psychosocial stress and less likely to consider age- and hereditary-related factors compared with Caucasian participants.</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Healthcare system barriers /P6</b>  Acceptability of available care included .....lack of respect for the poor [Kusuma 2010], and lack of attention to minorities [Barnes 2012; Greer 2010].</p> <p><b>Buckley 2016/Conceptualizations of Hypertension/p3</b>  When prompted to discuss hypertension, many African American participants from older studies 5 (23%) described two disease states [Heurtin-Roberts 1992; Wilson 2002; Schoenberg 1997; Bailey 1998; Lukoschek 2003].</p> <p><b>Schlomann 2006 / Definition, aetiology and mechanism / p360</b>  Lukoschek (2003) explored the beliefs of low income, urban hypertensive African Americans about hypertension. He described the belief that hypertension and high blood pressure are separate diseases. Hypertension was described as a curable stress response that tightens up the blood vessels and increases the heart rate. In contrast, high blood pressure or “high blood” was viewed as an incurable physiological problem caused by certain foods, especially fatty ones or pork. These foods could cause the blood to be “thick.”</p> <p>The “thick blood” theory or tightening of blood vessels was the primary explanation of the underlying mechanism of high blood pressure.</p> <p>....the Hmong shamans in Hessel et al.’s (2005) study described some difficulty in conceptualizing high blood pressure. Their own language did not have a word for it, and the notion of a chronic illness was not part of their culture. The language of Laos, the country of origin for the Hmong, does have a word for high blood pressure—it means, “fat in the blood.’</p>

		<p><b>Khatib 2014/ Intention and determinants of intention strength/P6</b>  Motivation barriers refer to intention to change and were reported in terms of exercise, where patients described being too lazy or too tired to exercise [Ford 2009].</p> <p>Breaking habit barriers were mostly reported in terms of adapting to a healthier lifestyle, whereby patients mainly expressed difficulty in changing dietary habits [Parker 2012; Peters 2008].</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Intention and determinants of intention strength/P6</b>  Lack of motivation was also reported in terms of medication adherence, where patients admitted to not putting enough effort or thought to taking their medication as prescribed.</p> <p><b>Buckley 2016/Treatment of Hypertension/p3</b>  Home remedies, defined in this review as any non-medical treatment option, were used by participants from ten studies  Stress relief and treatments to reduce stress were reported in four studies (18%)</p> <p>Lifestyle modifications, such as dietary changes and increased levels of exercise, often were used in conjunction with other treatments.</p> <p><b>Khatib 2014/ Intention and determinants of intention strength/P6</b>  Beliefs about the consequences of a healthy lifestyle were also discussed [Horwitz 2004], African American patients, for example, were reported as considering HYPERTENSION as being inevitable [Wexler 2009], similarly some patients showed a fatalistic perspective suggesting that “it’s all in God’s hands” [Peters 2008]. Therefore improving diet or exercising might not make any difference.</p>
	<p><b>Symptoms</b></p>	<p><b>Buckley 2016/Perceived Hypertension-Related Symptoms/p3</b>  Nine (41%) studies reported that participants attributed dizziness to hypertension  Participants from four (18%) studies perceived changes in vision to be hypertension related  Mood disturbances or panic attack-like symptoms were described by participants in three (14%) studies</p> <p><b>Schlomann 2006 / Symptoms / p361</b>  Participants described a minimum of three and an average of seven different symptoms associated with high blood pressure. In all the studies, a headache, which varied from dull to very severe, was identified as one of the most common symptoms and was believed to be caused by stress or fatty foods.  A change in heartbeat, either increased rate or force, was another commonly cited symptom.</p>

		<p>The participants described a pounding heartbeat as the most serious symptom as it may warn of a heart attack. Not taking one's medication could cause the heart to pound. If taking the medication did not resolve the problem, participants sought medical assistance.</p> <p>A general feeling of weakness, fatigue, or sluggishness was noted in all the studies as a symptom of high blood pressure, although it was not one of the top-rated symptoms.</p> <p>A nosebleed was another commonly reported symptom.</p> <p><b>Marshall 2012 / Symptoms and their meaning / p3</b>  Participants commonly (13 countries, 27 studies) reported symptoms that they connected with hypertension, particularly headache and dizziness. Participants in 16 of the studies reported that hypertension caused them no symptoms.</p>
	<p><b>Adherence</b></p>	<p><b>Marshall 2012 / Causes of hypertension and the role of stress / p2-3</b>  Most participants reported that stress led directly to increased blood pressure; but leading a stressful life also caused difficulties in finding time to take drugs, eat well, and attend clinic appointments.</p> <p><b>Marshall 2012 / Causes of hypertension and the role of stress / p3</b>  Participants in five studies (South Korea, Sweden, United Kingdom, and United States) described that taking drugs reduced anxiety or worries.[Benson 2006; Lee 2008; Lisper 1997; Lukoschek 2003; Morgan 1995] This was often thought to be a direct physiological action of drugs [Benson 2006; Lisper 1997; Lukoschek 2003] but in some cases resulted from feeling protected from the complications of hypertension. [Lee 2008; Morgan 1995]. However, participants in two studies (Sweden and United States) negatively perceived drugs to function as sedatives.</p> <p><b>Marshall 2012 / Attitudes to drug taking / p4</b>  Participants in nine studies (Brazil, Netherlands, Thailand, United Kingdom, and United States) reported taking drugs regularly according to the prescription. A belief that drugs were essential is illustrated by a participant in one of the Brazilian studies. A participant in one of the US studies described how she planned to ensure she never ran out of tablets.</p> <p><b>Buckley 2016/Treatment of Hypertension/p7</b>  In six (27%) studies, medication use was reported as a treatment options used by African American participants</p> <p><b>Khatib 2014/ Intention and determinants of intention strength/P6</b>  Beliefs about consequences of taking medication were commonly discussed; participants believed that they did not need anti-hypertensive medication because they have no symptoms [Ogedegbe 2004; Schafheutle 2002]</p> <p>Patients also expressed fear of “dependence” on anti- HYPERTENSION medications if they continue to take them [Ogedegbe 2004; Fongwa 2008] and preferred modifying their lifestyle over taking medication [Aroian 2012].</p>

		<p><b>Marshall 2012 / Intentional non-adherence (link between hypertension, stress and symptoms) / p4</b>  Deliberately choosing to avoid or reduce treatment (intentional non-adherence) was a theme recurring in many of the studies. People from the Netherlands, the United Kingdom, and the United States (11 studies) reported that symptoms made them more likely to take drugs and lack of symptoms less likely to do so. People from Brazil, Denmark, the Netherlands, Thailand, the United Kingdom, and the United States (10 studies) reported they took drugs exclusively only when symptoms were present. A participant from the Thai study described how he came to restart treatment after a period of feeling well. A participant in the Canadian study stopped taking drugs as he preferred instead to control blood pressure by reducing stress.</p> <p><b>Marshall 2012 / Intentional non-adherence (dislike of side effects, fear of addiction; alternative medicines) / p4</b>  People widely reported intentionally missing doses (Canada, Netherlands, Thailand, United Kingdom, and United States) or stopping treatment for a time without informing their doctor (Canada, Denmark, Spain, Netherlands, Thailand, United Kingdom, and United States).  Participants from Spain, the United Kingdom, and the United States experimented with stopping treatment to see how they felt without it. Participants from Brazil, Canada, Spain, the United Kingdom, and the United States reported that they self-adjusted their drug dose, often because of a desire to avoid side effects or a perception that their blood pressure was controlled. A few participants in two studies (United Kingdom and United States) omitted treatment when using alcohol or recreational drugs owing to fear of a harmful interaction.  Participants from Canada, Thailand, the United Kingdom, and the United States (in 10 studies) reported a fear of long term problems from taking drugs. These were described as a “build up” of drugs in the body or developing a tolerance or addiction to the drugs. A participant from a UK study described his reluctance to take drugs.</p> <p><b>Marshall 2012 / Non-intentional non-adherence / p4</b>  Participants described various external factors that limited their ability to adhere to treatment (non-intentional non-adherence). Participants commonly forgot to take drugs from time to time in studies from Canada, South Korea, Spain, the United Kingdom, and the United States (10 studies in total). Participants in eight studies (New Zealand, South Korea, and United States) reported that other commitments meant that they were too busy to take drugs or to attend medical appointments.</p> <p><b>Schlomann 2006 / Treatment / p361-362</b>  Ogedegbe, 2004 explored the barriers and facilitators of adherence. They developed a taxonomy of barriers, which included the following categories: patient-specific medication factors, disease specific, and logistics. Healthcare provider characteristics were not a part of the taxonomy. Patient-specific barriers included forgetfulness, beliefs, and attitudes. Beliefs that presented as barriers were those about medications (addictive, cause impotence, undesirable in general) and about Hypertension.</p>
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		<p>Medication factors included side effects, treatment durations, inconvenient dosing (frequency, size of pills), and cost. Disease-specific factors included the absence of symptoms or the already mentioned adjustment of medications in response to symptoms.</p> <p><b>Buckley 2016/Treatment of Hypertension/p7</b> Many participants used medications only when they perceived symptoms of hypertension to be present</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Intention and determinants of intention strength/P6</b> Difficulties with making long term medication adherence a habit were also identified. Memory or forgetting to take one’s medication appeared to play an important role in medication adherence</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Medication/P6</b> Medication related barriers mainly included side effects experienced due to anti-HYPERTENSION medications [34,36–39], as well as dosing frequency, taste, and large pill size [Ogedegbe 2004] .</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p216</b> HBPM had an impact on whether patients were adherent, whether they initiated or terminated treatment, and to what extent they tailored treatment. “I think taking my BP regularly really made me show that I did need to take the medication and that was somewhat motivating . . . it did show that the medication was important.” Lambert-Kerzener (2010) [patient, trial].</p>
	<b>Social factors</b>	<p><b>Marshall 2012 / Causes of hypertension and the role of stress / p2-3</b> Stress from work, unemployment, finances, and family matters were often mentioned as impediments to blood pressure control, both directly and indirectly.</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Intention and determinants of intention strength/P6</b> In terms of utilizing health care services and screening for hypertension, participants suggested that sessions aimed at increasing health awareness should include groups of patients and be social</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Healthcare system barriers /P6</b> In terms of utilizing care, patients reported difficulties with transportation [Pham 1999], inappropriate hours for screening services that conflict with working hours [Murimi 2010], and difficulties in getting clinic appointments [Ogedegbe 2004], or absence of or inaccessible health care facilities [Kusuma 2010; Peters 2008]. Other availability barriers included transportation difficulties hindering medication refills [Barnes 2012; Greer 2010], no interpreter services in physician offices [Pham 1999], lack of information targeting population subgroups such as African Americans [Wexler 2009], or short duration of physician consultations [Kusuma 2010].</p>

	<p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Intention and determinants of intention strength/P6</b>  Social influence was reported as both a barrier and a facilitator of improved BP control. Lack of social support, mainly from the family, affected medication adherence [Kusuma 2010, Ogedegbe 2004] and changing lifestyle.</p> <p>Studies also reported that having to cook for oneself differently from the rest of the family was perceived as a barrier  Social pressure was also reported as a barrier to a healthier lifestyle.</p> <p>Prioritizing one’s health was also reported as a barrier. Participants found it hard to prioritize clinic visits, diet and exercise over needs of family members [Parker 2012; Anthony 2012;; Schafheutle 2002; Aroian 2012; Wexler 2009; Greer 2010] and over work.</p> <p>Patients reported that stress and anxiety may affect BP management; such emotions maybe related to lack of money and jobs, single parenting, and living in unsafe neighbourhoods</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Healthcare system barriers /P6</b>  Patients reported lack of facilities, bad weather, and safety issues as barriers to physical exercise.</p> <p>Barriers to following a healthy diet included absence of nearby stores that sell healthy foods [Fongwa 2008], limited healthy food choices when eating out [Parker 2012],</p> <p>Cost issues also limited the ability to follow a healthy diet [Horowitz 2004; Ford 2009; Wexler 2009] and to exercise [Peters 2008].</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Affordability /P6</b>  Affordability of care barriers included lack of insurance and high costs of treatment [Barnes 2012; Murimi 2010; Aroian 2012] resulting in patients seeking care only for acute problems</p> <p><b>Marshall 2012 / Non-intentional non-adherence / p4</b>  Participants from two Brazilian studies and seven of the US studies reported that hypertension care was too expensive: the costs of drugs, healthy food, and visiting doctors were all reported as barriers. Participants in three of the US studies reported that not having health insurance hindered them from accessing medical care.</p> <p><b>Schlomann 2006 / Treatment / p361-362</b>  Lifestyle changes were often discussed, such as diet. Cost was often discussed as a barrier, or not viewing the benefits as sufficient enough to warrant the negative impact on their lives. Exercise was mentioned infrequently, but an aspect of a healthy lifestyle or as a way to offset unhealthy foods.</p>
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<p><b>Working Together</b></p>	<p><b>Patient/clinician relationship</b></p>	<p><b>Schlomann 2006 / Symptoms / p361</b> A discrepancy between lay and professional views on symptoms was depicted as problematic to all.</p> <p><b>Schlomann 2006 / Symptoms / p361</b> Like the general literature on high blood pressure, professional beliefs were depicted as “expert” beliefs and “right,” while lay beliefs were depicted as inferior and “wrong.”</p> <p><b>Buckley 2016/Treatment of Hypertension/p7</b> A mistrust of or concerns about medication use was expressed by participants in five (23%) studies and often was indicted as the cause of medication non-adherence or avoidance.</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p215</b> After using HBPM, patients questioned whether the usual practice of casual clinic measurement was sufficient to provide accurate information. “Why we need the machine in the house? [ . . . ] because our visit to the doctor is infrequent.” Abdullah (2011) [patient, daily practice]</p> <p><b>Fletcher 2016/ patient empowerment, autonomy and self-efficacy, and how HBPM changes the traditional patient-clinician dynamic/p216</b> Empowering patients also changed the dynamic of the patient-clinician relationship. Some patients thought that clinicians could be protective of BP results from the clinic, perhaps because the clinicians did not think the patient could understand. “But when we went for a check-up the doctor rarely tells us the actual BP reading. He did not tell us the readings he just said it’s ok.” Abdullah (2011) [patient, daily practice]</p> <p><b>Fletcher 2016/ patient empowerment, autonomy and self-efficacy, and how HBPM changes the traditional patient-clinician dynamic/p217</b> Patients also thought that if they were self-monitoring they might be taken more seriously by their clinician.  “It’s certainly given me more meaningful data to speak to the doctor rather than, ‘Well, I think my BP has probably gone up’.” Hanley (2013) [patient, trial]  “I think the doctor will observe you’re being a bit more serious than vaguely talking about this, that and the other.” Vasileiou (2013) [patient, daily practice]  “ The knowledge and information (i.e. HBPM measurements) they brought to the visit facilitated a bidirectional conversation that supported their self-care as well as assisted their physicians ” Lambert-Kerzener (2010) [author interpretation, trial.</p>
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		<p>Whilst most clinicians were generally supportive of their patients self-monitoring, some patients met with apparent disinterest from their clinician when they tried to communicate the results of self-monitoring, which was disempowering. The perceived disinterest may have been due to a lack of clear guidance for clinicians as to what to do with data from self-monitoring.</p> <p>“I went back quite soon after the initial diagnosis just to confirm that everything was okay. I mentioned that I’d purchased this [HBPM], but that was it really. We didn’t really speak about it anymore than that.” Vasileiou (2013) [patient, daily practice].</p> <p>“Well the strength is that I have better control. And then that in collaboration with others [nurse/physician] becomes a good foundation for judging how to plan the treatment.” Bengtsson (2014) [patient, intervention development].</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Capability barriers/P6</b> In one study, not knowing about the existence of screening service was reported as a barrier to awareness [35]. Skills were discussed in terms of communication between patients and providers, such as not feeling guilty about asking questions and knowing what questions to ask [Ogedegbe 2004].</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Healthcare system barriers /P6</b> Acceptability of available care included poor provider-patient communications [36], patients’ distrust in the services provided [Wexler 2009; Greer 2010],</p>
	<p><b>Individualised targeted treatment</b></p>	<p><b>Fletcher 2016/ Interpretation, attribution and action/p215</b> There was a belief among some patients that BP targets should be personalised to take their individual circumstances into account.</p> <p><b>Morton 2016/ Perceiving meaning in self-monitored data/p625</b> Understanding self-monitored physiological or symptom readings in the context of lifestyle behaviours such as medication adherence or physical activity appeared to give patients across conditions a sense of control over their condition and allowed them to assign meaning to their readings, which made the self-monitoring process more worthwhile to maintain over time. Perceiving an interaction between lifestyle activities and physiological data not only encouraged patients to continue self-monitoring, but also seemed to motivate them to engage in self-management behaviours in order to see an improvement in their readings, for example, to adhere to medication in order to reduce their blood pressure.</p> <p><b>Morton 2016/ Patients carefully consider recommended medication changes/p628</b> Confidence appeared to be high in ..... some hypertensive patients, As well as feeling confident, patients also needed to perceive that a recommended medication change was necessary. For example, hypertensive patients who felt that their readings were borderline were less likely to follow advice to change their medication because they didn’t feel their blood pressure was high enough to warrant a change.</p>

	<p><b>Different perspectives</b></p>	<p><b>Schlomann 2006 / Symptoms / p361</b>  The professional literature describes hypertension as symptomless—a “silent killer.” This is in sharp contrast with the views of participants in these studies. While some participants acknowledged that individuals may not have symptoms (or at least not always), the consistent finding in these studies is that participants believed that people experience symptoms of high blood pressure.</p> <p>For many participants, the notion of a disease without symptoms did not match paradigms of what a disease is. This raised questions about the validity of the diagnosis. To professionals, concern existed that if clients believed there were symptoms then they would modify treatments in response to symptoms. The concern is warranted; many participants in these studies did just that.</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p215</b>  Patients and clinicians were aware that self-measured blood pressure tended to be lower than clinic measures, which led to a dilemma of which measurement was best to use for treatment. Variation between successive HBPM measurements was also noted, again with uncertainty as to which readings should be used.</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p216</b>  One article raised the interesting perspective that patients and clinicians may have different expectations of treatment for hypertension: “. . . patients who perceive symptoms they believe are due to high blood pressure should not expect to feel better from the treatment. Rather, the treatment should merely serve to prevent these patients from feeling worse.” Bengtsson (2014) [author interpretation, intervention development]</p> <p><b>Morton 2016/Perceived purpose of DI: who is responsible? /p625</b>  both patients and HCPs perceive different benefits from the same DIs,</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Capability barriers/P6</b>  Gaps in understanding risk factors to and consequences of hypertension were reported [Machado 2012; Kusuma 2010; Pham 1999; Barnes 2012; Horowitz 2004; Wexler 2009].</p>
	<p><b>Importance of information clarity</b></p>	<p><b>Marshall 2012 / Causes of hypertension and the role of stress / p3</b>  Awareness of possible complications was often a source of fear.</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p213</b>  How patients interpreted their BP and acted upon self-measurement depended to a large extent on their understanding of high BP..... While patients were aware of some of the potential risks factors for, and consequences of high BP, many did not know what their target BP should be.</p>

		<p><b>Fletcher 2016/Interpretation, attribution and action/p215</b>  “ . . . people need to know [target BP] because you do get very uncomfortable whether . . . is this the danger level?” Rickerby (2003) [patient, daily practice]  There was a belief among some patients that BP targets should be personalised to take their individual circumstances into account</p> <p>“Clearly, participants were trying to find functional ways to define acceptable ranges of BP values. The guideline values were and initial broad framework for judgements, but within this, the personalised norm was deployed as a more meaningful rule of thumb, especially for those users who had a relatively consistent history of elevated or reduced readings.” Vasileiou (2013) [author interpretation, daily practice]  patients had neither a goal to focus on nor an understanding of the actual blood pressure value.” Bengtsson (2014) [author interpretation, intervention development]  There was a consensus between clinicians and patients that HBPM provided a more accurate picture of BP than casual clinic measurement due to the larger number of measurements, and it was this that led some patients to acquire their own monitor.  “I can’t remember if they . . . if I was advised to go and buy a home monitoring machine, but I decided to do it anyway . . . I knew that my blood pressure would be checked every time, regularly at the surgery but certainly twice a year . . . but until that I would like more information than that.” Hanley (2013) [patient, intervention development]  “I could do it one minute and then five minutes later it would be completely different.” Rickerby (2003) [patient, daily practice]  Patients often found that high BP had little impact on their daily lives due to the lack of symptoms, and that HBPM gave them an insight into their condition by acting as a proxy for symptoms. HBPM enabled patients to begin to make associations between their BP, symptoms and actions in their daily lives, and were then able to identify ways to self-manage.  “I mean I remember taking my blood pressure and it reading very high and I thought gosh I feel really great at the moment.” Rickerby (2003) [patient, daily practice]</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Capability barriers/P6</b>  Lack of skills to check blood pressure at home were also discussed [Barnes 2012].  Patients were not familiar with blood pressure readings and their meaning [Barnes 2012].</p> <p><b>Morton 2016/ Perceiving meaning in self-monitored data/p628</b>  Those who had stable readings which did not vary over time were less likely to feel a benefit from monitoring and this was the case across health conditions [Dinesen 2013; Hallberg 2015; Urowitz 2012], as readings did not then convey any meaning about their condition.</p> <p><b>Fletcher 2016/Convenience and reassurance vs anxiety and uncertainty/p216</b></p>
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		<p>Uncertainty for both patients and clinicians stemmed from how to interpret the results of HBPM, in particular coping with variability, as well as when and how to act upon the readings. For patients, the main concern was knowing at what point they needed to act.</p> <p>“Where should it [BP] be? That way I’ll know if me or the missus gotta give a call to an ambulance to come get me . . . because I don’t know what it’s supposed to be. I don’t know if I should call.” Schmid (2009) [patient, daily practice]</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Capability barriers/P6</b> Patients reported the need for better education regarding HYPERTENSION management and prevention [Pham 1999; Barnes 2012;Peters 2008].</p> <p><b>Khatib 2014/ Patient reported barriers in qualitative studies, Healthcare system barriers /P6</b> lack of guidance and dietary counselling from clinicians [Pham 1999].</p> <p><b>Schlomann 2006 / Treatment / p361-362</b> Stress busting was viewed as important, although often people was uncertain how to do this but were willing to learn.</p>
	<p><b>Home BP monitoring</b></p>	<p><b>Morton 2016/Perceived purpose of DI: who is responsible? /p625</b> Patients using self-management DIs generally perceive that they are more aware of their condition, better able to make decisions about their own health and engage as an equal with the HCP in meaningful discussions indicating that the DI facilitated self-management of their condition.</p> <p><b>Morton 2016/ Perceiving meaning in self-monitored data/p625</b> This motivation to change behaviour based on physiological data was found even amongst patients using standalone tele-monitoring systems with no behaviour change support or educational tools, indicating that just having access to the data was sufficient to trigger behaviour change.</p> <p><b>Fletcher 2016/ patient empowerment, autonomy and self-efficacy, and how HBPM changes the traditional patient-clinician dynamic/p216</b> Using HBPM increased patients’ involvement in their own care, increased their knowledge about their condition, and empowered them to make changes to benefit/improve their BP.</p> <p><b>Fletcher 2016/ patient empowerment, autonomy and self-efficacy, and how HBPM changes the traditional patient-clinician dynamic/p217</b> In contrast HBPM was seen to facilitate discussion, creating a clinician-patient alliance with patients better able to understand and be involved in making decisions about treatment.</p>

		<p>HBPM combined with an increased knowledge of BP and hypertension resulted in patients demonstrating self-efficacy. Rather than being in a passive role relying on their GP to both measure their BP and dictate treatment, patients felt more in control of their own care.</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p215</b>  There was a consensus between clinicians and patients that HBPM provided a more accurate picture of BP than casual clinic measurement due to the larger number of measurements, and it was this that led some patients to acquire their own monitor. “I can’t remember if they . . . if I was advised to go and buy a home monitoring machine, but I decided to do it anyway . . . I knew that my blood pressure would be checked every time, regularly at the surgery but certainly twice a year . . . but until that I would like more information than that.” Hanley (2013) [patient, intervention development]  “I could do it one minute and then five minutes later it would be completely different.” Rickerby (2003) [patient, daily practice]  Patients often found that high BP had little impact on their daily lives due to the lack of symptoms, and that HBPM gave them an insight into their condition by acting as a proxy for symptoms. HBPM enabled patients to begin to make associations between their BP, symptoms and actions in their daily lives, and were then able to identify ways to self-manage.  “I mean I remember taking my blood pressure and it reading very high and I thought gosh I feel really great at the moment.” Rickerby (2003) [patient, daily practice]</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p216</b>  In the absence of symptoms, having HBPM as a symptom proxy helped demonstrate the effectiveness of treatment. Patients were able to use HBPM to monitor the effectiveness of their medication and changes to their lifestyle.</p> <p><b>Fletcher 2016/Convenience and reassurance vs anxiety and uncertainty/p216</b>  HBPM was seen to be convenient and easy to use by patients, and the process was in some cases even said to be enjoyable. Patients were more relaxed out of the clinic environment and liked the ability to be able to monitor as and when they wanted. Patients felt reassured by being able to check symptoms that were potentially attributable to elevated BP. Patients trusted the technology of automated BP monitors.  “And it always comes in handy; you feel a little bit dodgy, you can always take it to see what your blood pressure is.” Ovaisi (2011) [patient, trial]  “I am reassured, and I feel quite happy with the fact that I know that my blood pressure is ok. I don’t have to think ‘oh God I haven’t been to the doctor in 4 months, I wonder if my BP is alright’ I know it is.” Jones (2012) [patient, trial].  “. . . it may not be applicable to patients with poor technical skills or those who were easily ‘over focused’.” Halifax (2007) [author interpretation, intervention development].  Some patients did discuss being anxious, and this was usually in relation to what to do when BP was high. While there is scope for patients to become anxious about high BP readings from self-monitoring, it was recognised that this anxiety can either inhibit or promote action; anxiety is only a bad thing if patients feel that they are unable to do anything about it.</p>
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		<p>“I would be quite worried if I took it all the time and it was high. I just think that I’m perfectly alright until I go to the surgery in four months’ time. I don’t worry about it. I don’t think about it.” Bostock (2009) [patient, intervention development].</p> <p><b>Fletcher 2016/Interpretation, attribution and action/p216</b>  As well as monitoring BP in relation to medication use, patients were able to use HBPM to attribute lifestyle factors to high BP, and then in many cases act in response. However, patients were concerned that they only received generalised advice about how lifestyle change could help, and would prefer the information to be tailored to hypertension in particular as well as more personalised or tailored advice.</p> <p>“When it’s high, then I know it’s either my diet or I’ve not been exercising. So when it’s high I’ll take my walks. I’ll do my aerobics and then cut down on meats, go vegetarian.” Abdullah (2011) [patient, daily practice]</p> <p>“What I did do, and I’ve stuck to it, I’ve cut out salt. I was overweight a few years ago and I cut out butter, so now I don’t have butter and I don’t have salt. I just use general knowledge.” Hanley (2013) [patient, trial]</p> <p>“Lifestyle advice was received from multiple sources and perceived to be general rather than being targeted at the reasons for them individually developing hypertension.” Hanley (2013) [author interpretation, trial]</p> <p><b>Fletcher 2016/Convenience and reassurance vs anxiety and uncertainty/p216</b>  Little evidence was presented that showed patients feeling burdened by the process of self-monitoring (i.e. according to a rigorous protocol), which was a concern of a small number of clinicians.</p>
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**Notes:** Note: HBPM = Home Blood Pressure Monitoring. HCPs = healthcare professionals. LTCs = long term conditions. DI=Digital Interventions

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## **Supplementary Digital Content file 3: Quantitative reviews**

3a: Mapping intervention components to PRISMS taxonomy Page 2

3b: Focussed data extraction from pre-publication check Page 4

3c: Assessments of heterogeneity and publication bias Page 5

### 3a: Mapping intervention components to PRISMS taxonomy<sup>9</sup>

Review	PRISMS Taxonomy components														Total number of components
	Information about condition and /or its management	Information about available resources	Provision of agreement on specific clinical action plans and/or rescue medication	Regular clinical review	Monitoring of condition with feedback	Practical support with adherence (medication or behavioural)	Provision of equipment (telehealth equipment in yellow)	Provision of easy access to advice or support when needed	Training/rehearsal to communicate with healthcare professionals	Training/rehearsal for everyday activities	Training/rehearsal for practical self-management activities	Training/rehearsal for psychological strategies	Social support	Lifestyle advice and support	
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	
* Beratarrechea 2017	✓				✓	✓	✓						✓		5
** B-Capblanch 2007	✓		✓		✓							✓			4
* Chandak 2015	✓				✓		✓	✓			✓				4
*** Cheema 2015	✓					✓								✓	3
** Chodosh 2005	✓				✓							✓		✓	4
* Crabtree 2013	✓		✓		✓		✓								4
** Dickinson 2006												✓		✓	2
*** Duan 2017	✓		✓		✓	✓	✓	✓						✓	7
** Ebrahim 1998	✓				✓	✓									3
*** Glynn 2010	✓				✓	✓									3
** G-Sridhar 2013	✓			✓	✓	✓	✓								5
** Lee 2012	✓							✓						✓	3
*** Lu 2012	✓			✓									✓		3
* Mansoor 2013	✓			✓		✓					✓		✓	✓	6
** McLean 2016	✓	✓			✓		✓				✓			✓	6

* Ogedegbe 2006	✓			✓	✓	✓		✓							5
*** Omboni-2013	✓			✓	✓			✓						✓	5
** Proia-2013	✓					✓					✓			✓	4
** Quinones 2014	✓										✓				2
** Radhakrishnan 2012	✓			✓	✓									✓	4
** Riegel 2016														✓	1
*** Ruppap-2017	✓				✓	✓		✓				✓	✓		6
* Saksena 2010	✓			✓											2
*** Schroeder 2008	✓				✓	✓		✓				✓			5
* Takiya 2004	✓					✓									2
** Vargas-2017 **	✓			✓	✓	✓	✓							✓	6
* Verbek 2011	✓		✓	✓	✓	✓	✓				✓			✓	8
** Viswanthan-2012	✓			✓		✓							✓		4
* Xu-2012	✓														1
<b>Number of studies</b>	<b>26</b>	<b>1</b>	<b>4</b>	<b>9</b>	<b>16</b>	<b>14</b>	<b>8</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>12</b>	
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	

**Table 3b. Focused data extraction from additional studies identified by forward citation prior to publication (pre-publication check)**

Review; RCTs, Participants, Duration,	Review focus; Target group; Setting; Comparator,	Components of the interventions mapped to PRISMS taxonomy[9]	Methods of analysis: Effectiveness on BP (mean diff mmHg (95%CI); adherence	Comments of authors/ reviewers
<b>Tucker 2017,</b> <sup>[56]</sup> 15 RCTs, n=7,138 Outcome at 12m	<b>Interventions including HBPM</b> in adults with a range of support co- intervention such as supported self-management <b>Comparator: no HBPM</b>	A1: Information about BP A4: Teleconsultations A5: HBPM A7: Telehealth equipment A8: Personal support throughout trial	<b>individual patient data meta-analysis:</b> <b>BP:</b> Compared to usual care, HBPM with telehealth self-management support (n=5RCTs) reduced: <ul style="list-style-type: none"> <li>• SBP: -6.1 (-9.0 to -3.2)</li> <li>• DBP: -2.3 (-4.0 to -0.6)</li> </ul>	HBPM worked best when combined with more intensive interventions such as self-management but had little or no effect on its own.
<b>Morrissey 2013</b> <sup>[57]</sup> 26 RCTs, n= 8,967	<b>Interventions to improve adherence;</b> 10 included HBPM; 13 included self-management strategies <b>Comparator: UC</b>	A1: Information about BP A4: Professional review A5: HBPM	<b>Meta-analysis</b> <b>BP:</b> Compared to adherence support without HBPM, use of HBPM was associated with: <ul style="list-style-type: none"> <li>• No effect on SBP: (<math>\chi^2=0.00</math>; p=0.99)</li> <li>• Reduction in DBP: (<math>\chi^2=5.21</math>; p=0.02)</li> </ul>	Range of adherence interventions, half of which were clearly self- management, a quarter were not self-management and the rest were unclear.

**Abbreviations:** HBPM = Home Blood Pressure Monitoring. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure.  
RCT= Randomised Controlled trial. SR= Systematic Review. UC = Usual Care

**3c. Details of assessments of heterogeneity and publication bias, as reported by the individual systematic reviews included in the meta-Forest plot**

	Heterogeneity SBP (I <sup>2</sup> )	Heterogeneity DBP (I <sup>2</sup> )	Publication bias
***Cheema 2014	36%	0%	Not reported
**Dickenson 2006	51%	53%	'Little evidence of publication bias'
***Duan 2017	64%	62%	No publication bias
**Ebrahim 1998	Not reported		Not reported
**Glynn 2010	59%	37%	Not reported
***Lu 2012	97%	97%	Smaller studies had smaller effect on SBP
**McLean 2013	0%	80%	No publication bias
***Omboni 2013	52%	40%	No publication bias
**Riegel 2016	40%	41%	Publication bias 'low'
*Verbek 2011	69% - 72%		Two small studies may have biased the results
*Xu 2014	96%	96%	Publication bias was 'small'