Cochrane Library

Cochrane Database of Systematic Reviews

Interventions used to improve control of blood pressure in patients with hypertension (Review)

Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T

Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T.
Interventions used to improve control of blood pressure in patients with hypertension.
Cochrane Database of Systematic Reviews 2010, Issue 3. Art. No.: CD005182.
DOI: 10.1002/14651858.CD005182.pub4.

www.cochranelibrary.com

WILEY

TABLE OF CONTENTS

[Intervention Review]

Interventions used to improve control of blood pressure in patients with hypertension

Liam G Glynn[1], Andrew W Murphy[2], Susan M Smith[3], Knut Schroeder[4], Tom Fahey[5]

[1]Department of General Practice, National University of Ireland, Galway, Ireland. [2]Department of General Practice, Faculty of Medicine and Health Sciences, Galway, Ireland. [3]Department of Public Health and Primary Care, Trinity College Centre for Health Sciences, Dublin, Ireland. [4]Academic Unit of Primary Health Care, Department of Community Based Medicine, Cotham Hill, UK. [5]Department of Family Medicine and General Practice, Royal College of Surgeons in Ireland Medical School, Dublin, Ireland

Contact address: Liam G Glynn, Department of General Practice, National University of Ireland, No 1, Distillery Road,, Galway, Ireland. liam.glynn@nuigalway.ie.

Editorial group: Cochrane Hypertension Group.
Publication status and date: New search for studies and content updated (conclusions changed), published in Issue 3, 2010.

Citation: Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T. Interventions used to improve control of blood pressure in patients with hypertension. *Cochrane Database of Systematic Reviews* 2010, Issue 3. Art. No.: CD005182. DOI: 10.1002/14651858.CD005182.pub4.

ABSTRACT

Background

Patients with high blood pressure (hypertension) in the community frequently fail to meet treatment goals - a condition labelled as "uncontrolled" hypertension. The optimal way to organize and deliver care to hypertensive patients has not been clearly identified.

Objectives

To determine the effectiveness of interventions to improve control of blood pressure in patients with hypertension. To evaluate the effectiveness of reminders on improving the follow-up of patients with hypertension.

Search methods

All-language search of all articles (any year) in the Cochrane Controlled Trials Register (CCTR) and Medline; and Embase from January 1980.

Selection criteria

Randomized controlled trials (RCTs) of patients with hypertension that evaluated the following interventions:
(1) self-monitoring
(2) educational interventions directed to the patient
(3) educational interventions directed to the health professional
(4) health professional (nurse or pharmacist) led care
(5) organisational interventions that aimed to improve the delivery of care
(6) appointment reminder systems

Outcomes assessed were:
(1) mean systolic and diastolic blood pressure
(2) control of blood pressure
(3) proportion of patients followed up at clinic

Data collection and analysis

Two authors extracted data independently and in duplicate and assessed each study according to the criteria outlined by the Cochrane Handbook.

Main results

72 RCTs met our inclusion criteria. The methodological quality of included studies varied. An organized system of regular review allied to vigorous antihypertensive drug therapy was shown to reduce systolic blood pressure (weighted mean difference (WMD) -8.0 mmHg, 95% CI: -8.8 to -7.2 mmHg) and diastolic blood pressure (WMD -4.3 mmHg, 95% CI: -4.7 to -3.9 mmHg) for three strata of entry blood pressure, and all-cause mortality at five years follow-up (6.4% versus 7.8%, difference 1.4%) in a single large RCT- the Hypertension Detection and Follow-Up study. Other interventions had variable effects. Self-monitoring was associated with moderate net reduction in systolic blood pressure (WMD -2.5 mmHg, 95% CI: -3.7 to -1.3 mmHg) and diastolic blood pressure (WMD -1.8 mmHg, 95% CI: -2.4 to -1.2 mmHg). RCTs of educational interventions directed at patients or health professionals were heterogeneous but appeared unlikely to be associated with large net reductions in blood pressure by themselves. Nurse or pharmacist led care may be a promising way forward, with the majority of RCTs being associated with improved blood pressure control and mean SBP and DBP but these interventions require further evaluation. Appointment reminder systems also require further evaluation due to heterogeneity and small trial numbers, but the majority of trials increased the proportion of individuals who attended for follow-up (odds ratio 0.41, 95% CI 0.32 to 0.51) and in two small trials also led to improved blood pressure control, odds ratio favouring intervention 0.54 (95% CI 0.41 to 0.73).

Authors' conclusions

Family practices and community-based clinics need to have an organized system of regular follow-up and review of their hypertensive patients. Antihypertensive drug therapy should be implemented by means of a vigorous stepped care approach when patients do not reach target blood pressure levels. Self-monitoring and appointment reminders may be useful adjuncts to the above strategies to improve blood pressure control but require further evaluation.

PLAIN LANGUAGE SUMMARY

What interventions improve the control of high blood pressure

There is little evidence as to how care for hypertensive patients should be organized and delivered in the community to help improve blood pressure control. This review aimed to determine the effectiveness of interventions whose objective was to improve follow-up and control of blood pressure in patients taking blood pressure lowering drugs. We included studies that had as population of interest adult patients with essential hypertension in an ambulatory setting. The interventions included all those that aimed to improve blood pressure control. The outcomes assessed were mean systolic and diastolic blood pressure, control of blood pressure and the proportion of patients followed up at clinic.

Seventy two randomised controlled trials met our inclusion criteria. The range of interventions used included (1) self-monitoring, (2) educational interventions directed to the patient, (3) educational interventions directed to the health professional, (4) health professional (nurse or pharmacist) led care, (5) organizational interventions that aimed to improve the delivery of care, (6) appointment reminder systems. The trials showed a wide variety of methodological quality, part of which may be attributed to poor reporting. An organized system of regular review allied to vigorous antihypertensive drug therapy was shown to reduce blood pressure and all-cause mortality in a single large RCT- the Hypertension Detection and Follow-Up study. Other interventions had variable effects. Weighted data analysis showed that self-monitoring was associated with moderate net reductions in systolic blood pressure (weighted mean difference -2.5 mmHg, 95% CI: -3.7 to -1.3 mmHg) and diastolic blood pressure (weighted mean difference -1.8 mmHg, 95% CI: -2.4 to -1.2 mmHg). Trials of educational interventions directed at patients or health professionals were heterogeneous but appeared unlikely to be associated with large net reductions in blood pressure by themselves. Nurse or pharmacist led care may be a promising way of improving control in patients with hypertension, with the majority of RCTs being associated with improved blood pressure control, improved systolic blood pressure and more modestly improved diastolic blood pressure, but these interventions require further evaluation. Appointment reminder systems increased the proportion of individuals who attended for follow-up (absolute difference 16%, but this pooled result should be treated with caution because of the heterogeneous results from individual RCTs) and in two small trials also led to improved blood pressure control, odds ratio favouring intervention 0.54 (95% CI 0.41 to 0.73).

We conclude that an organized system of registration, recall and regular review allied to a vigorous stepped care approach to antihypertensive drug treatment appears the most likely way to improve the control of high blood pressure. Health professional (nurse or pharmacist) led care and appointment reminder systems requires further evaluation. Education alone, either to health professionals or patients, does not appear to be associated with large net reductions in blood pressure.

BACKGROUND

High blood pressure (hypertension) is an important public health problem in terms of associated stroke and cardiovascular events. It is mostly of unknown aetiology, is easy to diagnose and is readily preventable by blood pressure reduction. Extensive epidemiological data have strengthened the well-recognised relationship between blood pressure and cardiovascular disease risk and have confirmed the importance of systolic BP as a determinant of risk (Prospective Studies Collaboration 2002). Evidence from randomized trials has shown that effective drug treatment reduces the risk of cardiovascular morbidity and mortality (Collins 1994; Gueyffier 1999). However, there is ongoing concern that the benefits demonstrated in randomized trials of antihypertensive drug treatment are not implemented in everyday clinical practice (Burnier 2002). Community-based studies throughout the world show that blood pressure goals are achieved in only 25 to 40% of the patients who take antihypertensive drug treatment (Burnier 2002; Hyman 2001; Chobanian 2001; Smith 1990), a situation that has remained unchanged for the last 30 years (Wilber 1972).

The quality of care patients with hypertension receive from health professionals has a clear impact on their risk of suffering a cardiovascular event. Observational studies in the UK have shown that inadequate control of blood pressure and poor follow-up is associated with a significant risk of stroke and avoidable vascular deaths (Du 1997; Payne 1993). In terms of the process of care that hypertensive patients receive, characteristics of the patient, health professional and the healthcare system in which they are given their medical care have been implicated in poor blood pressure control. Lack of adherence to medication and not having a primary care physician were associated with poor blood pressure control in a US study (Shea 1992). More recent studies have shown that frequent contact with health care professionals does not guarantee better blood pressure control unless there is more vigorous use of antihypertensive drugs (Hyman 2001; Berlowitz 1998), and that individual practitioners vary substantially in their clinical performance when managing hypertension in the community (Frijling 2001). These observations have led some commentators to suggest that poor control of blood pressure in the community may be due to ineffective management and inadequate practice organisation, described jointly as "clinical inertia" (Phillips 2001). Use of self monitoring of blood pressure by patients and professionals has gained popularity and is now recommended in certain patients in some national and international guidelines. A recent meta-analysis of randomised trials on the subject did suggest a benefit in terms of mean blood pressure and blood pressure control (Cappuccio 2004).

Whilst there is a strong evidence-base for the benefits of antihypertensive drug therapy (Collins 1994; Blood 2000; Staessen 2001), there is little clear evidence as to how care for hypertensive patients should be organized and delivered in the community to help improve blood pressure control. This systematic review aims to update and build upon previous reviews (Ebrahim 1998; Fahey 2006), to summarize the evidence from randomized controlled trials that evaluate different models of care that have been used to improve the control and follow-up of patients with hypertension.

OBJECTIVES

The objectives of this review are to:

(1) Evaluate which models of care are effective in improving "control" of high blood pressure;

(2) Evaluate the effectiveness of reminders on improving the follow-up of patients with hypertension.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized trials of interventions that have sought to evaluate different models of care for patients with hypertension with the overall aim of improving blood pressure control or follow-up care of patients. Included studies had to be RCTs with a contemporaneous control group where patient care in the intervention group(s) was compared with either no intervention or usual care. We excluded studies using interventions not intended to increase blood pressure control by organisational means, particularly drug trials and trials of non-pharmacological treatment.

Types of participants

The population of interest was composed of adult patients (aged 18 years or over) with essential hypertension (treated or not currently treated with blood pressure lowering drugs) in a primary care, outpatient or community setting.

Types of interventions

The interventions were aimed at improving control of blood pressure or clinic attendance and were classified as:
(1) self-monitoring
(2) educational interventions directed to the patient
(3) educational interventions directed to the health professional
(4) health professional (nurse or pharmacist) led care
(5) organisational interventions that aimed to improve the delivery of care
(6) appointment reminder systems

Types of outcome measures

Studies were included if they reported:
(1) mean systolic blood pressure (mean SBP) and/or mean diastolic blood pressure (mean DBP)
(2) control of blood pressure (blood pressure threshold that determines "control" being pre-specified or defined by each randomized trial's investigators)
(3) proportion of patients followed-up at clinic

Search methods for identification of studies

The following electronic databases were searched for primary studies:

a) The Cochrane Central Register of Controlled Trials (2007, Issue 4)

b) English language databases, including MEDLINE (1950-February 2008) and EMBASE (1980-February 2008).

Electronic databases were searched using a strategy combining a variation of the Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity-maximizing version (2008 revision) with selected MeSH terms and free text terms relating to hypertension. No language restrictions were

used. The MEDLINE search strategy was translated into the other databases using the appropriate controlled vocabulary as applicable. Full strategies for all English language databases are included in Appendix 1, Appendix 2, Appendix 3.

Other sources:

c) Reference lists of all papers and relevant reviews identified

d) Authors of relevant papers were contacted regarding any further published or unpublished work

e) Authors of trials reporting incomplete information were contacted to provide the missing information

f) ISI Web of Science was searched for papers that cite studies included in the review

Data collection and analysis

Two of the authors (LG and AM) assessed lists of citations and abstracts independently. We were not masked with regard to authors or journal. Each reviewer indicated whether a citation was potentially relevant (i.e. appearing to meet the inclusion criteria), was clearly not relevant, or gave insufficient information to make a judgement. To be included, a study had to meet all the inclusion criteria. We (LG and AM) resolved differences by discussion and final adjudication was performed by TF and SS. We obtained reprints of all potentially relevant citations

We (LG and AM) independently extracted data in duplicate on study design, methods, clinicians and patients, interventions, outcomes and potential sources of bias using a structured data collection form. We wrote to the corresponding authors of studies to request missing data, clarify study details and enquire about unpublished studies.

For assessment of study quality, we collected data on inclusion and exclusion criteria; randomization procedure; allocation concealment; blinding of participants, providers of care and outcome assessors; and losses to follow-up (Clarke 2000). We also identified those studies that used a cluster design, which has the potential for unit of analysis errors, and performed a sensitivity analysis excluding those studies which may have been analyzed incorrectly.

We examined the effects on blood pressure between interventions at follow-up (systolic and diastolic blood pressure) according to the six pre-defined intervention categories. We compared and pooled the mean blood pressure differences from baseline to final follow-up in the intervention and control groups using the weighted mean difference approach (see Cochrane Heart Group web site: http://www.epi.bris.ac.uk/cochrane/stats3.html). When only partial information about the variance was provided in RCT reports, we calculated variances using the method described by Follman (Follman 1992). We have taken account of the correlation of baseline and final blood pressure measurements by using empirical data from the Caerphilly data set which examined the correlation between baseline and 5-year follow-up blood pressure measurements in 2000 men (r=0.568 for systolic and r=0.514 for diastolic blood pressure) (personal communication Margaret May, Department of Social Medicine, University of Bristol).

For blood pressure control and clinic attendance at follow-up, statistical and clinical significance was evaluated by means of estimating odds ratios with 95% confidence intervals. Individual study definitions of control of blood pressure and attendance at clinic were used. For both continuous and categorical outcomes, we checked the meta-analyses for heterogeneity by visual inspection and by Cochran's test. When heterogeneity is significant, the individual study results are presented to illustrate the magnitude of blood pressure reduction reported but no overall pooled results are presented. Pooled odds ratios and their 95% confidence intervals were calculated with The Cochrane Collaboration RevMan 5 software.

RESULTS

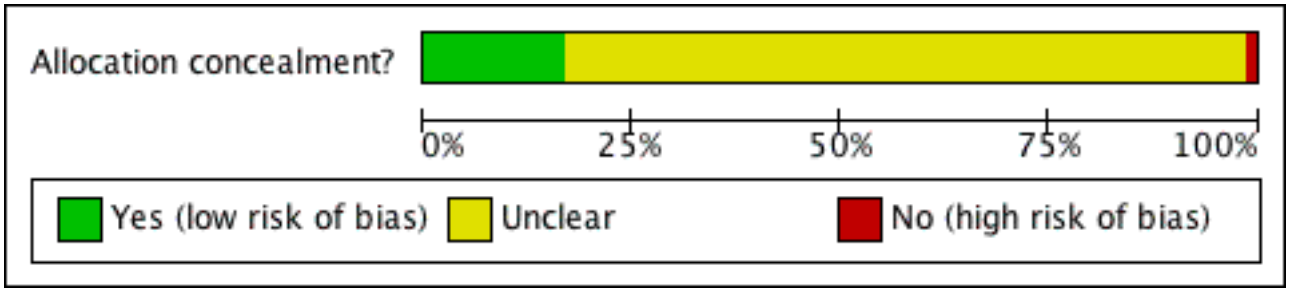
Description of studies

Seventy two unique randomized controlled trials met the inclusion criteria. Four of these trials had single or multiple companion publications or studies associated with them (Levine 1979 and Morisky 1983; Hypertension 1979 Hypertension 1979a and Hypertension 1982; Hetlevik 1998 and Hetlevik 1999; Takala 1979 and Takala 1983) giving a total of 77 studies included in the analysis. Four randomised controlled trials had a factorial design and are included twice under separate intervention headings - Hennessy (education- health professional and education- patient) (Hennessy 2006), Pierce (self-monitoring and education- patient) (Pierce 1984), Sackett (education- patient and organisation of care) (Sackett 1975), and Dickinson (education- health professional and organisation of care) (Dickinson 1981). There were also two three-armed RCTs: one of a telephone reminder, a mailed reminder and usual care (Contreras 2005) and a second of patient education, home monitoring from a family member actively participating in their care and a usual care arm (Earp 1982). Of the seventy two randomized controlled trials that met the inclusion criteria, 14 used a cluster design (Dickinson 1981; Evans 1986; Gullion 1987; Hetlevik 1998; Hetlevik 1999; McAlister 1986; Montgomery 2000; New 2004; Ornstein 2004; Baqu,Äö 2005; Hennessy 2006; Marquez 2004; McManus 2005; Turnbull 2006). In four of these, no adjustment was made for clustering effect (Evans 1986; Dickinson 1981; Gullion 1987; Turnbull 2006) and in two of these trials we could not ascertain whether adjustment was made for clustering effect (Baqu,Äö 2005; Marquez 2004). Thus we identified six trials as having potential unit of analysis errors. A sensitivity analysis excluding those studies did not significantly alter our main results below.

Risk of bias in included studies

The reported methodological quality of included studies was generally poor to moderate. The randomization process was described in thirty (42%) of the seventy two trials included whilst only fourteen (19%) had adequate allocation concealment (Figure 1). In 15 studies (21%) the outcome assessors were blind to the treatment allocation and losses to follow-up of 20% or more occurred in 18 (25%) of studies.

Figure 1. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.



For a detailed summary of each of the 72 included RCTs, see Table 1.

Effects of interventions

(1) Self-monitoring (n=18 RCTs) (McManus 2005; Baqu,Äö 2005; Halme 2005;Pierce 1984; Bailey 1998; Carnahan 1975; Friedman 1996; Haynes 1976; Johnson 1978; Mehos 2000; Rogers 2001; Soghikian 1992; Vetter 2000; Zarnke 1997; Artinian 2001; Midanik 1991; Rudd 2004; Earp 1982).
Pooled data from 12 RCTs that reported on differences in mean SBP (Halme 2005; McManus 2005; Carnahan 1975; Soghikian 1992; Friedman 1996; Bailey 1998; Mehos 2000; Vetter 2000; Rogers 2001; Artinian 2001; Midanik 1991; Rudd 2004) showed that self-monitoring was associated with a significant reduction of -2.5 mmHg (95% confidence intervals (CI): -3.7 to -1.3 mmHg). However significant between-group heterogeneity for mean SBP (range -10 to +5mmHg) was apparent in this group of studies. Pooled data from 14 RCTs on difference of mean DBP (Carnahan 1975; Soghikian 1992; Friedman 1996; Bailey 1998; Mehos 2000; Vetter 2000; Rogers 2001; Haynes 1976; Johnson 1978; Artinian 2001; Midanik 1991; Rudd 2004; McManus 2005; Halme 2005),showed that self-monitoring was associated with a more modest reduction of -1.8 mmHg (95% CI -2.4 to -1.2 mmHg). In the six RCTs that reported on control of blood pressure (Pierce 1984,Rogers 2001; Vetter 2000; Earp 1982; Baqu,Äö 2005; Halme 2005), there was no significant improvement in blood pressure control seen (odds ratio 0.97, 95% CI 0.81 to 1.16). The remaining RCT that did not report any usable data concerning blood pressure control, reported a mean arterial blood pressure difference of 3mmHg in favour of the intervention (Zarnke 1997). However, this RCT was of a short duration (8 weeks follow-up).

(2) Educational interventions directed to the patient (n=20 RCTs) (Pierce 1984; Sackett 1975; Billault 1995; Burrelle 1986; Earp 1982; Fielding 1994; Gullion 1987; Hamilton 1993; Martinez-Amenos 1990; Morisky 1983; Muhlhauser 1993; Roca-Cusachs 1991; Tanner 1981; Watkins 1987; Webb 1980; Zismer 1982; Cakir 2006; Hennessy 2006; Hunt 2004; McKinstry 2006). Eleven RCTs reported mean difference SBP, thirteen RCTs reported mean difference DBP, and seven reported BP control. For mean difference in SBP and DBP outcomes, pooling of results from individual RCTs produced heterogeneous results, so pooled mean differences are not valid. The reported mean difference in SBP ranged from -15.7 mmHg to +1.3 mmHg, and mean difference in DBP was reported with a range from -8.7 mmHg to +7.1 mmHg. In terms of blood pressure control (eight RCTs), there was a trend towards improved blood pressure control and this was significant (odds ratio 0.83, 95% CI 0.75 to 0.91). Three RCTs did not report relevant outcome data (Gullion 1987; Hamilton 1993; Martinez-Amenos 1990), but did report increases in patient knowledge (Martinez-Amenos 1990). Two of these RCTs reported no difference in blood pressure control (Gullion 1987; Martinez-Amenos 1990). One RCT reported an improvement in SBP but not DBP at six months follow-up (Hamilton 1993).

(3) Educational interventions directed to the physician (n=10 RCTs) (Dickinson 1981; Coe 1977; Evans 1986; Hetlevik 1999 ; McAlister 1986; Montgomery 2000; Ornstein 2004; New 2004; Sanders 2002; Hennessy 2006).
Educational interventions directed towards the physician were not associated with a significant decrease in mean SBP (mean difference -0.4 mmHg, 95% CI -1.1 to +0.2 mmHg) or DBP (mean difference -0.4 mmHg, 95% CI -1.1 to +0.3 mmHg) whilst control of blood pressure produced heterogeneous results (odds ratio ranged from 0.8 to 1.0).

(4) Health professional (nurse or pharmacist) led care (n=12 RCTs) (Bogden 1998; Garcia-Pena 2001; Hawkins 1979; Jewell 1988; Logan 1979; Park 1996; Solomon 2002; de Castro 2006; Schroeder 2005; Sookaneknun 2004; Tobe 2006; Tonstad 2007). Health professional (nurse or pharmacist) led care may be a promising way of delivering care, with the majority of RCTs being associated with improved blood pressure control. For all three outcomes, pooling of results from individual RCTs produced heterogeneous results, so pooled mean differences may not be valid. Mean difference in SBP was reported in ten RCTs with a range of difference in mean SBP from -13 mmHg to 0 mmHg. Mean difference in DBP was reported in eleven RCTs, ranging from -8 mmHg to 0 mmHg. Control of blood pressure was reported in six RCTs and produced heterogeneous results (odds ratio ranged from 0.1 to 0.9).

(5) Organisational interventions that aimed to improve the delivery of care (n=9 RCTs) (Sackett 1975; Dickinson 1981; Brook 1983; Bulpitt 1976; Hypertension 1979; Hypertension 1979a; Hypertension 1982; Robson 1989; Takala 1979; Takala 1983; Turnbull 2006; Wetzels 2007).
For all three outcomes, pooling of results from individual RCTs produced heterogeneous results, so pooled mean differences may not be valid and the range of mean difference in SBP and DBP is illustrated in MetaView. Of note, the largest RCT, the Hypertension Detection and Follow-Up Program (HDFP), produced substantial reductions in SBP and DBP across the three groups in this RCT (patients were stratified according to level of entry DBP level, weighted mean difference -8.2/-4.2 mmHg, -11.7/-6.5 mmHg, -10.6/-7.6 mmHg for the three strata of entry blood pressure)). At five year follow-up, these reductions in blood pressure were associated with a significant reduction in all-cause mortality (6.4% versus 7.8%, risk difference 1.4%). Two RCTs did not report relevant

outcome data (Robson 1989; Brook 1983), but one did report improved recording of blood pressure (Robson 1989).

(6) Appointment reminder systems (n=8 RCTs) (Ahluwalia 1996; Barnett 1983; Bloom 1979; Cummings 1985; Fletcher 1975; Krieger 1999; Contreras 2005; Marquez 2004).
In five RCTs, reminder systems were associated with an improvement in follow-up. One RCT of a mailed postcard reminder was not associated with improved follow-up (Ahluwalia 1996). The pooled results though favouring appointment reminder systems for follow-up of patients (odds ratio of being lost to follow-up 0.4, 95% CI 0.3 to 0.5) are heterogenous because of the single outlying RCT and the pooled results should be treated with caution. Four other RCTs (studies classified under the other intervention headings but incorporated some form of reminder intervention such as postal reminders or computer generated feedback) were associated with significantly improved follow-up attendance by patients (Dickinson 1981; Hamilton 1993; Hawkins 1979; Takala 1979; Takala 1983). Pooled data from two small RCTs, one a three-armed study of telephone reminder, mailed reminder and usual care (Contreras 2005) and the other a parallel study of SMS reminder versus usual care (Marquez 2004) gave heterogenous results in terms of systolic and diastolic blood pressure but did show a significant improvement in blood pressure control, odds ratio 0.54 (95% CI 0.41to 0.73).

DISCUSSION

Key findings from this review

The main finding from this systematic review is to a large extent dominated by the findings from the largest RCT, the HDFP study (Hypertension 1979; Hypertension 1979a; Hypertension 1982). Though partly intended as a trial to assess the value of systematic identification of hypertensive patients (Davis 2001), the key ingredients of how patients with established hypertension and taking antihypertensive drug treatment were managed- free care, registration, recall and regular review in tandem with a rigorous stepped care approach to antihypertensive drug treatment- should be emphasized as this multi-faceted intervention was effective in terms of reaching blood pressure goals and reducing all-cause mortality. It is interesting to note that a two-year post trial surveillance study showed that blood pressure control was attenuated when the stepped-care arm of the study was discontinued. This lack of control was associated with a decline in the use of antihypertensive medication (Hypertension 1986).

The other significant finding from this review is that self-monitoring was associated with a decline in systolic blood pressure (2.5 mmHg) and diastolic blood pressure (1.8 mmHg). Although this blood pressure reduction does not appear substantial in clinical terms, it appears to be nonetheless a useful adjunct to care and is likely to lead to a reduction in cardiovascular events. Further evaluation in larger RCTs and prospective studies including cardiovascular outcomes are warranted. Other interventions assessed in this systematic review did not produce clear results. None of the other interventions were associated with large, clinically important, reductions in either systolic or diastolic pressure, see MetaView. Education alone, directed either to patients or health professionals appears unlikely to influence control of blood pressure as a single intervention, as results were highly heterogeneous or of marginal clinical importance. Use of health care professionals such as nurses and pharmacists, though producing significantly heterogeneous results, did have mainly favourable effects, and merit further definitive evaluation in larger RCTs. Lastly, reminders (postal, computer or telephone based) were associated with an improvement in the follow-up and control of patients with hypertension but produced heterogeneous results in terms of systolic and diastolic blood pressure. This finding is consistent with the organisational structure of the HDFP study and re-iterates the importance of systematic recall systems when organising care for hypertensive patients.

Context of other studies

There are elements identified from this review that appear to be associated with improved blood pressure control and are consistent with findings from observational studies and previous systematic reviews. In a large community-based study, patients who received intensive antihypertensive drug therapy were significantly more likely to have reduced systolic blood pressure of 6.3 mmHg compared to an increase of 4.8 mmHg in those who received less intensive antihypertensive drug therapy (Berlowitz 1998). A more recent observational study showed that antihypertensive drug therapy was initiated or changed in only 38% of episodes of care, despite documented uncontrolled hypertension for at least six months (Davis 2001; Oliveria 2002). Lack of practice organisation is associated with a failure to achieve treatment surrogate goals in hypertension, diabetes and secondary prevention of coronary heart disease (Phillips 2001). A recent systematic review of self monitoring also produced similar findings of modest but potentially important benefit in systolic and diastolic blood pressure (Cappuccio 2004 errat). This is important in light of the fact that self monitoring is now practiced by up to two thirds of the hypertension population in the US and Europe (Pickering 2008). We have found substantially more RCT evidence in terms of hypertension management than a recent systematic review that examined interventions used in disease management programmes for patients with chronic illness (Weingarten 2002). In that review, eight hypertension-related RCTs were cited, which provided some evidence of benefit in terms of education directed at the patient and provider (health professional) (Weingarten 2002). In this systematic review of 72 RCTs, the subset of RCTs where the intervention was directed at the patient (n=20) or physician (n=10) does not support this finding, showing no clinically important evidence for patient or health professional education as an effective implementation strategy in the management of hypertension.

Study limitations

There are several shortcomings that need to be highlighted in this systematic review. The HDFP study was designed as an intervention that would identify newly diagnosed hypertensive patients and then start or modify antihypertensive treatment in those with untreated as well as uncontrolled hypertension (Davis 2001). A consequence of this study design is that a differential number of people were receiving antihypertensive drug treatment in the two arms. At follow-up in year five, 81.2% of patients in the stepped care arm were taking antihypertensive medication compared to 64.2% of patients in the referred care arm (see details on included studies). So though it appears that the systematic follow-up and stepped care approach in HDFP is an important element in effective clinical care and prompts rigorous antihypertensive drug treatment, it is not possible to distinguish between the independent effect of these interventions on blood pressure control. Several other RCTs included both treated and untreated hypertensive patients and had

differential rates of antihypertensive drug prescribing (Vetter 2000; Midanik 1991; Rudd 2004; Ornstein 2004; Contreras 2005), with rates of prescribing at higher levels in the intervention arm at follow-up. Secondly, many RCTs contained multi-faceted interventions that did not fit into a single intervention category. For example, several RCTs that were included under categories of patient education, physician education, health professional led care and organisation of care also incorporated some form of reminder intervention such as postal reminders or computer generated feedback (Dickinson 1981; Hamilton 1993; Hawkins 1979; Takala 1979; Takala 1983). Consequently, it has been difficult to attribute how far single elements that make up complex interventions exert their independent effect on blood pressure control. In terms of self monitoring, it is well established that "office" blood pressure readings are around 10/5mmHg higher when compared to ambulatory or self monitored readings (Staessen 1997; Staessen 2004; Williams 2004). Several of the RCTs did not make any recommendations about the need for adjustment of target blood pressure readings when self monitoring was the intervention being assessed, nor did they appear to anticipate lower blood pressure readings in the self monitoring group (Bailey 1998; Johnson 1978; Pierce 1984; Baqu,Äö 2005). This may have attenuated the impact of self monitoring on blood pressure control because of failure to intensify treatment. Poor adherence to therapy is thought to be associated with poor control of blood pressure (Shea 1992) and medication adherence in hypertension is estimated to be only around 50% to 70% (Ebrahim 1998). Yet only a few trials examined the relationship between adherence to medication and control of blood pressure (Haynes 1976; Johnson 1978; Sackett 1975; Schroeder 2005; Sookaneknun 2004; de Castro 2006; Wetzels 2007) despite the significant influence that adherence may have on blood pressure control. Future studies will need to be designed to assess the relationship between poor adherence and poor response to antihypertensive drugs in patients with good adherence. Cluster design was used in 14 of the 71 randomized controlled trials that met the inclusion criteria. The majority (8) of these trials correctly adjusted for clustering effect. However, in those six trials that did not, the potential exists for unit of analysis errors. However, sensitivity analysis excluding those studies did not significantly alter our main results. Lastly, not all RCTs reported on the outcomes of blood pressure achieved or blood pressure control. This has meant that the relevant a priori outcomes have not been reported for all included RCTs, and pooling of data from all RCTs has not been possible. Two further trials were identified which were published outside the search dates and thus were not included in the analysis. The first was a 2 × 2 randomized controlled trial with two year follow-up comparing two self-management interventions for improving BP control among 636 hypertensive patients in two university-affiliated primary care clinics (Bosworth 2009). Patients received usual care, a behavioral intervention (bimonthly tailored nurse-administered telephone intervention targeting hypertension-related behaviours), home BP monitoring three times weekly, or the behavioral intervention plus home BP monitoring. Combined home BP monitoring and tailored behavioral telephone intervention improved BP control, systolic BP, and diastolic BP at 24 months relative to usual care. The success of this combination of self-monitoring and nurse-led care appears to consolidate some of the findings of our review. The second was a randomized controlled trial in 14 community pharmacies in Edmonton, Alberta, Canada, of 227 patients with diabetes who had BPs higher than 130/80 mm Hg on two consecutive visits two weeks apart (McLean 2008). In patients who had diabetes and hypertension that were relatively well controlled, a pharmacist and nurse team based intervention resulted in a clinically important improvement in BP.

AUTHORS' CONCLUSIONS

Implications for practice

Despite these limitations important messages emerge from this systematic review. Effective delivery of hypertensive care requires a systematic approach in the community, incorporating regular review of patients and a willingness to intensify antihypertensive drug treatment, usually by adding additional classes of antihypertensive drugs, when blood pressure goals are not being met (Hypertension 1979; Hypertension 1979a; Hypertension 1986; Davis 2001). This approach of intensive drug therapy and "tight" control of blood pressure has been demonstrated to be possible in clinical trials in hypertensive and diabetic patients alike (Hansson 1999; UK PDS 1998). There are reports of successful systematic care of hypertensive patients in the community over a 20 year period (Hart 1991), but the challenge is to translate these findings into usual clinical care.

Implications for research

In terms of future studies, careful preliminary work is needed when developing and testing complex interventions and thought needs to be given as to how their individual and combined effects are measured (Campbell 2000). Aside from definitive RCTs examining the effects of self-monitoring and allied health professional led care (pharmacist and nurses), there is also a paucity of evidence in terms of computer-based clinical decision support systems (CDSSs) in hypertension and how adherence-enhancing strategies influence subsequent blood pressure control (Ebrahim 1998). HDFP was a well-funded study with substantial staffing resources. This meant that the "stepped care" intervention was provided by a highly motivated workforce. An economic evaluation of delivering organised care to hypertensive patients should accompany future studies. Lastly, none of the included RCTs attempted to manage hypertension in the context of overall cardiovascular risk. Future studies need to be congruent with hypertension guidelines that recommend treatment and control of blood pressure in combination with multi-factorial risk reduction (Ramsay 1999).

Conclusions

Effective delivery of hypertension care in the community requires a rigorous approach in terms of identification, follow-up and treatment with antihypertensive drugs. This systematic review shows that such an approach is likely to translate into reductions in cardiovascular mortality and morbidity (Hypertension 1979; Hypertension 1979a; Hypertension 1986; Davis 2001). Supplementary and alternative models of care, including self monitoring of blood pressure by patients, blood pressure management by allied health care professionals and CDSSs require further development and evaluation. Educational interventions directed to either patients or health professionals alone are unlikely to produce clinically important reductions in either systolic or diastolic blood pressure.

ACKNOWLEDGEMENTS

We are very grateful to Margaret Burke (Cochrane Heart Group) for help with searching and to Shah Ibrahim who was an author on the original review. Our thanks also to Alison Blenkinsopp, Barry Carter, Sandy Logan, Frank Sullivan, Hayden Bosworth, Brian Haynes, David Jewell, Jim Krieger, Richard McManus, Steven Ornstein, Mike Phelan, Mary Rogers, Lin Song, Kelly Zarnke and Peter Whincup concerning clarification about individual RCTs and providing additional data. Thanks to Craig Ramsay for advice concerning factorial trials. We are grateful to Curt Furberg for facilitating contact with the investigators of US-based studies. Our particular thanks to Charlie Ford for information regarding the Hypertension Detection and Follow-Up Program (HDFP) study. Lastly, we are grateful to Debbie Farrell for administrative support.

REFERENCES

References to studies included in this review

Ahluwalia 1996 *{published data only}*

* Ahluwalia J, McNagny S, Kanuru N. A randomized trial to improve follow-up care in severe uncontrolled hypertensives at an inner-city walk-in clinic.. *Journal of Health Care for the Poor and Underserved* 1996;**7**(4):377-389.

Artinian 2001 *{published data only}*

Artinian N, Washington O, Templin T. Effects of home telemonitoring and community-based monitoring on blood pressure control in urban African Americans: A pilot study. *Heart & Lung* 2001;**30**:191-199.

Bailey 1998 *{published data only}*

Bailey B, Carney S, Gillies A, Smith AJ. Antihypertensive drug treatment: a comparison of usual care with self blood pressure measurement. *Journal of Human Hypertension* 1998;**13**:147-150.

Baqu,Äö 2005 *{published data only}*

Baqu,Äö A, Capillas Per,Äöz R, Guarch Rocarias M, Figueras Sabater M, Ylla-Catal,Ä¶ Passola A, Bala¬§¬† Vilanova M, et al. [Effectiveness of self-measurement of blood pressure in patients with hypertension: the Dioampa study]. *Atencion primaria / Sociedad Espa¬§ola de Medicina de Familia y Comunitaria* 2005;**35**(5):233-7.

Barnett 1983 *{published data only}*

Barnett GO, Winickoff RN, Morgan MM, Zielstorff RD. A computer-based monitoring system for follow-up of elevated blood pressure. *Medical Care* 1983;**21**(4):400-409.

Billault 1995 *{published data only}*

Billault B, Degoulet P, Devries C, Plouin PF, Chatellier G, Menard J. Use of a standardized personal medical record by patients with hypertension: a randomized controlled prospective trial. *MD Computing* 1995;**12**(1):31-35.

Bloom 1979 *{published data only}*

Bloom JR, Jordan SC. From screening to seeking care: removing obstacles in hypertension control. *Preventive Medicine* 1979;**8**(4):500-506.

Bogden 1998 *{published data only}*

Bogden P, Abbott R, Williamson P, Onopa J, Koontz L. Comparing standard care with a physician and pharmacist team approach for uncontrolled hypertension. *Journal of General Internal Medicine YR:1998* 1998;**13**:740-5.

Brook 1983 *{published data only}*

Brook RH, Ware JE, Jr, Rogers WH, Keeler EB, Davies AR, Donald CA, Goldberg GA, Lohr KN, Masthay PC, Newhouse JP. Does free care improve adults' health? Results from a randomized controlled trial. *New England Journal of Medicine* 1983;**309**(23):1426-1434.

Bulpitt 1976 *{published data only}*

Bulpitt CJ, Beilin LJ, Coles EC, Dollery CT, Johnson BF, Munro-Faure, AD, Turner SC. Randomised controlled trial of computer-held medical records in hypertensive patients. *British Medical Journal* 1976;**1**(6011):677-679.

Burrelle 1986 *{published data only}*

Burrelle TN. Evaluation of an interdisciplinary compliance service for elderly hypertensives. J Geriatr Drug Ther YR:1986. 1 Vol. 1, issue 2:23-51`.

Cakir 2006 *{published data only}*

Cakir H, Pinar R. Randomized controlled trial on lifestyle modification in hypertensive patients. *Western Journal of Nursing Research* 2006;**28**(2):190-209.

Carnahan 1975 *{published data only}*

Carnahan JE, Nugent CA. The effects of self-monitoring by patients on the control of hypertension. *American Journal of the Medical Sciences* 1975;**269**(1):69-73.

Coe 1977 *{published data only}*

Coe FL, Norton E, Oparil S, Tatar A, Pullman TN. Treatment of hypertension by computer and physician-a prospective controlled study. *Journal of Chronic Diseases* 1977;**30**(2):81-92.

Contreras 2005 *{published data only}*

Contreras E M, Garcia O V, Claros N M, Guillen V G, Wichmann de la Figuera von, Martinez J J C, et al. Efficacy of telephone and mail intervention in patient compliance with antihypertensive drugs in hypertension. ETECUM-HTA study. *Blood Pressure* 2005;**14**(3):151-8.

Cummings 1985 *{published data only}*

Cummings KM, Frisof KB, Demers P, Walsh D. An appointment reminder system's effect on reducing the number of hypertension patients who drop out from care. *American Journal of Preventive Medicine* 1985;**1**(5):54-60.

de Castro 2006 *{published data only}*

de Castro M S, Fuchs F D, Santos M C, Maximiliano P, Gus M, Moreira L B, et al. Pharmaceutical care program for patients with uncontrolled hypertension. Report of a double-blind clinical trial with ambulatory blood pressure monitoring. *American journal of hypertension : journal of the American Society of Hypertension* 2006;**19**(5):528-33.

Dickinson 1981 *{published data only}*

Dickinson JC, Warshaw GA, Gehlbach SH, Bobula JA, Muhlbaier LH, Parkerson GR, Jr. Improving hypertension control: impact of computer feedback and physician education. *Medical Care* 1981;**19**(8):843-854.

Earp 1982 *{published data only}*

Earp JA, Ory MG, Strogatz DS. The effects of family involvement and practitioner home visits on the control of hypertension. *American Journal of Public Health* 1982;**72**(10):1146-1154.

Evans 1986 *{published data only}*

Evans CE, Haynes RB, Birkett NJ, Gilbert JR, Taylor DW, Sackett DL, Johnston ME, Hewson SA. Does a mailed continuing education program improve physician performance?

Results of a randomized trial in antihypertensive care. *JAMA* 1986;**255**(4):501-504.

Fielding 1994 *{published data only}*

Fielding JE, Knight K, Mason T, Klesges RC, Pelletier KR. Evaluation of the IMPACT blood pressure program. *Journal of Occupational Medicine* 1994;**36**(7):743-746.

Fletcher 1975 *{published data only}*

Fletcher SW, Appel FA, Bourgeois MA. Management of hypertension. Effect of improving patient compliance for follow-up care. *JAMA* 1975;**233**(3):242-244.

Friedman 1996 *{published data only}*

Friedman RH, Kazis LE, Jette A, Smith MB, Stollerman J, Torgers J, Carey K. A telecommunications system for monitoring and counseling patients with hypertension. Impact on medication adherence and blood pressure control. American Journal of Hypertension. 9 1996; Vol. 9, issue 4 Pt 1:285-92.

Garcia-Pena 2001 *{published data only}*

Garcia-Pena C, Thorogood M, Armstrong B, Reyes-Frausto S, Munoz O. Pragmatic randomized trial of home visits by a nurse to elderly people with hypertension in Mexico. *International Journal of Epidemiology* 2001;**30**:1485-1491.

Gullion 1987 *{published data only}*

Gullion DS, Tschann JM, Adamson TE. Physicians' management of hypertension: a randomized controlled CME trial. *Proceedings of the --- Annual Conference on Research in Medical Education* 1987;**26**:115-120.

Halme 2005 *{published data only}*

Halme L, Vesalainen R, Kaaja M, Kantola I, group HOme MEasuRement of blood pressure study. Self-monitoring of blood pressure promotes achievement of blood pressure target in primary health care. *American journal of hypertension : journal of the American Society of Hypertension* 2005;**18**(11):1415-20.

Hamilton 1993 *{published data only}*

Hamilton G, Roberts S, Johnson J, Tropp J, Anthony-Odgren D, Johnson B. Increasing adherence in patients with primary hypertension: an intervention. Health Values. 17 1993; Vol. 17:3-11.

Hawkins 1979 *{published data only}*

Hawkins D, Fridler F, Douglas H, Eschbach R. Evaluation of a clinical pharmacist in caring for hypertensive and diabetic patients. American Journal of Hosptial Pharmacy. 36 1979; Vol. 36:1321-5.

Haynes 1976 *{published data only}*

Haynes RB, Sackett DL, Gibson ES, Taylor DW, Hackett BC, Roberts RS, Johnson AL. Improvement of medication compliance in uncontrolled hypertension. *Lancet* 1976;**1**(7972):1265-1268.

Hennessy 2006 *{published data only}*

Hennessy S, Leonard C E, Yang W, Kimmel S E, Townsend R R, Wasserstein A G, et al. Effectiveness of a two-part educational intervention to improve hypertension control: a cluster-randomized trial. *Pharmacotherapy* 2006;**26**(9):1342-7.

Hetlevik 1998 *{published data only}*

Hetlevik I, Holmen J, Kruger O, Kristensen P, Iversen H. Implementing Clinical Guidelines in the Treatment of Hypertension in General Practice. *Blood Pressure* 1998;**7**:270-276.

Hetlevik 1999 *{published data only}*

Hetlevik I, Holmen J, Kruger O. Implementing clinical guidelines in the treatment of hypertension in general practice Evaluation of patient outcome related to implementation of a computer-based clinical decision support system. *Scandinavian Journal of Primary Health Care* 1999;**17**:35-40.

Hunt 2004 *{published data only}*

Hunt J S, Siemienczuk J, Touchette D, Payne N. Impact of educational mailing on the blood pressure of primary care patients with mild hypertension. *Journal of general internal medicine : official journal of the Society for Research and Education in Primary Care Internal Medicine* 2004;**19**(9):925-30.

Hypertension 1979 *{published data only}*

Hypertension Detection & Follow-up Program. Therapeutic control of blood pressure in the Hypertension Detection and Follow-up Program. Hypertension Detection and Follow-up Program Cooperative Group. *Preventive Medicine* 1979;**8**(1):2-13. [stratum 1]

Hypertension 1979a *{published data only}*

Hypertension detection and follow-up Program Cooperative Group. Five-year findings of the hypertension detection and follow-up program I. Reduction in mortality of persons with high blood pressure, including mild hypertension. *Journal of the American Medical Association* 1979;**242**(23):2562-2571.

Hypertension 1982 *{published data only}*

Hypertension detection and follow-up Program Cooperative Group. The effect of treatment on mortality in "mild" hypertension Results of the Hypertension Detection and Follow-up Program. *The New England Journal of Medicine* 1982;**307**(16):976-980.

Jewell 1988 *{published data only}*

Jewell D, Hope J. Evaluation of a nurse-run hypertension clinic in general practice. *Practitioner* 1988;**232**(1447):484-487.

Johnson 1978 *{published data only}*

Johnson AL, Taylor DW, Sackett DL, Dunnett CW, Shimizu AG. Self-recording of blood pressure in the management of hypertension. *Canadian Medical Association Journal* 1978;**119**(9):1034-1039.

Krieger 1999 *{published data only}*

Krieger J, Collier C, Song L, Martin D. Linking community-based blood pressure measurement to clinical care: a randomized controlled trial of outreach and tracking by community health workers. *American Journal of Public Health* 1999;**89**:856-861.

Levine 1979 *{published data only}*

Levine DM, Green LW, Deeds SG, Chwalow J, Russell RP, Finlay J. Health education for hypertensive patients. *JAMA* 1979;**241**(16):1700-1703.

Logan 1979 *{published data only}*

Logan AG, Milne BJ, Achber C, Campbell WP, Haynes RB. Work-site treatment of hypertension by specially trained nurses. A controlled trial. *Lancet* 1979;**2**(8153):1175-1178.

Marquez 2004 *{published data only}*

M¬†rquez Contreras E, Wichmann de la Figuera von, Gil Guill,Äön V, Ylla-Catal¬† A, Figueras M, Bala¬§a M, et al. [Effectiveness of an intervention to provide information to patients with hypertension as short text messages and reminders sent to their mobile phone (HTA-Alert)]. *Atencion primaria / Sociedad Espa¬§ola de Medicina de Familia y Comunitaria* 2004;**34**(8):399-405.

Martinez-Amenos 1990 *{published data only}*

Martinez-Amenos A, Fernandez Ferre ML, Mota Vidal C, Alsina Rocasalbas, J. Evaluation of two educative models in a primary care hypertension programme. *Journal of Human Hypertension* 1990;**4**(4):362-364.

McAlister 1986 *{published data only}*

McAlister NH, Covvey HD, Tong C, Lee A, Wigle ED. Randomised controlled trial of computer assisted management of hypertension in primary care. *British Medical Journal Clinical Research Ed* 1986;**. 293**(6548):670-674.

McKinstry 2006 *{published data only}*

McKinstry B, Hanley J, Heaney D, McCloughan L, Elton R, Webb D J. Impact on hypertension control of a patient-held guideline: a randomised controlled trial. *The British journal of general practice : the journal of the Royal College of General Practitioners* 2006;**56**(532):842-7.

McManus 2005 *{published data only}*

McManus R J, Mant J, Roalfe A, Oakes R A, Bryan S, Pattison H M, et al. Targets and self monitoring in hypertension: randomised controlled trial and cost effectiveness analysis. *BMJ (Clinical research ed.)* 2005;**331**(7515):493.

Mehos 2000 *{published data only}*

Mehos BM, Saseen JJ, MacLaughlin EJ. Effect of Pharmacist Intervention and Initiation of Home Blood Pressure Monitoring in Patients with Uncontrolled Hypertension. *Pharmacotherapy* 2000;**20**(11):1384-1389.

Midanik 1991 *{published data only}*

Midanik LT, Resnick B, Hurley LB, Smith EJ, McCarthy M. Home blood pressure monitoring for mild hypertensives. *Public Health Reports* 1991;**106**(1):85-89. [MEDLINE: 1039]

Montgomery 2000 *{published data only}*

Montgomery AA, Fahey T, Peters TJ, MacKintosh C, Sharp D. Evaluation of a computer-based clinical decision support system and chart guidelines in the management of hypertension in primary care: a randomised controlled trial. *British Medical Journal* 2000;**320**:686-690.

Morisky 1983 *{published data only}*

Morisky DE, Levine DM, Green LW, Shapiro S, Russell RP, Smith CR. Five-year blood pressure control and mortality following health education for hypertensive patients. *American Journal of Public Health* 1983;**73**(2):153-162.

Muhlhauser 1993 *{published data only}*

Muhlhauser I, Sawicki PT, Didjurgeit U, Jorgens V, Trampisch HJ, Berger M. Evaluation of a structured treatment and teaching programme on hypertension in general practice. *Clinical & Experimental Hypertension* 1993;**15**(1):125-142.

New 2004 *{published data only}*

New J, Mason J, Freemantle N, Teasdale S, Wong L, Bruce N, Burns J, Gibson J. Educational outreach in diabetes to encourage practice nurses to use primary care hypertension and hyperlipidaemia guidelines (EDEN): a randomized controlled trial. *Diabetic Medicine* 2004;**21**:599-603. [MEDLINE: 2956]

Ornstein 2004 *{published data only}*

Ornstein S, Jenkins R, Nietert P, Feifer C, Roylance L, Nemthe L, Corley S, Dickerson L, Bradford D, Litvin C. A multimethod quality improvement intervention to improve preventive cardiovascular care. *Annals of Internal Medicine* 2004;**141**:523-532. [MEDLINE: 2960]

Park 1996 *{published data only}*

Park JJ, Kelly P, Carter BL, Burgess PP. Comprehensive Pharmaceutical Care in the Chain Setting. Drug therapy monitoring and counseling be pharmacists contributed to improved blood pressure control in study patients.. *Journal of the American Pharmaceutical Association* 1996;**NS36**(7):443-451.

Pierce 1984 *{published data only}*

Pierce JP, Watson DS, Knights S, Gliddon T, Williams S, Watson R. A controlled trial of health education in the physician's office. *Preventive Medicine* 1984;**13**(2):185-194.

Robson 1989 *{published data only}*

Robson J, Boomla K, Fitzpatrick S, Jewell AJ, Taylor J, Self J, Colyer M. Using nurses for preventive activities with computer assisted follow up: a randomised controlled trial. *BMJ* 1989;**298**(6671):433-436.

Roca-Cusachs 1991 *{published data only}*

Roca-Cusachs A, Sort D, Altimira J, Bonet R, Guilera E, Monmany J, Nolla J. The impact of a patient education programme in the control of hypertension. *Journal of Human Hypertension* 1991;**5**(5):437-441.

Rogers 2001 *{published data only}*

Rogers M, Small D, Buchan D, Butch C, Stewart C, Krenzer B, Husovsky H. Home monitoring services improves mean arterial pressure in patients with essential hypertension. *Annals of Internal Medicine* 2001;**134**:1024-1032.

Rudd 2004 *{published data only}*

Rudd P, Houston Miller N, Kaufman J, Kraemer H, Bandura A, Greenwald G, Debusk R. Nurse management for hypertension:

a systems approach. *American Journal of Hypertension* 2004;**17**:921-927. [MEDLINE: 2959]

Sackett 1975 *{published data only}*

Sackett DL, Haynes RB, Gibson ES, Hackett BC, Taylor DW, Roberts RS, Johnson AL. Randomised clinical trial of strategies for improving medication compliance in primary hypertension. *Lancet* 1975;**1**(7918):1205-1207.

Sanders 2002 *{published data only}*

Sanders K, Satyvavolu A. Improving blood pressure control in diabetes: limitations of a clinical reminder in influencing physician behaviour. *The Journal of Continuing Education in the Health Professions* 2002;**22**:23-32. [MEDLINE: 2963]

Schroeder 2005 *{published data only}*

Schroeder K, Fahey T, Hollinghurst S, Peters T J. Nurse-led adherence support in hypertension: a randomized controlled trial. *Family Practice* 2005;**22**(2):144-51.

Soghikian 1992 *{published data only}*

Soghikian K, Casper SM, Fireman BH, Hunkeler EM, Hurley LB, Tekawa, IS, Vogt TM. Home blood pressure monitoring. Effect on use of medical services and medical care costs. *Medical Care* 1992;**30**(9):855-865.

Solomon 2002 *{published data only}*

Solomon D, Portner T, Bass G, Gourley D, Gourley G, Holt J, Wicke W, Braden R, Eberle T, Self T, Lawrence B. Part 2. Clinical and economic outcomes in the hypertension and COPD arms of a mulitcenter outcomes study. Journal of the American Pharmaceutical Association. 38 2002; Vol. 38:574-84.

Sookaneknun 2004 *{published data only}*

Sookaneknun P, Richards R M, Sanguansermsri J, Teerasut C. Pharmacist involvement in primary care improves hypertensive patient clinical outcomes. *The Annals of pharmacotherapy* 2004;**38**(12):2023-8.

Takala 1979 *{published data only}*

Takala J, Niemela N, Rosti J, Sievers K. Improving compliance with therapeutic regimens in hypertensive patients in a community health center. *Circulation* 1979;**59**(3):540-543.

Takala 1983 *{published data only}*

Takala J. Screening, treatment and adherence to treatment for hypertension. *Scandinavian Journal of Primary Health Care* 1983;**1**(3-4):114-119.

Tanner 1981 *{published data only}*

Tanner GA, Noury DJ. The effect of instruction on control of blood pressure in individuals with essential hypertension. *Journal of Advanced Nursing* 1981;**6**(2):99-106.

Tobe 2006 *{unpublished data only}*

Tobe SW, Pylypchuk G, Wentworth J, Kiss A, Szalai JP, Perkins N, Hartman S, Ironstand L, Hoppe J. Effect of nurse-directed hypertension treatment among First Nations people with existing hypertension and diabetes mellitus: the Diabetes Risk Evaluation and Microalbuminuria (DREAM 3) randomized controlled trial. *CMAJ* 2006;**174**(9):1267-1271.

Tonstad 2007 *{published data only}*

Tonstad S, Alm C S, Sandvik E. Effect of nurse counselling on metabolic risk factors in patients with mild hypertension: a randomised controlled trial. *European journal of cardiovascular nursing : journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology* 2007;**6**(2):160-4.

Turnbull 2006 *{published data only}*

Turnbull D A, Beilby J J, Ziaian T, Qureshi F, Nelson M, Tonkin A L, et al. Disease management for hypertension: a pilot cluster randomized trial of 67 Australian general practices. *Disease Management & Health Outcomes* 2006;**14**(1):27.

Vetter 2000 *{published data only}*

Vetter W, Brignoli R. Influence of self-measurement of blood pressure on the responder rate in hypertensive patients treated with losartan: results of the SVATCH study. *Journal of Human Hypertension* 2000;**14**:235-241.

Watkins 1987 *{published data only}*

Watkins CJ, Papacosta AO, Chinn S, Martin J. A randomized controlled trial of an information booklet for hypertensive patients in general practice. *Journal of the Royal College of General Practitioners* 1987;**37**(305):548-550.

Webb 1980 *{published data only}*

Webb PA. Effectiveness of patient education and psychosocial counseling in promoting compliance and control among hypertensive patients. *Journal of Family Practice* 1980;**10**(6):1047-1055.

Wetzels 2007 *{published data only}*

Wetzels G E, Nelemans P J, Schouten J S, Dirksen C D, van der Weijden T, Stoffers H E, et al. Electronic monitoring of adherence as a tool to improve blood pressure control. A randomized controlled trial. *American journal of hypertension : journal of the American Society of Hypertension* 2007;**20**(2):119-25.

Zarnke 1997 *{published data only}*

Zarnke K, Feagan B, Mahon J, Feldman R. A randomized study comparing a patient-directed hypertension management strategy with usual office-based care. *American Journal of Hypertension* 1997;**10**:58-67.

Zismer 1982 *{published data only}*

Zismer DK, Gillum RF, Johnson CA, Becerra J, Johnson TH. Improving hypertension control in a private medical practice. *Archives of Internal Medicine* 1982;**142**(2):297-299.

References to studies excluded from this review

Andrejak 2000 *{published data only}*

Andrejak M, Genes N, Vaur L, Poncelet P, Clerson P, Carre A. Electronic Pill-Boxes in the Evaluation of Antihypertensive Treatment Compliance: Comparison of Once Daily Versus Twice Daily Regimen. *American Journal of Hypertension* 2000;**13**:184-190. [MEDLINE: 1365]

Artinian 2007 *{published data only}*

* Artinian NT, Flack JM, Nordstrom CK, Hockman EM, Washington OG, Jen KL, et al. Effects of nurse-managed telemonitoring on blood pressure at 12-month follow-up among urban African Americans.. *Disease Management & Health Outcomes* 2007;**56**(5):312-322.

Asmar 2007 *{published data only}*

Asmar R, Achouba A, Brunel P, El Feghali R, Denolle T, Vaisse B. A specific training on hypertension guidelines improves blood pressure control by more than 10% in hypertensive patients: the VALNORM study. *Journal of the American Society of Hypertension* 2007;**1**(4):278-85.

Bachman 2002 *{published data only}*

Bachman L, Steurer J, Holm D, Vetter W. To what extent can we trust home blood pressure measurement? A randomized controlled trial. *The Journal of Clinical Hypertension* 2002;**4**:405-407. [MEDLINE: 2962]

Barron-Rivera 1998 *{published data only}*

Barron-Rivera AJ, Torreblaca-Roldan FL, Sanchez-Casanova LI, Martinez-Beltran M. Effect of an educational intervention on the quality of life of the hypertense patient. Salud Publica de Mexico YR:1998. 40 Vol. 40, issue 6:503-9. [MEDLINE: 1362]

Ben Said *{published data only}*

Ben Said M, Consoli SM, Jean J. A comparative study between a computer-aided education (ISIS) and habitual education techniques for hypertensive patients. Proceedings - the Annual Symposium on Computer Applications in Medical Care YR:1994. [MEDLINE: 1373]

Binstock 1988 *{published data only}*

Binstock ML, Franklin KL. A comparison of compliance techniques on the control of high blood pressure. *Am J Hypertens* 1988;**1**:192S-1944S.

Birtwhistle 2004 *{published data only}*

Birtwhistle RV, Godwin MS, Delva MD, Casson RI, Lam M, MacDonald SE, Seguin R, Ruhland L. Randomised equivalence trial comparing three month and six month follow up of patients with hypertension by family practitioners. *BMJ* 2004;**328**(7433):204-0.

Blenkinsopp 2000 *{published data only}*

Blenkinsopp A, Phelan M, Bourne J, Dakhil N. Extended adherence support by community pharmacists for patients with hypertension: a randomised controlled trial. *The International Journal of Pharmacy Practice* 2000;**8**:165-175.

Bond 1984 *{published data only}*

Bond CA, Monson R. Sustained improvement in drug documentation, compliance, and disease control. A four-year analysis of an ambulatory care model. *Archives of Internal Medicine* 1984;**144**(6):1159-1162. [MEDLINE: 906]

Borbolla 2007 *{published data only}*

Borbolla D, Giunta D, Figar S, Soriano M, Dawidowski A, de Quiros F G. Effectiveness of a chronic disease surveillance systems for blood pressure monitoring. *Medinfo* 2007;**12**(Pt 1):223-7.

Bosworth 2009 *{published data only}*

Bosworth HB, Olsen MK, Dudley T, Orr M, Goldstein MK, Datta SK, et al. Patient education and provider decision support to control blood pressure in primary care: A cluster randomized trial.. *American Heart Journal* 2009;**157**(3):450-56.

Broege 2001 *{published data only}*

Broege P, James GD, Pickering TG. Management of hypertension in the elderly using home blood pressures. *Blood Pressure Monitoring* 2001;**6**:139-144.

Burke 2005 *{published data only}*

Burke V, Beilin L J, Cutt H E, Mansour J, Wilson A, Mori T A. Effects of a lifestyle programme on ambulatory blood pressure and drug dosage in treated hypertensive patients: a randomized controlled trial. *Journal of Hypertension* 2005;**23**(6):1241-9.

Cappuccio 2004 *{published data only}*

Cappuccio FP, Kerry SM, Forbes L, Donald A. Blood pressure control by home monitoring: meta-analysis of randomised trials. *BMJ* 2004;**329**(7458):145.

Caro 1998 *{published data only}*

Caro JJ, Speckman JL. Existing treatment strategies: does nocompliance make a difference?. *Journal of Hypertension* 1998;**16**(Supplement 7):S31-S34. [MEDLINE: 1358]

Carter 2008 *{published data only}*

Carter B L Bergus G R Dawson J D Farris K B Doucette W R Chrischilles E A Hartz A J. A Cluster Randomized Trial to Evaluate Physician/Pharmacist Collaboration to Improve Blood Pressure Control. *The Journal of Clinical Hypertension* 2008;**10**(4):260-71.

Celis 1998 *{published data only}*

Celis H, Staessen JA, Buntinz F, Fagard R, Leeman M, Thijs L, Van Hedent T. Antihypertensive treatment based on home or office blood pressure measurement: protocol of the randomized controlled THOP trial. *Blood Pressure Monitoring* 1998;**3**(Supplement 1):S29-S35. [MEDLINE: 1356]

Chabot 2003 *{published data only}*

Chabot I, Moisan J, Gregoire J P, Milot A. Pharmacist intervention program for control of hypertension.[see comment]. *Annals of Pharmacotherapy* 2003;**37**(9):1186-93.

Charlesworth 1984 *{published data only}*

Charlesworth EA, Williams BJ, Baer PE. Stress management at the worksite for hypertension: compliance, cost-benefit, health care and hypertension-related variables. *Psychosomatic Medicine* 1984;**46**(5):387-397. [MEDLINE: 827]

Consoli *{published data only}*

Consoli SM, Ben Said M, Jean J, Menard J, Plouin PF, Chatelier G. Interactive electronic teaching (ISIS); has the future started?. Journal of Human Hypertension YR:1996. 10 Vol. 10, issue Supplement 1:S69-S72. [MEDLINE: 1370]

Consoli SM, Ben2 *{published data only}*

Consoli SM, Ben Said M, Jean J, Menard J, Plouin PF, Chatellier G. Benefits of a computer-assisted education program for hypertensive patients compared with standard education tools. Patient Education & Counselling YR:1995. 26 Vol. 26, issue 1-3:343-7. [MEDLINE: 1371]

Consoli SM, Ben3 *{published data only}*

Consoli SM, Ben Said M, Jean J, Menard J, Plouin PF, Chatelier G. Evaluation of a computer assisted training program for hypertensive patients. Archives des Maladies du Coeur et des Vaisseaux YR:1994. 87 Vol. 87, issue 8:1093-6. [MEDLINE: 1372]

Cranney 1999 *{published data only}*

Cranney M, Barton S, Walley T. Addressing barriers to change: an RCT of practice-based education to improve the management of hypertension in the elderly. *British Journal of General Practice* 1999;**49**:522-526. [MEDLINE: 1344]

De Luca 2005 *{published data only}*

De Luca N, Izzo R, Iaccarino G, Malini P L, Morisco C, Rozza F, et al. The use of a telematic connection for the follow-up of hypertensive patients improves the cardiovascular prognosis. *Journal of Hypertension* 2005;**23**(7):1417-23.

Den 2004 *{published data only}*

Den Hond E, Staessen J A, Celis H, Fagard R, Keary L, Vandenhoven G, et al. Antihypertensive treatment based on home or office blood pressure--the THOP trial. *Blood Pressure Monitoring* 2004;**9**(6):311-4.

Denver 2003 *{published data only}*

Denver E, Barnard M, Woolfson R, Earle K. Management of uncontrolled hypertension in a nurse-led clinic compared with conventional care for patients with Type 2 diabetes. *Diabetic Care* 2003;**26**:2256-2260. [MEDLINE: 2958]

Djerassi 1990 *{published data only}*

Djerassi L, Silverberg DS, Goldblatt H, Goldberg A, Porat V. Comparison of hypertension treatment on and off the worksite. *Journal of Human Hypertension* 1990;**4**(4):322-325. [MEDLINE: 610]

Dusing 1998 *{published data only}*

Dusing R, Weisser B, Mengden T, Vetter H. Changes in Antihypertensive Therapy - The Role of Adverse Effects and Compliance. *Blood Pressure* 1998;**7**:313-315. [MEDLINE: 1368]

Elmer 2006 *{published data only}*

Elmer P J, Obarzanek E, Vollmer W M, Simons-Morton D, Stevens V J, Young D R, et al. Effects of comprehensive lifestyle modification on diet, weight, physical fitness, and blood pressure control: 18-month results of a randomized trial. *Annals of Internal Medicine* 2006;**144**(7):485-95.

Erickson 1997 *{published data only}*

Erickson SR, Slaughter R, Halapy H. Pharmacists' Ability to Influence Outcomes of Hypertension Therapy. *Pharmacotherapy* 1997;**17**(1):140-147. [MEDLINE: 1389]

Flack 1995 *{published data only}*

Flack JM, Novikov SV, Ferrario CM. Benefits of adherence to anti-hypertensive drug therapy. *European Heart Journal* 1995;**17**(Supplement A):16-20. [MEDLINE: 1387]

Flack 2000 *{published data only}*

Flack JM, Yunis C, Preisser J, Holmes CB, Mensah G, McLean B, Saunders E. The Rapidity of Drug Dose Escalation Influences Blood Pressure Responses and Adverse Effects Burden in Patients With Hypertension. The Quinapril Titration Interval Management Evaluation (ATIME) Study. *Archives of Internal Medicine* 26-6-2000;**160**:1842-1847. [MEDLINE: 1384]

Foote 1983 *{published data only}*

Foote A, Erfurt JC. Hypertension control at the work site. Comparison of screening and referral alone, referral and follow-up, and on-site treatment. *New England Journal of Medicine* 1983;**308**(14):809-813. [MEDLINE: 292]

Fu 2005 *{published data only}*

Fu D B, Ding Y M, Yang K J, Sun W, Wang J L, Fu H. [Evaluation of hypertension self-management patient education program]. *Acta Academiae Medicinae Shanghai* 2005;**32**(3):284-8, 294.

Girvin 1999 *{published data only}*

Girvin B, McDermott J, Johnston GD. A comparison of enalapril 20 mg once daily versus 10 mg twice daily in terms if blood pressure lowering patient compliance. *Journal of Hypertension* 1999;**17**:1627-1631. [MEDLINE: 1360]

Godley 2003 *{published data only}*

Godley P, Nguyen A, Yokoyama K, Rohack J, Woodward B, Chiang T. Improving hypertension care in a large group-model MCO. *American Journal of Health-System Pharmacy* 2003;**60**:554-563. [MEDLINE: 2964]

Goldstein 2005 *{published data only}*

Goldstein M K, Lavori P, Coleman R, Advani A, Hoffman B B. Improving adherence to guidelines for hypertension drug prescribing: cluster-randomized controlled trial of general versus patient-specific recommendations. *The American journal of managed care* 2005;**11**(11):677-85.

Gonzalez-Fernandez *{published data only}*

Gonzalez-Fernandez RA, Rivera M, Torres D, Quiles J, Jackson A. Usefulness of a systemic hypertension in-hospital educational program. *American Journal of Cardiology* 1990;**65**(20):1384-1386.

Grimm *{published data only}*

Grimm RH, Jr, Grandits GA, Cutler JA, Stewart AL, McDonald RH, Svendsen K, Prineas RJ, Liebson PR. Relationship of Quality-of-Life measures to Long-term Lifestyle and Drug Treatment in the Treatment of Mild Hypertension Study. *Archives of Internal Medicine* 1997;**157**:638-648. [MEDLINE: 1386]

Hatcher 1986 *{published data only}*

Hatcher ME, Green LW, Levine DM, Flagle CE. Validation of a decision model for triaging hypertensive patients to alternate health education interventions. *Social Science & Medicine* 1986;**22**(8):813-819. [MEDLINE: 836]

Herbert 2004 *{published data only}*

Herbert CP, Wright JM, Maclure M, Wakefield J, Dormuth C, Brett-MacLean P, Legare J, Premi J. Better Prescribing Project: a randomized controlled trial of the impact of case-based educational modules and personal prescribing feedback on prescribing for hypertension in primary care. *Family Practice* 2004;**21**(5):575-581. [MEDLINE: 2955]

Hyman *{published data only}*

Hyman DJ, Pavlik VN. Self-reported Hypertension Treatment Practices Among Primary Care Physicians. Blood Pressure Thresholds, Drug Chocies, and the Role of Guidelines and Evidence-Based Medicine. *Archives of Internal Medicine* 2002;**160**:2281-2286. [MEDLINE: 1385]

Inui 1976 *{published data only}*

Inui TS, Yourtee EL, Williamson JW. Improved outcomes in hypertension after physician tutorials. A controlled trial. *Annals of Internal Medicine* 1976;**84**(6):646-651. [MEDLINE: 132]

Iso 1996 *{published data only}*

Iso H, Shimamoto T, Yokota K, Sankai T, Jacobs DR, Komachi Y. Community-Based Education classes for hypertension control. *Hypertension* 1996;**27**:968-974. [MEDLINE: 1342]

Iso H, *{published data only}*

Iso H, Shimamoto T, Yokota K, Sankai T, Jacobs DR. Community-Based Education Classes for Hypertension Control. A 1.5-Year Randomized Controlled Trial. *Hypertension* 1996;**27**:968-974. [MEDLINE: 1367]

Jennett 1986 *{published data only}*

Jennett PA, Laxdal O, Hayton R, Klaassen D, Mainprize G, Spooner J, Swanson R, Wickett R, Wilson T. The effects of continuing medical education upon family physician performance in the office management of hypertension. A randomized controlled study. *Proceedings of the Annual Conference on Research in Medical Education* 1986;**25**:145-150. [MEDLINE: 3250]

Kawachi 1991 *{published data only}*

Kawachi I, Malcolm LA. The cost-effectiveness of treatingmild-to-moderate hypertension: a reappraisal. *Journal of Hypertension* 1991;**9**:199-208. [MEDLINE: 1382]

Krishan 1979 *{published data only}*

Krishan I, Brennan LA, Jr, Nobrega FT, Smoldt RK, Smutka LK, Labarthe, DR, McEnaney JA, Hunt JC. The Mayo Three-Community Hypertension Control Program. II. Outcome of intervention in entire communities. *Mayo Clinic Proceedings* 1979;**54**(5):299-306. [MEDLINE: 236]

Lee 2006 *{published data only}*

Lee J K, Grace K A, Taylor A J. Effect of a pharmacy care program on medication adherence and persistence, blood pressure, and low-density lipoprotein cholesterol: a randomized controlled trial. *JAMA : the journal of the American Medical Association* 2006;**296**(21):2563-71.

Levine 2003 *{published data only}*

Levine DM, Bone LR, Hill MN, Stallings R, Gelber AC, Barker A, Harris EC, Zeger SL, Felix-Aaron KL, Clark JM. The effectiveness of a community/academic health center partnership in decreasing the level of blood pressure in an urban African-American population.[comment]. *Ethnicity & Disease* 2003;**13**(3):354-361. [MEDLINE: 3903]

Lewis 1967 *{published data only}*

Lewis CE, Resnik BA. Nurse clinics and progressive ambulatory patient care. *The New England Journal of Medicine* 7-12-1967;**277**(23):1236-1241. [MEDLINE: 1375]

Liehr 2006 *{published data only}*

Liehr P, Meininger J C, Vogler R, Chan W, Frazier L, Smalling S, et al. Adding story-centered care to standard lifestyle intervention for people with Stage 1 hypertension. *Applied nursing research : ANR* 2006;**19**(1):16-21.

Linjer 1997 *{published data only}*

Linjer E, Hansson L. Underestimation of the true benefits of antihypertensive treatment: an assessment of some important sources of error. *Journal of Hypertension* 1997;**15**:221-225. [MEDLINE: 1383]

Littenberg 1990 *{published data only}*

Littenberg B, Garber AM, Sox HC. Screening for Hypertension. *Annals of Internal Medicine* 1-2-1990;**112**(3):192-202. [MEDLINE: 1380]

Marquez 2000 *{published data only}*

Marquez Contreras E, Casado Martinez JJ, Celotto Gomez B, Gascon Vivo J, Martin de Pablos JL, Gil Rodriguez R, Lopez Molina V, Dominguez YR. Therapeutic compliance in hypertension. Trial of two-year health education intervention. Atencion Primaria YR:2000. 26 Vol. 26, issue 1:5-10. [MEDLINE: 1363]

Mashru 1997 *{published data only}*

Mashru M, Lant A. Interpractice audit of diagnosis and management of hypertension in primary care: educational intervention and review of medical records. *British Medical Journal* 1997;**314**:942-946. [MEDLINE: 1351]

McDowell 1989 *{published data only}*

McDowell I, Newell C, Rosser W. A randomized trial of computerized reminders for blood pressure screening in primary care. *Medical Care* 1989;**27**(3):297-305. [MEDLINE: 645]

McInnes 1995 *{published data only}*

McInnes GT, McGhee SM. Delivery of care for hypertension. *Journal of Human Hypertension* 1995;**9**:429-433. [MEDLINE: 1369]

McKenney 1973 *{published data only}*

McKenney JM, Slining JM, Henderson HR, Devins D, Barr M. The effect of clinical pharmacy services on patients with essential hypertension. *Circulation* 1973;**48**(5):1104-1111. [MEDLINE: 1194]

Mitchell 2004 *{published data only}*

Mitchell E, Sullivan F, Watt G, Grimshaw J M, Donnan P T. Using electronic patient records to inform strategic decision making in primary care. *Medinfo.Medinfo* 2004;**11**(Pt 2):1157-61.

Mitchell 2005 *{published data only}*

Mitchell E, Sullivan F, Grimshaw J M, Donnan P T, Watt G. Improving management of hypertension in general practice: a randomised controlled trial of feedback derived from electronic patient data. *The British journal of general practice : the journal of the Royal College of General Practitioners* 2005;**55**(511):94-101.

Morisky 2002 *{published data only}*

Morisky D E, Lees N B, Sharif B A, Liu K Y, Ward H J. Reducing disparities in hypertension control: a community-based hypertension control project (CHIP) for an ethnically diverse population. *Health Promotion Practice* 2002;**3**(2):264-75.

Murray 1988 *{published data only}*

Murray DM, Kurth CL, Finnegan JR, Jr, Pirie PL, Admire JB, Luepker RV. Direct mail as a prompt for follow-up care among persons at risk for hypertension. *American Journal of Preventive Medicine* 1988;**4**(6):331-335. [MEDLINE: 543]

New 2003 *{published data only}*

New J, Mason J, Freemantle N, Teasdale S, Wong L, Bruce N, Burns J, Gibson J. Specialist nurse-led intervention to treat and control hypertension and hyperlipidemia in Diabetes (SPLINT). *Diabetic Care* 2003;**26**:2250-2254. [MEDLINE: 2957]

Pheley 1995 *{published data only}*

Pheley AM, Terry P, Pietz L, Fowles J, McCoy CE, Smith H. Evaluation of a nurse-based hypertension managment program: Screening, management, and outcomes. *The Journal of Cardiovascular Nursing* 1995;**9**(2):54-61. [MEDLINE: 1355]

Putnam 1989 *{published data only}*

Putnam RW, Curry L. Physicians' participation in establishing criteria for hypertension management in the office: will patient outcomes be improved?. *Canadian Medical Association Journal* 1989;**140**(7):806-809. [MEDLINE: 726]

Ramsay 1996 *{published data only}*

Ramsay LE, Haq IU, Yeo WW, Jackson PR. Interpretation of prospective trials in hypertension: do treatment guidelines accurately reflect current evidence?. *Journal of Hypertension* 1996;**14**(Supplement 5):S187-S194. [MEDLINE: 1381]

Roumie 2006 *{published data only}*

Roumie C L, Elasy T A, Greevy R, Griffin M R, Liu X, Stone W J, et al. Improving blood pressure control through provider education, provider alerts, and patient education: a cluster randomized trial. *Annals of Internal Medicine* 2006;**145**(3):165-75.

Simon 2005 *{published data only}*

Simon S R, Majumdar S R, Prosser L A, Salem-Schatz S, Warner C, Kleinman K, et al. Group versus individual academic detailing to improve the use of antihypertensive medications in primary care: a cluster-randomized controlled trial. *The American journal of medicine* 2005;**118**(5):521-8.

Staessen 2004 *{published data only}*

Staessen J, Den Hond E, Celis H, Fagard R, Keary L, Vandenhoven G, O'Brien ET. Antihypertensive treatment based on blood pressure measurement at home or in the physician's office. *Journal of the American Medical Association* 2004;**291**:955-964.

Stahl 1984 *{published data only}*

Stahl SM, Kelley CR, Neill PJ, Grim CE, Mamlin J. Effects of home blood pressure measurement on long-term BP control. *American Journal of Public Health* 1984;**74**(7):704-709. [MEDLINE: 713]

Statson 1977 *{published data only}*

Statson WB, Weinstein MC. Public-Health Rounds at the Harvard School of Public Health. allocation of Resources to Manage Hypertension.. *The New England Journal of Medicine* 31-3-1977;**296**(13):732-739. [MEDLINE: 1379]

Stephenson 1999 *{published data only}*

Stephenson J. Noncompliance May Cause Half of Antihypertensive Drug "Failures". *JAMA* 28-6-1999;**282**(4):313-314. [MEDLINE: 1378]

Thomas 2006 *{published data only}*

Thomas, P. D, Miceli, R. Evaluation of the "Know Your Health" program for type 2 diabetes mellitus and hypertension in a large employer group. *Am J Managed Care* 2006;**12**:SP33-SP39..

Trocha 1999 *{published data only}*

Trocha AK, Schmidtke C, Didjurgeit U, Muhlhauser I, Bender R, Berger M, Sawicki PT. Effects of intensified antihypertensive treatment in diabetic nephropathy: mortality and morbidity results of a prospective controlled 10-year study. *Journal of Hypertension* 1999;**17**:1497-1503. [MEDLINE: 1374]

Tu 1999 *{published data only}*

Tu M. The effect of health education on self-care behaviours and hypertension control in elderly hypertensive patients at a veterans home. *Chinese Journal of Public Health* 1999;**18**:54-65. [MEDLINE: 1405]

UK PDS 1998 *{published data only}*

UK Prospective Diabetes Study Group. Tight Blood pressure control and risk of macrovascular and microscular complications in type 2 diabetes: UKPDS 38. *British Medical Journal* 12-9-1998;**317**:703-713. [MEDLINE: 1377]

van den Hoogen 1990 *{published data only}*

van den Hoogen JP, van Ree JW. Preventive cardiology in general practice: computer-assisted hypertension care. *Journal of Human Hypertension* 1990;**4**(4):365-367. [MEDLINE: 606]

Waeber 1999 *{published data only}*

Waeber B, Leonetti G, Kolloch R, McInnes GT. Compliance with asprin or placebo in the hypertension optimal treatment (HOT) study. *Journal of Hypertension* 1999;**17**:1041-1045. [MEDLINE: 1388]

Weiner 1980 *{published data only}*

Weiner EE. Nurse management of hypertension. *American Journal of Nursing* 1980;**80**(6):1129.

Weir 2002 *{published data only}*

Weir MR, Maibach EW, Bakris GL, Black HR, Chawla P, Messerli FH, Neutel JM, Weber MA. Implications of a health Lifestyle and Medication Analysis for Improving Hypertension Control. *Archives of Internal Medicine* 28-2-0002;**160**:481-490. [MEDLINE: 1359]

Wollard 1995 *{published data only}*

Wollard J, Beilin L, Lord T, Puddey I, MacAdam D, Rouse I. A controlled trial of nurse counselling on lifestyle change for hypertensives treated in general practice: preliminary results. *Clinical and Experimental Pharmacology and Physiology* 1995;**22**:466-468. [MEDLINE: 1366]

Wyka-Fitzgerald 1984 *{published data only}*

Wyka-Fitzgerald C, Levesque P, Panciera T, Vendettoli D, Mattea E. Long-term evaluation of group education for high blood pressure control. *Cardiovascular Nursing* 1984;**20**(3):13-18. [MEDLINE: 728]

Zernike 1998 *{published data only}*

Zernike W, Henderson A. Evaluating the effectiveness of two teaching strategies for patients diagnosed with hypertension. *Journal of Clinical Nursing* 1998;**7**:37-44. [MEDLINE: 1364]

References to ongoing studies

Bosworth *{published data only}*

Bosworth HB, Olsen MK, McCant F, Harrelson M, Gentry P, Rose C, et al. Hypertension Intervention Nurse Telemedicine Study (HINTS): testing a multifactorial tailored behavioral/educational and a medication management intervention for blood pressure control.. *Am Heart J* 2007;**153**(6):918-924.

Carter *{unpublished data only}*

A Trial to Evaluate Physician/Pharmacist Collaboration to Improve Blood Pressure Control:An effectiveness study.. Ongoing study Not known.

Coppola *{unpublished data only}*

Improving the primary prevention of stroke in older patients in general practice: a randomized controlled trial. Ongoing study Not known.

Krieger *{unpublished data only}*

SHIP Clinic-Based Program. Ongoing study Not known.

Logan *{unpublished data only}*

Mobile phone-based remote patient monitoring system for management of hypertension in diabetic patients. Ongoing study Not known.

Zarnke *{unpublished data only}*

Not known. Ongoing study Not known.

Additional references

Berlowitz 1998

Berlowitz D, Ash A, Hickey E, Friedman R, Glickman M, Kader B, Moskowitz M. Inadequate management of blood pressure in a hypertensive population. *The New England Journal of Medicine* 1998;**339**:1957-1963. [MEDLINE: 1364]

Blood 2000

Blood pressure lowering Treatment Trialists' Collaboration. Effects of ACE inhibitors, calcium antagonists, and other blood pressure lowering drugs: results of prospectively designed overviews of randomised trials. *Lancet* 2000;**356**:1955-1964. [MEDLINE: 1670]

Bosworth 2009

Bosworth HB, Olsen MK, Grubber JM, Neary AM, Orr MM, Powers BJ, et al. Self-management Interventions to Improve Hypertension Control.. *Annals of Internal Medicine* 2009;**151**:687-695.

Burnier 2002

Burnier M. Blood pressure control and the implementation of guidelines in clinical practice: can we fill the gap?. *Journal of Hypertension* 2002;**20**:1251-1253. [MEDLINE: 1997]

Campbell 2000

Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, Tyrer P. Framework for design and evaluation of complex interventions to improve health. *British Medical Journal* 2000;**321**:694-696. [MEDLINE: 1643]

Cappuccio 2004 errat

Cappuccio FP, Kerry SM, Forbes L, Donald A. Blood pressure control by home monitoring: meta-analysis of randomised trials. *BMJ* 2004;**329**(7464):499. [MEDLINE: 2870]

Chobanian 2001

Chobanian AV. Control of hypertension - an important national priority. *The New England Journal of Medicine* 16-8-2001;**345**(7):534-535. [MEDLINE: 1927]

Clarke 2000

Clarke M, Oxman AD. Assessment of study quality. The Cochrane Library, Cochrane reviewer's handbook 4.1 [updated June 2000]. Issue 2. Chichester, UK: John Wiley & Sons, Ltd, 2000. [MEDLINE: 1407]

Collins 1994

Collins R, Peto R. Antihypertensive drug therapy: effects on stroke and coronary heart disease. In: Swales J editor(s). Textbook of Hypertension. Oxford: Blackwell Scientific Publications, 1994. [MEDLINE: 2160]

Davis 2001

Davis B, Ford C. The Hypertension Detection and Follow up Program. In: Black HR editor(s). Clinical trials in Hypertension. New York: Marcel Dekker Inc, 2001. [MEDLINE: 1409]

Du 1997

Du X, Cruickshank JK, McNamee R, Saraee M, Sourbutts J, Summers A, Roberts N, Walton E, Holmes S. Case-control study of stroke and the quality of hypertension control in north west England. *British Medical Journal* 1997;**314**:272-276. [MEDLINE: 1000]

Ebrahim 1998

Ebrahim S. Detection, adherence and control of hypertension for the prevention of stroke: a systematic review. *Health Technology Assessment* 1998;**2**:11. [MEDLINE: 2164]

Follman 1992

Follman D, Elliott P, Suh I, Cutler J. Variance imputations for overviews of clinical trials with continuous response. *Journal of Clinical Epidemiology* 1992;**45**:769-773. [MEDLINE: 1408]

Frijling 2001

Frijling B, Spies T, Lobo C, Hulscher M, van Drenth B, Braspenning G, Prins A, van der Woulden J, Grol R. Blood pressure control in treated hypertensive patients: clinical performance of general practitioners. *British Journal of General Practice* 2001;**51**:9-14. [MEDLINE: 1626]

Gueyffier 1999

Gueyffier F, Bulpitt C, Boissel JP, Schron E, Ekbom T, Fagard R, Casiglia E, Kerlikowske K, Coope J. Antihypertensive drugs in very old people: a subgroup meta-analysis of randomised controlled trials. *Lancet* 1999;**353**:793-796. [MEDLINE: 2161]

Hansson 1999

Hansson L, Zanchetti A, Carruthers S, Dahlof B, Elmfeldt D, Julius S, Menard J, Rahn K, Wedel H, Westerling S. Effects of intensive blood pressure lowering and low dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. *Lancet* 1999;**351**:1755-1762. [MEDLINE: 1478]

Hart 1991

Hart JT, Thomas C, Gibbons B, Edwards C, Hart M, Jones J, Jones M, Walton P. Twenty five years of case finding and audit in a socially deprived community [see comments]. *BMJ* 1991;**302**(6791):1509-1513. [MEDLINE: 1220]

Hyman 2001

Hyman DJ, Pavlik VN. Characteristics of patients with uncontrolled hypertension in the United States. [see comments.]. *New England Journal of Medicine* 2001;**345**(7):479-486. [MEDLINE: 2157]

Hypertension 1986

Hypertension detection and follow-up Program Cooperative Group. Persistence of reduction in blood pressure and mortality of participants in the hypertension detection and follow-up program.. *Journal of the American Medical Association* 1986;**259**(14):2113-2122..

McLean 2008

McLean DL, McAlister FA, Johnson JA, King KM, Makowsky MJ, Jones CA, et al. A Randomized Trial of the Effect of Community Pharmacist and Nurse Care on Improving Blood Pressure Management in Patients With Diabetes Mellitus: Study of Cardiovascular Risk Intervention by Pharmacists-Hypertension (SCRIP-HTN).. *Arch Intern Med* 2008;**168**(21):2355-61..

Oliveria 2002

Oliveria SA, Lapuerta P, McCarthy BD, L'Italien GJ, Berlowitz DR, Asch SM. Physician-Related Barriers to the Effective Management of Uncontrolled Hypertension. *Annals of Internal Medicine* 2002;**162**:413-420. [MEDLINE: 2142]

Payne 1993

Payne JN, Milner PC, Saul C, Bowns I, Hannay DR, Ramsay LE. Local confidential inquiry into avoidable factors in deaths from stroke and hypertensive disease. *British Medical Journal* 1993;**307**:1027-1030. [MEDLINE: 196]

Phillips 2001

Phillips L, Branch W, Cook C, Doyle J, El-Kebbi I, Gallina D, Miller C, Ziemer D, Barnes C. Clinical inertia. *Annals of Internal Medicine* 2001;**135**:825-834. [MEDLINE: 1919]

Prospective Studies Collaboration 2002

Prospective Studies Collaboration. Age-specific relevance of usual blood pressure tovascular mortality: a meta-analysis of individual data for one million adults in 61 prospectivestudies.. *Lancet* 2002;**360**:1903-13..

Ramsay 1999

Ramsay LE, Williams B, Johnston G, MacGregor GA, Poston L, Potter JF, Poulter NR, Russell G. Guidelines for the management of hypertension: report of the third working party of the British Hypertension Society. *Journal of Human Hypertension* 1999;**13**:569-592. [MEDLINE: 1500]

Shea 1992

Shea S, Misra D, Ehrlich M, Field L, Francis C. Predisposing factors for severe, uncontrolled hypertension in an inner-city minority population. *The New England Journal of Medicine* 1992;**327**:776-781. [MEDLINE: 100]

Smith 1990

Smith WCS, Lee AJ, Crombie IK, Tunstall-Pedoe H. Control of blood pressure in Scotland: the rule of halves. *British Medical Journal* 1990;**300**:981-983. [MEDLINE: 2163]

Staessen 1997

Staessen JA, Byttebier G, Buntinx F, Celis H, O'Brien ET, Fagard R. Antihypertensive Treatment Based on Conventional or Ambulatory Blood Pressure Measurement A randomised controlled trial. *Journal of the American Medical Association* 1997;**278 No 13**:1065-1072. [MEDLINE: 1208]

Staessen 2001

Staessen JA, Wang J-G, Thijs L. Cardiovascular protection and blood pressure reduction: a meta analysis. *The Lancet* 20-10-2001;**358**:1305-1315. [MEDLINE: 1922]

Weingarten 2002

Weingarten SR, Henning JM, Badamgarav E, Knight K, Hasselblad V, Gano A, Jr, Ofman JJ. Interventions used in disease management programmes for patients with chronic

illness---which ones work? Meta-analysis of published reports. *BMJ* 26-10-2002;**325**(7370):925. [MEDLINE: 2200]

Wilber 1972

Wilber J, Barrow J. Hypertension: a community problem. *The American Journal of Medicine* 1972;**52**:653-663. [MEDLINE: 2162]

Williams 2004

Williams B, Poulter NR, Brown MJ, McInnes GT, Potter J, Sever P, McG Thom S. Guidelines for management of hypertension: report of the fourth working party of the British Hypertension Society, 2004- BHS IV. *Journal of Human Hypertension* 2004;**18**:139-185. [MEDLINE: 2972]

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Ahluwalia 1996

Methods	Parallel, individuals, hospital outpatients in a single hospital clinic, USA
Participants	Hypertensive (SBP 180mmHg and/or DBP 110mmHg), 95% African American, 49% uninsured, mean age 56
Interventions	(1) Mailed reminder- postcard addressed in the presence of the patient and mailed next day as a reminder to attend clinic in a week's time (2) No reminder card, given routine clinic appointment
Outcomes	(1) First follow up visit to walk-in clinic or a continuity medicine clinic- no difference at 6 months (E) 45/53, 85% versus (C) 48/54, 89% Duration of FU 6 months
Notes	No blood pressure data collected at outcome

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Artinian 2001

Methods	Pilot RCT
Participants	Age >18 years, SBP >140mmHg or >90mmHg or for diabetic patients ?130mmHg or ?85mmHg
Interventions	(1) Home BP telemonitoring- self monitoring at home and transmitting BP readings over telephone line to care providers in order to "facilitate telecounselling and treatment planning". BP readings transmitted 3 times per week for 12 weeks. (2) Nurse-managed community based BP monitoring. (3) Usual care
Outcomes	(1) Blood pressure- mean change SBP 25 mmHg, mean change DBP 14mmHg (E) versus mean change SBP +1 mmHg, mean change DBP 2mmHg Duration of FU 3 months
Notes	Small pilot study with short follow up period

Risk of bias

Bias	Authors' judgement	Support for judgement

Artinian 2001 *(Continued)*

Allocation concealment?	Unclear risk	B - Unclear

Bailey 1998

Methods	Parallel, individuals based in general practitioner surgeries, Australia
Participants	Patients who were about to start BP lowering treatment who did not practice self-measurement, <7% previously untreated, mean age 53.5 years.
Interventions	(1) Self monitoring- use of an OMRON HEM706 monitor. Asked to record BP twice daily for 8 weeks (2) Usual care- no self recording
Outcomes	(1) Blood pressure control- significantly worse (E) 148/89mmHg versus (C) 142/89. (2) Process of medical care-more vigorous in (C) group in terms of increase, addition of medication (3) Compliance (pill count) (E) 88% versus (C) 94% NS Duration of FU 8 weeks
Notes	23% patients were not interested in future self-measurement Outcome assessment: 24 hour ambulatory monitoring Physicians not instructed to achieve a treatment goal or protocol Significant disagreement between self monitoring and office measurement found by 19% physicians and 16% patients. In (E) group negative finding most likely due to the fact that physicians were less likely to alter drug regimen when self-measurement readings were lower than office BP measurement. Finding most likely to due different responses to process of care no protocol concerning treatment intensification was provided in this RCT. No adjustment to the lower self monitor readings were made and no intensification was associated with the intervention

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Unclear risk	B - Unclear

Baqu,Äö 2005

Methods	Cluster RCT, Parallel, 180 Primary care basic health care units (BCU) throughout Spain, randomised by BCU (n=180), analysed by patient (n=1325)
Participants	Patients with poorly controlled essential hypertension, defined as systolic blood pressure > or = 140 or diastolic blood pressure > or = 90 mm Hg.
Interventions	The patients were given an OMRON HEM-705CP automatic blood pressure monitor on two occasions, for use during 15 days at weeks 6 and 14. Blood pressure was recorded at each visit (baseline, 6, 8, 14, 16, and 24 weeks).
Outcomes	Control of blood pressure, considered systolic/diastolic blood pressure <140/90 mm Hg (130/85 in patients with diabetes).
Notes	Original in Spanish and only translation of abstract available. Full text in Spanish did not give denominator for follow-up at 24 weeks so data from follow-up at 16 weeks used.

Risk of bias

Baqu,Äö 2005 *(Continued)*

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Barnett 1983

Methods	Parallel, individuals based in one community-based health centre in USA.
Participants	Physicians nurse-practitioners (numbers not stated). Patients (n= 115) with sustained hypertension and/or diagnosis of hypertension and placed on therapy, <2 repeat BP measurements after initial visit. 49% female, mean age 43 years (42% older than 45 years), 17% black mean initial BP 150/102mmHg, 7% with history of hypertension, 4% with history of cardiovascular disease, 15% with family history of hypertension, 34% diagnosed obese
Interventions	(1) Computer reminder to GP- automated surveillance system utilizing computer-based medical record system, generated automatic reminder to GP to check BP of patients. "No attempt was made to monitor the quality of care as to the degree of BP control". (2) Usual care.
Outcomes	(1) Evaluate extent BP FU was attempted or achieved, (E) 62/63 (98%) versus (C) 24/52 (46%). (2) Repeat BP recorded (E) 44/63 (70%) versus (C) 27/52 (52%). (3) Degree of DBP control achieved (DBP <100mmHg) (E) 44/63 (70%) versus (C) 27/52 (52%). Duration of FU 24 months.
Notes	Intervention improved follow up of patients and in those who were followed up DBP was significantly improved. Stratified according to age (45) and DBP (100mmHg)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Billault 1995

Methods	Parallel, individuals in a single outpatient clinic, Paris, France.
Participants	Individuals who attended hypertension clinic, no entry SBP/DBP defined, 88% (C) 83% (E) on BP lowering drugs. 63% male
Interventions	(1) Booklet with personalised standardised medical information explained to patient and their family doctor. Ten items included on the basis of usefulness of managing hypertension. Patients asked to complete with family doctor and mail carbon copy to outpatient clinic for entry into computerised record. (2) Usual care Patients in both groups encouraged to visit family doctor 1-3 times per trimester according to severity of hypertension
Outcomes	(1) Process of care in terms of use of services. (2) SBP/DBP- (E) 145.1/88.2mmHg versus (C) 146.2/86.8; no difference between groups (3) Other cardiovascular risk factors (smoking, exercise, body weight- no difference between groups. Duration of FU 1 year

Billault 1995 *(Continued)*

Notes	44/82 (54%) of intervention group who were followed up completed personal medical record.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Bloom 1979

Methods	Parallel, individuals based after a work-site screening programme US
Participants	Patients with elevated blood pressure 140/90mmHg. Average age 40, white, male 82%, well educated 60% with a masters degree or higher
Interventions	(1) Educational material about hypertension, reinforced by a hypertension counsellor one week later, designed to improve appointment keeping and knowledge (2) No educational material or counsellor follow up.
Outcomes	(1) Number seeking medical care/appointment- significantly improved 15/27 (E- 55.5%), 7/27 (C- 25.9%) (2) Knowledge about hypertension- increased in (E) 3.22 versus (C) 2.26 Duration of FU 3 months
Notes	RCT concerned with initial follow up of patients identified as having sustained hypertension after screening programme

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Bogden 1998

Methods	Parallel, individuals in a single OPD clinic in US
Participants	Patients with increased blood pressure, either: 150 or 95mmHg 140 or 90mmHg with CVS risk factors or target organ damage Mean age 55 sd13, 25% mixed Hawiian ancestory, 57% high school graduates, 87% health insurance
Interventions	(1) Pharmacist interacted with physicians and patients: Patients: "Go through medication history "Answered questions "Encouraged compliance Physicians: "Reviewed laboratory data with doctors "Attached "recommendations" about blood pressure treatment Control: usual medical care without pharmacist involvement
Outcomes	(1) % patients with controlled BP (<140 and <90mmHg)- improved 27/49 (E) 9/46 (C) p<0.001

Bogden 1998 *(Continued)*

	(2) Mean reduction in SBP/DBP at follow up- improved (E) 132/85mmHg versus (C) 145/92mmHg p<0.01 (3) Mean medication cost decreased $6.8 (E) increased $6.5 (C) Duration of FU 16 months
Notes	No contamination between doctors Intervention superior to usual care Process of care in intervention arm. Pharmacist made 162 recommendations to doctors: 10 new (additional) medication to be started 34 medication dose increase 12 stop medication 5 reduce medication due to side effects 16 renew medication at existing dosage 52 switch to a cheaper drug 20 newer more effective drug

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Brook 1983

Methods	Cluster RCT, families unit of randomisation
Participants	2005 Families living in six US cities (47% men, 18% non white, mean age 33.4, range 14-61) Results are reported for subset of hypertensive subjects, 24.7% (n=294) full health insurance, 24.5% (n=562) partial health insurance.
Interventions	(1) Full health insurance- (2) Partial health insurance (three groups at different levels of re-imbusement: (a) Individual - 95% OPD to ceiling of $150, all inpatient (b) Intermediate- 25-50% both OPD and inpatient up to $1000 (c) Catastrophic- 95% both OPD and inpatient up to $1000
Outcomes	(1) Mean DBP- improved by -1.9mmHg (2) Mean SBP- improved by -1.8mmHg (3) General health (4) Health habits (5) Risk of dying Duration of FU: 3 years
Notes	SBP/DBP reported but baseline DBP lower than follow up (see tables 3 and 5 in original report). Subsequent report suggested lower SBP/DBP at follow up adjusted for blood pressure at baseline (see table 2 and text). high losses to FU No details on process of BP care, but free care increased physician contacts and better lifestyle changes Subgroup analysis: Low-income people with high BP had greater improvement than high-income--3.5mmHg (low income) versus 1.1mmHg (high-income)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Bulpitt 1976

Methods	Parallel, individuals based in 3 hospital hypertension clinics in UK

Bulpitt 1976 *(Continued)*

Participants	Intervention directed at hospital physicians (number not stated). 278 patients with diagnosed hypertension referred to clinics. Characteristics of patients: computer group: 56% female, mean age 51years, mean lying BP 178/105mmHg; control group: 53% female, mean age 48 years, mean lying BP 177/106mmHg
Interventions	(1) Computer-held records- allowed doctor to record clinical information in structured format. (2) Standard hospital notes
Outcomes	(1) Content of patient record 15 items- overall better recording in computer group (2) Length of time of consultation- longer in E (39.9 mins) than C (31.4 mins) at initial consultation, subsequent consultations no difference. (3) Patient investigations during RCT- no difference (4) Drop outs- 25/136 (E- 18%) 36/142 (C- 25%) (4) Average SBP and DBP- no difference (E) 149/96mmHg (C) 149/97mmHg Duration of FU 12 months.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Burrelle 1986

Methods	Parallel, individuals, hospital outpatients and primary care, USA
Participants	16 treated and non-adherent elderly hypertensive patients, 75% black, 75% women, mean age 69.
Interventions	(1) Home visits, education and special dosing devices; addressed psycho-social problems and compliance problems by means of: medication planners; special dosing devices; individualized instruction on disease states and treatments- Treatment Information on Medications for the Elderly (TIME) (2) Usual care
Outcomes	(1) Blood pressure control- no difference between groups, (E) 167.8/89.2mmHg versus (C) 165.8/86.8mmHg (2) Compliance (Pill counts and direct questioning, taking >80% of medication)- Percent of pills taken: 92% (E) versus 71% (C) (p<0.001) (3) % with controlled hypertension, no difference, (E) 1/8, 13% versus (C) 1/8, 13% Duration of FU 8 weeks
Notes	Very small and underpowered study

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Cakir 2006

Methods	Parallel, Outpatient hypertension clinic at a university hospital in Istanbul, Turkey
Participants	Persons were eligible if had been diagnosed with hypertension (i.e., mean systolic BP of 140 mmHg and/or mean diastolic BP, DBP, of 90 mmHg on 3 separate occasions during a 3-week period), and were able to complete the questionnaire unaided and were a*ged 1*8 to 65 years of age. Major exclusion criteria were currently participating in a structured dietary program aimed at weight reduction, regular participation in physical activity during the previous 3 months, regular use of drugs that affect dyslipidemia, use of weight-loss medications, a prior cardiovascular event, or ischemic heart disease.
Interventions	Patient education ("lifestyle intervention") while participants in the control group were provided with routine outpatient services and were asked to maintain their usual lifestyles, including dietary and exercise habits, for 6 months until they were reexamined. Duration:6 months
Outcomes	The primary outcome was SBP. Additional outcomes included DBP, fasting lipids, obesity parameters, alcohol consumption, smoking, and stress management at 6 months.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Carnahan 1975

Methods	Parallel Individuals
Participants	V A outpatient clinic US, starting treatment, n=100 (male 98), mean age 54 (E) 57 (C)
Interventions	(1) Self Monitoring, Instructed to use own sphygmomanometer twice a day. Readings recorded and delivered to the clinic when visiting. (2) usual care
Outcomes	(1) Mean SBP/DBP- SBP lower at 6 months FU in (E), 7.5mmHg difference DBP no difference at FU Duration FU: 6 months
Notes	No SDs available, estimated to be 20mmHg SBP, 10mmHg DBP

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Coe 1977

Methods	Parallel, individuals based in 2 hospital hypertension clinics in US
Participants	Hospital physicians (number not stated) 116 patients, 90.5% female, mean age 52years, all black unselected, consecutive referrals to clinics during 6-month period. Characteristics: (1)Mean of 3 separate pretreatment BP measurements >140/95mmHg (2)Three return visits while on treatment (3).BP medication taken as prescribed
Interventions	(1) Computer-generated treatment recommendations by algorithm; generated drug type and dose recommendations to physician (2) Usual physician care
Outcomes	(1) Blood pressure- reported in three strata of DBP, <95, 95-105, >105 but no differences between (E) 152.5/99.6mmHg versus (C) 148.7/96.5mmHg (2) Compliance- self report, no difference (3) Drugs prescribed- patterns of drug use the same. Duration of FU months uncertain but weeks of treatment varied within a range of 21 to 40 weeks
Notes	Difficult to interpret as trial reported on all outcomes by means of initial DBP strata. Mean SBP/DBP was non significantly better in (C) versus (E). Overall conclusion computer generated treatment (E) and usual care by physicians (C) was equivalent.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Unclear risk	B - Unclear

Contreras 2005

Methods	To study the efficacy of telephone and mail intervention in therapeutic compliance among patients with mild to moderate hypertension. Design. A prospective controlled multicenter clinical trial with 3 arms
Participants	Eighty-five primary care centers in Spain, with a duration of 6 months. Patients. A total of 636 patients with newly diagnosed or uncontrolled hypertension were included. Interventions. T
Interventions	he patients were randomized and distributed between the following groups: (i) control (CG) - under routine clinical management; (ii) mail intervention (MIG) - received a mailed message reinforcing compliance and reminding of the visits (15 days, 2 and 4 months),- (iii) telephone intervention (TIG) - received a telephone call at 15 days, then at 7 and 15 weeks.
Outcomes	Five hundred and thirty-eight patients completed the study (261 males); 85.5% were compliers (CI=82.5-88.5, n=460). The MPC was 95.1 +/- 19.6% (CI=93.28-96.92). The CG consisted of 182 individuals, MIG=172 and TIG=184. Compliers represented 69.2% of the CG (CI 62.5-75.9%), 91.3% (CI=87.1-95.5) of the MIG (p=0.0001) and 96.2% of the TIG (CI 93.5-98.9%); the final MPC was 89.6% +/- 15 in CG, 96.6% +/- 12 in MIG and 99.1 +/- 26.8 in TIG (p=0.0001). The percentage of controlled subjects was 47.2% in CG (CI=40-54.4), 61.3% in MIG (CI=54.1-68.5%) and 63.3% in TIG (CI=56.4-70.2%) (p<0.05). Conclusions. TIG and MIG are effective measures for improving patient compliance in hypertension.

Contreras 2005 *(Continued)*

Notes	This is a three arm study of a mail intervention, a telephone intervention and a usual care group.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Cummings 1985

Methods	Hypertensive patients attending in a single urban family practice
Participants	Patients, aged 19 to 96, mean age 60. 62% female, 91% black, 11% newly diagnosed, 75% SBP <140mmHg and DBP >90mmHg
Interventions	(1) Appointment reminder- reminder card sent one week in advance of appointment and telephone patients who missed appointments to schedule new ones (2) Usual care
Outcomes	(1) Appointment keeping rate-appointments improved in (E- 87%) versus (C- 79%). (2) Dropouts from treatment- drop outs less at 4 months in experimental group (E- 87/486, 18%) versus (C- 150/487, 31%) (3) Blood pressure control- average SBP/DBP improved in experimental group(SBP-2mmHg, p=0.18 and DBP -1mmHg, p=0.75) (4) Proportion of patients with controlled hypertension (<140/90)- 31% (E) versus 25% (C) Duration FU 8 months
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

de Castro 2006

Methods	double-blind randomized clinical trial, Setting. Single hospital clinic outpatient in brazil
Participants	A total of 71 patients in a single hospital clinic outpatient in brazil Included: >18 years,with uncontrolled hypertensive,
Interventions	(i) control (CG) - under routine clinical management and sham intervention (ii) intervention (IG) - received a Pharmaceutical care programme delivered by 9 trained pharmacists: Patient education and support
Outcomes	ABPM after 6 months (large cuff was used in >32cm arms)
Notes	

Risk of bias

de Castro 2006 *(Continued)*

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Dickinson 1981

Methods	Factorial, Cluster, RCT
Participants	Four clinical teams in Family Medicine Centre in USA, 4 faculty physicians 37 residents. Each team received on of the interventions. 250 Patients, 69.9% female, mean age 49.6 years, 70.4% white mean weight 78.9kg, mean baseline BP 159/89mmHg. Inclusion criteria: (1) Hypertensive patients visiting practice during 4-month baseline period (2) Elevated systolic or diastolic pressure at last baseline visit (3) At least one visit during 7-month intervention period
Interventions	(1) Computer-generated feedback-monthly feedback reports on individual patients for physician, containing identification, age, date of last visit and latest BP in those with uncontrolled hypertension (age 18-44 >/=140/90; 45-64 >/=150/95; age >64 >/=160/95) or overdue appointments (2) Education programme- designed to increase physician awareness about non-compliance, plan long term management based on periodic assessment, encourage family, behavioural and drug therapies. Three separate self instructions (3) Both (4) Neither
Outcomes	1) Follow up appointments increased in interventions-feedback 3.4, education 3.3, both 3.2, control 2.6 NS. (2) Knowledge-significantly improved in physicians who received education only, feedback 76, education 84, both 78, control 74 (3) Blood pressure control- no difference - feedback 145/86mmHg, education 149/85mmHg, both 149/84mmHg, control 148/83 (4) % with controlled hypertension- non significant differences, feedback 65%, education 63%, both 57%, control 58% Duration of FU 7 months.
Notes	Intervention randomised by, directed at physicians, analysis by patient No account taken of clustering. Explains uneven patient numbers per arm of RCT

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Earp 1982

Methods	Parallel Individuals
Participants	Hypertension, taking BP medication that had been initiated, altered or re-started. Based in outpatient hypertension clinic or family practice clinic n=218, mean age 48, 59% female, 77% black
Interventions	(1) Home visits- over 18 months by nurse or pharmacist. Provided a "test of how effectively home-visiting health practitioners could motivate and/or reinforce positive health behaviours, including medication compliance" (2) Home visits plus involvement of "significant other"- involved daily/several times a week BP monitoring (3) Usual care
Outcomes	(1) Home visit group versus usual care: proportion of patients in each group with uncontrolled hypertension (DBP >/=95mmHg)- significant effect at year 2 (E) 21% versus (C) 42%, not significant at year 1 (E) 34% versus (C) 34%.

Earp 1982 *(Continued)*

	(2) Home visit and involvement of significant other versus usual care; proportion of patients in each group with uncontrolled hypertension (DBP 95mmHg)- non significant effect at year 2 (E) 25% versus (C) 42%, not significant at year 1 (E) 39% versus (C) 34%. Duration of FU: 1 year
Notes	Large proportions lost to follow up at year 2, hence follow up at 1 year when pooling data. Mean number of BP medication taken declined in the two intervention group (1.7 to 1.5 Group 1 and 1.5 to 1.4 Group 2) but increased in control group (Group 3 1.6 to 1.8); between group differences non significant.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Evans 1986

Methods	Cluster- physicians stratified to solo or group practice and randomly allocated within strata
Participants	Canadian family physicians. Eligible patients, age 30 to 69 years, either DBP >90mmHg at one home visit and taking BP medication or no BP medication and DBP >90mmHg on 3 times at home visits
Interventions	(1) Mailed CME to physicians 14 weekly instalments of information, chart and fu appointment system to encourage detection and recall of patients (2) Usual care
Outcomes	(1) Blood pressure- (DBP<90mmHg, (E) 67% versus (C) 67%, non significant. (2) # visits for BP check- no difference (3) # patients told BP elevated- no difference (4) # patients on BP medication- no difference (5) Mean % compliance rate- no difference (6) % patients with controlled blood pressure- no difference Duration FU 1 year
Notes	Cluster RCT- BP data aggregated at cluster level. No difference found between intervention and usual care, 76% (E) and 79% (C) patients on BP medication.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Fielding 1994

Methods	Parallel, individuals at four work sites in the US
Participants	Patients with increased blood pressure, either: SBP 140 and/or DBP 90mmHg identified during work-site screening. 16%female, 30.5% taking BP lowering durgs
Interventions	(1) IMPACT consisted of monthly 10 minute individual sessions for patients with counsellor at work site that included: "Assessment of current behaviours "Discussion re: treatment goals

Fielding 1994 *(Continued)*

	"Compliance "Mailed monthly package including personalised blood pressure information "Incentives offered e.g. coupons for free sports equipment "Sites were requested to offer at least six classes or demonstrations related to BP control during the year (2) Usual care
Outcomes	(1) Mean SBP/DBP changes- SBP: significantly improved 138.1mmHg (E) versus 144.5mmHg (C) DBP: -no difference 86mmHg (E) versus 86.5mmHg (C) Adjusted difference: SBP 7.6mmHg, p<0.05 DBP 2.4mmHg, NS Duration of FU 1 year
Notes	Statistically significant change for SBP (but not DBP) after adjustment for age, sex and baseline blood pressure A significantly higher proportion of intervention group started BP lowering drugs (E) 13/49, 26.5% (C) 5/52, 9.6%

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Fletcher 1975

Methods	Parallel, individuals based in single emergency room in US
Participants	Patients who attended emergency department with DBP 100mmHg and who had been given a follow up appointment for a medical clinic
Interventions	(1) Reminder (letter or phone) to attend follow up appointment at clinic, offer of assistance if problems arose, followed up until attended clinic or missed two consecutive appointments (2) Usual care
Outcomes	(1) Returned to initial medical clinic appointment significantly improved 62/74 (E- 84%), 44/70 (C- 63%). (2) Blood pressure control the same at FU 38/74 (E- 51%), 37/70 (C- 53%) Duration of FU 5 months
Notes	Improved initial attendance but blood pressure control in both groups the same. Process of care the more vigorous in (E) group but (E- 38%), (C- 33%) said that they were on BP lowering drugs. Blood pressure control defined in age-specific categories 20-39 <140/90 40-59 <150/95 >60 <160/100

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Friedman 1996

Methods	Parallel, individuals from 29 different communities, Boston, USA
Participants	Under care of physician for hypertension on BP lowering drugs, SBP >/=160 mmHg or DBP >/= 90mmHg on average two readings. 90% white, 77% female, mean age 76 years
Interventions	(1) Home monitoring and telecommunication system "Weekly automated home blood pressure recording. "Telephone-linked computer system (TLC)- computer-based telecommunications system that converses with patients in their homes, patients contacted weekly. Provides advice concerning their blood pressure, understanding of BP lowering medication, adherence to medication, symptoms that might relate to side effects of therapy. Information directed to patient's physician (2) Usual care
Outcomes	(1) Adherence to medication- improved by 18% (E) vs 12% (C), p=0.03. (2) Mean change in SBP/DBP- no difference for SBP, (E) 158.5mmHg versus (C) 156.4mmHg, p=0.2; significant difference for DBP, (E) 80.9mmHg versus (C) 83.2mmHg, p=0.02; (3) Cost effectiveness- most cost effective for non-adherent patients Duration of FU 6 months.
Notes	Cost effectiveness measured all computer and telecommunication costs, facilities charges, supplies and support personnel for start-up and maintenance of the system. Cost effectiveness ratios were computed for medication adherence improvement and DBP decrease using regression analysis

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Garcia-Pena 2001

Methods	Parallel, individuals, elderly (60) age-stratified sample recruited from 12 family medical centres, Mexico city, Mexico
Participants	Hypertension, mean SBP 160 or/both DBP 90 in untreated patients or treated hypertension patients Mean BP level 161.9/90.8 (C) 162.1/90.9 (E) average age 70.6 years
Interventions	(1) Nurse-based intervention Nurses trained in aging and clinical aspects of hypertension including: "Personal interviews "Health behaviour change models "Process of negotiation "Ethical aspects of home visits On each visit nurse did the following: "Measured BP "Discussed baseline health check and discussed lifestyle changes "Guided patients in healthier lifestyle and negotiated specific targets "Revised pharmacological treatment "Adherence encouraged Frequency of visits 2-4 weeks (2) Usual care from institute's clinic and mailed pamphlet about hypertension
Outcomes	(1) Blood pressure- mean change SBP 3.31 mmHg p=0.03, mean change DBP 3.67mmHg p<0.001 (2) Weight -1.1 kg significantly reduced

Garcia-Pena 2001 *(Continued)*

	(3) Sodium excretion -5.8 ns (4) Control BP <160/90mmHg improved 36.5% (E) versus 6.8% (C) (5) Exercise- slow walking exercise increased (E) 9.1% versus decreased (C) 0.7% (6) Not taking antihypertensive drugs (E) 15.9% versus (C) 26.9% (7) Antihypertensive drug usage- increased in (E) change from baseline12.5% versus (C) 5.3%, difference 7.2% p=0.02 Duration of FU 6 months
Notes	Well conducted RCT. Nurse intervention aimed at both pharmacological and non-pharmacological management of hypertension. Had positive effect on mean SBP/DBP and BP control with increases in number taking antihypertensive medications. Non pharmacological treatment also effective at reducing weight, increasing exercise with non significant reduction in sodium excretion

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Gullion 1987

Methods	Factorial RCT, randomised by physician (n=111), analysed by patient (n=2583), San Francisco USA. Average of 23 patients per practice
Participants	Hypertensive patients using anti-hypertensive medication, had a DBP >90mmHg at some stage of their care. Age range 20-80 years
Interventions	(1) Medical education- "Individualised feedback on medical record information, detailed peer-review "Syllabus material "Educational session by means of telephone call with faculty expert discussing feedback reports and syllabus materials. (2) Behavioural education- "Individualised feedback on patient survey summaries, detailed peer-review "Syllabus material "Educational session, telephone call with faculty expert discussing feedback reports and syllabus materials (3) Both interventions (4) Neither intervention
Outcomes	(1) DBP- no difference between four groups either for mean DBP (85.17, 85.59, 85.16, 85.79 mmHg respectively) or for % with controlled DBP (68.65%, 66.78%, 67.93%, 68.25% respectively) at follow up. (2) Lifestyle outcomes- no difference apart from decreased BMI in behavioural group. (3) Health promotion advice given- more likely to be given advice re: medication regimen, side effects of drugs, sodium intake in behavioural group. Duration of FU 1 year
Notes	Negative RCT with regard to primary outcome of DBP. Caution required with interpretation of lifestyle and health promotion outcomes. Multiple comparisons. DBP reported but not usable because no baseline numbers randomised reported or standard deviations

Risk of bias

Gullion 1987 *(Continued)*

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Halme 2005

Methods	Multicenter, randomized, parallel-group study in 55 primary care health centres in Finland.
Participants	269 patients randomised and 232 analysed: (119 C and 113 E). Persons were eligible if had been diagnosed with hypertension (i.e., mean BP of 140/90 or higher measured twice each time at 4 consecutive occasions), consent, aged between 20-75 years of age,and were excluded with obesity, secondary or malignant hypertension, A fib or flutter.
Interventions	Intermittent self-monitoring of BP. Home BP was measured in the self-monitoring (SM) group at 0, 2, 4, and 6 months, and in the control (C) group at 0 and 6 months.
Outcomes	SBP, DBP and % controlled, Duration:6 months
Notes	"Home" results only used in analysis as by definition self-monitoring takes place outside office.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	B - Unclear

Hamilton 1993

Methods	Parallel, individuals based in hypertension clinic in tertiary care teaching medical centre, US
Participants	Thirty four treated hypertensives DBP 90mmHg and/or SBP 160 mmHg, participating in therapeutic hypertension regimen. Mean age 54 years, white, married, high school educated.
Interventions	(1) Postcard reminder one week before the next regularly scheduled appointment, a 30 to 40 min intervention with the nurse practitioner before the appointment with the physician (including tailored care plan, information on hypertension, discussion of risk factors, max. 45 min total time), follow up phone call one month after the intervention to evaluate the negotiated plan of care. (2) Usual care- no self recording
Outcomes	(1) SBP/DBP- improved SBP difference -17.3 mmHg, not DBP -4.7 mmHg, (p=0.03 and 0.22 respectively) (2) Compliance (self report)- no difference, adherence score of 27.5 in intervention group vs 24.5 in control group (p=0.12) (3) Mean number of appointments kept- improved 97% (E) v 74% (C) (p=0.04) (4) Physician rated patient adherence- improved (E), adherence score of 29.18in intervention group vs 23.92 in control group (p=0.005) Duration of FU 6 months
Notes	SBP improved, mean number of appointments kept improved in (E) group, adherence no difference on self-report Small RCT

Hamilton 1993 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Hawkins 1979

Methods	Parallel Individuals
Participants	Medical OPD clinic, San Antonio, US, patients fu for hypertension (42% E) (49% C) and diabetes or both (28% E) (21% C), mean age 61 (E) 60 (C), >90% Mexican Americans, (female 76% E, 78% C)
Interventions	(1) Clinical pharmacist- chronic disease management in OPD setting (medical care monitored by family practice faculty) (2) Usual care by physician
Outcomes	(1) Kept-clinic appointments (2) Compliance with medication (prescription record)- improved diuretic only: 60.5% adherent (E) vs 52.9% (C) (p<0.7), diuretic plus methyldopa: 84.6 % (E) vs 65.4% (C) (p=0.2) (3) Kept OPD appointments- 83.3% (E) vs 73.8% (C) (p<0.0005) (4) Frequency of clinic visit- 6.69 (E) vs 5.38 (C) (p=<0.001) (4) Mean SBP (E) 147mmHg versus 141 (C); p<0.01. Mean DBP 84mHg (E) versus 84mHg (C) non significant. Duration FU 24-29 months
Notes	Improved for pharmacist led care(E) for: (1) Kept OPD appointments (2) Frequency of OPD appointments (3) Mean SBP between group comparison- improved in (E) group but worse for DBP

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Haynes 1976

Methods	Parallel Individuals
Participants	Hypertensive males (n=39), not compliant (pill counts <80%) or at goal DBP (90mmHg) after 6 months (previously enrolled in a separate RCT, see Sackett 1975)
Interventions	(1) Patient self monitoring and education, includes: "Home self-measurement of BP "Home BP and medication charting "Tailoring- patients interviewed to improved medication taking "Increased supervision and reinforcement- fortnightly review including positive re-enforcement. All interventions supervised and executed by non health professional programme coordinator

Haynes 1976 *(Continued)*

	(2) Usual care
Outcomes	(1) Compliance- increased in experimental group (E) 65.8 versus (C) 43.2, p=0.025 (2) Control of DBP- increased in experimental group, (E) 93.1mmHg versus (C) 96.4mmHg, p=0.12 (3) Combined compliance and DBP targets- increased in experimental group Duration of FU 1 year.
Notes	(1) No data given- change in DBP and compliance reported (2) Experimental group patients received significantly more attention than control patients (5 hours over 6 months) (3) Physicians treating experimental patients prescribed more vigorously

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Hennessy 2006

Methods	Cluster factorial randomized trial. SETTING: Academic health system using an ambulatory electronic medical record.
Participants	A total of 10,696 patients with a diagnosis of hypertension cared for by 93 primary care providers. Randomised by provider (n=93), analysed by patient (n=7159).
Interventions	Academic detailing, provision of provider-specific data about hypertension control, provision of educational materials to the provider, and provision of educational and motivational materials to patients.
Outcomes	The primary outcome was blood pressure control, defined as a blood pressure measurement below 140/90 mm Hg, and was ascertained from electronic medical records over 6 months of follow-up.
Notes	This trial is factorial involving education of provider and patient. absolute data only for BP and control data entered

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Hetlevik 1998

Methods	Cluster (29 health centres, 53 family practitioners), analysed by patient (2239 patients). Two regions in Norway.
Participants	Hypertensive patients (baseline BP level given), mean age 64 years, 57% female.
Interventions	(1) Computer based decision support system (CDSS). Doctors and assistants trained and received a user manual. Re-enforcement by means of telephone repetitions seminar on risk intervention and further demonstration of CDSS. (2) Usual care

Hetlevik 1998 *(Continued)*

Outcomes	(1) SBP/DBP- SBP no difference (E) 156.8mmHg versus (C) 155.6mmHg NS, DBP (E) 88.8mmHg versus 89.8mmHg, p<0.05 (2) Cholesterol (3) % smokers (4) BMI (5) Coronary heart disease risk score. All other outcomes no different between groups (6) Recording of risk factor data- improved slightly in (E) group for cholesterol and family history. Duration of FU 24 months.
Notes	Only 104 (11%) patients had CDSS used on them during trial period.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Hetlevik 1999

Methods	Cluster (29 health centres, 53 family practitioners), analysed by patient (2239 patients). Two regions in Norway.
Participants	Hypertensive patients (baseline BP level given), mean age 64 years, 57% female.
Interventions	(1) Computer based decision support system (CDSS). Doctors and assistants trained and received a user manuel. Re-enforcement by means of telephone repetitions seminar on risk intervention and further demonstration of CDSS. (2) Usual care
Outcomes	(1) SBP/DBP- SBP (E) 156.8mmHg versus (C) 155.6mmHg NS, DBP (E) 88.8mmHg versus 89.8mmHg, p<0.05 (2) Cholesterol (3) % smokers (4) BMI (5) Coronary heart disease risk score. All other outcomes no different between groups (6) Recording of risk factor data- improved slightly in (E) group for cholesterol and family history. Duration of FU 24 months.
Notes	Only 104 (11%) patients had CDSS used on them during trial period. No account for clustering reported in the analysis section

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Hunt 2004

Methods	Primary care practice-based research network in which 9 clinics located in Portland, Oregon
Participants	Patients with mildly uncontrolled hypertension as defined as a last blood pressure of 140 to 159/90 to 99 mmHg from query of an electronic medical record database. *5473 total randomised and 312 analysed (E 162 and C 150)*

Hunt 2004 *(Continued)*

Interventions	Patients randomized to intervention were mailed 2 educational packets approximately 3 months apart. The first mailer included a letter from each patient's primary care provider. The mailer included a booklet providing an overview of hypertension and lifestyle modification and a refrigerator magnet noting target blood pressure. The second mailing also included a letter from the patient's primary care provider, a second educational booklet focused on medication compliance and home blood pressure monitoring, and a blood pressure logbook. The control group consisted of similar patients receiving usual care for hypertension.
Outcomes	The primary outcome was blood pressure control, defined as a blood pressure measurement below 140/90 mm Hg, and was ascertained from electronic medical records over 6 months of follow-up. Also SBP and DBP as secondary outcomes. Patients from each group were randomly selected for invitation to participate in a study visit to measure blood pressure and complete a survey (intervention n= 162; control n= 150). No significant difference was found in mean blood pressure between intervention and control patients (135/77 mmHg vs 137/77 mmHg; P=.229). Patients in the intervention arm scored higher on a hypertension knowledge quiz (7.48 +/- 1.6 vs 7.06 +/- 1.6; P=.019), and reported higher satisfaction with several aspects of their care. No significant difference was seen in the prevalence of home blood pressure monitoring ownership or use.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Hypertension 1979

Methods	Patients identified at 14 "HDFP centres throughout the US (13 by residential area- census tract, probability sample of larger areas, entire housing projects or in one centre by employment roll of industries). Randomisation at the patient level after initial screening. Initially screened for DBP, 2 stage process: (1) All 158,096 screened (89% of all age-eligible patients), if average DBP was 95mmHg invited for second screen at clinic, regardless of whether taking BP lowering drugs or not. (2) If mean DBP 90mmHg, patient eligible and randomised. 10,940 agreed to randomisation Randomisation stratified according to entry DBP and HDFP centre: (1) Stratum i- 90-104 mmHg, n= 7,825 (71.5%) (2) Stratum ii- 105-114 mmHg, n=2,052 (18.8%) (3) Stratum iii- 115 mmHg, n=1,063 (9.7%) No SBP entry criteria and no upper limits of BP 11,386 persons randomised but 446 subsequently excluded due to randomisation error that occurred at one clinic
Participants	Inclusion criteria: (1) Men and women age 30 to 69 years (2) Average home screening DBP 95mmHg (3) Confirmed follow up DBP 90mmHg Exclusion criteria: (1) Terminally ill (2) Institutionalised 10,940 randomised, 54% male, 45% black Antihypertensive drugs taken at start of RCT: SC (26.3%), RC (25.7%)
Interventions	(1) Stepped care (SC), designed to provide rigorous, systematic, antihypertensive drug treatment by means of: "Free care- visits, drugs, investigations, transport "Emphasis placed on clinic attendance and compliance- pill counts used "Convenience- low waiting times, parmedical personnel, physician on call "Stepped drug treatment according to BP response "Patients seen at intervals determined by their clinical status, at least every 4 months, and generally every 2 months (2) Referred care (RC): referred to their "primary sources of care, usually own physicians.

Hypertension 1979 *(Continued)*

	All SC (E) and RC (C) participants seen at home at years 1, 2, 4 and 5 for health history and BP measurement and at the clinic at years 2 and 5 for an examination. At each contact each RC participant was advised to visit a physician. If severe hypertension (DBP 115mmHg or end organ damage) special steps were taken to achieve contact with a physician.
Outcomes	(1) # (%) on antihypertensive medication- higher for SC 81.2%, compared to RC 64.2% by year 5. (2) SBP/DBP level- lower for SC (130/84mmHg) vs RC (140/89) at 5 year FU (3) % controlled blood pressure (HDFP goal)- improved SC versus RC. (4) All cause mortality- significantly better 350/5485 (6.38%) vs 421/5455 (7.78%) All outcomes apply across 3 strata of entry DBP. Most of BP reduction occurred by end of year 1 Duration FU 1 and 5 years (mortality)
Notes	Data reported in 3 strata of entry DBP At one year 84.4% (SC) versus 59.1% (RC) taking antihypertensive medication Step 1- 32.7% v 12.1% Step 2- 23.6% v 16% Step 3- 3.3% v 2.3% Step 4- 2% v 2% Total drug status known at 1 year, 82.4% SC v 82.8% RC Intensity of BP medication in SC at 5 years: 42% taking single drug- step 1, 27% taking two drugs- step 2, 9% taking 3 drugs- step 3, 11% taking 4 or more drugs, step 4and 5 at 5 years HDFP defined goal DBP as 90mmHg for those entering with DBP 100mmHg or receiving antihypertensive therapy and a 10mmHg decrease for those entering with DBP of 90-99mmHg. Mortality FU 5 years, mean BP data reported at 1 year and 5 years

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Hypertension 1979a

Methods	Patients identified at 14 "HDFP centres throughout the US (13 by residential area- census tract, probability sample of larger areas, entire housing projects or in one centre by employment roll of industries). Randomisation at the patient level after initial screening. Initially screened for DBP, 2 stage process: (1) All 158,096 screened (89% of all age-eligible patients), if average DBP was 95mmHg invited for second screen at clinic, regardless of whether taking BP lowering drugs or not. (2) If mean DBP 90mmHg, patient eligible and randomised. 10,940 agreed to randomisation Randomisation stratified according to entry DBP and HDFP centre: (1) Stratum i- 90-104 mmHg, n= 7,825 (71.5%) (2) Stratum ii- 105-114 mmHg, n=2,052 (18.8%) (3) Stratum iii- 115 mmHg, n=1,063 (9.7%) No SBP entry criteria and no upper limits of BP 11,386 persons randomised but 446 subsequently excluded due to randomisation error that occurred at one clinic
Participants	Inclusion criteria: (1) Men and women age 30 to 69 years (2) Average home screening DBP 95mmHg (3) Confirmed follow up DBP 90mmHg

Hypertension 1979a *(Continued)*

	Exclusion criteria: (1) Terminally ill (2) Institutionalised 10,940 randomised, 54% male, 45% black Antihypertensive drugs taken at start of RCT: SC (26.3%), RC (25.7%)
Interventions	(1) Stepped care (SC), designed to provide rigorous, systematic, antihypertensive drug treatment by means of: "Free care- visits, drugs, investigations, transport "Emphasis placed on clinic attendance and compliance- pill counts used "Convenience- low waiting times, parmedical personnel, physician on call "Stepped drug treatment according to BP response "Patients seen at intervals determined by their clinical status, at least every 4 months, and generally every 2 months (2) Referred care (RC): referred to their "primary sources of care, usually own physicians. All SC (E) and RC (C) participants seen at home at years 1, 2, 4 and 5 for health history and BP measurement and at the clinic at years 2 and 5 for an examination. At each contact each RC participant was advised to visit a physician. If severe hypertension (DBP 115mmHg or end organ damage) special steps were taken to achieve contact with a physician.
Outcomes	(1) # (%) on antihypertensive medication- higher for SC 81.2%, compared to RC 64.2% by year 5. (2) SBP/DBP level- lower for SC (130/84mmHg) vs RC (140/89) at 5 year FU (3) % controlled blood pressure (HDFP goal)- improved SC versus RC. (4) All cause mortality- significantly better 350/5485 (6.38%) vs 421/5455 (7.78%) All outcomes apply across 3 strata of entry DBP. Most of BP reduction occurred by end of year 1 Duration FU 1 and 5 years (mortality)
Notes	Data reported in 3 strata of entry DBP At one year 84.4% (SC) versus 59.1% (RC) taking antihypertensive medication Step 1- 32.7% v 12.1% Step 2- 23.6% v 16% Step 3- 3.3% v 2.3% Step 4- 2% v 2% Total drug status known at 1 year, 82.4% SC v 82.8% RC Intensity of BP medication in SC at 5 years: 42% taking single drug- step 1, 27% taking two drugs- step 2, 9% taking 3 drugs- step 3, 11% taking 4 or more drugs, step 4and 5 at 5 years HDFP defined goal DBP as 90mmHg for those entering with DBP 100mmHg or receiving antihypertensive therapy and a 10mmHg decrease for those entering with DBP of 90-99mmHg. Mortality FU 5 years, mean BP data reported at 1 year and 5 years

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Hypertension 1982

Methods	Patients identified at 14 "HDFP centres throughout the US (13 by residential area- census tract, probability sample of larger areas, entire housing projects or in one centre by employment roll of industries). Randomisation at the patient level after initial screening. Initially screened for DBP, 2 stage process: (1) All 158,096 screened (89% of all age-eligible patients), if average DBP was 95mmHg invited for second screen at clinic, regardless of whether taking BP lowering drugs or not. (2) If mean DBP 90mmHg, patient eligible and randomised. 10,940 agreed to randomisation Randomisation stratified according to entry DBP and HDFP centre: (1) Stratum i- 90-104 mmHg, n= 7,825 (71.5%) (2) Stratum ii- 105-114 mmHg, n=2,052 (18.8%) (3) Stratum iii- 115 mmHg, n=1,063 (9.7%) No SBP entry criteria and no upper limits of BP 11,386 persons randomised but 446 subsequently excluded due to randomisation error that occurred at one clinic
Participants	Inclusion criteria: (1) Men and women age 30 to 69 years (2) Average home screening DBP 95mmHg (3) Confirmed follow up DBP 90mmHg Exclusion criteria: (1) Terminally ill (2) Institutionalised 10,940 randomised, 54% male, 45% black Antihypertensive drugs taken at start of RCT: SC (26.3%), RC (25.7%)
Interventions	(1) Stepped care (SC), designed to provide rigorous, systematic, antihypertensive drug treatment by means of: "Free care- visits, drugs, investigations, transport "Emphasis placed on clinic attendance and compliance- pill counts used "Convenience- low waiting times, parmedical personnel, physician on call "Stepped drug treatment according to BP response "Patients seen at intervals determined by their clinical status, at least every 4 months, and generally every 2 months (2) Referred care (RC): referred to their "primary sources of care, usually own physicians. All SC (E) and RC (C) participants seen at home at years 1, 2, 4 and 5 for health history and BP measurement and at the clinic at years 2 and 5 for an examination. At each contact each RC participant was advised to visit a physician. If severe hypertension (DBP 115mmHg or end organ damage) special steps were taken to achieve contact with a physician.
Outcomes	(1) # (%) on antihypertensive medication- higher for SC 81.2%, compared to RC 64.2% by year 5. (2) SBP/DBP level- lower for SC (130/84mmHg) vs RC (140/89) at 5 year FU (3) % controlled blood pressure (HDFP goal)- improved SC versus RC. (4) All cause mortality- significantly better 350/5485 (6.38%) vs 421/5455 (7.78%) All outcomes apply across 3 strata of entry DBP. Most of BP reduction occurred by end of year 1 Duration FU 1 and 5 years (mortality)
Notes	Data reported in 3 strata of entry DBP At one year 84.4% (SC) versus 59.1% (RC) taking antihypertensive medication Step 1- 32.7% v 12.1% Step 2- 23.6% v 16% Step 3- 3.3% v 2.3% Step 4- 2% v 2% Total drug status known at 1 year, 82.4% SC v 82.8% RC

Hypertension 1982 *(Continued)*

	Intensity of BP medication in SC at 5 years: 42% taking single drug- step 1, 27% taking two drugs- step 2, 9% taking 3 drugs- step 3, 11% taking 4 or more drugs, step 4and 5 at 5 years HDFP defined goal DBP as 90mmHg for those entering with DBP 100mmHg or receiving antihypertensive therapy and a 10mmHg decrease for those entering with DBP of 90-99mmHg. Mortality FU 5 years, mean BP data reported at 1 year and 5 years

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Jewell 1988

Methods	Hypertensive patients in a single practice in the UK
Participants	Patients aged 30-64 years. Newly diagnosed: raised DBP >100mmHg aged 30-39, >105mmHg aged >40 Previously diagnosed: DBP >95mmHg on 3 measurements at a single visit
Interventions	(1) Nurse-led clinic. Agreed protocol determined treatment and frequency of attendance in both groups. Target was to reduce DBP <90mmHg, 15 minute consultation. Note: both nurse led and doctor led care was by means of identical protocol. (2) Usual care-general practitioner 10 minute consultation
Outcomes	(1) Mean SBP/DBP- between group difference in mean SBP -0.8mmHg (-8.7 to 24.7) NS, DBP - 0.4mmHg (-6.2 to 7) NS. (2) Proportion with DBP <90mmHg 10/15 (E- 67%) 12/19 (C- 63%) (3) Quality of data recording (better in nurse group for pulse, weight, urine testing) (4) Frequency of attendance (no difference, mean annual rates 5.7 (C) 6 (E) groups. (5) Knowledge of medication (no difference) (6) Reactions to the service (no difference) Duration FU 1 year
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Johnson 1978

Methods	Factorial RCT, randomised at individual level, stratified by age and sex.
Participants	Screenees from a Canadian shopping centre, n=140 (male 82), age 35-65 years

Johnson 1978 *(Continued)*

	All taking BP lowering medication for 1 year with uncontrolled hypertension (DBP 95mmHg)
Interventions	(1) Self recording- given BP recording device, take BP daily and take charts with BP records to their physician (2) Home visits- BP measured in their homes every 4 weeks with result given to them and physician. Both groups visited at home after 2 weeks (3) Both interventions (4) Neither intervention
Outcomes	(1) Changes in mean DBP- no difference (2) Changes in mean compliance- no difference. (3) Changes mean compliance in those with initial compliance <80%- no difference (4) Change mean DBP in those with initial problems remembering to take BP medication- subgroup effect in initially difficult to remember group (5) Change in strength in therapy- no difference Duration of FU 6 months
Notes	More "explanatory" RCT, follow on from Haynes. In contrast to positive findings in Haynes RCT, this RCT proved to be negative. Main difference in this RCT is that home visitors dealt with only measurement of BP, no attempts made to influence medication taking. No standardised treatment regimen or goal BP advocated to treating physicians

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Krieger 1999

Methods	Parallel, individuals in a single "low income" area of Seattle, USA
Participants	Hypertensive patients (entry SBP 140mmHg or DBP 90mmHg). 4761 had BP measured, 759 (15.9%) eligible, 421 (55.5%) participated. Overall, 40% taking BP lowering medication, 79% black, 66% below federal poverty level, 33% BP 160/100mmHg. All participants paid $25 for completing study
Interventions	(1) Outreach and tracking by community health worker. Provided: referral to medical care and assistance with finding a provider; ensure appointment with health worker; appointment reminder letter; follow up patient (up to 3 times) to see if appointment kept; new appointment if one missed (up to 3 times); assistance to reduce barriers to care including transport, child care or other services (2) Usual care
Outcomes	(1) Follow up appointment within 90 days- (E) 95/146 (65.1%) versus (C) 77/165 (46.7%). (2) SBP/DBP-improved SBP (E) 139.4mmHg versus (C) 141mmHg, DBP no difference (E) 84.6mmHg versus (C) 84.3mmHg Duration of FU 3 months.
Notes	Study designed to assess follow up within 30 days. Large differential loss to follow up (greater in intervention arm). Mean SBP/DBP data provided by authors of study No intention to treat analysis.

Risk of bias

Krieger 1999 *(Continued)*

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Levine 1979

Methods	Factorial trial with 8 groups of various combinations of the 3 interventions and control individuals at two hypertension clinics in US
Participants	91% black, median age 54 years, 70% female, low income ($45250 median yearly income). BP (mmHg) entry criteria based on age: 20-39: >140/90 40-59: >150/95 60: 160/100
Interventions	(1) Three interventions: "Exit interview- individualised 5-10 minute counselling session, explaining and re-inforcing instructions to the patient "Instructional session with adult at home concerning adherence and follow up care "Group sessions- three, one hour sessions led by social worker "Seven experimental groups and one control group (2) Usual care with none of above interventions
Outcomes	(1) Deviation in weight from ideal weight- significantly better in patients who received all 3 interventions compared to those who received none (2) Appointment keeping (ratio of kept/scheduled)- improved in group who received all 3 interventions versus control at 2 yrs (E) .68 versus (C) .63; no difference at 5 yrs (E) .95 versus (C) .83 (3) Adherence to drug therapy- all improved, greatest in 3 intervention arm versus control (53% vs 40%) (4) % patients with controlled BP - increased at 2 years (E) 52% versus (C) 42%; 5 years (E) 66% versus (C) 56%. Significantly better in four intervention groups compared to control at 5 years (5) All cause mortality- cumulative mortality better in all experimental groups combined (12.9) compared to control group (30.2) (6) Cost effectiveness- multiple interventions appear more effective, not necessarily more cost effective. Authors feel that may be better to use single interventions depending on setting and financial constraints{821} Duration of FU 2 and 5 years.
Notes	Multiple comparisons in results section: 7 intervention arms and one control group In addition no a priori sub-group analysis Blood pressure control age-specific categories <40 <140/90, 40-59 <150/95 60, <160/100 Substantially greater numbers lost to follow up in (C) arm at 2 and 5 years

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Logan 1979

Methods	Parallel Individuals
Participants	Volunteers from business settings with newly diagnosed hypertension (DBP 95mmHg, or DBP 91-94mmHg and SBP >140mmHg)
Interventions	(1) Work-site care- nurse management according to a standard protocol- including drug regimen and regular review, once monthly if BP not controlled (2) Usual care from their own family physicians
Outcomes	(1) # patients taking BP treatment- increased in Experimental group (177/206, 86% vs 108/204, 53%) (2) Mean DBP- improved in (E) 94.3mmHg versus (C) 90.3mmHg, p<0.01. (3) Reach goal DBP- 50% (E) versus 28.9% (C). (4) Compliance-better in experimental group (67.6% vs 49.1%) Duration of FU 6 months
Notes	Goal DBP <90mmHg if entry DBP >95mmHg; or <6mmHg in those with entry DBP 95mmHg or less.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Marquez 2004

Methods	Comparative, controlled, multicenter, randomized cluster study.
Participants	SETTING: 26 primary care health centers in Spain. PARTICIPANTS: 26 researchers were randomized to a control group or an intervention group (52 patients each, for a total of 104 patients). All patients were receiving monotherapy for uncontrolled hypertension. 104 total eligible patients 52 IG and 52 CG Analyzed 33 CG and 34 IG
Interventions	Patients in the control group received their physician's usual interventions. Patients in the intervention group received messages and reminders sent to their mobile phones 2 days per week during 4 months.
Outcomes	Tablets were counted and blood pressure was measured at the start of the study and 1, 3, and 6 months later. The percentage of compliers, mean percentage of compliance and degree of control of hypertension were compared. The reduction in absolute and relative risk was calculated, as was the number of individuals needed to treat to avoid noncompliance.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Martinez-Amenos 1990

Methods	Parallel Individuals
Participants	Hypertension Registry from 19 primary care centres in Spain. Mean age 61 years, 59% female Initial volunteers asked if they wished to participate; those agreeing were randomised and labelled "motivated" group; group who declined to participate also followed up "non motivated"
Interventions	(1) Individual education- comments and explanations to errors encountered in answers to baseline knowledge questionnaire (2) Team education- 2 talks given by nurses or doctors with AV material to 8-12 patients (3) Control group
Outcomes	(1) Proportion of patients in each group with uncontrolled hypertension (SBP <160, DBP <95mmHg)- within group increase reported for both intervention arms, individual 50.4% to 60.9%, team, 55.8% to 68.8%, non significant within group change in control group, 54.4% to 58.9% (2) Patient knowledge- no between group difference, individual 19.79, Team 20.58, control 19.78 Duration of FU: 2 months
Notes	Knowledge increased within all 3 groups over time, between group comparison not statistically tested No baseline numbers per arm of study reported % control BP not included in meta-analysis as no denominator data available at start of RCT

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

McAlister 1986

Methods	Cluster (60 doctors initially, 10 dropped out), parallel, Toronto Canada
Participants	N=50 general practitioners, 1241 (E) 990 (C), hypertensive patients with one of the following: (1) DBP >90 mmHg on treatment (2) DBP >104 mmHg not on treatment (3) DBP >90 or <105 mmHg unless evidence of complications or risk factors (4) Newly detected patients with "high blood pressure" detected during the trial
Interventions	(1) Computer generated feedback to physician: "Cumulative chart of patient's DBP "Inter and Intra practice DBP ranking "Commentary on treatment by GP according to a "stepped care" approach (2) Control group filled out same forms but no feedback given
Outcomes	1)Workload: GPs in experimental group saw more patients (2) Mean score on length of follow up: better in intervention 199.3 days (E) vs 167days (C) (3) Drop outs: 37.5% (E) vs 42.1% (C) (4) In all patients DBP reading in those with initial DBP > 104mmHg: 88.5mmHg (E) vs 93.3mmHg (C), net DBP change 0.8mmHg P <0.1 (5) % patients with controlled DBP (90mmHg)- 88.9% (E) versus 87.5% (C) NS (6) # days with sustained DBP control 323 (E) vs 259(C) (7) # times visited GP: 13.3 (E) vs (17.4)

McAlister 1986 *(Continued)*

	Duration 16 months
Notes	Multiple outcomes reported, some favourable for experimental arm- saw more patients who were less likely to drop out of care. Doesn't appear to have had an impact on overall DBP control but other measures of BP control favoured intervention group such as number of days with sustained DBP control. This was achieved with fewer visits in the intervention group

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

McKinstry 2006

Methods	Parallel, single blind, Single urban general practice over 1 year in the UK.
Participants	Patient-held guideline with written explicit exhortation to challenge care when appropriate. Two hundred and ninety-four of 536 eligible patients on the practice hypertension register were recruited, all of whom were randomised into one of two groups. Two hundred and thirty-six patients completed the study. *All >18 years with one SBD >150 were invited to take part. No exclusions*
Interventions	Primary outcome: average systolic blood pressure. Secondary outcomes: proportion of patients with blood pressure < 150 mmHg systolic and < 90 mmHg diastolic, average cholesterol, proportion of patients prescribed statins and aspirin according to guideline, hospital anxiety and depression score
Outcomes	Primary outcome: average systolic blood pressure. Secondary outcomes: proportion of patients with blood pressure < 150 mmHg systolic and < 90 mmHg diastolic, average cholesterol, proportion of patients prescribed statins and aspirin according to guideline, hospital anxiety and depression score. No clinically, or statistically significant differences were found between intervention and control with respect to all parameters or in anxiety and depression levels. Statin and aspirin use improved throughout the course of the study in both groups. Statin use showed a trend (P = 0.02) in favour of control. 12/12 follow up
Notes	Only absolute values for BP measure, control data entered

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

McManus 2005

Methods	Parallel, in eight general practices in south Birmingham
Participants	441 people receiving treatment in primary care for hypertension but not controlled below the target of < 140/85 mm Hg.
Interventions	Patients in the intervention group received treatment targets along with facilities to measure their own blood pressure at their general practice; they were also asked to visit their general practitioner or prac-

McManus 2005 *(Continued)*

	tice nurse if their blood pressure was repeatedly above the target level. Patients in the control group received usual care (blood pressure monitoring by their practice).
Outcomes	Primary outcome: change in systolic blood pressure at six months and one year in both intervention and control groups. Secondary outcomes: change in health behaviours, anxiety, prescribed antihypertensive drugs, patients' preferences of method of blood pressure monitoring, and costs. 400 (91%) patients attended follow up at one year. Systolic blood pressure in the intervention group had significantly reduced after six months (mean difference 4.3 mm Hg (95% confidence interval 0.8 mm Hg to 7.9 mm Hg)) but not after one year (mean difference 2.7 mm Hg (- 1.2 mm Hg to 6.6 mm Hg)). No overall difference was found in diastolic blood pressure, anxiety, health behaviours, or number of prescribed drugs. Patients who self monitored lost more weight than controls (as evidenced by a drop in body mass index), rated self monitoring above monitoring by a doctor or nurse, and consulted less often. Overall, self monitoring did not cost significantly more than usual care (251 pounds sterling (437 dollars; 364 euros) (95% confidence interval 233 pounds sterling to 275 pounds sterling) versus 240 pounds sterling (217 pounds sterling to 263 pounds sterling). 12 months follow up
Notes	Well desgined study carried out in primary care.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Mehos 2000

Methods	Parallel, individuals in a single family medicine clinic, US
Participants	41 uncontrolled hypertensives, SBP 140-179mmHg and/or DBP 90-109mmHg, currently on treatment, mean age 59 years, 70% women
Interventions	(1) Home blood pressure monitoring, diary and instruction to measure blood pressure, information on hypertension and risk factors, subsequent evaluation by clinical pharmacist (2) Usual care
Outcomes	(1) SBP, DBP and mean BP- all reduced in (E) group, SBP (E) 140.8mmHg versus (C) 146.9mmHg (p=0.069), DBP (E) 80.6mmHg versus (C) 85.6mmHg (p=0.02), (2) Compliance (self report)- mean adherence 82% (E) vs 89% (C) (p=0.29) (3) Drug alteration (dosage increase, addition or switch)- 83% (E) vs 33% (C) (p=0.29) (4) Quality of life (SF36)- no difference between groups Duration of FU 6 months
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Midanik 1991

Methods	Parallel, individuals, from a single foundation health plan in California, US.
Participants	204 untreated hypertensive patients with "mild" hypertension- SBP <180mmHg and DBP 90-99mmHg
Interventions	(1) Self monitoring- patients trained to take two consecutive readings twice a week. Sent in readings every 4 weeks for one year (2) Usual care
Outcomes	(1) Blood pressure- mean change SBP -1 mmHg, mean change DBP -1 mmHg (E) versus mean change SBP +1 mmHg, mean change DBP -1 mmHg Duration of FU 1 year
Notes	Untreated subjects with 18% of (E) and 17% of (C) patients taking antihypertensive medication at the end of the RCT

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Montgomery 2000

Methods	27 general practice in UK, Cluster RCT, patients on register
Participants	Hypertensive patients aged 60-80 taking BP lowering drugs. Randomly selected from practice register
Interventions	(1) Computer based decision support system (CDSS) (2) Risk chart Both interventions provided health professional (general practitioner or practice nurse) with explicit cardiovascular risk. Based on New Zealand hypertension guidelines. (3) Usual care
Outcomes	(1) Cardiovascular risk- no change in CVD risk between 3 groups (2) SBP/DBP- adjusted analysis, chart group had better mean SBP reading than usual care (difference 4.6mmHg) (3) Proportion of patients with controlled hypertension (<160/90)- no difference between two intervention groups chart 39.7%, CDSS 47.5% and control 40.7% (4) Medication change- intensity of BP medication prescribing greater in chart group compared to usual care Duration of FU 1 year
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Morisky 1983

Methods	Factorial trial with 8 groups of various combinations of the 3 interventions and control individuals at two hypertension clinics in US
Participants	91% black, median age 54 years, 70% female, low income ($45250 median yearly income). BP (mmHg) entry criteria based on age: 20-39: >140/90 40-59: >150/95 60: 160/100
Interventions	(1) Three interventions: "Exit interview- individualised 5-10 minute counselling session, explaining and re-inforcing instructions to the patient "Instructional session with adult at home concerning adherence and follow up care "Group sessions- three, one hour sessions led by social worker "Seven experimental groups and one control group (2) Usual care with none of above interventions
Outcomes	(1) Deviation in weight from ideal weight- significantly better in patients who received all 3 interventions compared to those who received none (2) Appointment keeping (ratio of kept/scheduled)- improved in group who received all 3 interventions versus control at 2 yrs (E) .68 versus (C) .63; no difference at 5 yrs (E) .95 versus (C) .83 (3) Adherence to drug therapy- all improved, greatest in 3 intervention arm versus control (53% vs 40%) (4) % patients with controlled BP - increased at 2 years (E) 52% versus (C) 42%; 5 years (E) 66% versus (C) 56%. Significantly better in four intervention groups compared to control at 5 years (5) All cause mortality- cumulative mortality better in all experimental groups combined (12.9) compared to control group (30.2) (6) Cost effectiveness- multiple interventions appear more effective, not necessarily more cost effective. Authors feel that may be better to use single interventions depending on setting and financial constraints{821} Duration of FU 2 and 5 years.
Notes	Multiple comparisons in results section: 7 intervention arms and one control group In addition no a priori sub-group analysis Blood pressure control age-specific categories <40 <140/90, 40-59 <150/95 60, <160/100 Substantially greater numbers lost to follow up in (C) arm at 2 and 5 years

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Muhlhauser 1993

Methods	10 general practices Germany, 20 hypertensive patients randomly selected (age 30-60 years)
Participants	Hypertension (mean last 2 measurements 160 and/or 95). Taking BP medication (E 77%, C 86%)
Interventions	(1) Hypertension treatment and teaching programme (HTTP) consisted of: "Four consecutive meetings lasting 60-90 mins in groups of 4-6.

Muhlhauser 1993 *(Continued)*

	"Provided by physician assistants "Responsibility including BP self monitoring "Confirming diagnosis and treatment by using home BP measurements "Emphasis on non-pharmacological treatment Doctors (8 hours) and assistants (20 hours) in intervention practices attended preparatory course but RCT aimed principally at patients (2) Usual care
Outcomes	(1) Change in SBP/DBP- significantly improved at follow up, difference SBP 5mmHg, DBP 4mmHg (2) Proportion of patients with controlled hypertension (<140/90)- no difference (E) 14% versus 15% (C) (3) # BP drugs taken Duration of FU 18 months
Notes	(1) Only 46 (46%) in intervention group received intervention (2) Cluster RCT not accounted for design or analysis. (3) Well conducted RCT but differential losses to FU (4) Less people in intervention group taking BP medication at end of RCT (mean # (E)- 1.2, (C) 1.8)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

New 2004

Methods	Cluster RCT General practices
Participants	44 general practices, Salford, UK, 10303 participants
Interventions	(1) Educational outreach: specialist nurses arranged a schedule of visits with general practitioners and practice nurses, reminding them of protocols and clinical targets; provided educational material and protocols used in secondary care for nurse and doctor interventions including stepping up pharma-cotherapy when necessary. (2) usual care
Outcomes	(1) Proportion of participants reaching blood pressure target/OR: no difference between groups OR 1.01 (95% CI 0.8 to 1.3, p=0.93).
Notes	Study funded by pharmaceutical company.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Ornstein 2004

Methods	Cluster RCT, 20 community-based family or general internal medicine practices in 14 US states. 44 physicians, 17 "midlevel" providers and approximately 200 staff members

Ornstein 2004 *(Continued)*

Participants	Of 87,291 patients from 20 practices, 7772 (8.9%) with hypertension. At baseline 40% (E) and 43.7% (C) had "controlled" blood pressure (<140/90). 21 study indicators included: -Hypertension (5) including most recent BP measurement <140/90 for patients with a diagnosis of hypertension -Hyperlipidemia (2) -Coronary heart disease (6) "Heart failure (1) -Atrial fibrillation (1) -Diabetes (6)
Interventions	(1) Multi-method quality improvement (QI)- -Practice site visits (6-7, 1-2 day site visits in a two year period) involving physicians and pharmacist with expertise in academic detailing. Healthcare providers encouraged to use (QI) tools -Two-day network meetings in each study year. Initial meeting directed at lead clinician with "best practice" presentations made by participating clinicians who were performing well. Clinical and administrative staff attended second meeting (2) Usual care- received copies of practice guidelines and quarterly performance reports
Outcomes	(1) Control BP <140/90mmHg improved 58.4% (E) versus 51.9% (C), adjusted difference 8.0 (0.0 to 16.0), p=0.047 Duration of FU 2 years
Notes	General multi-method across 6 conditions and 21 quality indicators. Overall intervention practices improved 22.4 percentage points in terms of indicators at or above target, compared to 16.4 in control practices, difference 6.0 percentage points (p>0.2). Patients in intervention practices had greater improvements than control practices for diagnosis of hypertension and blood pressure control

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Park 1996

Methods	Parallel, individuals two pharmacies, US
Participants	Taking BP lowering treatment or had BP 140/90 mmHg. mainly white treated hypertensives, 50% women, mean age 60 years
Interventions	(1) Pharmacist administered monthly patient management including education, medication changes, verbal counselling and written information on hypertension and risk factors (2) Traditional pharmacy services
Outcomes	(1) SBP/DBP- improved SBP (E) 143.2mmHg versus (C) 148.6mmHg, DBP (E) 83.2mmHg versus (C) 83.7mmHg, no between group p values reported (2) Control of blood pressure (<140/90 mmHg)- improved 52.2% (E) vs 17.4% (C), p<0.02 (3) Compliance (pill counts, unaware)- mean adherence 86.8% (E) vs 89.1% (C) no p value reported (4) Self reported quality of life- in general higher in (E) vs (C) group (5) Time spent with patient- higher in (E) group, particularly at first visit Duration of FU 4 months

Park 1996 *(Continued)*

Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Pierce 1984

Methods	Factorial, individuals, single general practice clinic, Western Australia
Participants	Uncontrolled hypertensives (SBP 160 and/or DBP 95) taking BP medication, mean age 57 years, 60% women,
Interventions	(1) Self monitoring of blood pressure: 30 min briefing, monthly recording chart (2) Health education programme promoting a healthy cardiovascular lifestyle: four meetings, 90 min duration, max 12 participants, encouraged to make action goals, information (risk factors for heart disease, stress, diet) (3) Both interventions (4) Usual care
Outcomes	(1) Blood pressure control- Education: 83% (E) vs 67% (C) ($p<0.05$, effect size unclear) $p<0.05$ Monitoring: 74% (E) vs 78% (C) NS (2) Compliance (pill count, self report)- No significant difference between groups: Education: 27% good adherers versus 24% in control group. Monitoring: 30% Both interventions: 26% (3) Patient Knowledge- no difference Duration of FU 12 months
Notes	Health education appears more beneficial in controlled blood pressure than self monitoring. Blood pressure reduction, target blood pressure level not defined

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Robson 1989

Methods	Parallel, individuals based in a single family practice in UK
Participants	Patients registered in the practice. Age 30-64. Also concerned with recording and follow up of other cardiovascular risk factor data and cervical screening follow up
Interventions	(1) Recording and follow up of blood pressure and other cardiovascular risk factors with practice nurse or general practitioner aided by computer (2) Usual general practitioners follow up
Outcomes	(1) Blood pressure recording in all patients- increased 1511/1620 (E- 93%) 1160/1586 (C- 73%) (2) Blood pressure recording in hypertensive patients- increased 104/107 (E- 97%) 90/116 (C- 69%)

Robson 1989 *(Continued)*

	(3) Other cardiovascular risk factors- all increased recording in intervention group, smoking, family history and cholesterol Duration of FU 2 years
Notes	Improved recording of blood pressure and other cardiovascular risk factors

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Roca-Cusachs 1991

Methods	Parallel, individual in a hypertension clinic, Spain
Participants	Newly diagnosed hypertensive patients (excluded age >70, illiterate and "high probability of non attendance") Entry SBP/DBP noted but no threshold required for eligibility. Mean values were: (E) 156.3/95.8 (C) 160.3/96.1
Interventions	(1)Patient education- "Booklet at initial entry into study "Two educational talks. First educational talk given by pharmacist and doctor, covered information about hypertension, treatment adherence and appointments; second educational talk given by dieticians covered non-pharmacological treatments. "Personal tutorial meeting one month later- solve problems, clarify misunderstandings and re-enforce knowledge. (2) Usual care
Outcomes	(1) Weight- no difference (2) Mean SBP/DBP- no difference (3) Withdrawals- 39% (E) vs 26% (C) significant difference (4) Knowledge questionnaire- improved knowledge in (E) group (5) Number of BP pills taken- no difference (6) Biochemical markers- no difference Duration of FU 6 months
Notes	(1) Knowledge improved, other outcomes no difference, withdrawal from the programme greater in the (E) 39% versus (C) 25% (2) Large proportion of (E) failed to attend an educational session, 83/138 (60%). (3) Sub-group analysis showed that 55/138 (40%) who attended one or more educational session did not have a different outcome in terms of all outcome measures at follow up, including SBP/DBP than those in intervention group who failed to attend sessions 83/138 (60%), except that those who attended had significantly higher probability of not withdrawing overall 3.6% vs 63%.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Rogers 2001

Methods	Medical outpatients department, patients covered by insurance under care of 5 internists, New York state, US.
Participants	Previous diagnosis of hypertension but were being considered for change in BP medication because: (1) SBP 140 or DBP 90 despite current antihypertensive therapy (2) Side effects from drugs (3) SBP >180 or DBP >110 without current antihypertensive therapy
Interventions	(1) Telecommunication service with 3 components: "Automated BP at home with no self report "Central processing of BP readings "Weekly reports to both physician and patient. When physicians received report forms that indicated increased blood pressure they adjusted BP medication via telephone call, office visit or both. Readings minimum of 3 days each week for minimum 8 weeks (2) Usual care
Outcomes	(1) Mean change in arterial blood pressure- improved -2.8mmHg (E) versus +1.3 (C) p=0.013 (2) Mean change in systolic blood pressure- improved -4.9mmHg (E) versus -0.1 (C) p=0.047 (3) Mean change in diastolic blood pressure- improved -2mmHg (E) versus +2.1 (C) p=0.012 Median duration of FU 11 weeks
Notes	Change in mean arterial BP primary outcome via 24 hr ambulatory reading Change in BP medication related to change in mean arterial BP and was more common in intervention group, 33% (E) versus 7% (C) group. No change in median number of office visits Difference in median length of FU (longer in intervention group, 79 vs 72 days) Satisfaction with care same in both groups

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Rudd 2004

Methods	Parallel RCT, two medical clinics
Participants	Hypertension- SBP ?140 mmHg or DBP ?90mmHg in previous six months or history of drug treatment. Drug therapy for patients with 150 mmHg or DBP 95 mmHg.
Interventions	(1) Self measurement with nurse management based on algorithm. Twice daily measurement, after 14 measurements mailed to nurse care manager who used this BP data to give management. Additional interventions included tips on enhancing drug adherence and recognition of possible side effects; printed materials; follow up calls at 1 week, 1, 2 and 4 months. Nurse contacted physicians to initiate new drugs not did not contact physicians when changing medication dosage. Increase in drug dose occurred when <80% measurements met criterion of 130/85mmHg. (1)
Outcomes	Usual care
Notes	(1) Blood pressure- mean change DBP -6.5 mmHg (E) versus mean change DBP 3.4 mmHg (C) (2) Increase in taking and intensification of antihypertensive drugs-22% (E) and 30% (C) patients taking antihypertensive medication, changed to 96% (E) and 78% (C). Significant increase in number taking ? drugs 70% (E) and 46% (C). (3) Improved adherence to mediation-80.5% (E) versus 69.2% (C) Duration of FU 6 months

Rudd 2004 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Sackett 1975

Methods	Factorial RCT Steel mill employees in Canada
Participants	Hypertension 95mmHg on repeated measurement. Not currently treated. n=230.
Interventions	(1) Augmented convenience (AC) Saw on-site physicians during working hours and on full pay versus usual care of seeing their own GP (2) Mastery learning (ML) Educational programme designed to give them the facts about hypertension, including compliance advice and reminders about pill-taking. Information supplied in audio-casette and booklet. Mastery learning re-emphasised by a "patient educator" (3) Both intervention (4) Usual care
Outcomes	(1) Number men placed on BP medication increased in both groups AC (87/114, 76% vs 57/116, 49%) ML (80/115, 70% vs 64/115, 56%) (2) Compliance- no difference AC (47/87, 54% vs 29/57, 51%) ML (40/80, 50% vs 36/64, 56%) (3) Compliance and at goal BP (<90mmHg)- no difference AC (20/87, 23% vs 11/57, 19%) ML (19/80, 24% vs 12/64, 19%) Duration of FU 6 months
Notes	Knowledge improved significantly in the Mastery learning group (85% vs 18%). Individual compliance rates bore no relationship to knowledge.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Sanders 2002

Methods	Cluster RCT, two of three primary care group practices, Virginia, US. 22 primary care physicians
Participants	Hypertension and diabetes, 30 years of older, on medication for both conditions, blood pressure "greater than normal" on an index visit.
Interventions	(1) Chart reminder- consisted on a bright cardstock consisting of information on the following: description of the problem; recommended target blood pressures, algorithm for suggested care (modified from US JNC VI guidelines). Participating physicians not reminded in any other way.

Sanders 2002 *(Continued)*

	(2) Usual care
Outcomes	(1) Blood pressure- mean SBP 148mmHg (E) versus 150.87, p=0.14, mean DBP 75.14mmHg (E) versus 77.21mmHg (C), p=0.16 (2) Medication change- 31% (E) versus 36% (C), p=0.51 Duration of FU "as soon as feasible after the chart reminder was placed and the clinic visit conducted.
Notes	Cluster RCT analysed at individual level

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Schroeder 2005

Methods	To evaluate the effect of nurse-led adherence support for people with uncontrolled high blood pressure compared with usual care.
Participants	245 women and men recruited with uncontrolled hypertension (> or = 150/90 mmHg) from 21 general practices in Bristol, UK. All patients with hypertension coded and latests SBP ?150 and/or DBP 90 in last 6 months
Interventions	Participants were randomized to receive nurse-led adherence support or usual care alone.
Outcomes	Main outcome measures were adherence to medication ('timing compliance') and blood pressure. *Duration:6 months*
Notes	absolute only

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Soghikian 1992

Methods	Parallel, 430 individuals in four medical centres, California, USA referred by 67 physicians
Participants	Hypertension but no entry BP level required or defined. DBP <90mmHg in 60% (C) 59% (E), 90-104mmHg 33% (C) 37% (E), 105mmHg 7% (C) 4% (E) patients. 82% (C) 88% (E) patients taking BP lowering medication. 14% had end organ damage of cardiovascular event during the year of the trial
Interventions	(1) Home blood pressure measurement- patients asked to measure BP twice weekly, mail record of BP, medications and side effects to project office every 4 weeks. Data compiled and sent to each patient's physician. Non compliant patients were contacted and urged to submit readings. (2) Usual care

Soghikian 1992 *(Continued)*

Outcomes	(1) Use of medical services- mean number hypertension related office visits 1.2 less in (E) group, telephone calls 0.8 more in (E) group, procedures per patient the same. (2) Cost of services- mean cost significantly lower $88.28 (E) vs $125.37 (C) (3) Blood pressure control lower in (E) group - mean SBP (E) 135.9mmHg versus (C) 142mmHg unadjusted difference-6.1mmHg NS; DBP (E) 86.2mmHg versus (C) 88mmHg, unadjusted difference -1.8mmHg. NS (4) Patient and physician satisfaction- high for (E) group Duration of FU 1 year
Notes	Costs lower in (E) group (29%) with a non significant trend in reduction of SBP/DBP.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Solomon 2002

Methods	Parallel, individuals from ten departments of Veterans Affairs medical centres and one academic medical centre, US
Participants	Treated hypertensive patients (dihydropyridine and/or diuretic therapy) (n=133), 64% caucasian, 28% black, 96% men, mean age 67 years,
Interventions	(1) Patient-centred pharmaceutical care model (employing standardised care) implemented by clinical pharmacy residents, scheduled visits at one-month intervals for a total of five visits (2) Usual care
Outcomes	(1) Blood pressure control- SBP improved (E) 138.5mmHg versus (C) 144.9mmHg ($p<0.05$), DBP (E) 80.2mmHg versus (C) 83.2mmHg NS (2) Compliance (pill count, self report)- better compliance scores (0.23 vs 0.61) in (E) group ($p<0.05$) (3) Mean number of hospitalisations/other health care provider visits- significantly higher in (C) group Duration of FU 6 months
Notes	Losses to follow up not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Sookaneknun 2004

Methods	Pre-test, post-test controlled group study.
Participants	Adults with hypertension from hospital and 2 primary care units
Interventions	Patients were monitored monthly by reviewing their medications and supported by providing pharmaceutical care and counseling.

Sookaneknun 2004 *(Continued)*

Outcomes	Systolic and Diastolic BP; % achieving targets
Notes	From a total of 235 patients, the treatment group (n = 118) had a significant reduction in both systolic (S) and diastolic (D) BP compared with the 117 patients of the control group (p = 0.037, 0.027, respectively). The 158 patients (76 treatment, 82 control) with BPs >or=140/90 mm Hg at the beginning of the study showed significant BP reductions (p = 0.002 SBP, 0.008 DBP). The proportion of 158 patients whose BP became stabilized was higher in the treatment group (p = 0.017).

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Takala 1979

Methods	Hypertensive patients identified through systematic screening of 1245 individuals. To be included had to have two BP readings, six months apart with high blood pressure on not on BP treatment
Participants	Hypertensive patients in Finland, n=147, aged 40-49, SBP 160mmHg or DBP 95mmHg; aged 50-64, SBP 170mmHg or DBP 105mmHg. Drug treatment started in 78/93 (84%) in intervention group and 86/100 (86%) in control group
Interventions	(1) "Improved treatment system" included: Written treatment instructions. Card with details of BP readings, drugs prescribed, time of next appointment. Appointments at one monthly intervals. Invitation for outpatient review; appointment if defaulted on any appointment. (2) Usual care
Outcomes	(1) "Dropping out" of system- failing to keep outpatient follow up appointment. Improved in (E) 3/100 versus (C) 16/102 (2) Control of SBP/DBP reported separately in two age groups (aged 50) (3) % patients in each group who attained BP goal, 31% (E) vs 17% (C) Duration of FU 1 and 2 years.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Takala 1983

Methods	Hypertensive patients identified through systematic screening of 1245 individuals. To be included had to have two BP readings, six months apart with high blood pressure on not on BP treatment
Participants	Hypertensive patients in Finland, aged 40-49, SBP 160mmHg or DBP 95mmHg; aged 50-64, SBP 170mmHg or DBP 105mmHg. Drug treatment started in 78/93 (84%) in intervention group and 86/100 (86%) in control group
Interventions	(1) "Improved treatment system" included: Written treatment instructions. Card with details of BP readings, drugs prescribed, time of next appointment. Appointments at one monthly intervals. Invitation for outpatient review; appointment if defaulted on any appointment. (2) Usual care

Takala 1983 *(Continued)*

Outcomes	(1) "Dropping out" of system- failing to keep outpatient follow up appointment. Improved in (E) 3/100 versus (C) 16/102 (2) Control of SBP/DBP reported separately in two age groups (aged 50) (3) % patients in each group who attained BP goal, 31% (E) vs 17% (C) Duration of FU 1 and 2 years.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Tanner 1981

Methods	Hypertensive patients attending in a single urban family practice. Both groups visit family practice every 2 weeks for 4 months- total 8 appointments.
Participants	Diagnosis of hypertension from computer search with DBP 90mmHg, age 18-65. 50 identified, 30 agreed to participate, 11 males. 14 black
Interventions	(1) Intervention group given "Guide to essential hypertension" content included: hypertension; medication; diet; stress; exercise; smoking; lifestyle; BP monitoring techniques. Encouraged to ask questions and discuss problems when they at practice visits. (2) Usual care
Outcomes	(1) Knowledge- baseline and follow up-within group comparison knowledge E-13.53 to 14.40 increase C- 13.26 to 13.26 no change. Between group score significantly better in E versus C group. (2) Control of DBP- no difference Duration of FU 4 months
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Tobe 2006

Methods	Hypertensive diabetic First Nations patients registered through community screening clinics, home care nurses, health aides randomized, prospective, open-label study with 2 parallel groups 693 patients were assessed for eligibility, Canada
Participants	Diagnosis of hypertension with SBP greater or equal to 130mmHg DBP greater or equal to 80mm Hg Diagnosis of type 2 diabetes mellitus 99 identified, 95 agreed to participate 48 intervention group, 47 control group

Tobe 2006 *(Continued)*

Interventions	(1) Medical clinic measurement of blood pressure by home care nurse using BpTRU automated oscillometric blood pressure cuff (2) Healthy lifestyle classes stressing a healthier dietary regimen, exercise, smoking cessation and drug adherence
Outcomes	(1) Primary outcome measure: mean change in SBP from baseline to the final visit in the intervention group compared with the control group (2) Secondary outcome measure: mean change in DBP over time in the 2 groups, change in urine albumin status and incidence of adverse events
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Tonstad 2007

Methods	RCT
Participants	Subjects that participated in a health screening with systolic blood pressure 140-169 mm Hg and diastolic blood pressure 90-99 mm Hg at a minimum of three separate readings treated or not treated with antihypertensive drugs.
Interventions	Randomly allocated either to monthly nurse-led lifestyle counselling (intervention group, N=31) or to conventional primary care (control group, N=20) to be followed by lifestyle counselling.
Outcomes	Systolic and diastolic BP
Notes	The mean (S.D.) baseline and end of study blood pressure was 157 (9)/94 (6) mm Hg and 147 (9)/91 (8) mm Hg, respectively, in the intervention group versus 153 (9)/94 (4) and 143 (10)/92 (8) mm Hg, respectively, in the control group (NS between the groups).

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Turnbull 2006

Methods	pilot cluster randomized controlled trial (stratified for rurality) of 67 general practices (including 371 patients) across two Australian states.
Participants	Persons were eligible if had mild to moderate hypertension (i.e., mean systolic BP of ? 140 mmHg and/or mean diastolic BP, DBP, of ? 90 mmHg on 3 separate occasions during a 3-week period), and were able to complete the questionnaire unaided and *aged* between18 and 75 years. *Source of patients:* A proposed study group consisted of all persons n (*N* = 320) who had visited the outpatient hypertension clinic between November 2000 and September 2001. 76 eligible but 6 did not consent

Turnbull 2006 *(Continued)*

Interventions	The central platform of this program is an information communication technology package for risk assessment and management, access to a dietitian commissioned by the program and a tailored set of audiovisual and written material.,
Outcomes	The primary outcome was SBP, which was measured after a 6-month interval. Additional outcomes included DBP, fasting lipids, obesity parameters, alcohol consumption, smoking, and stress management at 6 months follow-up.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Vetter 2000

Methods	Parallel, individuals 244 practitioners in Switzerland, 4 patients per practitioner recruited
Participants	Hypertension, SBP 160-200mmHg or DBP 95-115mmHg in untreated patients or uncontrolled patients or who wished to change BP lowering drug because of low tolerance
Interventions	(1) Home measurement of blood pressure by patients (2) Usual care
Outcomes	(1) Blood pressure control- SBP improved (E) 145.1mmHg versus (C) 147.6mmHg(p=0.02), DBP improved (E) 88.7mmHg versus (C) 90.1mmHg (p=0.038). (2) % with controlled hypertension (DBP 90mmHg) 66.2% (E) vs 59.8mmHg (ns) Duration of FU 8 weeks
Notes	All patients treated with same BP lowering drug, Losartan 50mg once daily. No compliance data so not possible to say improved BP control due to improved compliance. Home BP measurement produced small BP change at 8 weeks

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Watkins 1987

Methods	6 General practices UK n=414, 41% male
Participants	Hypertension determined from medical records age range 35-64
Interventions	(1) Information booklet on hypertension sent out to patients

Watkins 1987 *(Continued)*

	(2) Usual care
Outcomes	(1) (1) Systolic blood pressure- no difference 149.2mmHg (C) versus 149.8mmHg (E) (2) Diastolic blood pressure- no difference 94.9mmHg (C) versus 95.3mmHg (E) (2) Knowledge- slight increase in knowledge score in intervention group Duration of FU 1 year
Notes	Drop outs not reported in each arm

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Webb 1980

Methods	Parallel, individuals who were patients of 14 family practice residents US
Participants	Patients had to have at least: one year history of hypertension; uncontrolled DBP 90mmHg; taking BP lowering drugs
Interventions	(1) Education- three group education sessions by nurse-health educator (causes, nature, implications and treatment of hypertension) (2) Counselling- three "individualized" counselling sessions (3) Usual care- three appointments with family physician
Outcomes	(1) DBP- no difference between either group and usual care- education (E1) 88.9mmHg versus (C) 88.1mmHg, counselling (E2) 87.4mmHg versus 88.1mmHg (2) Compliance- no difference between either group and usual care (3) Return for follow up appointment- no difference education (E1)10.1 versus (C) 10.2, counselling (E2) 11.2 versus 10.2 Duration of FU 6 months
Notes	Negative RCT, data pooled from education arm of trial

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Wetzels 2007

Methods	Parallel RCT, This study was designed to evaluate the effectiveness of electronic monitoring of adherence in lowering blood pressure (BP) in comparison with usual care.
Participants	43 Gps in Holland, Number of patients randomised: 258 (168 C. and 90 I.) 2:1 randomization employed, Number of patients analysed: 253 (164 C. and 89 I.) Persons were eligible if had been diagnosed with hypertension (? SBP 160 or DBP 95) and inadequate BP control despite drugs and indication for Rx escalation

Wetzels 2007 *(Continued)*

Interventions	A total of 258 patients with high BP despite use of antihypertensive medication were randomly assigned to either continuation of usual care (with adjustment in antihypertensive medication if necessary) or to the introduction of electronic monitoring. Adherence to antihypertensive medication was monitored for 2 months without medication changes.
Outcomes	The primary outcome measure was the proportion of patients who reached target BP levels after a 5-month follow-up period. At 5 months, 50.6% of the patients in the usual care group reached adequate BP, v 53.7% in the electronic monitoring group (P = .73). The percentages of patients with drug additions or increases in dosage were higher in the usual care group compared with those in whom adherence was monitored (P < .01). CONCLUSION: These data show that electronic monitoring in comparison to usual care results in similar BP control but leads to fewer drug changes and less drug use. This result is likely to be achieved by improving adherence. Hence a strategy that includes electronic monitoring has the potential to prevent unnecessary treatment escalation in patients with poor adherence
Notes	Not sure if the intervention fits here or where? Good data for entering (not done)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Zarnke 1997

Methods	Parallel individuals from eleven family physicians and one tertiary hypertension research unit, Canada
Participants	Age 52 (E) 56 (C), 13 (42%) male, average BP readings <160/95, taking BP lowering drugs or receiving non-pharmacological advice
Interventions	(1) Patient-directed group - instructed in home BP measurement, measured own BP twice daily and instructed by means of algorithm to change own BP medication, if still exceed goal to contact family doctor (2) Office-based group- adjustments to BP medication made by family doctor
Outcomes	(1) Change in daytime mean arterial BP adjusted for baseline measurement- decreased significantly in (E) group -0.95 versus +1.9 (C) (2) Compliance (doses missed per week- (E) 0.05 versus (C) 0.2 NS (3) Quality of life scores- no difference (4) Indices of health care resource use- total number of physician visits significantly greater in (E) group, no difference in total number of BP drugs used Duration of FU 8 weeks
Notes	Small RCT (n=31), short period of follow up

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Zismer 1982

Methods	Hypertensive patients in a single urban family practice. 176 eligible, 50 randomly selected, 39 agreed to take part. 3 groups- two separate intervention groups treated as the same in the analysis.
Participants	Diagnosis of hypertension or receiving BP lowering drugs or elevated BP for 2 consecutive visits 140 or 90mmHg within previous 12 months 37 black, 21 male, average age 45 (E) 56 (C), age range 21 to 76.
Interventions	(1) Experimental group A- Educational "self-care" intervention: pill taking; appointment keeping; dietary sodium reduction (2) Experimental group B-received additional support from family member. (3) Usual care
Outcomes	(1) Systolic blood pressure- improved 150.9mmHg (C) versus 130.5mmHg (E), p<0.01. (2) Diastolic blood pressure- improved 92mmHg (C) versus 85mmHg (E), p<0.001. (3) Frequency of visits- no difference between groups in mean number of visits Duration of FU 6 months
Notes	BP readings at baseline and FU were mean of last 3 readings Control group was not similar to experimental group: 10 years older and diagnosed for longer

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Andrejak 2000	Randomised trial of once daily versus twice daily ace inhibitor. Outcome compliance as judged by mem's monitored. Once daily medication better than twice daily dosage. Included in adherence systematic review. Excluded: adherence RCT
Artinian 2007	Control group not a proper control group as received enhanced usual care.
Asmar 2007	Not a RCT: 'preselected' GP's were randomised and then asked to include the first 4 consecutive eligible patients agreeing to participate. No record of eligible patients who did not participate
Bachman 2002	Accuracy and quality of self-reported home blood pressure values assessed. 48 patients randomised to receive information about storage capabilities of a home measuring device or not. Accuracy and interpretation of home blood measurement increased in the informed group. Reason for exclusion: intervention not aimed directly at improving blood pressure control; no blood pressure data reported.
Barron-Rivera 1998	Randomised trial of education programmed to patients. Outcome was well-being and quality of life. Excluded: no report on blood pressure control in the process of care.
Ben Said	Randomised trial of assessment education interventions - same trial as reported by Consoli. Excluded: no outcome on blood pressure or process of care reported.
Binstock 1988	Excluded because no "usual care" group.

Study	Reason for exclusion
Birtwhistle 2004	Equivalence RCT of three month versus six month follow up. Reason for exclusion: (1) Neither intervention met inclusion criteria of the review. No additional intervention directed at either patient, health professional or organisation of care. Finding that BP control was equivalent between three and six month follow up arms of the study. Both groups saw health professional much more often than planned over the three years- mean (sd) visits per patient in three month group 18.8 (8.06) versus 16.2 (8.45) in six month group.
Blenkinsopp 2000	Parallel, cluster randomised, 20 community pharmacy sites, UK. 180 treated hypertensives, 62% age 60 or over. (1) Pharmacist delivered, Structured, brief questioning protocol on medication problems; including advice, information and referral to general practitioner versus usual care, delivered three times at two-month intervals (2) Usual care. (1) % with controlled hypertension- of those patients with initially uncontrolled hypertension (160/90mmHg) (E) 35.7% versus (C) 17.1% were controlled at follow up ($p<0.05$), no difference in BP control in those who were controlled at start of study (2) Compliance (self report)- 62% (E) versus 50% (C) ($p<0.05$) (3) Patient satisfaction- high level with service and no significant differences between groups. Duration of FU 6 months. Substantial losses to follow up. Subgroup analysis of % controlled blood pressure, therefore not included in analysis. Reason for exclusion: no blood pressure data.
Bond 1984	Non-randomised trial of clinical pharmacologist nurse clinician improving drug documentation, for blood pressure control and rheumatology/renal screening. Excluded: no BP outcome data
Borbolla 2007	Participants were not patients with a diagnosis of hypertension
Bosworth 2009	Patient education and provider decision support to control blood pressure in primary care: A cluster randomized trial. Excluded as no usual care arm.
Broege 2001	40 hypertensive men and women randomly assigned to "home" self measurement with subsequent management and medication change compared to "clinic" group where medication adjusted based upon readings taken by project nurse. Reasons for exclusion: 1. Includes treated and untreated hypertensive patients. Drug treatments adjusted downward or treatment initiated depending on BP reading and drug treatment status. Not possible to detect effect of self monitoring on treated blood pressure alone. 2. No usual care- both groups experienced monitoring- self monitoring at home or nurse monitoring in clinic.
Burke 2005	Participants were volunteers to a research studies unit and thus the setting for the study was not ambulatory care.
Cappuccio 2004	Systematic review of home monitoring. 18 RCTs included- several RCTs excluded from this review that Cappucion included. These are (with reasons why excluded from this review in brackets): Binstock- no usual care group included. Stahl- non randomised trial, patients allocated "sequentially". Midanik-
Caro 1998	Non-randomised trial. Observational study of compliance and persistance with therapy, excluded for these reasons.
Carter 2008	Quasi randomised trial. No proper control group due to presence or abscence of clinical pharmacists and due to education intervention given to physicians and patients in control group.
Celis 1998	A randomised controlled trial protocol comparing self measurement of blood pressure against conventional blood pressure measurement. Protocol of trial. Excluded: no results reported.
Chabot 2003	Not an RCT

Study	Reason for exclusion
Charlesworth 1984	Quasi randomised trial. Patients assigned random numbers and then rank ordered. The first 32 were given intervention, the next 22 were in the control group. Intervention was of stress management outcome SBP and DBP was significantly reduced in the stress management group. Excluded: intervention and wasn't properly randomised.
Consoli	Randomised trial of computer assisted programme intervention was educational. Outcome knowledge increased at two months in intervention group compared to control. Excluded as no outcome on blood pressure or process of care reported.
Consoli SM, Ben2	Randomised trial of computer assisted programme intervention was educational. Outcome knowledge increased at two months in intervention group compared to control. Excluded as no outcome on blood pressure or process of care reported
Consoli SM, Ben3	Randomised trial of computer assisted programme intervention was educational. Outcome knowledge increased at two months in intervention group compared to control. Excluded as no outcome on blood pressure or process of care reported
Cranney 1999	Non-randomised trial 9 pairs of practices matched by means of overall blood pressure control and then randomised to eductional intervention directed to health professionals in the practice. The outcome was a stated threshold for blood pressure control. Excluded because of non-randomised trial design.
De Luca 2005	Not an RCT as GPs outside the netwrok could not be randomised.
Den 2004	Control group did not receive usual care. Had a fixed drug regimen as part of usual care.
Denver 2003	120 Type 2 diabetic patients with uncontrolled hypertension (BP >140/90) randomised to usual GP care or nurse-led outpatient care. Nurse led care associated with improved systolic blood pressure. Reasons for exclusion: (1) patients allocated by means of alternation rather than randomisation (2) setting.
Djerassi 1990	Non-randomised trial, before/after design. Intervention was based in factories program of follow-up treatment by planned doctor and nurse versus usual care by family doctor in other factories. Outcomes number of percentage of people treated with an intervention group was greater.
Dusing 1998	Observational study of 1603 patients in 320 private practices in Germany. Investigated change in antihypertensive therapy within six months of start of study. Inadequate BP control most important reason for change in 48.4% of patients in the cohort, others include: adverse effects 30.1%, patient dissatisfaction 20%, non-compliance 16.8%, cost 4.9%.
Elmer 2006	Participants were patients with pre-hypertension and not patients with hypertension
Erickson 1997	A non-randomised trial of pharmacist care which involved reviewing medical records, taking drug history, assessing patients specific drug issues, concerns about taking drugs, lifestyle, compliance and knowledge all direct to the patient. Outcomes SBP and DBP were reduced in the group who received a pharmacist's care at 5 months. Quality of life measures were the same. Trial excluded because it was not randomised.
Flack 1995	Observational study reporting adherence rates with different classes of anti-hypertensive agents.
Flack 2000	Randomised trial of slow versus fast titration of blood pressure lowering drugs.
Foote 1983	Quasi randomised controlled trial. Four interventions, screening and referral to physician, referral to physician and semi-annual follow-up, referral to physician and more frequent follow-up, and on-site treatment. Outcome was the number of people under treatment, control and proved in the last three groups.

Study	Reason for exclusion
Fu 2005	No English translation could be found.
Girvin 1999	A randomised trial cross-over design of single versus twice a day Enalapril. The outcomes were of compliance which increased with the single dose medication and blood pressure control which is better in the twice a day medication group. Reason for exclusion, adherence randomised trial, included in the adherence systematic review.
Godley 2003	Evaluation of a quality improvement programme for hypertension management. Intervention consisted of educating healthcare providers and recommending appropriate pharmacotherapy for compelling indications. 30,721 hypertensive patients identified from pharmacy claims, 417 patients randomly selected for note review. Overall level of blood pressure control stated to have improved from 37.2% to 49.2% at follow up. Reason for exclusion: not a randomised study; no comparison group.
Goldstein 2005	Not an RCT to test an intervention to improve blood pressure control.
Gonzalez-Fernandez	Parallel, individuals, hospitalised for "non-hypertensive related diseases) in a single hospital, Puerto Rico. 60 treated hypertensives, 55% women, mean age 59 years. (1) In-hospital education- 4 educational interventions: "knowing high BP" by a physician; "diet and high BP" by a dietician; "exercise and high BP" by a health educator; "medications and compliance in high BP" by physician and pharmacy student. (2) Usual care. (1) Blood pressure control- SBP and DBP improved in (E) 137mmHg versus (C) 154mmHg (p=0.005), diastolic (E) 89mmHg versus 98mmHg (p=0.006) (2) Compliance (direct questioning and pill count)- adherence improved by 66% in the intervention group compared to 16% in usual care group (p=0.04). Reason for exclusion: hospital-based RCT. Duration of FU 8 weeks
Grimm	A randomised trial of four different class of anti-hypertensive agents and quality of life. Excluded: no data on BP control, no interventions other than different classes of anti-hypertensive drugs.
Hatcher 1986	Factorial randomised trial of health education intervention. Three levels of intervention medication schedules, diet, appointment keeping, family member, reinforcements and small group meeting. Excluded as intervention was based on ? ? education and no outcomes on blood pressure control in the process of care.
Herbert 2004	2x2 factorial RCT of 28 peer learning groups involving 200 family physicians in British Columbia, Canada. Interventions: personalised prescribing feedback relating to hypertension; case-based educational module. Evidence-based prescribing improved in both groups (increase in thiazide prescribing as first line agents). Reason for exclusion: no blood pressure outcomes reported.
Hyman	Questionnaire study self reported physician practice excluded for that reason.
Inui 1976	Before/after study intervention with tutor physician educating patients regarding their hypertension. Excluded: not a randomised trial.
Iso 1996	Randomised trial of health education advice (non-pharmacological) follow-up was at 6 months and one and half years. Excluded: intervention was based around health education/counselling advice.
Iso H,	Randomised trial of health education classes to patients. Excluded as intervention was non-pharmacological advice.
Jennett 1986	RCT of continuing medical education in the context of treatment of hypertension. Intervention focused on three learning objectives: 1) physicians reschedule diagnosed hypertensive patients (aged 50 years or older) not as yet in control, to be seen at least every month until controlled; 2) physicians take blood pressure of hypertensive patients in the supine position and also within one minute after standing on every visit and the patient's position is recorded with their blood pressure record; 3) physicians ask patients who have not yet got controlled blood pressure about their compliance in taking prescribed medication and record the answer. Two educational formats used: 1)

Study	Reason for exclusion
	six to eight page educational newsletters; 2) small group discussion. Behaviour change improvement scores with the intervention group compared to control. Behaviour was sustained 12 months post education. Reason for exclusion: no blood pressure data reported.
Kawachi 1991	Non-randomised trial. Cost effectiveness analysis.
Krishan 1979	Non-randomised trial of nurse practitioner and integrated physician supervised management in community hypertension clinics versus usual care. No difference in outcome of blood pressure control.
Lee 2006	Participants were 200 community-based patients aged 65 years or older taking at least 4 chronic medications and not specifically patients with hypertension.
Levine 2003	RCT of community health workers providing less intensive care (education, counselling and information about gaining access to free ongoing care in the community) versus more intensive care (all components of less intensive intervention plus additional home visits, further educational messages and social support mobilization through family members) . At 40 months follow up, both groups experienced improvement in blood pressure control (significant within group difference from baseline blood pressure readings). Less intensive group had greater blood pressure control compared to more intensive group but difference was not significant. Reason for exclusion: no usual care group.
Lewis 1967	Randomised trial of nurse clinics versus usual care in outpatient clinic. The population included patients with Hypertension and Atherosclerotic Disease, Obesity, Arthritis and Psychophysiological Disorders. The outcomes are preferences for care, costs and process of care in terms of examinations and investigations. Excluded: no data on process or outcome of blood pressure care.
Liehr 2006	This study examined the blood pressure (BP)-lowering effect of adding story-centered care (i.e., carefully attending to another's narrative) to standard lifestyle intervention (i.e., exercise training and nutrition counselling) and thus was a trial of a non-pharmacological treatment
Linjer 1997	Non-randomised trial. Discussion paper regarding percentage of patients eligible in randomised trials generally at low risk in trial participants.
Littenberg 1990	Non-randomised trial. Cost effectiveness study of increased blood pressure.
Marquez 2000	Randomised trial intervention being health education through group sessions with postal back-up. Outcomes were compliance with blood pressure medication. Excluded as no outcome in terms of blood pressure control reported
Mashru 1997	Before after study of interpractice audit following educational programme concerning diagnosis and management of hypertension. Six general practices in NW London, UK, 750 hypertensive patients. At two years follow up, two thirds of patients remained "uncontrolled" (BP<160/90).
McDowell 1989	Non hypertensive patients registered with a large family practice (Canada). Interventions: computer reminder to GP, letter to patient, nurse telephone call to patient. Outcome was whether blood pressure was checked or not. Effect of reminders was "modest"
McInnes 1995	Non-randomised trial two patients were matched and then randomised to it. Shared care or clinical care. The intervention was computerised shared care versus hospital clinical care in outpatients departments. The outcome showed there were less drop-outs for shared care and they were better adequately used in terms of patient management in shared care compared to usual care. Shared care was more cost effective. Blood pressure control was similar in both groups.
McKenney 1973	A pharmacist intervention directly at patients improved knowledge compliance with medication and blood pressure control, however not randomised properly. Patients assigned consecutive numbers then randomised according whether they had odd or even numbers

Study	Reason for exclusion
Mitchell 2004	Quasi-randomisation study. Randomisation occurred at the level of practice but data collected at the level of the patient. Patients not randomised. Thus patient numbers increase from baseline to follow-up.
Mitchell 2005	Quasi-randomisation study. Randomisation occurred at the level of practice but data collected at the level of the patient. Patients not randomised. Thus patient numbers increase from baseline to final
Morisky 2002	Control group did not receive usual care but rather were receiving the CHIP programme.
Murray 1988	Not hypertensive patients. Population: persons "at risk" of developing hypertension. Intervention: direct mail to prompt attendance at clinic, either single, multiple or no mail. Outcome: number of patients who had a blood pressure checked or discussed with their physician
New 2003	Specialist nurse-led clinic in a single outpatient clinic in Salford, UK. Population: diabetic patients receiving hospital-based care. Comparison group: usual hospital care. Outcome: improvement in blood pressure and hyperlipidemia targets acheived with intervention. Reason for exclusion: hosp-tial-based, (2) diabetic patients.
Pheley 1995	Observational study of nurse based hypertension clinic with no comparison group.
Putnam 1989	40 family physicians from the Dalhousie University Division of Continuing Medical Education sepa-rated into 3 groups according to extent of involvement in establishing essential criteria for hyper-tension managment. No difference in control of blood pressure in these family physician's patients at 18 months follow up. Reason for exclusion: non randomised trial
Ramsay 1996	Non-randomised trial. Discussion paper.
Roumie 2006	No proper control group. Providers who cared for eligible patients were randomly assigned to re-ceive an e-mail with a Web-based link to the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) guidelines (provider education); provider education and a patient-specific hypertension computerized alert (provider education and alert); or provider education, hypertension alert, and patient education, in which patients were sent a letter advocating drug adherence, lifestyle modification, and conversa-tions with providers (patient education).
Simon 2005	Quasi-randomised trial: Randomisation occurred at the level of practice but data collected at the level of the patient. Patients not randomised. Thus patient numbers increase from baseline to final
Staessen 2004	Randomised trial of treatment based on (1) BP measured at home (3 consecutive measurements twice daily) versus (2) BP measured at physician's office (average of 3 consecutive readings taken by physician during practice hours). Reason for exclusion: (1) Assessed self monitoring in the context "as guides to initiate and titrate antihypertensive drug treatment". (2) Treated and untreated patients included. At follow-up (median 350 days), more home BP than office BP patients had stopped antihyper-tensive drugs with no difference between groups of patients who had progressed to multiple drug treatment. Final office, home and 24-hour ambulatory BP measurements were higher in the home BP group than in the office BP group.
Stahl 1984	Non-randomised trial. Self and family read blood pressure monitoring groups plus nurse educa-tion. Excluded because of non-randomised study.
Statson 1977	Non-randomised trial. Examining the cost effectiveness of treatment of hypertension
Stephenson 1999	Non-randomised trial.

Study	Reason for exclusion
Thomas 2006	No outcome data specific to hypertensive patients available. Corresponding author emailed and no response.
Trocha 1999	91 hypertensive type 1 diabetic patients with overt diabetic nephropathy followed for 10 years. Intensfied versus routine antihypertensive treatment. Blood pressure control and survival improved in the intensified group. Reason for exclusion: non randomised study
Tu 1999	Parallel, individuals 222 attending a "health unit clinic", carried out in a veteran home in Taiwan, China. Hypertension, SBP 140 or DBP 90 in untreated patients or treated hypertension patients BP level not stated. Average age 74.6 years. (1) Medical education group (MEG)- monthly meeting concerning cognition, attitude self-care behaviours for hypertension (2) Health education- same content but delivered every other month group (EOMG). Differences between groups not clearly reported. Stated that no difference in attitudes and behaviour between groups. Blood pressure no difference in SBP but higher DBP in EOMG. Between group differences not clearly stated. Table 3, within group differences all improved for "cognition, behaviours and attitudes" scores and "blood pressure marking" changes. Duration of FU 6 months. Reason for exclusion: no BP data for both arms of study reported.
UK PDS 1998	Randomised trial of tight less tight blood pressure control. Excluded because its not reporting on process and organisational issues in hypertension care.
van den Hoogen 1990	Non randomised study. "Experimental" study but no mention of randomisation. 15 general practices in the Netherlands, newly detected patients with hypertension two years prior to start of study aged 36-55 years. Intervention: computer-assisted monitoring system, provides monthly feedback on treatment results, regular meetings at practices where surveys discussed. Outome: improved surveillance and control of blood pressure in computer group
Waeber 1999	Randomised trial of compliance in terms of aspirin versus placebo from the HOT randomised controlled trial
Weiner 1980	Cluster- six "industrial settings" randomised. Ohio county clinics US, SBP>140 or DBP >90 age 19-39, SBP >150 or DBP >90 age 40-64. (1) Nurse management. Involved reinforcement to take medication, information about side effects of medications, diet instruction, BP checks, weight checks, education and counselling regarding "an understanding and acceptance of hypertension", (2) Usual care. Positive RCT reported. Experimental patients had better: (1) Decreases in maximum SBP (p=0.02) (2) Average SBP (p=0.02) (3) % overweight (p=0.01) (4) Improved knowledge (p=0.002). Duration FU 3 months. No difference found for maximum and average DBP between (E) and (C). Only very brief account of RCT with no details of baseline or follow up blood pressure. Reason for exclusion: no blood pressure data.
Weir 2002	Questionnaire survey a combination of lifestyle medication taking in half outcomes
Wollard 1995	Randomised trial at two levels of intensity, lifestyle advice/counselling from practice nurses. Outcome was lifestyle and non-pharmacological change in patients. Excluded because intervention was based on non-pharmacological advice and outcomes included lifestyle changes. Of note intervention was more effective than usual care.
Wyka-Fitzgerald 1984	Randomised trial of nurse education programme directed at patients intervention was non-pharmacological advice so excluded for this reason.
Zernike 1998	Randomised trial of structured patient-centred education programme versus normal information. Outcome patient knowledge which was increased and structured intervention. Excluded as no outcomes reported on blood pressure control or process of care.

Characteristics of ongoing studies *[ordered by study ID]*

Bosworth

Trial name or title	Bosworth HB, Olsen MK, McCant F, Harrelson M, Gentry P, Rose C, et al. Hypertension Intervention Nurse Telemedicine Study (HINTS): testing a multifactorial tailored behavioral/educational and a medication management intervention for blood pressure control. 2007;153(6):918-924.
Methods	RCT
Participants	Patients with hypertension
Interventions	Multifactorial tailored behavioral/educational and a medication management intervention for blood pressure control.
Outcomes	Blood pressure control.
Starting date	2007-2009
Contact information	boswo001@mc.duke.edu
Notes	Trial nearing completion

Carter

Trial name or title	A Trial to Evaluate Physician/Pharmacist Collaboration to Improve Blood Pressure Control:An effectiveness study.
Methods	Cluster Randomized Trial
Participants	Patients with hypertension
Interventions	Physician/Pharmacist led intervention
Outcomes	Blood Pressure Control
Starting date	Not known
Contact information	barry-carter@uiowa.edu
Notes	Duration of the intervention was 6 months. Submitted for publication

Coppola

Trial name or title	Improving the primary prevention of stroke in older patients in general practice: a randomized controlled trial
Methods	Practices were randomised by size and location to receive a specific intervention package or not. This included the use of a scoring system to identify those at particularly high risk. Emphasis was placed on the identification of risk and the use of interventions targeted on the major risk factors: Identification and management of raised blood pressure, smoking cessation, and use of aspirin. Agreement was reached within the practice about the use of risk scores, and levels of intervention. Control practices received no contact until the casenote review.

Coppola *(Continued)*

Participants	Elderly patients (aged between 60 to 75 years) registered in 20 general practices in London UK
Interventions	Intervention directed at health professionals in general practices. One hour seminar
Outcomes	Blood pressure control
Starting date	Not known
Contact information	pwhincup@sghms.ac.uk
Notes	Trial remains unpublished at the time of the current update..

Krieger

Trial name or title	SHIP Clinic-Based Program
Methods	Not known
Participants	1. Patients currently at a participating clinic with a diagnosis of hypertension. 2. Low income. 3. Caucasian or African American. 4. Aged 18 or older
Interventions	1. Patient care co-ordinator at each clinic. 2. Computerised tracking system. 3. Linkage with outreach workers. 4. Linkage with community-based resources
Outcomes	1. Mean systolic and diastolic blood pressure. 2. Non-pharmacological behaviour change 3. Control of blood pressure
Starting date	Not known
Contact information	James Krieger James.krieger@METROC.GOV
Notes	RCT complete, anticipated publication in 2003. However, author could not be contacted at the above email addresses at the time of the current update.

Logan

Trial name or title	Mobile phone-based remote patient monitoring system for management of hypertension in diabetic patients
Methods	Phase 1 involved a series of focus-group meetings with patients and primary care providers to guide the system's development.
Participants	In Phase 2, 33 diabetic patients with uncontrolled ambulatory hypertension were enrolled in a 4-month pilot study, using a before-and-after design to assess its effectiveness in lowering BP, its acceptability to users, and the reliability of home BP measurements.
Interventions	Home BP tele-management system that actively engages patients in the process of care.

Logan *(Continued)*

Outcomes	Mean systolic and diastolic blood pressure and control of blood pressure
Starting date	Not known
Contact information	LOGAN@lunenfeld.ca
Notes	In final year of RCT, Results available in June 2010

Zarnke

Trial name or title	Not known
Methods	Not known
Participants	Patients with uncontrolled hypertension
Interventions	Patient-directed self measurement
Outcomes	1. Blood pressure measurement 2. Mean systolic and diastolic blood pressure 3. Blood pressure control
Starting date	Not known
Contact information	kelly.zarnke@lhsc.on.ca
Notes	RCT complete, data being analysed. Remians unpublished and author remains uncontactable.

DATA AND ANALYSES

Comparison 1. Active intervention versus control

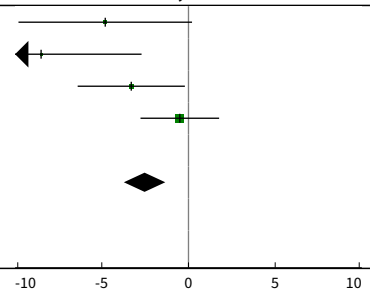
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Self monitoring (systolic blood pressure)	12	2492	Mean Difference (IV, Fixed, 95% CI)	-2.53 [-3.73, -1.34]
2 Self monitoring (diastolic blood pressure)	14	2598	Mean Difference (IV, Fixed, 95% CI)	-1.81 [-2.39, -1.23]
3 Self monitoring (BP control)	6	2237	Odds Ratio (M-H, Fixed, 95% CI)	0.97 [0.81, 1.16]
4 Patient education (systolic blood pressure)	11	8901	Mean Difference (IV, Fixed, 95% CI)	-0.57 [-1.22, 0.08]
5 Patient education (diastolic blood pressure)	13	9050	Mean Difference (IV, Fixed, 95% CI)	0.46 [0.07, 0.86]
6 Patient education (BP control)	7	7950	Odds Ratio (M-H, Fixed, 95% CI)	0.83 [0.75, 0.91]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
7 Physician education (systolic blood pressure)	7	9998	Mean Difference (IV, Fixed, 95% CI)	-0.43 [-1.07, 0.22]
8 Physician education (diastolic blood pressure)	7	9998	Mean Difference (IV, Fixed, 95% CI)	0.59 [0.21, 0.96]
9 Physician education (BP control)	7	21144	Odds Ratio (M-H, Fixed, 95% CI)	0.85 [0.80, 0.90]
10 Health professional led care (systolic blood pressure)	10	2235	Mean Difference (IV, Fixed, 95% CI)	-2.52 [-3.77, -1.27]
11 Health professional led care (diastolic blood pressure)	11	2682	Mean Difference (IV, Fixed, 95% CI)	-1.49 [-2.02, -0.96]
12 Health professional led care (BP control)	6	1506	Odds Ratio (M-H, Fixed, 95% CI)	0.30 [0.24, 0.38]
13 Organisation/protocol driven care (systolic blood pressure)	9	7664	Mean Difference (IV, Fixed, 95% CI)	-6.00 [-8.81, -7.18]
14 Organisation/protocol driven care (diastolic blood pressure)	9	7664	Mean Difference (IV, Fixed, 95% CI)	-4.27 [-4.65, -3.89]
15 Organisation/protocol driven care (BP Control)	7	11998	Odds Ratio (M-H, Fixed, 95% CI)	0.45 [0.41, 0.48]
16 Appointment reminder (outcome: lost to follow up at clinic)	6	1704	Odds Ratio (M-H, Fixed, 95% CI)	0.41 [0.32, 0.51]
17 Appointment reminder (systolic blood pressure)	2	787	Mean Difference (IV, Fixed, 95% CI)	-4.56 [-6.31, -2.81]
18 Appointment reminder (diastolic blood pressure)	2	787	Mean Difference (IV, Fixed, 95% CI)	-0.53 [-2.01, 0.95]
19 Appointment reminder (outcome: blood pressure control)	2	767	Odds Ratio (M-H, Fixed, 95% CI)	0.54 [0.41, 0.73]

Analysis 1.1. Comparison 1 Active intervention versus control, Outcome 1 Self monitoring (systolic blood pressure).

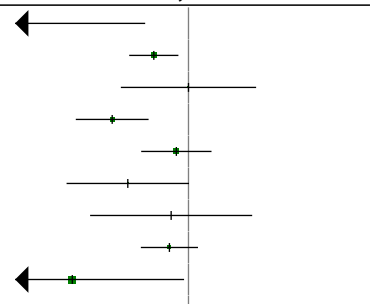
Study or subgroup	Treatment		Control		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI		Fixed, 95% CI
Artinian 2001	6	-25 (13.8)	9	1 (14.1)		0.69%	-26[-40.38,-11.62]
Bailey 1998	31	-8 (19.4)	29	-13 (19)		1.51%	5[-4.72,14.72]
Carnahan 1975	49	-18 (18.5)	48	-10.5 (14.9)		3.2%	-7.5[-14.18,-0.82]
Friedman 1996	110	-11 (13.4)	123	-10.6 (13.7)		11.77%	-0.4[-3.88,3.08]
Halme 2005	113	-7.7 (15.3)	119	-4.5 (16.2)		8.69%	-3.2[-7.25,0.85]
McManus 2005	189	-8.9 (15.3)	211	-6.6 (16.2)		14.98%	-2.3[-5.39,0.79]
Mehos 2000	18	-17.1 (15.8)	18	-7 (13.9)		1.51%	-10.1[-19.82,-0.38]
Midanik 1991	74	-1 (15.8)	72	1 (17.3)		4.94%	-2[-7.38,3.38]
				Favours treatment	-10 -5 0 5 10		Favours control

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Rogers 2001	56	-4.9 (13.5)	55	-0.1 (13.4)		5.7%	-4.8[-9.8,0.2]
Rudd 2004	74	-14.2 (17.8)	76	-5.7 (18.4)		4.26%	-8.5[-14.29,-2.71]
Soghikian 1992	200	-1.5 (13.9)	190	1.8 (17)		14.95%	-3.3[-6.39,-0.21]
Vetter 2000	296	-21 (14.5)	326	-20.5 (14.3)		27.8%	-0.5[-2.77,1.77]
Total ***	**1216**		**1276**			**100%**	**-2.53[-3.73,-1.34]**
Heterogeneity: Tau^2=0; Chi^2=26.79, df=11(P=0); I^2=58.93%							
Test for overall effect: Z=4.15(P<0.0001)							



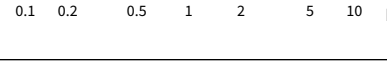
Analysis 1.2. Comparison 1 Active intervention versus control, Outcome 2 Self monitoring (diastolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Artinian 2001	6	-14 (8.7)	9	-2 (9.9)		0.37%	-12[-21.5,-2.5]
Bailey 1998	31	-6 (2.8)	29	-4 (2.8)		16.81%	-2[-3.42,-0.58]
Carnahan 1975	49	-10.4 (9.8)	48	-10.4 (9.8)		2.22%	0[-3.9,3.9]
Friedman 1996	110	-5.2 (8.3)	123	-0.8 (8)		7.67%	-4.4[-6.5,-2.3]
Halme 2005	113	-3 (7)	119	-2.3 (8.7)		8.22%	-0.7[-2.73,1.33]
Haynes 1976	20	-5.4 (5.7)	18	-1.9 (5.4)		2.71%	-3.5[-7.03,0.03]
Johnson 1978	34	-8.5 (8.1)	34	-7.5 (11.3)		1.55%	-1[-5.67,3.67]
McManus 2005	189	-5.7 (8.2)	211	-4.6 (8.6)		12.46%	-1.1[-2.75,0.55]
Mehos 2000	18	-10.5 (10.4)	18	-3.8 (9.3)		0.81%	-6.7[-13.15,-0.25]
Midanik 1991	74	1 (9.4)	72	1 (8.4)		4.05%	0[-2.89,2.89]
Rogers 2001	56	-1.9 (10)	55	2.1 (10)		2.44%	-4[-7.72,-0.28]
Rudd 2004	74	-6.5 (9.9)	76	-3.4 (7.8)		4.14%	-3.1[-5.96,-0.24]
Soghikian 1992	200	0.1 (9.1)	190	1.7 (10.2)		9.15%	-1.6[-3.52,0.32]
Vetter 2000	296	-13.2 (7.2)	326	-11.9 (6.9)		27.39%	-1.3[-2.41,-0.19]
Total ***	**1270**		**1328**			**100%**	**-1.81[-2.39,-1.23]**
Heterogeneity: Tau^2=0; Chi^2=20.71, df=13(P=0.08); I^2=37.24%							
Test for overall effect: Z=6.09(P<0.0001)							



Analysis 1.3. Comparison 1 Active intervention versus control, Outcome 3 Self monitoring (BP control).

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Baqu,Äö 2005	345/487	380/570		41.58%	1.21[0.94,1.58]
Earp 1982	29/74	16/47		4.85%	1.25[0.58,2.68]
Halme 2005	80/113	100/119		11.59%	0.46[0.24,0.87]
Pierce 1984	15/55	7/29		2.71%	1.18[0.42,3.32]
Rogers 2001	36/60	35/61		5.65%	1.11[0.54,2.3]
Vetter 2000	100/296	131/326		33.62%	0.76[0.55,1.05]
Total (95% CI)	**1085**	**1152**		**100%**	**0.97[0.81,1.16]**



Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Total events: 605 (Treatment), 669 (Control)					
Heterogeneity: Tau²=0; Chi²=10.95, df=5(P=0.05); I²=54.32%					
Test for overall effect: Z=0.34(P=0.73)					

Analysis 1.4. Comparison 1 Active intervention versus control, Outcome 4 Patient education (systolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Billault 1995	82	-2.7 (16.5)	85	-1.6 (14.6)		1.88%	-1.1[-5.83,3.63]
Burrelle 1986	8	-13.2 (16)	8	-5.8 (14.8)		0.18%	-7.4[-22.5,7.7]
Cakir 2006	30	-8.9 (10.7)	30	1.1 (9)		1.68%	-10[-15,-5]
Fielding 1994	74	-10.9 (19.3)	71	-2.4 (19.5)		1.06%	-8.5[-14.82,-2.18]
Hennessy 2006	3617	-3 (15.6)	3542	-3 (15.7)		80.18%	0[-0.73,0.73]
Hunt 2004	135	-9 (11.4)	150	-7 (11.8)		5.8%	-2[-4.7,0.7]
McKinstry 2006	130	1 (19.7)	131	2 (19.3)		1.88%	-1[-5.73,3.73]
Muhlhauser 1993	86	-8 (13.5)	74	-3 (13.9)		2.32%	-5[-9.26,-0.74]
Roca-Cusachs 1991	84	-16.7 (18.5)	111	-18 (21.6)		1.33%	1.3[-4.34,6.94]
Watkins 1987	204	-0.2 (18.6)	210	-0.8 (18.6)		3.28%	0.6[-2.98,4.18]
Zismer 1982	26	-13.1 (13.9)	13	2.6 (16.2)		0.4%	-15.7[-26,-5.4]
Total ***	**4476**		**4425**			**100%**	**-0.57[-1.22,0.08]**
Heterogeneity: Tau²=0; Chi²=37.29, df=10(P<0.0001); I²=73.18%							
Test for overall effect: Z=1.72(P=0.09)							

Analysis 1.5. Comparison 1 Active intervention versus control, Outcome 5 Patient education (diastolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Billault 1995	82	1.3 (7.8)	85	-0.1 (11.2)		1.81%	1.4[-1.52,4.32]
Burrelle 1986	8	-4.1 (11.9)	8	-11.2 (13.1)		0.1%	7.1[-5.16,19.36]
Cakir 2006	30	-7 (7.9)	30	1.6 (6.5)		1.15%	-8.6[-12.26,-4.94]
Fielding 1994	74	-5.6 (9.7)	71	-1.7 (9.8)		1.53%	-3.9[-7.07,-0.73]
Hennessy 2006	3617	-2 (9.5)	3542	-3 (9.6)		78.82%	1[0.56,1.44]
Hunt 2004	162	-5 (9.9)	150	-3 (10.3)		3.06%	-2[-4.25,0.25]
McKinstry 2006	130	-4 (10.6)	131	-2 (11.1)		2.23%	-2[-4.63,0.63]
Muhlhauser 1993	86	-5 (7.3)	74	-2 (8.2)		2.63%	-3[-5.42,-0.58]
Roca-Cusachs 1991	84	-7.6 (9.5)	111	-9.5 (11.7)		1.74%	1.9[-1.08,4.88]
Tanner 1981	15	-3.7 (6.9)	15	-3.9 (6.9)		0.63%	0.2[-4.74,5.14]
Watkins 1987	204	0.3 (9.3)	210	-0.1 (9.3)		4.81%	0.4[-1.39,2.19]
Webb 1980	37	-6.8 (9)	55	-3.5 (8.4)		1.16%	-3.3[-6.95,0.35]
Zismer 1982	26	-8.2 (8.9)	13	0.5 (10.9)		0.33%	-8.7[-15.54,-1.86]
Total ***	**4555**		**4495**			**100%**	**0.46[0.07,0.86]**

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Heterogeneity: Tau²=0; Chi²=65.69, df=12(P<0.0001); I²=81.73%							
Test for overall effect: Z=2.32(P=0.02)							

Favours treatment -10 -5 0 5 10 Favours control

Analysis 1.6. Comparison 1 Active intervention versus control, Outcome 6 Patient education (BP control).

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Earp 1982	14/41	16/47		0.99%	1[0.42,2.43]
Hennessy 2006	1238/3617	1363/3542		91.19%	0.83[0.76,0.92]
McKinstry 2006	59/130	60/131		3.29%	0.98[0.6,1.6]
Morisky 1983	15/44	24/40		1.67%	0.34[0.14,0.84]
Muhlhauser 1993	74/86	63/74		0.95%	1.08[0.44,2.61]
Pierce 1984	10/59	9/27		1.03%	0.41[0.14,1.17]
Sackett 1975	61/80	26/32		0.89%	0.74[0.27,2.07]
Total (95% CI)	**4057**	**3893**		**100%**	**0.83[0.75,0.91]**
Total events: 1471 (Treatment), 1561 (Control)					
Heterogeneity: Tau²=0; Chi²=6.54, df=6(P=0.37); I²=8.2%					
Test for overall effect: Z=4.02(P<0.0001)					

Favours treatment 0.1 0.2 0.5 1 2 5 10 Favours control

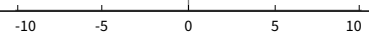
Analysis 1.7. Comparison 1 Active intervention versus control, Outcome 7 Physician education (systolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Coe 1977	60	-19.5 (21.1)	56	-18.3 (27)		0.53%	-1.2[-10.06,7.66]
Dickinson 1981	78	-10 (20.9)	33	-11 (23.8)		0.48%	1[-8.35,10.35]
Evans 1986	102	-12.2 (13.7)	81	-13 (19.6)		1.64%	0.8[-4.23,5.83]
Hennessy 2006	3617	-3 (15.6)	3542	-3 (15.7)		79.1%	0[-0.73,0.73]
Hetlevik 1999	816	-2.3 (19.1)	1023	-0.8 (18.3)		13.98%	-1.5[-3.22,0.22]
Montgomery 2000	199	-3 (18.1)	130	1 (20.3)		2.25%	-4[-8.3,0.3]
Sanders 2002	135	-7.1 (18.5)	126	-0.3 (18.9)		2.02%	-6.8[-11.34,-2.26]
Total ***	**5007**		**4991**			**100%**	**-0.43[-1.07,0.22]**
Heterogeneity: Tau²=0; Chi²=13.38, df=6(P=0.04); I²=55.16%							
Test for overall effect: Z=1.29(P=0.2)							

Favours treatment -10 -5 0 5 10 Favours control

Analysis 1.8. Comparison 1 Active intervention versus control, Outcome 8 Physician education (diastolic blood pressure).

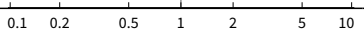
Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Montgomery 2000	199	-1 (9.1)	130	-2 (10.4)		2.9%	1[-1.19,3.19]
Coe 1977	60	-13.4 (13.2)	56	-14.5 (12.8)		0.62%	1.1[-3.63,5.83]
Dickinson 1981	78	-5 (13.9)	33	-4 (14.7)		0.4%	-1[-6.89,4.89]
Evans 1986	102	1 (6.9)	81	0.7 (8.6)		2.62%	0.3[-2,2.6]
Hetlevik 1999	816	-1.8 (9.3)	1023	-1.2 (8.5)		20.51%	-0.6[-1.42,0.22]
Sanders 2002	135	-3.4 (10.8)	126	-1.3 (11.5)		1.89%	-2.1[-4.81,0.61]
Hennessy 2006	3617	-2 (9.5)	3542	-3 (9.6)		71.05%	1[0.56,1.44]
Total ***	**5007**		**4991**			**100%**	**0.59[0.21,0.96]**
Heterogeneity: Tau²=0; Chi²=15.62, df=6(P=0.02); I²=61.58%							
Test for overall effect: Z=3.09(P=0)							



Favours treatment — Favours control

Analysis 1.9. Comparison 1 Active intervention versus control, Outcome 9 Physician education (BP control).

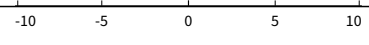
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Dickinson 1981	14/78	3/16		0.15%	0.95[0.24,3.78]
Evans 1986	42/102	37/81		0.9%	0.83[0.46,1.5]
Hennessy 2006	1238/3617	1363/3542		33.53%	0.83[0.76,0.92]
McAlister 1986	35/319	35/283		1.22%	0.87[0.53,1.44]
Montgomery 2000	120/199	77/130		1.37%	1.05[0.67,1.64]
New 2004	1282/2474	1319/2531		23.26%	0.99[0.88,1.1]
Ornstein 2004	1850/4446	1600/3326		39.57%	0.77[0.7,0.84]
Total (95% CI)	**11235**	**9909**		**100%**	**0.85[0.8,0.9]**
Total events: 4581 (Treatment), 4434 (Control)					
Heterogeneity: Tau²=0; Chi²=12.86, df=6(P=0.05); I²=53.33%					
Test for overall effect: Z=5.86(P<0.0001)					



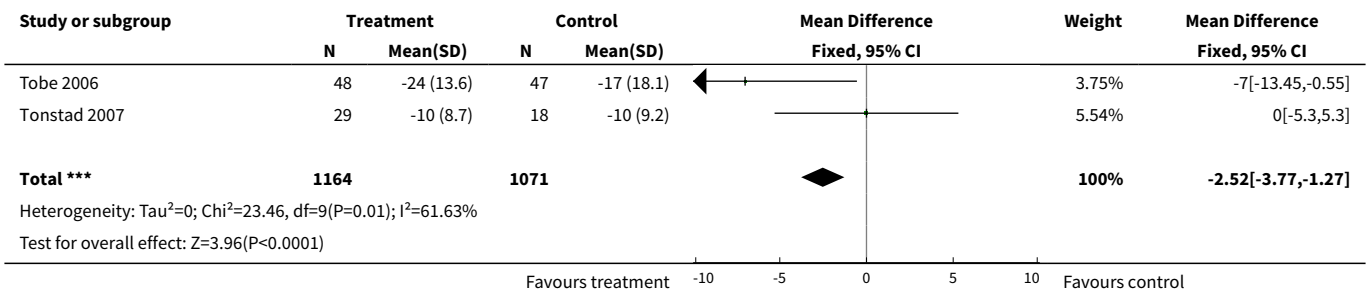
Favours treatment — Favours control

Analysis 1.10. Comparison 1 Active intervention versus control, Outcome 10 Health professional led care (systolic blood pressure).

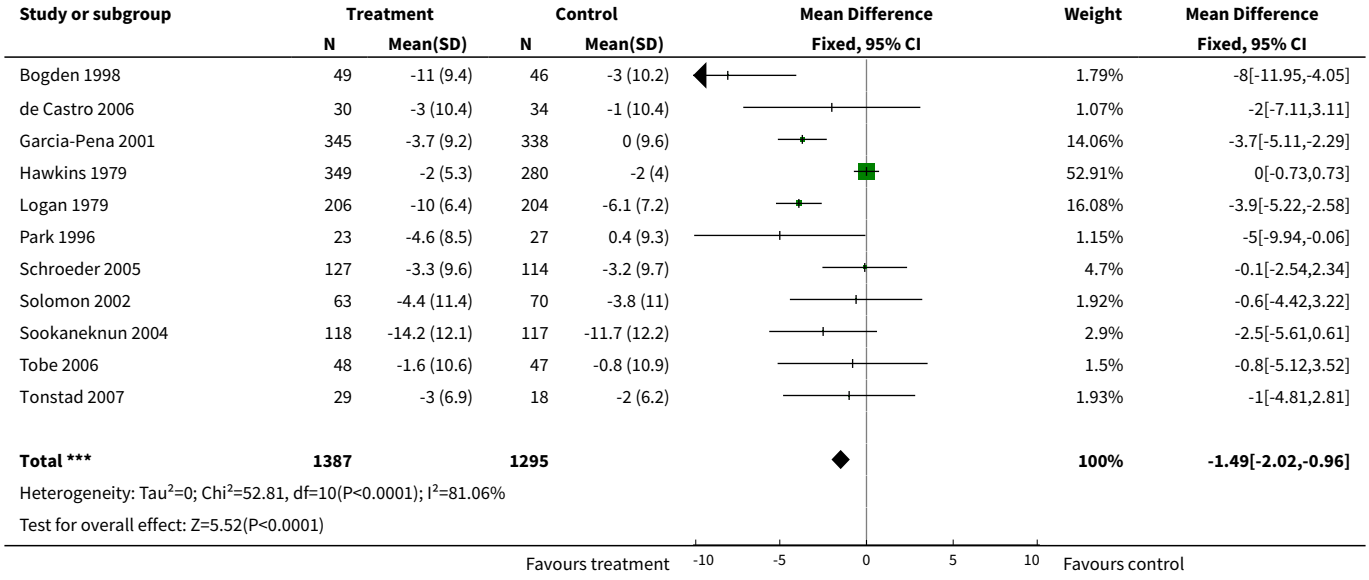
Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Bogden 1998	49	-23 (22.6)	46	-11 (20)		2.12%	-12[-20.57,-3.43]
de Castro 2006	30	-6 (14.7)	34	-1 (14.3)		3.07%	-5[-12.13,2.13]
Garcia-Pena 2001	345	-6.8 (17.4)	338	-3.5 (17)		23.4%	-3.3[-5.88,-0.72]
Hawkins 1979	349	-2 (14.1)	280	-2 (10.7)		41.43%	0[-1.94,1.94]
Park 1996	23	-12.3 (15.8)	27	0.7 (18.8)		1.69%	-13[-22.59,-3.41]
Schroeder 2005	110	-6.1 (15.7)	94	-4.4 (18.3)		6.99%	-1.7[-6.42,3.02]
Solomon 2002	63	-8.2 (15.2)	70	-1.3 (19)		4.59%	-6.9[-12.72,-1.08]
Sookaneknun 2004	118	-23.3 (17.2)	117	-17.6 (18.6)		7.42%	-5.7[-10.28,-1.12]



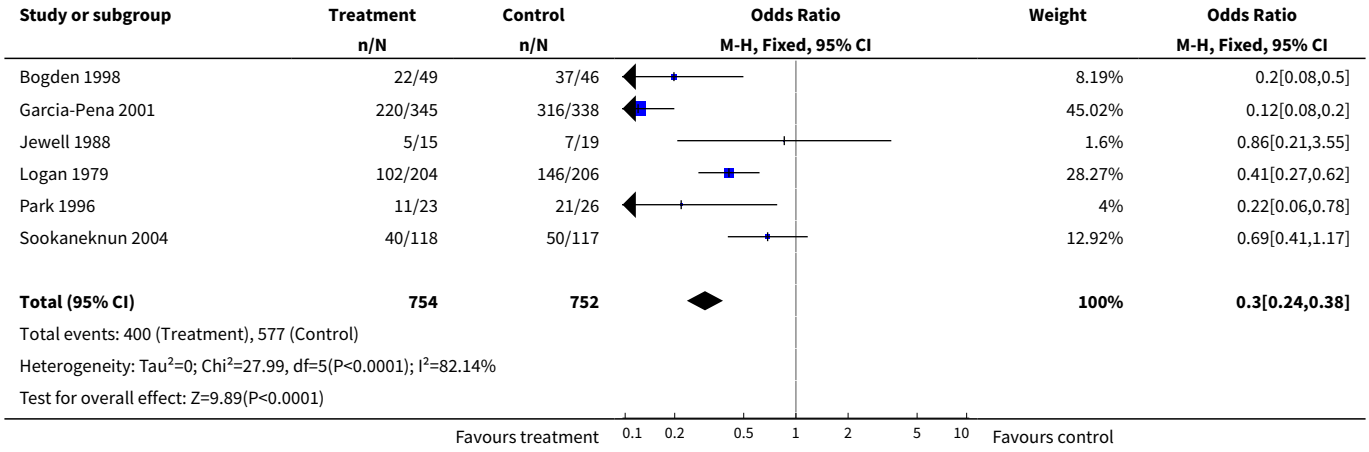
Favours treatment — Favours control



Analysis 1.11. Comparison 1 Active intervention versus control, Outcome 11 Health professional led care (diastolic blood pressure).



Analysis 1.12. Comparison 1 Active intervention versus control, Outcome 12 Health professional led care (BP control).



Analysis 1.13. Comparison 1 Active intervention versus control, Outcome 13 Organisation/protocol driven care (systolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Bulpitt 1976	80	-28.8 (17.6)	71	-28.4 (17.1)		2.16%	-0.4[-5.94,5.14]
Dickinson 1981	51	-12 (19.7)	33	-11 (23.8)		0.7%	-1[-10.76,8.76]
Hypertension 1979	2872	-23.6 (16.2)	1718	-15.4 (17.5)		64.06%	-8.2[-9.22,-7.18]
Hypertension 1979a	811	-38.9 (17.5)	542	-27.2 (18.6)		17%	-11.7[-13.68,-9.72]
Hypertension 1982	438	-52.3 (21.9)	311	-41.7 (21.4)		6.73%	-10.6[-13.74,-7.46]
Takala 1979	39	-26 (18.4)	36	-29 (17.5)		1%	3[-5.13,11.13]
Takala 1983	36	-35 (18.5)	34	-38 (18)		0.91%	3[-5.55,11.55]
Turnbull 2006	154	0.7 (17.3)	185	1.4 (17.4)		4.82%	-0.7[-4.41,3.01]
Wetzels 2007	164	-16 (18.4)	89	-14 (20.1)		2.62%	-2[-7.04,3.04]
Total ***	**4645**		**3019**			**100%**	**-8[-8.81,-7.18]**

Heterogeneity: $Tau^2=0$; $Chi^2=59.2$, df=8(P<0.0001); $I^2=86.49\%$

Test for overall effect: Z=19.25(P<0.0001)

Analysis 1.14. Comparison 1 Active intervention versus control, Outcome 14 Organisation/protocol driven care (diastolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Bulpitt 1976	80	-9.2 (8.8)	71	-9.4 (8.5)		1.88%	0.2[-2.56,2.96]
Dickinson 1981	51	-6 (9.9)	33	-4 (14.7)		0.44%	-2[-7.7,3.7]
Hypertension 1979	2872	-10.9 (7.3)	1718	-6.7 (8.1)		65.73%	-4.2[-4.67,-3.73]
Hypertension 1979a	811	-20.8 (7.2)	542	-14.3 (9)		17.48%	-6.5[-7.41,-5.59]
Hypertension 1982	438	-30.5 (9.8)	311	-22.9 (12.2)		5.34%	-7.6[-9.24,-5.96]
Takala 1979	39	-12 (9.2)	36	-15 (8.7)		0.87%	3[-1.05,7.05]
Takala 1983	36	-11 (9.2)	34	-16 (9)		0.79%	5[0.74,9.26]
Turnbull 2006	154	-0.1 (7.7)	185	0 (7.7)		5.29%	-0.1[-1.75,1.55]
Wetzels 2007	164	-10 (10.4)	89	-9 (9.7)		2.17%	-1[-3.57,1.57]
Total ***	**4645**		**3019**			**100%**	**-4.27[-4.65,-3.89]**

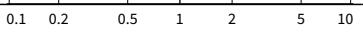
Heterogeneity: $Tau^2=0$; $Chi^2=111.36$, df=8(P<0.0001); $I^2=92.82\%$

Test for overall effect: Z=22.11(P<0.0001)

Analysis 1.15. Comparison 1 Active intervention versus control, Outcome 15 Organisation/protocol driven care (BP Control).

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Dickinson 1981	15/51	3/16		0.15%	1.81[0.45,7.27]
Fletcher 1975	36/74	33/70		0.83%	1.06[0.55,2.04]

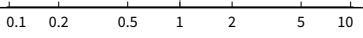
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Hypertension 1979	1925/5485	3077/5455		95.29%	0.42[0.39,0.45]
Sackett 1975	67/87	23/28		0.38%	0.73[0.25,2.16]
Takala 1983	49/71	57/69		0.85%	0.47[0.21,1.04]
Turnbull 2006	126/154	130/185		1.02%	1.9[1.14,3.19]
Wetzels 2007	49/164	34/89		1.47%	0.69[0.4,1.19]
Total (95% CI)	**6086**	**5912**		**100%**	**0.45[0.41,0.48]**
Total events: 2267 (Treatment), 3357 (Control)					
Heterogeneity: Tau^2=0; Chi^2=46.94, df=6(P<0.0001); I^2=87.22%					
Test for overall effect: Z=21.38(P<0.0001)					



Favours treatment — Favours control

Analysis 1.16. Comparison 1 Active intervention versus control, Outcome 16 Appointment reminder (outcome: lost to follow up at clinic).

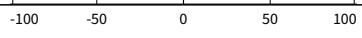
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H, Fixed, 95% CI	Weight	Odds Ratio M-H, Fixed, 95% CI
Ahluwalia 1996	8/53	6/54		2.17%	1.42[0.46,4.42]
Barnett 1983	1/63	28/52		12.97%	0.01[0,0.11]
Bloom 1979	12/27	20/27		4.77%	0.28[0.09,0.88]
Cummings 1985	70/486	129/487		47.38%	0.47[0.34,0.65]
Fletcher 1975	12/74	26/70		9.62%	0.33[0.15,0.72]
Krieger 1999	51/146	88/165		23.09%	0.47[0.3,0.74]
Total (95% CI)	**849**	**855**		**100%**	**0.41[0.32,0.51]**
Total events: 154 (Treatment), 297 (Control)					
Heterogeneity: Tau^2=0; Chi^2=16.91, df=5(P=0); I^2=70.42%					
Test for overall effect: Z=7.66(P<0.0001)					



Favours treatment — Favours control

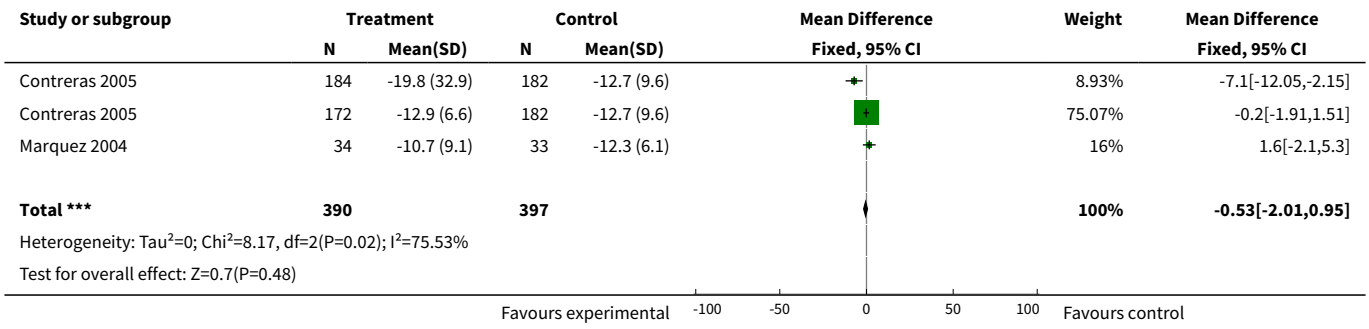
Analysis 1.17. Comparison 1 Active intervention versus control, Outcome 17 Appointment reminder (systolic blood pressure).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Contreras 2005	172	-22.4 (14.6)	182	-22.1 (11.5)		40.51%	-0.3[-3.05,2.45]
Contreras 2005	184	-31.6 (12.4)	182	-22.1 (11.5)		50.97%	-9.5[-11.95,-7.05]
Marquez 2004	34	-19.1 (13.3)	33	-23.8 (11.7)		8.52%	4.7[-1.29,10.69]
Total * **	**390**		**397**			**100%**	**-4.56[-6.31,-2.81]**
Heterogeneity: Tau^2=0; Chi^2=34.02, df=2(P<0.0001); I^2=94.12%							
Test for overall effect: Z=5.11(P<0.0001)							

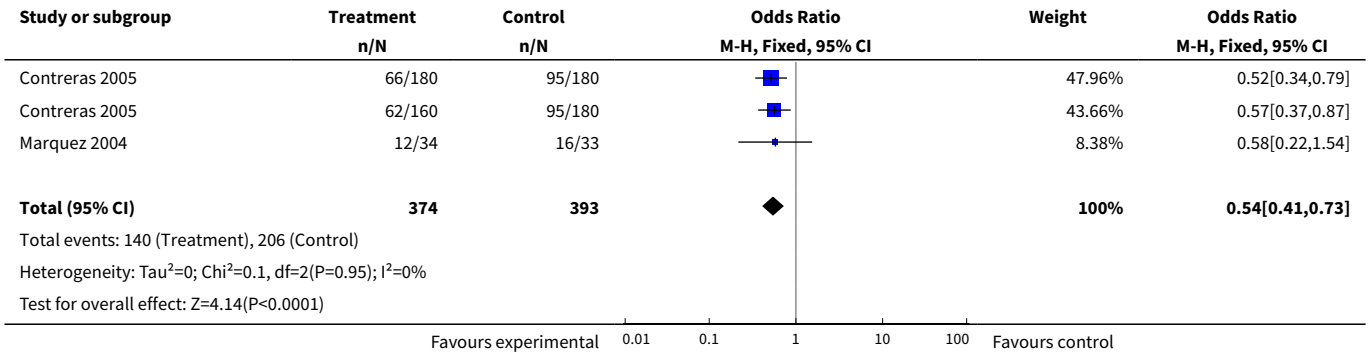


Favours experimental — Favours control

Analysis 1.18. Comparison 1 Active intervention versus control, Outcome 18 Appointment reminder (diastolic blood pressure).



Analysis 1.19. Comparison 1 Active intervention versus control, Outcome 19 Appointment reminder (outcome: blood pressure control).



ADDITIONAL TABLES

Table 1. Quality of included randomized trials

Study ID	Randomization	Allocation concealed	Blinding	Losses to follow up
Carnahan	Method not stated	Not stated	No	1/50 (E- 2%) 2/50 (C- 4%) 1/50 (E- 2%) 2/50 (C- 4%) 1/50 (E- 2%) 2/50 (C- 4%)
Hawkins	Method not stated	Not stated	No	225/574 (E- 39.2%) 294/574 (C-51.2%)
Evans	Method not stated	Not stated	Yes- BP check Staff "blind" to	5/107 (E- 5%) 10/91 (C- 11%)

Table 1. Quality of included randomized trials *(Continued)*

			allocation group	
Hypertension Detection and Follow up (HDFP)	Randomisation done centrally, stratified by centre (n=14) and entry DBP strata (n=3)	Yes, coordinating centre prepared sealed opaque envelopes. An envelope was drawn sequentially and attached to participant's data form at the time of DBP screening. Envelope opened after baseline	No- neither participant or clinic blind to randomisation. BP outcome not blinded	967/5485 (E- 17.6%) 938/5422 (C- 17.2%) status of antihypertensive drug treatment not known at 1 year (includes lost to FU/dead/missing data)
Jewell	Method not stated	Not stated	No	15/17 (E- 12 19/19 (C- 0%)
Cummings	"Randomisation list"	Not stated	Yes	446\486 (E- 8%) 420\487 (C- 14%)
Tanner	"Randomly assigned through a table of random numbers"	Not stated	No	15/15 (E- 0%) 15/15 (C- 0%)
Zismer	Not stated	Not stated	No	26/26 (E- 0%) 13/13 (C- 0%)
Watkins	Not stated but stratified by age, sex, practice and last recorded BP	Not stated	Yes	414/565 (Overall- 27%)
Rogers	Randomisation stratified by # prescription medications	Yes- to physicians and clinical research staff but once completed "open"	No	56/60 (E-7%) 55/61 (C- 10%)
Muhlhauser	Randomisation process for 10 participating practices. 20 patients per practice selected by means of random number chart	Not stated	No	86/100 (E- 14%) 74/100 (C- 26%)
Montgomery	Randomisation by means of random number table by a researcher not involved in study. Practices stratified by computer system used (2 alternative computer systems)	Yes	No	202/229 (E 1 12%) 199/228 (E 2- 13%) 130/157 (C- 17%)
Takala	Method not stated	Not stated	No	25/100 (E- 25%) 32/102 (C- 31%)

Table 1. Quality of included randomized trials *(Continued)*

Sackett	Method not stated	Not stated	Yes	Factorial RCT (1) Convenience Augmented 6/114 (E- 5%) Normal 4/116 (C- 3%) (2) Mastery learning Yes 8/115 (E-7) No 2/115 (C- 2%)
Haynes	Minimisation, method not stated, patients stratified according to important prognostic factors in previous RCT by Sackett20	Not stated	Yes	0/20 (E- 0%) 1/19 (C- 5%)
Logan	Method not stated	Not stated	Yes	26/232 (E- 11%) 21/204 (C- 9%)
Johnson	Method not stated	Not stated	Yes	Factorial RCT (1) Self recording of blood pressure (E- 34/36- 6%) (2) Home visits (C-34/36- 6%)
Brook	By means of "random sampling techniques that made the distribution of family characteristics in each as similar as possible"	Not stated	No	Free care versus 3 forms of cost-sharing plans. Blood pressure outcome: Free care (E- 134/294, 46%) Cost share (C-
Earp	Method not stated	Not stated	No	3 arm RCT Follow up at year 1 and 2 Group 1- 1 year- 74/99, 25% 2 year- 55/99, 44% Group 2- 1 year- 41/56, 27% 2 year- 39% Group 3(control)- 1 year- 47/63, 25% 2 year- 38/63, 40%
Martinez-Amenos	Method not stated	Not stated	No	No details on losses to FU provided
McAllister	Practice cluster stratified by: 1) partners 2) Ethnicity randomisation by "shuffled deck of cards"	Not stated	No	5/30 (E- 17%) 5/30 (C- 17%)
Bogden	Randomisation by last digit of social security number: Odd # (E) Even # (C)	Not stated	Yes	1/50 (E- 2%) 4/50 (C- 8%)
Fielding	Randomisation by means of random numbers table	Not stated	No	6/80 (E- 7%) 8/79 (C- 10%)

Table 1. Quality of included randomized trials *(Continued)*

Morisky and Levine	Randomisation through "simple random sampling procedures"	Not stated	No	Overall 64/400 (16%) Control of BP (C) 40/50 (20%) 2 yrs 30/50 (40%) 5 yrs (E) all 3 intervention 44/50 (12%) 2 yrs 42/50 (16%) 5 yrs
Zarnke	Randomisation by means of computer generated list in blocks of six. Asymmetric allocation scheme (2:1 E:C)	Not stated	No	0/20 (E- 0%) 1/11 (C- 9%)
Roca-Cusachs	Research nurse "allocated every patient to one of the two groups using a random scale balanced for age and BP"	No	Yes	54/138 (E- 39%) 38/149 (C- 26%)
Soghikian	Method not stated	Not stated	No	15/215 (E- 7%) 25/215 (C- 12%)
Billault	Method not stated	Not stated	No	82/101 (E- 19%) 85/99 (C- 14%)
Gullion	Method not stated, physicians stratified according to four criteria: (1) % patients whose DBP controlled. (2) % patients responding to the survey (3) Physician's ethnic group (4) Specialty	Not stated	Yes	(1) Medical- 27 (2) Behavioural- 28 (3) Both- 30 (4) Neither- 27
Friedman	Randomized "using a paired randomisation protocol"	Not stated	Yes	23/133 (E- 17%) 11/134 (C- 8%)
Hetlevik	Method not stated	Not stated	No	816/984 (E- 17.1%) /1255 (C- 18.5%)
Krieger	Randomisation based on computer-generated random number table	Sealed opaque envelopes, sequentially numbered. Not clear who allocated individuals to groups	No	146/209 (E- 30.1%) 165/212 (C- 22.2%)
Dickinson	Method not stated	Not stated	No	51/51(E feedback- 0%) 78/78 (E education- 0%) 88/88 (E both- 0%) 33/33 (C neither- 0%)
Barnett	Method not stated but stratified by age and initial DBP (100mmHg or <100mmHg)	Not stated	No	44/63 (E- 30%) 27/52 (C- 48%)
Bulpitt	Method not stated	Not stated	No	25/136 (E- 18%) 36/142 (C- 25%)
Coe	Method not stated	Not stated	Yes	56/56 (E- 0%)

Table 1. Quality of included randomized trials *(Continued)*

				60/60 (C- 0%)
Robson	Random number tables	Not stated	No	?/1620 (E- ?%) ?/1586 (C- ?%)
Bloom	Method not stated	Not stated	Yes	12/27 (E- 44%) 19/27 (C- 74%)
Fletcher	Patients were "divided by meams of a table of random numbers"	Not stated	Uncertain	144/155 (93%) followed up at five months. Group losses to FU not reported
Bailey	Method not stated	Not stated	Yes	29/30 (E- 3%) 31/32 (C- 3%)
Webb	Method not stated	Not stated	Yes	37/37 (E1-0%) 31/31 (E2-0%) 55/55 (C-0%)
Hamilton	Method not stated	Not stated	No	0/17 (E- 0%) 4/17 (C- 24%)
Park	Method not stated	Not stated	No	5/32 (E- 16%) 6/32 (C- 19%)
Mehos	Yes "randomized using a deck of cards"	Not stated	No	2/20 (E- 10%) 3/21 (C- 14%)
Pierce	Yes "minimisation"	Not stated	Yes	59/59 (E health education)-0%) 54/57 (E monitor-8.5%)
Solomon	Yes, random number tables	Not stated	No	63/63 (E- 0%) 70/70 (C- 0%) 63/63 (E- 0%) 70/70 (C- 0%)
Burelle	Not stated	Not stated	No	8/8 (E- 0%) 8/8 (C- 0%)
Ahluwalia	Yes, computer generated random number table	Not stated	No	8/8 (E- 0%) 8/8 (C- 0%)
Vetter	Not stated	Not stated	No	296/296 (E- 0%) 326/326 (C- 0%)
Bogden	Randomisation by last digit of social security number: Odd # (E) Even # (C)	Not stated	Yes	1/50 (E- 2%) 4/50 (C- 8%)
Garcia-Pena	Randomisation by computer	Yes	Yes	345/345 (E- 0%) 338/338 (C- 0%)
Artinian	Method not stated	Not stated	No	6/6 (E), 9/9 (C)
Midanik	Method not stated	Not stated	No	74/102 (E- 28%) 72/102 (C- 30%)
New	Method not stated	Not stated	No	99/506 (19.6%) in intervention group compared to 132/508 (26.0%) in control group

Table 1. Quality of included randomized trials *(Continued)*

Rudd	Computer-generated assignment	Not stated	Blind outcome assessment	74/74 (E-0%) 74/74 (0%)
Ornstein	"Balanced adaptive randomisation scheme", 3 practice characteristics were: practice specialty, practice size and geographical location	Not stated	No- open RCT	4446/4446 (E- 0%) 3326/3326 (C- 0%)
Mc Manus	Random number generator and opaque envelopes	Yes	No- open RCT	25/ 214 (E-12%) 14/ 227(C-6%)
Baque	Unsure as only have translation of abstract	Unsure as only have translation of abstract	No- open RCT	133/703 (C- 19%) 487/622 (E- 22%)
Halme	Block randomisation 2: 3 OR 3: 2 BLOCKS	Not stated	No- open RCT	37/ 269 (14%)
Cakir	Centrally via Computer-generated assignment	Yes	Blind outcome assessment	2 /32 (E-6%) 8/38 (C- 21%)
Hunt	Computer-generated assignment	Yes	Blind outcome assessment	Not provided
McKInstry	Computer random generation	Yes	Blind outcome assessment	17/ 148 (E-11%) 16/ 146 (C-11%)
Hennesey	Comercially available spreadsheet programme	Not stated	Blind participant	1784/5401(E- 33%) 1753/5295(C-33%)
Sookaneknun	Simple randomisation technique?	Not stated	Blind participant	5/118 (E-4%) 3/117 (C-3%)
De Castro	Stratified by gender though a computer generated sequence.	Not stated	Double-blind randomized clinical trial	4/ 34 (E-12%) 3/ 37 (C-8%)
Tonstad	Presealed numbered consecutive envelopes with a 3:2 ratio for assignment to intervention or control groups	Opaque envelopes	No	2/ 31 (E-7%) 2/ 20 (C-10%)
Schroeder	Stratified by age and sex using computer generated numbers	Yes	No- open RCT	18/ 128 (E-14%) 23/ 117 (C-20%)
Wetzels	Computer generated centrally by Trial Coordinating Centre	Yes	Blind treatment providers	4/168 (E-2%) 1/ 90 (C-1%)

Table 1. Quality of included randomized trials *(Continued)*

Turnbull	Remote computer generated	Yes	No	9/ 170 (E-5%) 8/201 (C-4%)
Marquez	Done centrally by two investigators who were not field investigators but method not stated	Not stated	No	18/ 52 (E-35%) 19/ 52 (C-36%)
Contreras	Done centrally by two investigators who were not field investigators but method not stated	Not stated	No	98/636 (total-15%) No breakdown
Tobe	Opaque sealed envelopes using permuted block design	No	No	2/ 50 (E-4%) 2/ 49 (C-4%)

APPENDICES

Appendix 1. CENTRAL search strategy

#1 MeSH descriptor HYPERTENSION explode all trees 11049

#2 blood next pressure in Record Title 4480

#3 hypertens* in Record Title 12324

#4 (#1 or #2 or #3) 18179

#5 MeSH descriptor PHYSICIANS explode all trees 723

#6 MeSH descriptor PATIENT CARE MANAGEMENT explode all trees 9866

#7 MeSH descriptor PATIENT CARE PLANNING explode all trees 1066

#8 MeSH descriptor PATIENT CARE TEAM explode all trees 974

#9 MeSH descriptor PATIENT EDUCATION explode all trees 3728

#10 MeSH descriptor PATIENT PARTICIPATION explode all trees 488

#11 MeSH descriptor AMBULATORY CARE INFORMATION SYSTEMS explode all trees 22

#12 MeSH descriptor FEEDBACK explode all trees 705

#13 MeSH descriptor INFORMATION SYSTEMS explode all trees 1557

#14 MeSH descriptor MANAGEMENT INFORMATION SYSTEMS explode all trees 422

#15 MeSH descriptor Decision Support Systems, Clinical this term only 134

#16 MeSH descriptor Decision Making, Computer-Assisted this term only 110

#17 MeSH descriptor REMINDER SYSTEMS explode all trees 330

#18 MeSH descriptor GUIDELINES explode all trees 1337

#19 MeSH descriptor MEDICAL AUDIT explode all trees 244

#20 MeSH descriptor MEDICAL RECORDS explode all trees 1404

#21 MeSH descriptor Medical Records Systems, Computerized explode all trees 174

#22 MeSH descriptor PRIMARY HEALTH CARE explode all trees 2048

#23 MeSH descriptor Physicians, Family this term only 329

#24 MeSH descriptor Primary Nursing Care this term only 27

#25 MeSH descriptor NURSE PRACTITIONERS explode all trees 222

#26 MeSH descriptor NURSE CLINICIANS explode all trees 143

#27 MeSH descriptor HEALTH BEHAVIOR explode all trees 6432

#28 remind* in All Text 1310

#29 motiv* in All Text 3973

#30 MeSH descriptor PATIENT CARE this term only 74

#31 MeSH descriptor NURSING CARE this term only 146

#32 MeSH descriptor GUIDELINE ADHERENCE this term only 351

#33 MeSH descriptor AMBULATORY CARE this term only 2716

#34 MeSH descriptor BEHAVIOR THERAPY explode all trees 5550

#35 MeSH descriptor COUNSELING this term only 1531

#36 counsel* in All Text 6293

#37 MeSH descriptor MOTIVATION this term only 1544

#38 self next monitor* in All Text 854

#39 (patient* in All Text near/6 educat* in All Text) 6497

#40 (patient* in All Text near/6 manage* in All Text) 8483

#41 (patient* in All Text near/6 train* in All Text) 3254

#42 (patient* in All Text near/6 teach* in All Text) 1588

#43 (program* in All Text near/6 educat* in All Text) 4243

#44 (program* in All Text near/6 manage* in All Text) 2488

#45 (program* in All Text near/6 train* in All Text) 3521

#46 (program* in All Text near/6 teach* in All Text) 713

#47 self next manag* in All Text 983

#48 (manag* in All Text near/6 hypertension in All Text) 714

#49 (manag* in All Text near/6 blood next pressure in All Text) 264

#50 (monitor* in All Text near/6 blood next pressure in All Text) 2609

#51 (monitor* in All Text near/6 hypertension in All Text) 532

#52 MeSH descriptor HEALTH PROMOTION explode all trees 1618

#53 MeSH descriptor HEALTH EDUCATION explode all trees 5702

#54 reward* in All Text 693

#55 incentiv* in All Text 1031

#56 uncontrol* in All Text 2729

#57 MeSH descriptor SELF CARE this term only 1316

#58 (#5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14) 15288

#59 (#15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23) 5372

#60 (#24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33) 14333

#61 (#34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43) 30629

#62 (#44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53) 16207

#63 (#54 or #55 or #56 or #57) 5572

#64 (#58 or #59 or #60 or #61 or #62 or #63) 58634

#65 (#4 and #64) 3454

Appendix 2. MEDLINE search strategy

1 exp Hypertension/ (167533)

2 (blood adj pressure).ti. (33263)

3 hypertens$.ti. (120524)

4 or/1-3 (208545)

5 exp physicians/ (62183)

6 exp Patient Care Management/ (351254)

7 exp Patient Care Planning/ (40740)

8 exp Patient Care Team/ (40160)

9 exp Patient Education/ (50057)

10 exp Patient Participation/ (11975)

11 exp Ambulatory Care Information Systems/ (1034)

12 exp Feedback/ (21503)

13 exp Information Systems/ (98899)

14 exp Management Information Systems/ (27680)

15 exp Decision Support Systems, Clinical/ (2297)

16 exp Decision Making, Computer-Assisted/ (46651)

17 exp Reminder Systems/ (1144)

18 exp Practice Guidelines/ (42659)

19 exp Guidelines as topic/ (64954)

20 exp Medical Audit/ (10918)

21 exp Medical Records/ (56232)

22 exp Medical Records Systems, Computerized/ (13174)

23 exp Primary Health Care/ (49856)

24 exp Physicians, Family/ (11443)

25 exp Primary Nursing Care/ (1868)

26 exp Nurse Practitioners/ (11902)

27 exp Nurse Clinicians/ (6234)

28 exp Health Behavior/ (58847)

29 remind$.tw. (6318)

30 motiv$.tw. (41873)

31 Patient Care/ (4501)

32 Nursing Care/ (24234)

33 Guideline Adherence/ (9258)

34 Ambulatory Care/ (28816)

35 exp Behavior Therapy/ (35585)

36 Counseling/ (21055)

37 counsel$.tw. (40826)

38 Motivation/ (34065)

39 self monitor$.tw. (2518)

40 ((patient$ or program$) adj3 (educat$ or manage$ or train$ or teach$)).tw. (121066)

41 self manage$.tw. (3390)

42 ((manage$ or monitor$) adj3 (hypertension or blood pressure)).tw. (9858)

43 Health Promotion/ (31545)

44 exp Health Education/ (102113)

45 (reward$ or incentive$).tw. (25369)

46 uncontrol$.tw. (17033)

47 Self Care/ (14858)

48 or/5-47 (1087894)

49 4 and 48 (19344)

50 randomized controlled trial.pt. (246660)

51 controlled clinical trial.pt. (76052)

52 Randomized Controlled Trials/ (51847)

53 random allocation/ (59418)

54 double blind method/ (94259)

55 single blind method/ (11548)

56 or/50-55 (416351)

57 animal/ not human/ (3141649)

58 56 not 57 (390135)

59 clinical trial.pt. (439482)

60 exp clinical trials as topic/ (197049)

61 (clin$ adj25 trial$).ti,ab. (139080)

62 ((singl$ or doubl$ or treble$ or tripl$) adj25 (blind$ or mask$)).ti,ab. (93517)

63 placebos/ (26524)

64 placebo$.ti,ab. (106301)

65 random$.ti,ab. (393128)

66 research design/ (50559)

67 or/59-66 (882479)

68 67 not 57 (818962)

69 58 or 68 (840420)

70 49 and 69 (4661)

Appendix 3. EMBASE search strategy

1 exp hypertension/ (224295)

2 blood pressure.ti. (26788)

3 hypertens$.ti. (86298)

4 or/1-3 (241489)

5 patient referral/ (24316)

6 patient education/ (24921)

7 information system/ (10983)

8 feedback system/ (19306)

9 exp practice guideline/ (132101)

10 medical audit/ (11229)

11 exp primary health care/ (38904)

12 general practitioner/ (28102)

13 nurse practitioner/ (1862)

14 nurse/ (14123)

15 health behavior/ (14365)

16 treatment planning/ (64890)

17 patient counseling/ (18957)

18 behavior therapy/ (19880)

19 motivation/ (16574)

20 self monitoring/ (1519)

21 self care/ (5850)

22 occupational health nursing/ (1062)

23 ((patient$ or program$) adj3 (educat$ or manage$ or train$ or teach$)).tw. (97871)

24 ((manage$ or monitor$) adj3 (hypertension or blood pressure)).tw. (9279)

25 self monitor$.tw. (2307)

26 (reward$ or incentiv$).tw. (19491)

27 or/5-26 (485148)

28 4 and 27 (24029)

29 random$.tw. (360909)

30 factorial$.tw. (7393)

31 (crossover$ or cross over$ or cross-over$).tw. (37365)

32 placebo$.tw. (103564)

33 (double$ adj blind$).tw. (80760)

34 (singl$ adj blind$).tw. (7017)

35 assign$.tw. (100633)

36 allocat$.tw. (31580)

37 volunteer$.tw. (93637)

38 crossover procedure/ (19892)

39 double blind procedure/ (68037)

40 randomized controlled trial/ (153884)

41 single blind procedure/ (7329)

42 or/29-41 (610829)

43 exp animal/ or nonhuman/ (3022524)

44 exp human/ (6071669)

45 43 not 44 (2552403)

46 42 not 45 (535066)

47 28 and 46 (3668)

WHAT'S NEW

Date	Event	Description
17 February 2010	New search has been performed	Substantive update completed
17 February 2010	New citation required and conclusions have changed	New citation with change in authors. New data demonstrate that self-monitoring is associated with moderate net reduction in systolic and diastolic blood pressure.

HISTORY

Protocol first published: Issue 2, 2002
Review first published: Issue 1, 2005

Date	Event	Description
13 August 2008	Amended	Converted to new review format.
2 June 2006	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

All authors contributed to the design, article review, data extraction, analysis and write up of the review.

DECLARATIONS OF INTEREST

None declared.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- NHS R&D Primary Care Career Scientist Award, UK.
- Medical Research Council Health Services Research Training Fellowship Scheme, UK.
- Health Research Board, Cochrane Fellowship Scheme, Ireland.

INDEX TERMS

Medical Subject Headings (MeSH)

*Blood Pressure [drug effects]; Antihypertensive Agents [*therapeutic use]; Blood Pressure Monitoring, Ambulatory; Education, Medical, Continuing; Hypertension [drug therapy] [*therapy]; Patient Education as Topic; Randomized Controlled Trials as Topic; Self Care

MeSH check words

Humans