Will Exercise Advice Be Sufficient for Treatment of Young Adults With Prehypertension and Hypertension? A Systematic Review and Meta-Analysis

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Abstract—Previous studies report benefits of exercise for blood pressure control in middle age and older adults, but longer-term effectiveness in younger adults is not well established. We performed a systematic review and meta-analysis of published randomized control trials with meta-regression of potential effect modifiers. An information specialist completed a comprehensive search of available data sources, including studies published up to June 2015. Authors applied strict inclusion and exclusion criteria to screen 9524 titles. Eligible studies recruited younger adults with a cardiovascular risk factor (with at least 25% of cohort aged 18–40 years); the intervention had a defined physical activity strategy and reported blood pressure as primary or secondary outcome. Meta-analysis included 14 studies randomizing 3614 participants, mean age 42.2±6.3 (SD) years. At 3 to 6 months, exercise was associated with a reduction in systolic blood pressure of −4.40 mm Hg (95% confidence interval, −5.78 to −3.01) and in diastolic blood pressure of −4.17 mm Hg (95% confidence interval, −5.42 to −2.93). Intervention effect was not significantly influenced by baseline blood pressure, body weight, or subsequent weight loss. Observed intervention effect was lost after 12 months of follow-up with no reported benefit over control, mean difference in systolic blood pressure −1.02 mm Hg (95% confidence interval, −2.34 to 0.29), and in diastolic blood pressure −0.91 mm Hg (95% confidence interval, −1.85 to 0.02). Current exercise guidance provided to reduce blood pressure in younger adults is unlikely to benefit long-term cardiovascular risk. There is need for continued research to improve age-specific strategies and recommendations for hypertension prevention and management in young adults. **(*Hypertension*. 2016;68:78-87. DOI: 10.1161/HYPERTENSIONAHA.116.07431.)**

• **Online Data Supplement**

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Population studies estimate 1 in 17 adults below the age of 40 years are hypertensive[1] with higher prevalence in those with diabetes mellitus, obesity, familial predisposition, or prenatal and other early childhood factors.[2–7] Hypertension in early life significantly increases the risk of stroke and cardiovascular disease before the age of 50 years.[8–11] However, rates of diagnosis are consistently lower in younger adults and, even when identified, control is frequently suboptimal.[5,12–14] This may relate to an acceptance of higher blood pressures because of a perceived lower 5-year cardiovascular risk, particularly for those in the prehypertensive range. This is despite epidemiological evidence of cumulative vascular protection and lower disease burden in later life after change in blood pressure and lifestyle during early adulthood.[9,15–17] Together, these observations may explain why 1 in 5 strokes still occur in the below 55 years age group.[18]

To reduce burden of early stroke and cardiovascular disease, evidence-based guidance is required to improve hypertension prevention and management for young adult populations. Exploring heterogeneity in response pattern

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to exercise and linking exercise response with hypertensive and cardiovascular phenotypes identifiable within younger subgroups may be of value in future studies and offer opportunity to deliver more personalized and targeted intervention strategies. Current guidelines recommend specialist review of young adults with elevated blood pressure because the risk of hypertension may be underestimated in the below 40 years age group.[19] In the absence of significan end organ disease or secondary causes of elevated blood pressure, young adults below 40 years of age are encouraged to implement lifestyle changes, in particular regular exercise, as the first line for hypertension management.[20,21] A limitation of this guidance is that it is based on data from physical activity trials in older populations with mean ages >50 years.[22,23] There are many potential modifiers of intervention effect which are not consistent across age groups, including baseline physical activity,[24] barriers to participation,[25] and physiological training adaptations.[26] Therefore, we performed a new systematic review and meta-analysis to evaluate the quality of the evidence base and effectiveness of exercise intervention to reduce blood pressure in younger adult populations.

Methods

Protocol registration: PROSPERO (www.crd.york.ac.uk/PROSPERO/) registration number CRD42014009604.

Search Strategy and Selection Criteria

We completed a systematic review in accordance with established methods for Cochrane reviews of physical activity interventions (Online-only Data Supplement S1). We adhered to the Cochrane Handbook for Intervention Reviews and PRISMA statement (Data Supplement S2). An information specialist (N.R.) searched the following databases: Cochrane Central Register of Controlled Trials, MEDLINE & MEDLINE In Process, EMBASE, CINAHL, AMED, PsycINFO, SPORTdiscus, OpenGrey, Science Citation Index & Conference Proceedings Citation Index-Science, ACM Digital Library, and IEEE Xplore Digital Library. Cochrane highly sensitive search was used to identify randomized controlled trials. No language or date restrictions were applied. Bibliographies of review articles and selected articles were examined for relevant trials. Literature searches completed up to June 2015. Full description of data sources and search summary are available in the online-only Data Supplement (Data Supplement S1; Table S1).

Study Selection and Data Extraction

We included studies with mean population age between 18 and 40 years or within 1 SD of this range to ensure at least 25% of the study population were <40 years of age. To be representative of young adults who may be provided advice to manage blood pressure, included studies were required to recruit participants with ≥1 cardiovascular risk factor, or family history of cardiometabolic risk. Risk factors included hypertension or prehypertension (systolic blood pressure ≥120 mm Hg or diastolic blood pressure ≥80 mm Hg), overweight (mean body mass index >25 kg/m^2) but not severely obese (body mass index ≥35 kg/m^2), diabetes mellitus, metabolic syndrome, dyslipidaemia, smoking, and alcohol consumption. The defined body mass index exclusion criteria were based on the understanding that severely obese populations have higher burden of comorbidities and potential functional barriers to exercise participation that makes them a unique target audience. Studies examined the effectiveness of interventions with define exercise, physical activity or cardiovascular fitness components. The comparator was a control group exposed to placebo, no or minimal intervention. Blood pressure was reported as a primary or secondary outcome after a minimum follow-up of 3 months. Studies were required to have >80% complete follow-up data analyzing the results by intention-to-treat or, if not applying intention-to-treat, ensuring <20% study attrition. Additional details on inclusion criteria provided in the online-only Data Supplement (Data Supplement S1).

Titles and abstracts were screened independently by paired authors (W.W., H.R., A.L., and P.K.). Two authors (W.W. and H.R.) independently reviewed full-text articles and extracted data. Study inclusion was agreed by consensus in discussion with other authors (C.F. and P.L.). Missing or ambiguous data were clarified with the corresponding author. We assessed risk of bias for studies that met inclusion criteria for meta-analysis using the Cochrane Risk of Bias Tool, which was expanded to include risk areas specific for physical activity and blood pressure interventions (Data Supplement S1). Quality of included studies were summarized using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.[27]

Statistical Analysis

Studies were analyzed using mean and SD of outcomes expressed in the original papers. Clinic blood pressures, measured at rest, were reported across all studies and used as the outcome measures. We expressed effect size using the mean difference between the postintervention values of the randomized groups. If required, we imputed SDs from SEs and confidence intervals (CIs) using methods described in the Cochrane handbook.[27] When studies investigated multiple interventions arms, intervention arms inclusive of exercise were included as individual intervention strata. Mean values were plotted with associated error bars using forest plots. Statistically significant results were identified as CIs excluding a null effect and P value of <0.05. Heterogeneity was assessed through examination of the forest plots and quantified using the I^2 statistic. I^2 statistics were graded according to Cochrane interpretation (>75% considerable/large heterogeneity). Reporting bias was assessed by plotting a funnel plot of intervention effect on blood pressure (Data Supplement S1).

We completed meta-analysis according to Cochrane methods,[27] using RevMan version 5.2 statistical software.[28] A random-effects model was the default to incorporate heterogeneity between studies, the inverse variance method was used to calculate the overall effect and SE.[29]

Planned subgroup analysis of included studies was completed according to the following covariants: (1) baseline blood pressure, (2) baseline weight, (3) delivery method, whether exercise was self-directed or supervised, (4) estimated contact time between participants and intervention, (5) target intensity of exercise, and (6) change in weight after intervention (Data Supplement S1).

Meta-regression analysis was performed using the Wilson (2010) SPSS macro using IBM SPSS Statistics for Windows, version 22.0.[30] Meta-regression was performed using a random-effects model to examine whether study level covariates (potential effect modifiers) predict intervention effect on systolic and diastolic blood pressure between studies at 3 to 6 months follow-up. A priori the following factors where agreed for inclusion in the meta-regression model: (1) mean arterial blood pressure combining systolic and diastolic blood pressure, (2) estimated contact time between participants and intervention, (3) target exercise intensity during intervention, and (4) effect of intervention on weight loss calculated as the standard mean difference between intervention and control post intervention to allow comparison between studies reporting change in weight and body mass index (FigureS3a and S3b).

Results

Results of Search

We screened 9524 titles and abstracts reviewing 786 full-text articles (Figure 1). We identified 14 randomized control trials (RCTs) with 20 exercise intervention arms for inclusion,

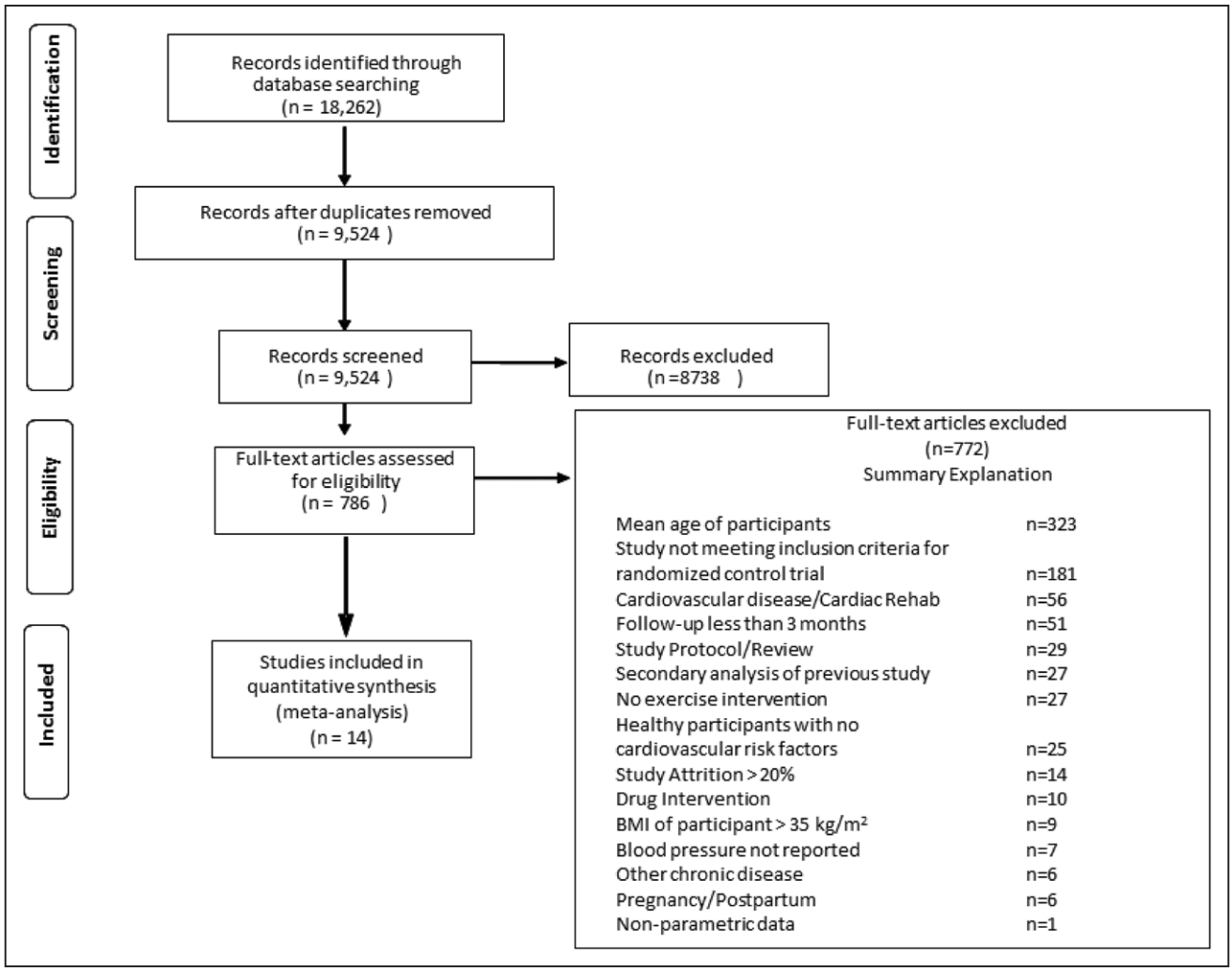

Figure 1. PRISMA flow diagram describing the screening and selection of studies for inclusion in meta-analysis.

published between 1985 and 2015 (Table 1; Table S2). The RCTs randomized 3614 participants with a recognized cardiovascular risk factor, mean age 42.2 years (SD, 6.3). Over 75% of participants were white and only 35% were female (Table 1). The studies recruited prehypertensive and stage 1 hypertensive participants. The majority of stage 1 hypertensives were not medicated at time of intervention, 1 study included participants that continued with antihypertensive prescription (n=15).

Excluded studies, with explanation of exclusion listed in the online-only Data Supplement (Table S3). The major reason for study exclusion was age of population outside inclusion criteria (n=323; Figure 1). One hundred fifty eight of these studies reported blood pressure as a primary outcome, of these, 73 studies excluded participants <35 years of age. None of the excluded cardiovascular studies performed subgroup analysis separating intervention effects by age. Other common explanations for study exclusion included non-RCT design or lack of true exercise control arms (n=181), or study objectives focused on acute or short-term exercise response, primarily in healthy participants (n=51).

Description of Included Studies

The majority of participants received a combined behavioral intervention with a defined physical activity strategy (Table S2). Eighteen intervention exercise arms targeted increase in moderate to vigorous physical activity, 12 intervention arms delivered structured, supervised aerobic exercise programs in gym and group environments with intensity defined by baseline exercise testing. Seven trial intervention arms promoted self-directed increase in physical activity supported by regular group and individual counseling sessions. Behavioral counseling was delivered by multidisciplinary professional groups. Contact time with the intervention in the first 3 months ranged from 5 to 48 hours, average 25 hours. The average in the first 3 months for studies reporting 3- to 6-month outcome was 30 hours (Table S2). The minimum follow-up for inclusion in the present systematic review was 3 months, 10 studies report 3 to 6 months of follow-up data (15 intervention arms, n=2716). Five studies complete follow-up at 3 months and 6 studies report follow-up after 12 months (8 intervention arms, n=3023, Table S2).

Table 1. Baseline Description of Study Populations Participating in RCTs Included in Meta-Analysis

Study	Mean Age (SD)	Age Range, Y	Female, %	Weight, kg (SD)	BMI, kg/m^2	Intervention Group, BP mm Hg		Control Group, BP mm Hg	
						Systolic	Diastolic	Systolic	Diastolic
Duncan, 1985	30.4 (.)	21–37	0	86.4 (14)	…	146.3 (5.9)	94.3 (4)	145 (5.5)	93.3 (3.8)
Stamler, 1989	37 (3.5)	30–44	13	84.3 (11)	…	122.2 (6.7)	82.4 (2.8)	122.9 (7)	82.6 (3)
Blumenthal, 1991 Aerobic Exercise	45.2 (7.8)	29–59	38	82 (13)	27	141 (9)	96 (6)	142 (12)	96 (6)
Blumenthal, 1991 Strength	45.2 (7.8)	29–59	42	81 (15)	27.2	143 (10)	95 (5)	142 (12)	96 (6)
Stevens 1993 TOPH Weight Loss and Exercise	42.8 (6.1)	30–54	32	89.7 (13)	29.5	124.3 (8.4)	83.7 (2.6)	124.6 (8.1)	84 (3)
Whelton 1997 TOHP Combined Lifestyle	43.6 (6.2)	30–54	31	93.6 (14.2)	…	127.4 (6.5)	86 (1.9)	127.3 (6.4)	85.8 (1.9)
Whelton 1997 TOHP Weight Loss and Exercise	43.4 (6.1)	30–54	37	93.4 (14.1)	…	127.6 (6.1)	86 (1.9)	127.3 (6.4)	85.8 (1.9)
Blumenthal 2000 Aerobic exercise	46.6 (8.8)	>29	54	95.4 (14.5)	32.8	138.1 (15.4)	93.6 (7.3)	143.8 (6.9)	94.4 (3.4)
Blumenthal 2000 Aerobic exercise and Weight	48.5 (8.9)	>29	62	93.3 (17.7)	32.1	142.7 (10.4)	93.2 (5.2)	143.8 (6.9)	94.4 (3.4)
Tsai 2002	41 (8.6)	20–60	45.2	…	23.6	134.3 (12.2)	85.3(10.2)	137.6 (7.9)	91.6 (7.9)
Esposito 2003	34.6 (5)	20–46	100	94.5 (9.3)	34.8	124 (8.5)	85 (4.7)	123 (7.9)	85 (4.9)
Olson 2006	38 (6)	24–44	30	38 (6)	27.6	119 (7.7)	67 (7.7)	119 (11.6)	68 (11.6)
Kinmonth 2008 In Person	40.6 (6)	20–50	62	78.6 (15.6)	27.7	122.6 (12.6)	77.9 (9.0)	122.6 (12.6)	78.2 (9.0)
Kinmonth 2008 Telephone	40.6 (6)	20–50	62	79.9 (18)	27.8	124.2 (13.0)	79.1 (10.6)	122.6 (12.6)	78.2 (9.0)
Marquez-Celedonio 2009	43.2 (7·8)	30–55	.	78.1 (15)	31.2	133.0 (4.4)	87.6 (2.84)	132.7 (4.2)	85.6 (4.1)
Knoepfli-Lenzin 2010 Football	37 (4)	20–45	0	82.1 (8.7)	26	134 (7.0)	87 (4.0)	134 (4.0)	86 (3)
Knoepfli-Lenzin 2010 Running	36 (5)	20–45	0	87.3 (9.4)	26	136 (9.0)	87 (5.0)	134 (4.0)	86 (3)
Edwards 2011 Aerobic Exercise	45.9 (10.4)	25–65	50	…	30.1	140.6 (9.8)	89.8 (11.2)	137.6 (11.5)	88.2 (9.2)
Edwards 2011 Aerobic Exercise and Weight Loss	45.9 (10.4)	25–65	50	…	31.2	139.9 (10.5)	85.1 (10)	137.6 (11.5)	88.2 (9.2)
Krustrup 2012	46 (7.3)	31–54	0	97.8 (13.6)	30	151 (10)	92 (7)	153 (8)	96 (6)

Mean values presented with SD. Sex distribution presented as percentage of females included. Missing or unreported values represented as (.). BMI indicates body mass index, kg/m^2; BP, blood pressure; RCTs, randomized control trials; and TOHP, Trials of Hypertension Prevention.

Risk of Bias and Quality Assessment

The funnel plot of intervention effect on systolic blood pressure was symmetrical about the mean effect size line, suggesting there was no particular study publication bias (Figure S1). Overall quality of the included RCTs using the GRADE approach suggests moderate quality data (Figure S2). In total, 9 studies are downgraded secondary to study design and outcome reporting being unclear or at risk of bias with limited reporting of participant allocation methods and lack of clarification of blinding during outcome assessment. A significant limitation of the included studies was the lack of reference to published study protocols that adhere to the template for intervention description and replication.[31] Only the Trials of Hypertension Prevention (TOHP) and ProActive UK studies consistently reference published study protocols (Data Supplement S3; Table S2).

Participant Compliance With Intervention and Effect on Cardiovascular Fitness and Weight

The majority of studies reported >80% participant compliance with intervention at 3 to 6 months, recorded as attendance at supervised classes and group meetings, or achievement of behavioral targets, such as self-reported minutes of activity. However, compliance with behavioral targets dropped to an estimated 40% beyond 12 months.

Eight intervention arms deliver exercise in combination with weight management, 4 of these interventions report a significant reduction in weight loss compared with control at 3 to 6 months (Figure S3a). Dietary assessment was undertaken using self-report diaries during periods of 1 to 7 days. The majority of studies use diary cards as aids to behavior change as opposed to assessing compliance, only 3 studies report the change in dietary intake. Mean cardiovascular fitness was reported from 14 intervention arms, the median increase was 12% improvement in peak exercise capacity (range, 3%–30%).

Intervention Effect on Blood Pressure

Forest plots for mean differences in systolic and diastolic blood pressure after 3 to 6 months of intervention are presented in Figure 2 (Figure S4a and S4b). Mean difference in systolic blood pressure was −4.40 mm Hg (95% CI, −5.78 to −3.01) and −4.17 mm Hg (95% CI, −5.42 to −2.93) for diastolic blood pressure when intervention was compared with control.

There are no significant differences between intervention and control group blood pressures when followed up at, or beyond, 12 months (Figure 2; Data Supplement S5a and S5b). Mean difference in systolic blood pressure −1.02 mm Hg (95% CI, −2.34 to 0.29) and mean difference in diastolic blood pressure was −0.91 mm Hg (95% CI, −1.85 to 0.02).

Subgroup Analysis

I^2 statistic identified moderate to considerable heterogeneity across the studies (56%–72%) at 3 to 6 months of follow-up. Subgroup analysis did not provide a consistent explanation for

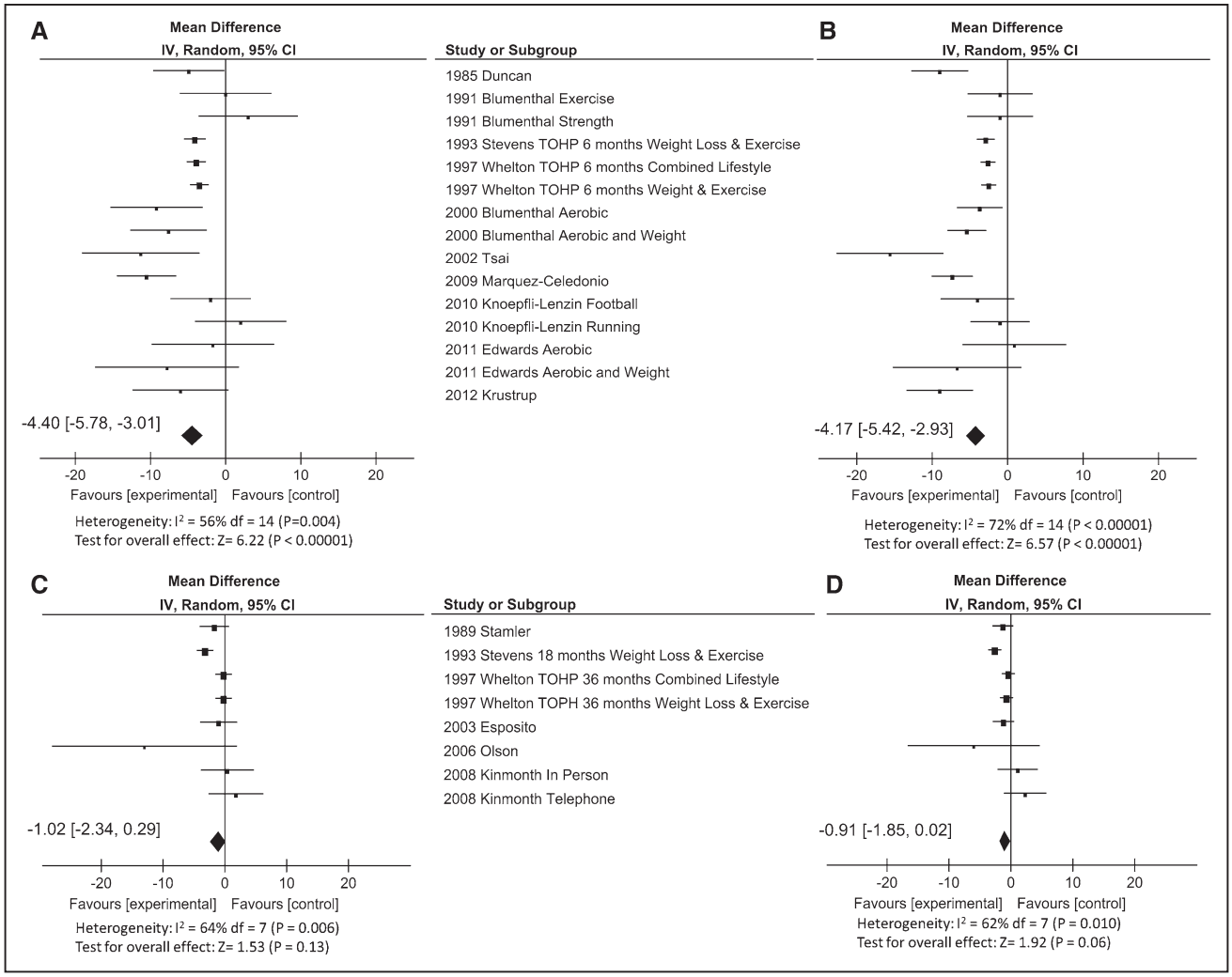

Figure 2. Forest plot demonstrating mean difference in systolic and diastolic blood pressure (mm Hg) after 3 to 6 months (**A** and **B**) and at, or beyond 12 months (**C** and **D**) follow-up. Included studies are all randomized control trial design delivering exercise and physical activity lifestyle intervention. Results for individual exercise intervention arms reported when available. Squares represent mean difference between intervention and control post intervention with 95% confidence intervals (CIs), size of the square proportional to the weight of the study; pooled estimates from meta-analysis are depicted as solid black diamonds.

Table 2. Subgroup Analysis of Effects of Intervention on Systolic and Diastolic Blood Pressure According to Study Level Characteristics

Group	Intervention Arms	n	Systolic BP, mm Hg	Diastolic BP, mm Hg
Overall Intervention effect ≤6 months of follow-up	15	2716	−4.40 (−5.78, −3.01) I^2=56%, Z=6.22 (P<0.00001)	−4·17 (−5·42, −2·93) I^2=72%, Z=6·57 (P<0·00001)
Intervention effect ≥12 months	8	3023	−1.02 (−2.34, 0.29) I^2=64%, Z=1.53 (P=0.13)	−0.91 (−1·85, 0·02) I^2=62%, Z=1.92 (P=0·06)
Baseline weight <90 kg	7	815	−3.0 (−6.04, 0.05) I^2=72%, Z=1.93 (P=0.05)	−3·88 (−6·13, −1·63) I^2=73%, Z=3·38 (P=0·0007)
Baseline weight ≥90 kg	5	1806	−4.23(−5.49, −2.98) I^2=32%, Z=6.6 (P<0.00001)	−3·69 (−5·09, −2·30) I^2=69%, Z=5·2 (P<0·0001)
Baseline systolic BP <140 mm Hg and Diastolic <90 mm Hg	7	2370	−4.41 (−6.06, −2.77) I^2=69%, Z=5.25 (P<0.00001)	−3·87 (−5·33, −2·41) I^2=77%, Z=5·20 (P<0·00001)
Baseline systolic BP ≥140 mm Hg and or Diastolic ≥90 mm Hg	8	346	−4.35 (−7.26, −1.44) I^2=42%, Z=2.93 (P=0.003)	−4·55 (−6·91, −2·19) I^2=62%, Z=3·78 (P=0·0002)
Aerobic supervised exercise (follow-up ≤6 months)	11	475	−5.40 (−8.08, −2.72) I^2=56%, Z=3.95 (P<0.0001)	−5·43 (−7·58, −3·28) I^2=67%, Z=4·95 (P<0·00001)
Self-directed physical activity (follow-up ≤6 months)	3	2199	−3.81 (−4.52, −3.09) I^2=0%, Z=10.39 (P<0.00001)	−2·64 (−3·20, −2·08) I^2=0%, Z=9·18 (P<0·00001)
Weight loss >4 kg	6	1586	−5.03 (−6.89, −3.17) I^2=65%, Z=5·31 (P<0.00001)	−4·77 (−6·54, −2·99) I^2=79%, Z=5·27 (P<0·00001)
Weight loss ≤4 kg	6	1236	−2.61 (−5.77, 0.55) I^2=61%, Z=2.07 (P=0.11)	−2·95 (−4·76, −1·13) I^2=53%, Z=3·18 (P=0·001)
Moderate exercise intensity (≤60%)	5	2265	−3.40 (−4.59, −2.21) I^2=50%, Z=5.60 (P<0.0001)	−2.58 (−3.13, −2.03) I^2=0%, Z=9.14 (P<0.00001)
Moderate to vigorous intensity (>60%)	10	451	−6.19 (−8.64, −3.73) I^2=43%, Z=4.93 (P<0.0001)	−5.92 (−8.09, −3.76) I^2=64%, Z=5.36 (P<0.00001)
Contact time <60 h	9	806	−2.83 (−5.33, −0.34) I^2=46%, Z=2.23 (P=0.03)	−3.91 (−6.33, −1.49) I^2=67%, Z=3.16 (P=0.002)
Contact time, ≥60 h	6	1910	−5.61 (−7.55, −3.67) I^2=69%, Z=5.68 (P<0.00001)	−4.57 (−6.22, −2.92) I^2=80%, Z=5.42 (P<0.00001)

Results at 3- to 6-month follow-up used unless otherwise stated. Mean differences are pooled estimates from meta-analysis with 95% confidence intervals. I^2 values reported as measure of heterogeneity. Z scores with associated P values reported as test for overall effect.

heterogeneity between studies for both systolic and diastolic blood pressure. I^2 statistic reduced to <45% for systolic blood pressure when analysis was restricted to hypertensive groups, groups with baseline weight >90 kg and self-directed intervention (Table 2).

Supervised aerobic exercise, higher exercise intensity, and increased contact time with intervention were associated with larger reductions in systolic and diastolic blood pressures (Table 2). Reduction in diastolic blood pressure was significantly greater when comparing supervised (−5.43 mm Hg [95% CI, −7.58 to −3.28]) with self-directed exercise (−2.64 mm Hg [95% CI, −3.20 to −2.08]) and when intervention targeted higher intensity compared with moderate intensity. Blood pressure reductions appeared greater in association with >4 kg weight loss, a weight loss threshold identified from previous systematic review.[32] However, observed differences did not reach significance (systolic BP, −5.03 mm Hg [95% CI, −6.89 to −3.17] versus −2.61 mm Hg [95% CI, −5.77 to 0.55] and diastolic BP, −4.77 mm Hg, [95% CI, −6.54 to −2.99] versus −2.95 mm Hg [95% CI, −4.76 to −1.13]). There were no significant differences in intervention effect when groups were separated as hypertensive or prehypertensive at baseline (Table 2).

Meta-Regression

The a priori meta-regression model explained 50% of variance in intervention effect on systolic blood pressure. Increased intensity of exercise and hours of contact with the intervention were significantly associated with reduction in systolic blood pressure (Table 3). Baseline mean arterial blood pressure and standard mean difference in weight loss (Figure S3a) between exercise and control groups post intervention were not significant predictors of mean reduction in systolic bloo pressure. The a priori model did not provide significant explanation for variance in diastolic blood pressure response.

Discussion

This is the first systematic review to apply age criteria to evaluate the RCT evidence base to promote exercise to prevent and manage hypertension in younger adults. In the short-term (3–6 months), exercise and physical activity interventions are beneficial, with between 4 and 5 mm Hg

Table 3. Meta-Regression Model Comparing Effect of Study Level Covariates on Post Intervention Systolic (1) and Diastolic (2) Blood Pressure (mm Hg) Compared With Control

	Model 1. Systolic Blood Pressure			Model 2. Diastolic Blood Pressure		
Variable	β_1±SE	95% CI	*Z* (*P*)	β_1±SE	95% CI	*Z* (*P*)
MABP, mm Hg	0.3161±0.1625	−0.0230, 0.6346	1.95 (0.052)	−0.0255±0.1966	−0.4108, 0.3599	−0.13 (0.897)
Hours of contact	−0.0718±0.0336	−0.1376, −0.0060	−2.14 (0.032)	0.0192±0.0404	−0.0601, 0.0985	0.47 (0.635)
Exercise intensity	−0.1458±0.0601	−0.2636, −0.0281	−2.43 (0.015)	−0.1275±0.0724	−0.2695, 0.0144	−1.76 (0.078)
Weight loss	−0.9610±1.6473	−4.1897, 2.2677	−0.58 (0.560)	2.1510±1.9962	−1.7615, 6.0635	1.08 (0.281)

Model statistics for systolic blood pressure R^2=0.50, Q=16.4, df=4.0, *P*=0.0025. Model statistics for diastolic blood pressure R^2=0.23, *Q*=4.95, df=4.0, *P*=0.293. CI indicates confidence intervals; MABP, mean arterial blood pressure at baseline, mm Hg; and *Z*(*p*), *z*-score and *P* value.

reductions in blood pressure. This is a larger effect than reported from a recent review reporting results from older adult groups and prehypertension groups.[22] This may be explained by selection criteria, we excluded normotensive cohorts with no cardiovascular risk factors. Alternatively, the result may suggest that younger adults may be more responsive to exercise as an intervention to lower blood pressure. There were also comparable benefits in blood pressure reduction for both prehypertension and hypertension groups, which have not been observed previously in older adult groups.[22] Early adulthood may be an important life stage to target cardiovascular risk reduction. It is identified as a period where at risk groups present with hypertension.[7] In addition, adverse cardiovascular risk profile in early adulthood are predictive of future morbidity.[17,33,34] Transition to early adulthood is identified as a period of decline in physical activity,[35] with low fitness in early adulthood predictive of cardiometabolic dysfunction in middle age.[36,37] In contrast, maintained or increased cardiovascular fitness in younger adults can change cardiovascular risk trajectory.[16,38] However, a dominant finding is that we have not observed any sustained effects in blood pressure reduction from studies reporting outcomes after 12 months. This is the first review in the blood pressure literature to explore the sustained effects of exercise intervention and the first to exclude studies with <3 months follow-up, which may have previously contributed to overestimation of effect.[22,39] Our reported findings are similar to patterns observed in the general physical activity literature with a longitudinal decline in compliance with maintaining physical activity. The current evidence supports the need to build more detailed physical activity recommendations for hypertension management in younger adult populations.

Current guidelines recommend review of adults below 40 years of age with elevated blood pressure for exclusion of secondary causes of hypertension.[19] The age inclusion criteria for this review were defined to align with this practice. However, a major limitation is the paucity of studies recruiting younger adults. Hypertension in younger adults is complicated by high rates of underdiagnosis and, when identified, suboptimal treatment.[5,12–14] These deficiencies may reflect broader misconception that younger age is sufficiently protective against cardiovascular risk.[5,12–14] This pattern is reflected in this review with an observed age bias for study recruitment in favor of older adults. The majority of excluded trials recruit cohorts >50 years of age. In addition, >46% of studies reporting blood pressure as a primary outcome excluded participants below 35 years of age.

Improved risk evaluation and interpretation of the benefits of blood pressure reduction may facilitate discussion on how to reform hypertension management for younger adults. An example is clinical interpretation of the reported 4 to 5 mm Hg reduction in blood pressure, if this was sustained in a younger adult cohort with prehypertension, the estimated 5-year incidence of hypertension would reduce from 1 in 5 to 1 in 10.[40] This interpretation may be more beneficial than prediction of 10-year risk of cardiovascular events, which is difficult in younger adults.[41,42] However, long-term benefits on cardiovascular end points can be estimated; a sustained 2 mm Hg reduction in blood pressure could translate to 7% to 10% reduction in stroke and ischemic cardiovascular event.[9] The major challenge is how to achieve sustained effect. In this review, intervention effect dropped to 1 mm Hg by 12 months with no significant difference compared with control.

To provide a platform to improve future intervention design, we present an evaluation of study level characteristics that predict intervention effect at 3 to 6 months. With regard to intervention strategy and delivery, both supervised and self-directed exercise achieve reduction in blood pressure, although effect was greater with supervised exercise. This may reflect a dose effect; supervised exercise was associated with increased exercise participation in the short-term. This group also achieved higher exercise intensity and increased cardiovascular fitness. However, higher volumes of planned contact time between participant and intervention, irrespective of intensity, or self-directed exercise were also associated with greater reduction in blood pressure at 3 to 6 months. Explanation for the subgroup analyses may relate to distinctions between physiological and behavioral influences of intervention. The exposure to higher exercise intensity may drive a mechanism for change in blood pressure distinct from low-level activity. Self-directed and lower intensity exercise had relatively lower effects on diastolic blood pressure, which is consistent with previous observations that blood pressure responses differ with intervention strategy.[22,23,32]

The finding that contact time, independent of intensity is associated with a positive influence on systolic blood pressure may support a beneficial effect of increased frequency

of low to moderate activity. However, interpretation is limited without objective and repeated measures of physical activity behavior, which was not reported in studies with 3 to 6 months of outcomes. Alternatively, planned contact, inclusive of telephone and remote contact may be a stimulus for sustained behavior. Unfortunately, the pattern across studies is that as contact is withdrawn intervention effect declines. This is despite several studies implementing recommended behavior strategies, such as promotion of participant self-effica y, activity planning, self-monitoring, and participant feedback.[25,43] Participant motivation and self-effica y are of particular relevance as, despite the low attrition rates, the included studies report decline in scheduled attendance and compliance with intervention targets from >80% at 3 to 6 months to 40% at 18 months. There are currently no strategies that effectively address the challenge of promoting sustained long-term physical activity behavioral change. A promising approach is a personalized intervention supported by device-assisted behavioral change and fl xible communication strategies to better sustain effective intervention.[43] The use of wearable activity monitors and physical activity tracking applications on mobile devices can provide objective measures of behavior, facilitate self-monitoring, and allow real-time feedback. However, the resource demands of maintaining high contact time and technology supported behavior change may be a barrier to clinical translation. Economic evaluation of effective interventions with reference to delivery cost and process evaluation of strategies to sustain participant engagement, motivation, and compliance may help to drive innovation and overcome these barriers.

Improvement in intervention design and delivery may also benefit from more transparency and disclosure of the specific methods and content of delivered communication strategies. There were often only brief summaries available, which described the professional team, if communication training was provided to the team, and broad categorical descriptors of intervention themes discussed with participants. In the current review, several studies focused communication strategies around weight loss, promoting exercise as a mechanism for weight loss. However, an interesting observation from the review which may help to guide the evolution of future studies is the patterns of intervention effect associated with weight loss. Previous review identified that weight loss >4 kg was required to achieve significant blood pressure reduction.[32] However, in our review, short-term benefits of exercise on blood pressure were seen even in those who did not achieve this degree of weight loss. This observation is supported by weight loss not being a significant effect modifier in the regression model. The positive message is that in the short-term, exercise is beneficial for blood pressure reduction independent of pre- or postintervention weight. Distinguishing between the independent benefits of exercise and weight loss may facilitate effective communication and participant engagement strategies, especially when participants may be motivated by different health and well-being goals.

Limitations

Major limitations are the paucity of research studies recruiting younger adult or performing subgroup analysis defined by age. Included studies did not present results by age preventing analysis of effect in early adulthood. Evaluation of the available literature base would be strengthened by meta-analysis of individual participant data, but this was outside the scope of the review. The results would be strengthened by using ambulatory blood pressure, only 3 studies reported ambulatory blood pressure in addition to clinic blood pressure. Identification of effective intervention components is limited by several study level factors, including lack of objective measurement and tracking of physical activity behavior, limited description of content and delivery of communication strategies, and lack of disclosure of effectiveness of intermediate intervention process outputs such as strategies to maintain participant engagement and compliance. In the majority of studies, there is also risk of bias in relation to participant allocation concealment and blinding of outcome assessors, with methods not discussed or unclear, which may risk overestimation of intervention effectiveness. However, overall the quality of included studies were moderate and funnel plots suggest no evidence of reporting bias, though caution in interpretation is required because of the small number of studies.

Perspectives

This review raises concern that current clinical practice to promote lifestyle and exercise intervention risks suboptimal management of young adult hypertension. Although it has been pragmatic to assume that exercise will improve blood pressure in young adults, the available evidence suggests current intervention strategies do not maintain long-term benefit. Discussion with young adult patient and public groups highlight that lifestyle interventions remain an attractive alternative to starting potential lifelong prescriptions for blood pressure. However, short-term reduction in blood pressure reported in this review involved multiple contacts over time and delivery of targeted exercise prescription. These strategies generally required supervised exercise interventions, which are expensive and currently not widely supported.[44] A major challenge for the clinical research community is to design and evaluate interventions which target sustained increase in physical activity behavior, accommodate potential for titration of exercise prescription, and deliver improvement in the cost per quality adjusted life year. Translation of research findings into clinical practice may be improved by study design incorporating comparative adaptiveness evaluations and exploring interactive effects with prescription medication. Going forward there seems to be a need for strategic overhaul of the approaches implemented in the prevention and management of young adult blood pressure.

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Disclosures

None.

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Novelty and Significance

What Is New?

- An age defined review of randomized trials, with long-term follow-up, designed to assess effectiveness of exercise intervention for blood pressure reduction in younger adults.

What is Relevant?

- Exercise intervention is beneficial for young adults in the short-term at 3 to 6 months but has no sustained effect at, or beyond, 12 months. Efficacy of intervention at 3 to 6 months was dependent on intensity of exercise and contact time with intervention teams.

Summary

Current recommendations for lifestyle and exercise interventions risk undertreating younger adults. There is a need for review of practice and development of affordable interventions that deliver appropriate dose of exercise and sustained behavior change.

Hypertension
Journal of the American Heart Association

Will Exercise Advice Be Sufficient for Treatment of Young Adults With Prehypertension and Hypertension? A Systematic Review and Meta-Analysis

Wilby Williamson, Charlie Foster, Hamish Reid, Paul Kelly, Adam James Lewandowski, Henry Boardman, Nia Roberts, David McCartney, Odaro Huckstep, Julia Newton, Helen Dawes, Stephen Gerry and Paul Leeson

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ONLINE SUPPLEMENT

WILL EXERCISE ADVICE BE SUFFICIENT FOR TREATMENT OF YOUNG ADULTS WITH PRE-HYPERTENSION AND HYPERTENSION? A SYSTEMATIC REVIEW AND META-ANALYSIS

Wilby Williamson[1], Charlie Foster[2], Hamish Reid[2], Paul Kelly[3], Adam James Lewandowski[1], Henry Boardman[1], Nia Roberts[4], David McCartney[5], Odaro Huckstep[1], Julia Newton[6], Helen Dawes[7], Stephen Gerry[8] Paul Leeson[1]

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Short Title: Exercise and Blood Pressure in Younger Adults

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ONLINE SUPPLEMENT

Contents:

S1: Methods Supplement

Data Sources

Cochrane Central Register of Controlled Trials (Cochrane Library, Wiley)[Issue 5, 2015], MEDLINE & MEDLINE In Process (OvidSP) [1946-present], EMBASE (OvidSP0[1974- June 2015 (week 2)], CINAHL (EBSCOHost) [1982-present], AMED (OvidSP) [1985-June 2015], PsycINFO (OvidSP) [1967-present], SPORTdiscus (EBSCOHost) [17th June 2015], OpenGrey, Science Citation Index & Conference Proceedings Citation Index-Science (Wed of Science, Thomson Reuters) [1945-present], ACM Digital Library and IEEE Xplore Digital Library. Cochrane highly sensitive search was used to identify randomized controlled trials. No language or date restrictions were applied. Bibliographies of relevant review articles and selected articles were examined for potentially relevant trials. Literature searches completed up to June 2015

Study Inclusion Criteria and Selection

The following inclusion criteria were applied to determine if the full paper needed further scrutiny.

Did the study:

1. Aim to examine the effectiveness of an intervention that included an exercise/physical activity/cardiovascular fitness component on a primary outcome of blood pressure?

2. Include a participant population with a cardiovascular risk factor including hypertension or pre-hypertension (systolic blood pressure ≥ 120 mmHg and/or diastolic blood pressure ≥ 80 mmHg), overweight (mean BMI > 25 kg/m^2) but not severely obese (mean BMI > 35 kg/m^2), diabetes, metabolic syndrome and dyslipidaemia, family history of cardiovascular or metabolic risk, or smoking and alcohol consumption?

3. Allocate participants to the intervention or control group using a method of randomisation?

4. Have a control group that is exposed to placebo, no and/or minimal intervention?

5. Include adults of 18 years and older, with a mean population age below 40 years old or within one standard deviation of this range, with aim for at least 25% of the study population to be younger adults?

6. Recruit community dwelling adults?

7. Have a follow-up period of at least 3 months between commencing the intervention and measuring the outcomes?

8. Have over 80% complete follow-up data analysing the results by intention-to-treat or, if not applying intention to treat, ensuring that there is less than 20% attrition from the study?

Data collection and management

Data extraction was piloted by two authors (CF, WW) and subsequently adjusted to ensure it captured the relevant data. Two authors (WW and HR) independently extracted the data from all the selected studies using a standard template piloted in previous Cochrane reviews.[1,2] When there was disagreement a third author reviewed the study and a consensus was reached (PL or CF). We separately extracted data from multiple publications of the same study and then combined them to avoid replication. Any missing or ambiguous data was clarified with the study corresponding author.

Assessment of risk of bias in included studies

The risk of bias was only assessed and reported for studies that met the inclusion criteria for meta-analysis.[3] The Cochrane Risk of Bias assessment instrument was expanded to include risk of bias assessment specific for physical activity and blood pressure interventions.[2] Two authors (WW, HR) assessed the risk of bias. Where there was disagreement between review authors in the risk of bias assessment, a third author (CF or PL) was asked to independently appraise the study and discrepancies were resolved by consensus between authors.

We assessed the studies for the five general domains of bias: selection, performance, attrition, detection, and reporting. Risk of bias scores were allocated for:

1. Allocation sequence generation;
2. Allocation concealment;
3. Incomplete outcome data;
4. Selective outcome reporting;
5. Comparable groups at baseline;
6. Contamination between groups,
7. Validated blood pressure measurement protocol,
8. Outcome measure applied appropriately;
9. Final analysis adjusted for baseline blood pressure levels;
10. Outcome assessment that was independently and blinded;
11. Intention-to-treat analysis

Where sufficient information was available, each domain was identified as “high” or “low” risk of bias. Where there was a lack of information or uncertainty over the potential for bias, we described the domain as “unclear”.[2] We judged the studies overall as having a “low”, “medium”, or “high” risk of bias given consideration of the study design and size, and the potential impact of the identified weakness noted in the table for each study. The assessment of risk of bias and quality of included RCTs was then summarized using the GRADE approach.[4]

Summary measures of treatment effect and unit of analysis

Studies were analysed using the mean and standard deviation (SD) of outcomes expressed in the original papers. We expressed the effect size using the mean difference between the post-intervention values of the randomized groups. We used outcomes reported for short term follow-up between 3 and 6 months and extended

follow-up beyond 12 months when available. When studies investigated multiple interventions arms, the intervention arms inclusive of exercise were included as individual intervention strata. Mean differences in blood pressure following study intervention were presented for separate intervention arms when available. Mean values were plotted with associated error bars using forest plots. Statistically significant results were identified as confidence intervals excluding a null effect and an alpha value for $z<0{\cdot}05$.

Dealing with missing data

Missing data was identified on the data extraction template consistent with our previous Cochrane review protocols.[2] We contacted the authors of potentially eligible studies if missing data were unclear or data had not been fully reported. Imputed standard deviations from standard errors and confidence intervals for group means were calculated using methods described in the Cochrane handbook.[4]

Assessment of heterogeneity

Heterogeneity was quantified and evaluated to determine whether the observed variation in the study results was compatible with the variation expected by chance alone.[4] Heterogeneity was assessed through examination of the forest plots and quantified using the I^2 statistic according to the type of outcome utilised. I^2 statistics were graded according to Cochrane interpretation (>75% considerable/large heterogeneity).

Assessment of reporting biases

In accordance with Cochrane guidance, reporting bias was assessed by plotting a funnel plot of intervention effect on blood pressure.[5] To improve homogeneity, outcome data for the funnel plot was used for the earliest available follow-up, which was 3-6 months in the majority of studies.

Subgroup Analysis

Secondary objectives defined in the study protocol were to explore intervention effects in relation to 1) Baseline cardiovascular risk of participants, 2) Intervention components including: delivery methods, intensity of contact between participant and intervention and exercise prescription, 3) Participant cardiovascular fitness or physical activity, 4) Change in lipid or cholesterol status. Post study selection and data extraction the available data facilitated analysis on the effect of the following co-variants: 1) Baseline blood pressure, 2) Baseline weight 3) Delivery method, whether exercise was self-directed or supervised 4) Estimated contact time between participants and intervention, 5) Target intensity of exercise, 6) Change in weight following intervention.

S2. PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2, 3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4-6 Supplement
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5-6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5 Supplement
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5, Supplement
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5-6 Supplement
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6-7 Supplement
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6-7 Supplement
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6 Supplement
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6-7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6-7 Supplement

Section/topic	#	Checklist item	Reported on page #

Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-7, Supplement
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7 Supplement
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8, Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8-10, Table 1, Supplement
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	9 Supplement
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figure 2, Supplement
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	9-10, Figure 2, Supplement
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	9, Supplement
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	11, Figure 3, Supplement
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	14-16
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	17, Supplement
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	18
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	19

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

S3: Additional References

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Table S1: Search Summary Completed June 2015

Reviews

Database	Interface	Coverage	Date	Hits
Cochrane Database of Systematic Reviews	Cochrane Library, Wiley	Issue 5, 2015	17/06/2015	47
Database of Abstracts of Reviews of Effects	Cochrane Library, Wiley	Issue 4, 2015	17/06/2015	29
Embase	OvidSP	1974 to June 2015	17/06/2015	310
Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R)	OvidSP	1946-present	17/06/2015	276
PsycINFO	OvidSP	1967-present	17/06/2015	27
Total:				689
Duplicates:				246
Excluded:				6
Final Total:				427

RCTs

Database	Interface	Coverage	Date	Hits
AMED	OvidSP	1985-June 2015	17/06/2015	54
Cinahl	EBSCOHost	1982-current	17/06/2015	490
Cochrane Central Register of Controlled Trials	Cochrane Library, Wiley	Issue 5, 2015	17/06/2015	3154
Embase	OvidSP	1974 to June 2015	17/06/2015	4790
Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R)	OvidSP	1946-present	17/06/2015	5568
Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI) & Conference Proceedings Citation Index-Science (CPCI-S)	Web of Science	1945-present	17/06/2015	3084
SportDiscus	EBSCOHost		17/06/2015	137
PsycINFO	OvidSP	1967-present	17/06/2015	296
Total:				17,573
Duplicates:				8342
Excluded:				134
Final Total:				9097

Limits:

- Methodological filters applied to limit to SRs & RCTs
- Papers excluded which mentioned older adults in title
- Animal studies excluded

ONLINE SUPPLEMENT

Table S2. Description of the interventions delivered in the studies included in meta-analysis

Study	N	Intervention	Strategies & Delivery	Intensity (Heart rate Max) and Frequency [*f* (days) x Time (mins)]	Duration of Intervention	Estimated Participant Contact (hrs)	Follow-up months
Duncan 1985[6]	66	Aerobic exercise training program. Intensity 70 -80 % max heart rate determined from peak testing. Three 60 minutes sessions per weak plus 15minutes warm-up/cool-down	• Supervised exercise • Walk-Jog programme with graduated increase in running	• Moderate to vigorous (70-80%) • 3x60 mins	16 weeks	72	4
Stamler 1989[7]	201	Multifactorial intervention biweekly counselling. Nutritional hygiene. Diaries and lifestyle advice. 30 mins of exercise three times per week target heart rate 70% of max.	• Self-directed exercise • Individualised delivery • Physician and nutritionist lead • Social and Family members for planning activity	• Moderate activity (70%) • 3x30mins	Longitudinal -5 years	40	60
Blumenthal 1991[8]	92	1. 16 week Aerobic Exercise intervention 15 minutes warm-up 35 minute walk-jog 70% heart rate from peak exercise test. Three times per week. 2. 16 weeks strength and flexibility 20 minutes flexibility 30 minutes resistance circuit exercise	• Supervised group exercises with exercise trainer	• Moderate activity (70%) • 3 x 35 mins	16 weeks	40	4
Stevens TOHP Phase 1 1993[9]	564	Lifestyle behavioural intervention targeting diet and exercise. 14 weekly 90 minute group sessions followed by month meeting for 18 months Graduated brisk walking targeting 45 minutes 4 – 5 times per week. 40 – 55% heart rate reserve	• Self-directed exercise • Behaviour change counselling facilitated by nutritionists, psychologists and exercise physiologists • Supervised group based sessions • Self-management plans with activity self-monitoring and self-efficacy training to prevent relapse	• Moderate walking (40-55%) • 5x45 mins	18 months	43	6 & 18
Whelton TOHP Phase 2 1997[10]	1788	Lifestyle behavioural intervention targeting diet and exercise. 1. Weight Loss and Exercise 2. Weight Loss, Salt Restriction and Exercise 14 weekly 90 minute groups sessions followed by month meeting for 18 months] Graduated brisk walking targeting 45 minutes 4 – 5 times per week. 40 – 55% heart rate reserve	• Self-directed exercise • Behaviour change counselling facilitated by nutritionists, psychologists and exercise physiologists. • Weekly progress review and feedback • Self-management plans with activity self-monitoring and self-efficacy training to prevent relapse. • 4 supervised exercise sessions discussing intensity zones of exercise.	• Moderate walking (40-55%) • 5x 45 mins	36 months	60	6 & 36
Blumenthal 2000[11]	133	1. Supervised Aerobic Exercise Subjects exercised 3 to 4 times per week 70-85% Heart max from peak exercise test 10 minute warm up 35 minutes cycling or treadmill 10 minutes cool down. 2. Supervised exercise plus weight management As above plus 26 weekly group sessions discussing weight management	• Supervised exercise • Trained Exercise Physiologist • Participants instructed on how to monitor heart rates and intensity of exercise.	• Moderate to Vigorous Intensity (70-85%) • 4 x 35 mins	6 months	95 -120	6
Tsai 2002[12]	42	Supervised Aerobic Exercise Treadmill Walk-Jog programme 10 minutes warm up , 30 minutes exercise on treadmill, 10 minutes cool down	• Supervised exercise • Exercise intervention facilitated by trained exercise providers.	• Moderate Intensity (60-70%) • 3 x 30 mins	3 months	30	3
Esposito 2003[13]	120	Lifestyle behavioural intervention targeting diet and exercise. Objective of 10% weight loss. Month session for 12 months followed by bimonthly session for further 12 months	• Self-directed exercise • Behaviour change counselling facilitated by nutritionists and exercise trainer	• Moderate • Daily walking	24 months	24 to 48	24
Olson 2006[14]	30	Supervised and self-directed exercise and resistance training 2 sessions per week for 12 months. First 12 weeks supervised,	• Supervised small group exercise • Self-monitoring with training logs • Feedback from exercise trainer twice monthly	• Moderate to max intensity resistance exercise	12 months	38	12
Kinmonth 2008[15]	365	Self-directed exercise with behavioural coaching, 1. Telephone follow-up 1 home visit followed by 6 x 15-45 minute calls in 5 months followed by monthly letter. 2. In person intensive follow-up 4 x 1 hour visit, 2 x 15 minute calls in 5 months followed by monthly 30 minute calls	• Self-directed, self-regulatory exercise • Behavioural counselling from trained facilitators • Goal setting, action planning, self-monitoring, goal review, using prompts, family support, prevention plans	• No defined intensity, • Individualised graduated increase in activity	24 months	5 to 8	24
Marquez-Celedonio 2009[16]	81	Multifactorial intervention. Diet and low sodium advice with supervised exercise advice. 3-5 weekly sessions of supervised aerobic exercise plus weekly group exercise (basketball, volleyball, soccer).	• Supervised exercise • Group based activity • 45 minute sessions	• Moderate intensity (60-80) • 3 x 45 mins	6 months	100	6
Knoepfli-Lenzin 2010[17]	47	1. Aerobic Running 3 x 60 minute training session per week, 75-85% peak heart rate 2. Football 10 minute warm up, 50 minutes 5 aside football, Heart rate above 65%	• Supervised exercise • Coaching support	• Moderate intensity (60 to 85%) • 3 x 60 mins	3 months	36	3
Edwards 2011[18]	52	1. Aerobic Exercise Two supervised sessions per week and encouragement to exercise for 3 more sessions. Moderate intensity exercise for 30 to 60 minutes. Polar heart rate monitoring used to maintain 60-75% peak intensity 2. Diet plus Aerobic Exercise Target 500-1000 kcal decline in energy intake.	• Supervised exercise • Food diaries, • Weekly telephone call.	• Moderate Intensity (60-75%) • 3 x 60 mins	3 months	48	3
Krustrup 2012[19]	33	2 x 60 minutes sessions supervised per week Peer football. Exercise trainer, 5 minutes warm-up/cool down	• Supervised exercise • Heart rate monitoring 75-85% max	• Moderate to vigorous intensity (75-85%) • 2 x 60 mins	6 months	48	6

Table S3. Catalogue of Excluded Studies with Explanation.

AUTHOR AND YEAR	TITLE	SOURCE	STUDY DETAIL	EXCLUSION REASON	CODING
Bjernulf, A. (1973).	Haemodynamic aspects of physical training after myocardial infarction.	Acta Medica Scandinavica. Sup. 548.	Recruited POST INFARCT population	Cardiopulmonary disease secondary prevention	C2
Palatsi, I. (1976).	Feasibility of physical training after myocardial infarction and its effect on return to work, morbidity and mortality.	Acta Medica Scandinavica - Supplementum 599: 7-84.	Recruited POST INFARCT population	Cardiopulmonary disease secondary prevention	C2
Plavsic, C., et al. (1976).	The results of exercise therapy in coronary prone individuals and coronary patients	Giornale Italiano di Cardiologia 6(3): 422-432.	Established cardiovascular disease	Cardiopulmonary disease secondary prevention	C2
Shephard, R. J. (1979).	Recurrence of myocardial infarction in an exercising population.	British Heart Journal 42(2): 133-138.	Recruited POST INFARCT population	Cardiopulmonary disease secondary prevention	C2
Patel, C. and W. R. North (1975)	Randomized controlled trial of yoga and bio-feedback in management of hypertension.	Lancet 2, 93-95	6 week intervention, 3 month follow-up. Mean age 59.5 range > 39 years	Age of Cohort	H age
Patel, C. and W. R. S. North (1975).	Randomized controlled trial of yoga and bio feedback in management of hypertension.	Lancet 2(7925): 93-95.	6 week intervention, 3 month follow-up. Mean age 59.5 range > 39 years	Age of Cohort	H age
Pozenel, H. (1975).	The submaximal ergometric load test in hypertensive patients during physical training and treatment with debrisoquin	Wiener Klinische Wochenschrift 87(22): 767-772.	4 week follow-up, dual treatment anti-hypertensive medication	Follow up less than 3 months	F<3

Choquette, G. and R. J. Ferguson (1973).	Blood pressure reduction in borderline. hypertensives following physical training.	Canadian Medical Association Journal 108(6): 699-703.	Not and RCT - No control Group	Not RCT	NCRT
Patel, C. (1975).	12-month follow-up of yoga and bio-feedback in the management of hypertension.	Lancet 1(7898): 62-64.	CASE CONTROL STUDY DESIGN	Not RCT	NCRT
Peterson, C. M., et al. (1980).	Changes in basement membrane thickening and pulse volume concomitant with improved glucose control and exercise in patients with insulin-dependent diabetes mellitus.	Diabetes Care 3(5): 586-589.	NO CONTROL NOT RANDOMIZED	Not RCT	NRCT
Kiens, B., et al. (1980).	Increased plasma HDL-cholesterol and apo A-1 in sedentary middle-aged men after physical conditioning.	European Journal of Clinical Investigation 10(3): 203-209.	HEALTHY low risk population, Mean Age 40 SD 3.4. The trained subjects were studied at 4, 8 and 12 weeks.	Demographic of Study Population - healthy sedentary	PL BP2
Taylor, H. L., et al. (1973).	Exercise in controlled trials of the prevention of coronary heart disease.	Federation Proceedings 32(5): 1623-1627.	Review article discussing three US trails. Age group 40 to 59.	Not RCT	NRCT
Marra, S., et al. (1985)	Long-term follow-up after a controlled randomized post-myocardial infarction rehabilitation programme: effects on morbidity and mortality.	European Heart Journal 6(8): 656-663.	Cardiac Rehab, POST MI	Cardiopulmonary disease secondary prevention	C2

Gyntelberg, F., et al. (1981).	Blood pressure reduction by change in life style. The CVD intervention study in Glostrup.	Acta Medica Scandinavica - Supplementum 646: 10-14.	Primary prevention intervention. 25% < 40 years old	Primary prevention low risk	PL
Kornitzer, M., et al. (1983).	Belgian Heart Disease Prevention Project: Indicence and mortality results.. Lancet 1(8333): 1066-1070.	Lancet 1(8333): 1066-1070.	Mean age 48.2, No exercise intervention	No exercise intervention	NEI
Kornitzer, M., et al. (1983).	Belgian heart disease prevention project: incidence and mortality results.	Lancet 1(8333): 1066-1070.	Mean age 48.2, participants were referred for prescription treatment, subgroup had a nutritional intervention. No physical activity intervention.	No exercise intervention	NEI
Project Team. (1982).	The Roman coronary heart disease prevention program. Final results	Giornale Italiano di Cardiologia 12(8): 541-554.	Age Group 40-59. Primary prevention. Low risk groups	primary prevention low risk	PL
Andrews, G., et al. (1982).	Hypertension: comparison of drug and non-drug treatments.	British Medical Journal Clinical Research Ed. 284(6328): 1523-1526.	Review article	Not RCT	Protocol/Review
Lithell, H., et al. (1984).	The primary preventive study in Uppsala. Fatal and non-fatal myocardial infarction during a 10-year follow-up of a middle-aged male population with treatment of high-risk individuals.	Acta Medica Scandinavica 215(5): 403-409.	Cohort study, event rate in cohort compared with general population	Not RCT	NRCT

Menotti, A. (1983).	The european multifactorial preventive trial of coronary heart disease: four-year experience.	Preventive Medicine 12(1): 175-180.	Cross-sectional sampling, no intention to treat or longitudinal follow-up of individual participants. Control represented a population trend sample as opposed to providing effectiveness comparison. Mean age 48.5 range 40-59.	Not RCT	NRCT
Stransky, M., et al. (1982).	Prevention of coronary heart disease. [German]	Sozial- und Praventivmedizin 27(4): 178-186.	Population level intervention. Not an RCT	Not RCT	NRCT
Cambien, F., et al. (1981).	The Paris Cardiovascular Risk Factor Prevention Trial. Effects of two years of intervention in a population of young men.	Journal of Epidemiology & Community Health 35(2): 91-97.	Age group 25-35. Cardiovascular risk score, high risk population results presented separately. Need to explore intervention and PA advice		PL
Heath, G. W. and C. B. Broadhurst (1984).	Effects of exercise training and dietary behavior modification on weight reduction and lipoprotein lipids in female hospital employees.	Health Values 8(6): 3-9.	12 weeks of follow-up	Peri menapausal - age > 40	PL BP2
Holtz, H., et al. (1983).	Effectiveness of different intervention measures in children and adolescents with hypertension and lipid metabolism disorders	Zeitschrift fur die Gesamte Innere Medizin und Ihre Grenzgebiete 38(23): 644-649.	Mean age 14.2	Demographic of study population	PP

Fortmann, S. P., et al. (1988)	Effects of weight loss on clinic and ambulatory blood pressure in normotensive men.	American Journal of Cardiology 62(1): 89-93.		Secondary analysis. Normotensive population. Weight loss primary outcome. Age 45 sd (8). Attrition from the study was over 25% with no intention to treat.	Attrition
Woods (1988)	Changes in plasma lipids and lipoproteins in overweight men during weight loss through dieting as compared with exercise	N Engl J Med 1988; 319:1173–9	BP not reported	Primary analysis of Fortmann. Mean age 44 sd (8)	BPN
Rome Project Team (1986).	Eight-year follow-up results from the Rome Project of Coronary Heart Disease Prevention. Research Group of the Rome Project of Coronary Heart Disease Prevention.	Preventive Medicine 15(2): 176-191	Population age 40 to 59.	Participants exclusively older than 40.	H age
Kornitzer, M. (1989).	The Belgian project for the prevention of cardiovascular diseases: a model of multifactorial prevention	Bulletin et Memoires de l Academie Royale de Medecine de Belgique 144(1-2): 101-109; discussion 110-102.	Age 40 -59	Age of Cohort	H age
Jennings, G., et al. (1986)	Effects of exercise training on BP and haemodynamics in patients with essential hypertension.	Aust NZ J Med Suppl 16, 574	4 weeks of exercise, mean age 44, healthy participants	Follow-up less than 3 months	F<3

Jennings, G., et al. (1987)	The place of exercise in the long-term treatment of hypertension.	Nephron 47 Suppl 1: 30-33.	4 weeks of exercise, one group of sedentary healthy participants, mean age 44, range 25 to 62 years.	Follow-up less than 3 months	F<3
Jennings, G., et al. (1986)	The effects of changes in physical activity on major cardiovascular risk factors, hemodynamics, sympathetic function, and glucose utilization in man: a controlled study of four levels of activity.	Circulation 73(1): 30-40.	4 weeks follow-up, healthy participants, mean age 22	Demographic of study population	F<3
Lorinczy, J., et al. (1987)	Effects of exercise training and beta blockade on blood pressure during submaximal exercise in moderately hypertensive men.	International Journal of Sports Medicine 8, 240	Drug intervention	Drug intervention	H-physiology F<3 NRCT
Stamler, R., et al. (1989)	Cardiac status after four years in a trial on nutritional therapy for high blood pressure	Archives of Internal Medicine 149, 661-665	No defined exercise intervention. Mean age 56	No defined exercise intervention. Mean age 56	NEI
Ades, P. A., et al. (1988).	Ades, P. A., et al. (1988). .Hypertension, exercise, and beta-adrenergic blockade.. Annals of Internal Medicine 109(8): 629-634.	Annals of Internal Medicine 109(8): 629-634.	No non-exercise control	Study design	NRCT

Blumenthal, J. A., et al. (1988).	Exercise training in healthy type A middle-aged men: effects on behavioral and cardiovascular responses.	Psychosomatic Medicine 50(4): 418-433.	12 week follow-up, mean age 44.4. All participants exercise. Aerobic vs strength	Study design	NRCT
Cleroux, J., et al. (1987).	Effects of exercise training on plasma catecholamines and blood pressure in labile hypertensive subjects.	European Journal of Applied Physiology & Occupational Physiology 56(5): 550-554.	No control	Study design	NRCT
Gilders, R. M., et al. (1989)	Endurance training and blood pressure in normotensive and hypertensive adults	Medicine & Science in Sports & Exercise 21(6): 629-636.	Waitlist control and participants instructed to decondition after training, Hypertensive group mean age 46 SD 2	Study design	NRCT
Lasco, R. A., et al. (1989).	Participation rates, weight loss, and blood pressure changes among obese women in a nutrition-exercise program.	Public Health Reports 104(6): 640-646.	Not randomized less than 6 months	Study design	NRCT
Lovibond, S. H., et al. (1986)	Changing coronary heart disease risk-factor status: the effects of three behavioral programs	Journal of Behavioral Medicine 9(5): 415-437.	Mean age 46.3, lacks true control, Not RCT	Study design	NRCT
Roskies, E., et al. (1986).	The Montreal Type A Intervention Project: major findings.	Health Psychology 5(1): 45-69.	Intervention targeted .type A. men mean age 37, Not RCT	Study design	NRCT

Liao, Y., et al. (1987).	Cardiovascular responses to exercise of participants in a trial on the primary prevention of hypertension.	Journal of Hypertension 5(3): 317-321.	Response to acute peak exercise. No exercise RCT	Acute response to exercise	NRCT
Becque, M. D., et al. (1988).	Coronary risk incidence of obese adolescents: reduction by exercise plus diet intervention.	Pediatrics 81(5): 605-612.	20 week intervention, mean age 12.7 (0.5)	Demographic of study population	PP
Jalkanen, L. (1991).	The effect of a weight reduction program on cardiovascular risk factors among overweight hypertensives in primary health care.	Scandinavian Journal of Social Medicine 19(1): 66-71.	H + age, primary objective weightloss, 1000-1500 negative balance	Change in lipids primary outcome. Mean Age 49, (range 35 to 59)	H age
Engblom, E., et al. (1992).	Coronary heart disease risk factors before and after bypass surgery: results of a controlled trial on multifactorial rehabilitation.	European Heart Journal 13(2): 232-237.	Coronary heart disease	cardiopulmonary disease secondary prevention	C2
Hedback, B. and J. Perk (1990).	Can high-risk patients after myocardial infarction participate in comprehensive cardiac rehabilitation?	Scandinavian Journal of Rehabilitation Medicine 22(1): 15-20.	Recruited post infarct population	cardiopulmonary disease secondary prevention	C2
Hedback, B. E., et al. (1990).	Cardiac rehabilitation after coronary artery bypass grafting: effects on exercise performance and risk factors.	Archives of Physical Medicine & Rehabilitation 71(13): 1069-1073.	Coronary heart disease	cardiopulmonary disease secondary prevention	C2
Jovanovic-Peterson, L. and C. M. Peterson (1991).	Is exercise safe or useful for gestational diabetic women?	Diabetes 40 Suppl 2: 179-181.	Exercise less 3 months, pregnant population	Exercise less 3 months, pregnant population. F<3	D1, F<3

Page, R. C. L., et al. (1992).	Can life-styles of subjects with impaired glucose tolerance be changed? A feasibility study..	Diabetic Medicine 9(6): 562-566.	Feasibility study. Mean Age 39 SD 11. Attrition greater than 20%	Feasibility study. Mean Age 39 SD 11. Attrition greater than 20%	D1, Attrition
Eriksson, K. F. and F. Lindgarde (1991).	Prevention of type 2 (non-insulin-dependent) diabetes mellitus by diet and physical exercise. The 6-year Malmo feasibility study..	Diabetologia 34(12): 891-898.	MEAN AGE 48.1 (0.7)	Demographic of study population	D1, Age
Hanefeld, M., et al. (1991).	Diabetes Intervention Study. Multi-intervention trial in newly diagnosed NIDDM.	Diabetes Care 14(4): 308-317.	Diabetic population. Age 46.2 SD 7, Drug Intervention	Drug Intervention	D2, Drug intervention
Yeater, R. A., et al. (1990).	Coronary risk factors in type II diabetes: response to low-intensity aerobic exercise	The West Virginia medical journal 86(7): 287-290.	Mean age 56	Mean age 56	D2, Age
Marchman, H. B. and J. L. Skolnick (1992).	Blood pressure changes in patients with chronic obstructive pulmonary disease and hypertension completing phase II pulmonary rehabilitation.	Journal of the Kentucky Medical Association 90(10): 503-505.	COPD PATIENTS	Established chronic disease	ECD
Kostis, J. B., et al. (1992).	Superiority of nonpharmacologic therapy compared to propranolol and placebo in men with mild hypertension: a randomized, prospective trial.	American Heart Journal 123(2): 466-474.	Mean age 56.5 (8.1), inclusion age >30	Age of Cohort	H age
Mascioli, S. R., et al. (1990).	Characteristics of participants at baseline in the treatment of mild hypertension study (TOMHS).	American Journal of Cardiology 66(9): 32C-35C.	Mean age 54.8 (6.4) participant 45 to 69	Age of Cohort	H age

Nilsson, P. M., et al. (1992).	Life style changes improve insulin resistance in hyperinsulinaemic subjects: a one-year intervention study of hypertensives and normotensives in Dalby.	Journal of Hypertension 10(9): 1071-1078.	Age over 50 SD less than 10. Targeting hyperinsulaemia	Age of Cohort	D1 age
Balogun, M. O. and G. O. Ladipo (1990).	Cardiovascular responses to exercise in essential hypertension.	West African Journal of Medicine 9(4): 272-278.	Acute exercise response no training	Follow up less than 3 months	F<3
Katz, J. and B. R. Wilson (1992).	The effects of a six-week, low-intensity Nautilus circuit training program on resting blood pressure in females.	Journal of Sports Medicine & Physical Fitness 32(3): 299-302.	Follow up only after 6 week intervention	Follow up less than 3 months	F<3
Koga, M., et al. (1992).	Mild exercise decreases plasma endogenous digitalislike substance in hypertensive individuals.	Hypertension 19(2 Suppl): II231-236.	10 week intervention with measures before and after. Mean age 49 sd 2	Follow up less than 3 months	F<3
Lioznova, E. A., et al. (1991).	Characteristics of response to isometric exercise in women with stable arterial hypertension.	Kardiologiia 31(2): 61-64.	Acute exercise intervention	Follow up less than 3 months	F<3
Martin, J. E., et al. (1990).	Controlled trial of aerobic exercise in hypertension.	Circulation 81(5): 1560-1567.	Only followed up after exercise intervention (10 weeks)	Follow up less than 3 months	F<3
Radaelli, A., et al. (1992).	Effects of mild physical activity, atenolol and the combination on ambulatory blood pressure in hypertensive subjects.	Journal of Hypertension 10(10): 1279-1282.	Latin square study design. Follow-up less than 1 month.	Follow up less than 3 months	F<3

Meredith, I. T., et al. (1990).	Time-course of the antihypertensive and autonomic effects of regular endurance exercise in human subjects.	Journal of Hypertension 8(9): 859-866.	Heathy participants. No established risk factors. Study designed to investigate conditions training and detraining. Not RCT	Not RCT	NRCT
Somers, V. K., et al. (1991).	Effects of endurance training on baroreflex sensitivity and blood pressure in borderline hypertension..	Lancet 337(8754): 1363-1368.	NOT RCT	NOT RCT	NRCT
Stewart, K. J., et al. (1990).	Effects of diltiazem or propranolol during exercise training of hypertensive men.	Medicine & Science in Sports & Exercise 22(2): 171-177.	Drug or placebo plus exercise. All groups exercise.	NOT RCT	NRCT
Kingwell, B. A., et al. (1992).	Exercise training reduces the sympathetic component of the blood pressure-heart rate baroreflex in man.	Clinical Science 82(4): 357-362.	Healthy and less than 6 months	Follow up less than 3 months	F<3
van Montfrans, G. A., et al. (1990).	Relaxation therapy and continuous ambulatory blood pressure in mild hypertension: a controlled study.	BMJ 300(6736): 1368-1372.	Muscle relaxation therapy, no defined aerobic or resistance exercise	No exercise intervention	NEI
Jula, A., et al. (1990).	Long-term nopharmacological treatment for mild to moderate hypertension.	Journal of Internal Medicine 227(6): 413-421.	Nutrition and weight loss targeted intervention. Participants mean age 44 (range 31 -54)	No defined exercise intervention	NEI

Kumanyika, S. K. and J. B. Charleston (1992).	Lose weight and win: a church-based weight loss program for blood pressure control among black women.	Patient Education & Counseling 19(1): 19-32.	NOT AN RCT	Not an RCT	NRCT
Ades, P. A., et al. (1990).	Cardiac and skeletal muscle adaptations to training in systemic hypertension and effect of beta blockade (metoprolol or propranolol).	American Journal of Cardiology 66(5): 591-596.	Follow-up less than 6 months. Not a true control.	Not RCT	NRCT
Allen, D. H., et al. (1991).	A controlled study of the effects of aerobic exercise on antihypertensive drug requirements of essential hypertensive patients in the general practice setting.	Clinical & Experimental Pharmacology & Physiology 18(5): 279-282.	Mean age 45.2 (range 29 to 55) Light exercise compared with moderate exercise. No non-intervention control. Lacks exercise control	Not RCT	NRCT
Baglivo, H. P., et al. (1990)	Effect of moderate physical training on left ventricular mass in mild hypertensive persons.	Hypertension 15, I-153-i-156	Not randomized	Not RCT	NRCT
Barnard, R. J., et al. (1992).	Role of diet and exercise in the management of hyperinsulinemia and associated atherosclerotic risk factors.	American Journal of Cardiology 69(5): 440-444.	Not randomized, follow up less than 3 months. Hyperinsulinemia outcome marker. Included diabetic participants.	Not RCT	NRCT
Corry, J. M. (1990).	MetLife's experience with fitness and wellness programming.	Statistical Bulletin - Metropolitan Insurance Companies 71(4): 19-20.	No control group	Not RCT	NRCT

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Cutler, J. A. (1991).	Randomized clinical trials of weight reduction in nonhypertensive persons.	Annals of Epidemiology 1(4): 363-370.	Review paper	Not RCT	NRCT
Duncan, J. J., et al. (1990).	Effect of intrinsic sympathomimetic activity on the ability of hypertensive patients to derive a cardiorespiratory training effect during chronic beta-blockade.	American Journal of Hypertension 3(4): 302-306.	No control	Not RCT	NRCT
Ginsberg, G. M., et al. (1990).	Resource savings from non-pharmacological control of hypertension.	Journal of Human Hypertension 4(4): 375-378.	N0T AN RCT	Not RCT	NRCT
Gran, B. (1991).	.Non-pharmacological methods reduce drug use in the treatment of hypertension. A two-year trial in general practice.	Scandinavian Journal of Primary Health Care 9(2): 121-128.	N0T AN RCT	Not RCT	NRCT
Jennings, G. L., et al. (1991).	What is the dose-response relationship between exercise training and blood pressure?	Annals of Medicine 23(3): 313-318.	Review paper	Not RCT	NRCT
Johannesson , M., et al. (1991). .	Cost-benefit analysis of non-pharmacological treatment of hypertension.	Journal of Internal Medicine 230(4): 307-312	Not Randomized OUT	Not RCT	NRCT
Johnson, C. C., et al. (1991).	Cardiovascular intervention for high-risk families: the Heart Smart Program.	Southern Medical Journal 84(11): 1305-1312.	NOT AN RCT	Not RCT	NRCT

Kelemen, M. H., et al. (1990).	Exercise training combined with antihypertensive drug therapy. Effects on lipids, blood pressure, and left ventricular mass.	JAMA 263(20): 2766-2771.	Drug intervention. Exercise plus drug, all groups exercised. Control was placebo drug plus exercise	Not RCT	NRCT
Kiselkova, E., et al. (1991).	Changes in the electrophysiological parameters of hypertensives under the influence of therapeutic swimming	Eksperimental na Meditsina i Morfologiia 30(1): 10-14.	Mean age of 48.5 +/- 9.5 years, not randomized. Primary outcome brain bioelectric activity	Not RCT	NRCT
Knutsen, S. F. and R. Knutsen (1991).	The Tromso survey: The family intervention study - The effect of intervention on some coronary risk factors and dietary habits, a 6-year follow-up.	Preventive Medicine 20(2): 197-212.	Dietary intervention. No defined exercise intervention. Focus on diet and lowering cholesterol.	No exercise intervention	NEI
Pecelj-Gec, M., et al. (1992).	Effects of reducing diet and increased leisure time physical activity on hypertension associated with obesity.	Srpski Arhiv Za Celokupno Lekarstvo 120(9-10): 273-275.	NOT RCT	Not RCT	NRCT
Pecelj-Gec, M., et al. (1990).	Effects of reducing diet and increased leisure time physical activity on hypertension associated with obesity.	Acta medica Iugoslavica 44(4): 367-376.	NOT RCT	Not RCT	NRCT

Singh, R. B., et al. (1992).	The diet and moderate exercise trial (DAMET): results after 24 weeks.	Acta Cardiologica 47(6): 543-557.	Mean age 47.8. Dietary intervention plus exercise. No none intervention group. Both groups receive dietary advice	Not RCT	NRCT
Singh, R. B., et al. (1992).	In patients with mild hypertension, does exercise and a gradual rather than abrupt increase in fatty acid and salt intake cause less rise in cardiovascular risk factors?	Clinical Nutrition 11(5): 309-314.	Lacks true control, dietary intervention weeks 0-12 followed by exercise	Not RCT	NRCT
Tibblin, G. and H. Aberg (1990).	Non-pharmacological treatment of hypertension: differences between health centres in patients' blood pressure and success at withdrawal from drugs	Family Practice 7(1): 47-51.	All participant received an counselling and follow-up intervention. One group focused on prescription meds other prescription meds and lifestyle. Lacks true control	Not RCT	NRCT
Duncan, J. J., et al. (1991).	Women walking for health and fitness. How much is enough?	JAMA 266(23): 3295-3299.	No clear risk factors. Healthy baseline characteristics	primary prevention low risk	PL
Suter, E., et al. (1990).	Effects of self-monitored jogging on physical fitness, blood pressure and serum lipids: a controlled study in sedentary middle-aged men.[Erratum appears in	International Journal of Sports Medicine 11(6): 425-432.	Sedentary middles age men. Mean age 38. 61 participant. Inclusion criteria not defined by risk profile, Included hypertensive and low normotensive.	primary prevention low risk	PL

Lehmann, R., et al. (1995).	Loss of abdominal fat and improvement of the cardiovascular risk profile by regular moderate exercise training in patients with NIDDM.	Diabetologia 38(11): 1313-1319.	Diabetic. Mean age 54(range 42-73)	Mean age 54 range 42-73	D2, Age
Anderssen, S., et al. (1995)	Diet and exercise intervention have favourable effects on blood pressure in mild hypertensives: the Oslo Diet and Exercise Study (ODES).	Blood Pressure 4(6): 343-349.	Mean age reported 44.9 (0.2), participants exclusively >40 yrs	H age, participants exclusively over 40 years.	H Age
Cupples, M. E. and A. McKnight (1994)	Randomized controlled trial of health promotion in general practice for patients at high cardiovascular risk.	BMJ 309(6960): 993-996.	Mean age 62.7 (7.1), participants older than 38	Age of Cohort	H age
Elmer, P. J., et al. (1995).	Lifestyle intervention: Results of the Treatment of Mild Hypertension Study (TOMHS).	Preventive Medicine 24(4): 378-388.	Drug trial plus exercise, Age range 45-69	Drug intervention, Age of Cohort	H age
Hellenius, M. L., et al. (1993)	Diet and exercise are equally effective in reducing risk for cardiovascular disease. Results of a randomized controlled study in men with slightly to moderately raised cardiovascular risk factors.	Atherosclerosis 103(1): 81-91.	Mean age 46.2 (5), exclusively recruiting 35 to 60 age group	Age of Cohort	H age
Kokkinos, P. F., et al. (1995).	Effects of regular exercise on blood pressure and left ventricular hypertrophy in African-American men with severe hypertension.	New England Journal of Medicine 333(22): 1462-1467.	Exercise vs pharma OUT mean age 57 (10), participants older than 35	Drug intervention, Age of Cohort	H age

Liebson, P. R., et al. (1995).	Comparison of five antihypertensive monotherapies and placebo for change in left ventricular mass in patients receiving nutritional-hygienic therapy in the Treatment of Mild Hypertension Study (TOMHS).	Circulation 91(3): 698-706.	Out mean age 55. Participants 45-69	Age of Cohort	H age
Coulter, A., et al. (1995).	Effectiveness of health checks conducted by nurses in primary care: Final results of the OXCHECK study.	British Medical Journal 310(6987): 1099-1104.	Mean age 49.6 (SD 8), participants over 35	H age, participant exclusively over 35, health screening no defined exercise intervention.	H Age. NEI
Cox, K. L., et al. (1993)	The combinated effect of aerobic exercise and alcohol restriction on blood pressure and serum lipids: A two-way factorial study in sedentary men.	Journal of Hypertension 11(2): 191-201.	Measures before and after 4 weeks	Follow up less than 3 months	F<3
Reid, C. M., et al. (1994).	Interactions between the effects of exercise and weight loss on risk factors, cardiovascular haemodynamics and left ventricular structure in overweight subjects.	Journal of Hypertension 12(3): 291-301.	Query Age and Lack of True control with described cross over design.	12 week cross over study design, lacks true control, attrition greater than 20%	Attrition and NRCT
Fuchs, Z., et al. (1993).	Comprehensive individualised nonpharmacological treatment programme for hypertension in physician-nurse clinics: two year follow-up.	Journal of Human Hypertension 7(6): 585-591.	Comparative effectiveness of delivery methods	Not a control trial	NRCT

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Arroll, B. and R. Beaglehole (1995)	Salt restriction and physical activity in treated hypertensives	New Zealand Medical Journal 108(1003): 266-268.	Participant randomized 1. Exercise alone 2. Salt restriction 3. Exercise and salt. Lacks true control	Not RCT	NRCT
Bourn, D. M., et al. (1994)	Impaired glucose tolerance and NIDDM: does a lifestyle intervention program have an effect	Diabetes Care 17(11): 1311-1319.	NO control	Not RCT	NRCT
Heirich, M. A., et al. (1993)	Work-site physical fitness programs. Comparing the impact of different program designs on cardiovascular risks.	Journal of occupational medicine. 35, 510-517	Cross sectional sampling with pre post measures in work environment. No intention to treat	Not RCT	NRCT
Luepker, R. V., et al. (1994)	Community education for cardiovascular disease prevention: risk factor changes in the Minnesota Heart Health Program	American Journal of Public Health 84(9): 1383-1393.	Population level and mass media intervention	Not RCT	NRCT
Perez-Stable, E. J., et al. (1995).	Comparison of a lifestyle modification program with propranolol use in the management of diastolic hypertension.	Journal of General Internal Medicine 10(8): 419-428.	Propranolol and lifestyle intervention	Drug intervention	Drug intervention
Gomel, M., et al. (1993).	Work-site cardiovascular risk reduction: a randomized trial of health risk assessment, education, counseling, and incentives.	American Journal of Public Health 83(9): 1231-1238.	Open selection- no cardiac risk, 32 year old ambulance men	Primary prevention low risk	PL

Hanlon, P., et al. (1995).	Health checks and coronary risk: further evidence from a randomized controlled trial.	BMJ 311(7020): 1609-1613.	Not selected on basis of cardiac risk. Mean age higher than 40.	Primary prevention low risk	PL
Oldenburg, B., et al. (1995).	An economic evaluation of four work site based cardiovascular risk factor interventions.	Health Education Quarterly 22(1): 9-19.	Sydney ambulance service (Gomel above). Primary prevention.	Primary prevention low risk	PL
(1993).	The Oslo Diet and Exercise Study (ODES): design and objectives.	Controlled Clinical Trials 14(3): 229-243.	Protocol. Mean Age 45 (2.5)	Protocol	Protocol
Dunn, A. L., et al. (1997).	Reduction in cardiovascular disease risk factors: 6-month results from Project Active.. Preventive Medicine 26(6): 883-892.	Preventive Medicine 26(6): 883-892.	Healthy population. Hypertensives excluded 46.0 +/- 6.7 years	Demographic of study population	PL-Age
Rogers, M. W., et al. (1996)	Differential effects of exercise training intensity on blood pressure and cardiovascular responses to stress in borderline hypertensive humans.	Journal of Hypertension 14(11): 1369-1375.	12 week follow-up	Attrition greater than 20%	Attrition
Singh, R. B., et al. (1996).	Effect of diet and moderate exercise on central obesity and associated disturbances, myocardial infarction and mortality in patients with and without coronary artery disease	Journal of the American College of Nutrition 15(6): 592-601.	CAD is not separated from at risk groups in results.	Cardiopulmonary disease secondary prevention	C2

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Dyson, P. A., et al. (1997).	The Fasting Hyperglycaemia Study: II. Randomized controlled trial of reinforced healthy-living advice in subjects with increased but not diabetic fasting plasma glucose.	Metabolism: Clinical & Experimental 46(12 Suppl 1): 50-55.	Drug intervention and exercise advice. Mean age 50 (sd 9)	Age of Cohort	D1 age
Wing, R. R., et al. (1998).	Lifestyle intervention in overweight individuals with a family history of diabetes	Diabetes Care 21(3): 350-359	Mean age control and exercise 45.3 ±4.9, 46.4 ±4.5. Recruitment criteria 40 to 55. BMI > 35.Exercise compliance < 30%	D1 age, BMI > 35, Attrition 15% at 6 months, 22% at 12 and 24 months for control.	D1 Age
Wallace, M. B., et al. (1997).	Effects of cross-training on markers of insulin resistance/hyperinsulinemia	Medicine & Science in Sports & Exercise 29(9): 1170-1175.	14 week intervention, No control group, participants randomized to endurance only or endurance plus cross training.	Not RCT, lacks true control, looking at response to hyperinsulinemia	NRCT
Perry, T. L., et al. (1997)	Lifestyle intervention in people with insulin-dependent diabetes mellitus (IDDM	European Journal of Clinical Nutrition 51(11): 757-763	Mean age 42 SD 12. Insulin dependent diabetic population	Mean age 42 SD 12. Insulin dependent diabetic population. Cross over study design, lacking true control	D2, NRCT
Dunstan, D. W., et al. (1997).	The independent and combined effects of aerobic exercise and dietary fish intake on serum lipids and glycemic control in NIDDM. A randomized controlled study	Diabetes Care 20(6): 913-921.	Diabetic. 8 week follow up, Mean age 52.3 ±8.3	Age of Cohort	D2, Age

Honkola, A., et al. (1997)	Resistance training improves the metabolic profile in individuals with type 2 diabetes.	Acta Diabetologica 34(4): 245-248.	Diabetic mean age 62 (2)	Age of Cohort	D2, Age
Uusitupa, M. I. (1996)	Early lifestyle intervention in patients with non-insulin-dependent diabetes mellitus and impaired glucose tolerance	Annals of Medicine 28(5): 445-449.	Diabetic mean age 54 (sd 8)	Age of Cohort	D2, Age
Cox, K. L., et al. (1996).	.Determinants of change in blood pressure during S.W.E.A.T.: The sedentary women exercise adherence trial	Clinical and Experimental Pharmacology and Physiology 23(6-7): 567-569.	Mean age of subjects was 48.5 (47.6, 49.4)	PL, H age, participants exlusively over 40 years	H age
Gordon, N. F., et al. (1997)	Comparison of single versus multiple lifestyle interventions: are the antihypertensive effects of exercise training and diet-induced weight loss additive?	American Journal of Cardiology 79(6): 763-767.	12 week intervention follow-up baseline and after intervention, Mean age 50 (sd 8), 21 to 65 age criteria	Age of Cohort	H age
Grimm, R. H., et al. (1997).	Relationships of quality-of-life measures to long-term lifestyle and drug treatment in the treatment of mild hypertension study	Archives of Internal Medicine 157(6): 638-648	TOMHS study - age 45 and over	Age of Cohort	H age
Iso, H., et al. (1996).	Community-based education classes for hypertension control: A 1.5-year randomized controlled trial. Hypertension 27(4): 968-974.	Hypertension 27(4): 968-974.	Mean age 58.5 (8.1), 35 to 69 age criteria	Age of Cohort	H age

Kokkinos, P. F., et al. (1997).	Effects of aerobic training on exaggerated blood pressure response to exercise in African-Americans with severe systemic hypertension treated with indapamide + verapamil + enalapril	American Journal of Cardiology 79(10): 1424-1426	Mean age 58 sd (11), age over 45	Age of Cohort	H age
Kondwani, K. A. (1998).	Nonpharmacologic treatment of hypertensive heart disease in African-Americans: A trial of the transcendental meditation program and a health education program.. Dissertation Abstracts International: Section B: The Sciences and Engineering 59(6-B): 3114.	Dissertation Abstracts International: Section B: The Sciences and Engineering 59(6-B): 3114.	Population 55 to 85 years old	Age of Cohort	H age
Simkin-Silverman, L. R., et al. (1998).	Simkin-Silverman, L. R., et al. (1998). .Maintenance of cardiovascular risk factor changes among middle-aged women in a lifestyle intervention trial	Womens Health 4(3): 255-271.	Mean age 47 (sd 1.6)	Age of Cohort	H age
Taylor, A. H., et al. (1998).	Randomized controlled trial to examine the effects of a GP exercise referral programme in Hailsham, East Sussex, on modifiable coronary heart disease risk factors	Journal of Epidemiology & Community Health 52(9): 595-601.	Mean age 54.1 (sd0.8). Age range 44 to 55	Age of Cohort	H age

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Blair, S. N., et al. (1998).	Activity Counseling Trial (ACT): rationale, design, and methods. Activity Counseling Trial Research Group	Medicine & Science in Sports & Exercise 30(7): 1097-1106.	Mean age 51.98 (10.08) 50.98 (9.37) 50.07(9.59). Age range 35 to 75	Protocol	H age
Winterfeld, H. J., et al. (1996).	Hemodynamics in arterial hypertension treated with running endurance training or nifedipine therapy	Zeitschrift fur Kardiologie 85(3): 171-177.	Lacks control. Drug vs Exercise	Lacks control	NRCT
Amigo, I., et al. (1997).	Comparison of physical exercise and muscle relaxation training in the treatment of mild essential hypertension.	Stress Medicine 13(1): 59-65.	6 month follow-up	Lacks true control. Control completed stretching and warm up exercises.	NRCT
Leon, A. S., et al. (1996).	Effects of 2,000 kcal per week of walking and stair climbing on physical fitness and risk factors for coronary heart disease..	Journal of Cardiopulmonary Rehabilitation 16(3): 183-192.	Cross over design with wash out between. Less than 24 weeks continuous follow-up, Health sedentary population at baseline.	Demographic of study population	NRCT
Ketelhut, R. G., et al. (1997).	Efficacy and position of endurance training as a non drug therapy in the treatment of arterial hypertension.	Journal of Human Hypertension 11(10): 651-655.	No control, mean age 43.3 (sd 3.1)	Not RCT	NRCT
Kokkinos, P. F. and V. Papademetriou (1996)	Can regular exercise benefit Afro-American men with severe hypertension?	Cardiology Review 13(7): 25-34.	Exercise and drug therapy. Drug plus exercise or drug only. Lacks a control	Not RCT	NRCT

Lima, E. G., et al. (1998)	Ambulatory blood pressure monitoring in individuals with exaggerated blood pressure response to exercise. Influence of physical conditioning.	Arquivos Brasileiros de Cardiologia 70(4): 243-249.	Not an RCT, mean 44 +/- 1 years old	Not RCT	NRCT
Narayan, K. M., et al. (1998)	Randomized clinical trial of lifestyle interventions in Pima Indians: a pilot study	Diabetic Medicine 15, 66-72 DOI: 10.1002/(sici)1096-9136(199801)15:1<66::aid-dia515>3.0.co	Diabetic.BMI 36.5, lacks true control, compliance with intervention < 20%	Not RCT	NRCT
Naslund, G. K., et al. (1996).	Effect of diet and physical exercise intervention programmes on coronary heart disease risk in smoking and non-smoking men in Sweden.	Journal of Epidemiology & Community Health 50(2): 131-136.	Cohort study. Not an RCT	Not RCT	NRCT
Ponjee, G. A., et al. (1996).	Regular physical activity and changes in risk factors for coronary heart disease: a nine months prospective study.	European Journal of Clinical Chemistry & Clinical Biochemistry 34(6): 477-483.	Not randomized	Not RCT	NRCT
Kuller, L. H., et al. (2001).	Women's Healthy Lifestyle Project: A randomized clinical trial: results at 54 months.	Circulation 103(1): 32-37.	Mean age 47 (sd 2)	Age - exclusively recruiting 44-50 age great. BP reported as secondary	H age
Kochevar, A. J., et al. (2001).	Effects of a community-based intervention to increase activity in American Indian elders.	The Journal of the Oklahoma State Medical Association 94(10): 455-460.	Age 55-75	Age of Cohort	H age

Rosell, M., et al. (1999).	Serum urate determines antioxidant capacity in middle-aged men - a controlled, randomized diet and exercise intervention study.	Journal of Internal Medicine 246(2): 219-226.	Mean age 46.2 (5), Blood pressure not reported	Blood pressure not reported	BPN
Allison, T. G., et al. (2000).	Management of coronary risk factors by registered nurses versus usual care in patients with unstable angina pectoris (a chest pain evaluation in the emergency room [CHEER] substudy).	American Journal of Cardiology 86(2): 133-138.	Coronary patients	Cardiopulmonary disease secondary prevention	C2
Digenio, A. G., et al. (1999).	Effect of myocardial ischaemia on left ventricular function and adaptability to exercise training.	Medicine & Science in Sports & Exercise 31(8): 1094-1101.	Coronary artery disease	Cardiopulmonary disease secondary prevention	C2
Hedback, B., et al. (2001).	Cardiac rehabilitation after coronary artery bypass surgery: 10-year results on mortality, morbidity and readmissions to hospital.	Journal of Cardiovascular Risk 8(3): 153-158.	Coronary Artery Patients	Cardiopulmonary disease secondary prevention	C2
Hofman-Bang, C., et al. (1999).	Two-year results of a controlled study of residential rehabilitation for patients treated with percutaneous transluminal coronary angioplasty. A randomized study of a multifactorial programme.	European Heart Journal 20(20): 1465-1474.	Coronary artery patients	Cardiopulmonary disease secondary prevention	C2

Ketola, E., et al. (2001)	Individualised multifactorial lifestyle intervention trial for high risk cardiovascular patients in primary care.	British Journal of General Practice 51(465): 291-294	72% population cardiac disease, no age distinction	Cardiopulmonary disease secondary prevention	C2
Linxue, L., et al. (1999)	Effect of long-term exercise training on regional myocardial perfusion changes in patients with coronary artery disease.	Japanese circulation journal 63, 73-78	Coronary Artery Disease	Cardiopulmonary disease secondary prevention	C2
McHugh, F., et al. (2001).	Nurse led shared care for patients on the waiting list for coronary artery bypass surgery: a randomized controlled trial	Heart 86(3): 317-323.	Coronary Artery Patients	Cardiopulmonary disease secondary prevention	C2
Wallner, S., et al. (1999).	Effects of intensified lifestyle modification on the need for further revascularization after coronary angioplasty	European Journal of Clinical Investigation 29(5): 372-379.	Cardiac group, secondary prevention.	Cardiopulmonary disease secondary prevention	C2
Eriksson, J., et al. (1999).	Prevention of Type II diabetes in subjects with impaired glucose tolerance: the Diabetes Prevention Study (DPS) in Finland. Study design and 1-year interim report on the feasibility of the lifestyle intervention programme.	Diabetologia 42(7): 793-801	OUT mean age 55 (SD 7)	Age of Cohort	D1 age
Uusitupa, M., et al. (2000).	The Finnish Diabetes Prevention Study.	British Journal of Nutrition 83 Suppl 1: S137-142.	Age range 40 to 64 mean age 53.7	Age of Cohort	D1 age

Ubels, F. L., et al. (1999).	Walking training for intermittent claudication in diabetes	Diabetes Care 22(2): 198-201.	Diabetic complication group - vascular claudication, mean age 62 sd 2	Age of Cohort	D2, Age
Deligiannis, A., et al. (1999).	Cardiac effects of exercise rehabilitation in hemodialysis patients.	International Journal of Cardiology 70(3): 253-266.	Hemodialysis patients, 46.4+/-13.9 years, 51.4+/-12.5 years, 50.2+/-7.9 years	Established chronic disease.	ECD
Yeo, S., et al. (2000).	Effect of exercise on blood pressure in pregnant women with a high risk of gestational hypertensive disorders.	Journal of Reproductive Medicine 45(4): 293-298.	Study measures before and after 10 week intervention. Less than 12 weeks. Pregnant	Follow-up less than 3 months	F < 3
Murugesan, R., et al. (2000).	Effect of selected yogic practices on the management of hypertension.	Indian Journal of Physiology and Pharmacology 44(2): 207-210.	Mean age not presented. Range 35 to 65. Follow up less than 12 weeks	Follow-up less than 3 months	F <3
Cooper, A. R., et al. (2000).	What is the magnitude of blood pressure response to a programme of moderate intensity exercise? Randomized controlled trial among sedentary adults with unmedicated hypertension.	British Journal of General Practice 50(461): 958-962.	Mean age of controls 49.4 (8.9), 6 week follow-up	Age of Cohort	F<3 H age
Calfas, K. J., et al. (2001).	Six-month patient outcomes in a preventive cardiology center.	Preventive Cardiology 4(1): 16-22+27.	No control. Mean Age 55 (SD 14)	Age of Cohort	H age

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Ferrier, K. E., et al. (2001).	Aerobic exercise training does not modify large-artery compliance in isolated systolic hypertension.	Hypertension 38(2): 222-226.	Case control study age 64±7 [mean±SD]	Age of Cohort	H age
Hagberg J,M., et al (1999)	Exercise training-induced blood pressure and plasma lipid improvements in hypertensives may be genotype dependent	Hypertension 34(1): 18-23	Mean age 62.6 (SD 2.5), participants >45 yrs	Age of Cohort	H age
Halbert, J. A., et al. (2000).	Physical activity and cardiovascular risk factors: Effect of advice from an exercise specialist in Australian general practice.	Medical Journal of Australia 173(2): 85-87.	Recruited Participants over 60yrs old	Age of Cohort	H age
Higashi, Y., et al. (1999).	Daily aerobic exercise improves reactive hyperemia in patients with essential hypertension	Hypertension 33(1 Pt 2): 591-597.	Mean age 53.6 (10),	Age of Cohort	H age
Lavrencic, A., et al. (2000).	Physical training improves flow-mediated dilation in patients with the polymetabolic syndrome.	Arteriosclerosis, Thrombosis & Vascular Biology 20(2): 551-555.	Mean age 53±5 years, participants 40 to 60	Age of Cohort	H age
Moreira, W. D., et al. (1999).	The effects of two aerobic training intensities on ambulatory blood pressure in hypertensive patients: results of a randomized trial	Journal of Clinical Epidemiology 52(7): 637-642.	Less than 6 months, mean age 52.2 ± 9.2	Age of Cohort	H age
Reid, C. M., et al. (2000).	Substituting lifestyle management for pharmacological control of blood pressure: a pilot study in Australian general practice.	Blood Pressure 9(5): 267-274.	Mean age 53 (sd11), 54 (sd 8), inclusion age 18 to 60	Age of Cohort	H age

Sjostrom, M., et al. (1999).	A four week residential program for primary health care patients to control obesity and related heart risk factors: effective application of principles of learning and lifestyle change.	European Journal of Clinical Nutrition 53 Suppl 2: S72-77.	Mean age 52+/-9 years	Age of Cohort	H age
Tanaka, H., et al. (2000).	Aging, habitual exercise, and dynamic arterial compliance	Circulation 102(11): 1270-1275.	Intervention arm mean age 53 (2), age over 18	Age of Cohort	H age
Toobert, D. J., et al. (2000).	Physiologic and related behavioral outcomes from the women's lifestyle heart trial.	Annals of Behavioral Medicine 22(1): 1-9.	Mean age 64 (10), participants > 40 yrs	Age of Cohort	H age
Wylie-Rosett, J., et al. (2001).	Computerized weight loss intervention optimizes staff time: the clinical and cost results of a controlled clinical trial conducted in a managed care setting.	Journal of the American Dietetic Association 101(10): 1155-1162; quiz 1163-1154.	Mean age 52.2 sd 11.5-12, clincial patient population	Age of Cohort	H age
Yanek, L. R., et al. (2001).	Project Joy: faith based cardiovascular health promotion for African American women	Public Health Reports 116 Suppl 1: 68-81.	Mean age 53.6 sd 9, participants > 40 yrs	Age of Cohort	H age
Steptoe, A., et al. (1999).	Behavioural counselling in general practice for the promotion of healthy behaviour among adults at increased risk of coronary heart disease: randomized trial.	BMJ 319(7215): 943-947; discussion 947-948.	Mean age 48.1 (0.67)	Attrition greater than 20%. Recruited exclusively over 35's	H Age. Attrition

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Ard, J. D., et al. (2000).	Culturally-sensitive weight loss program produces significant reduction in weight, blood pressure, and cholesterol in eight weeks	Journal of the National Medical Association 92(11): 515-523.	Mean age 40.8. Follow-up 8 weeks, primary focus nutrition and weight loss	Follow up less than 3 months	H F<3
Cooper, A. R. and F. Goff (2001).	Does a single bout of brisk walking reduce ambulatory blood pressure in normotensives or hypertensives?	Cardiovascular Reviews and Reports 22(4): 213-216+222.	Acute exercise response	Follow up less than 3 months	F<3 NRCT
Lewis, T. V., et al. (1999).	Exercise training increases basal nitric oxide production from the forearm in hypercholesterolemic patients.	Arteriosclerosis, Thrombosis & Vascular Biology 19(11): 2782-2787.	Mean age 44 (3), Less than 12 week follow up	Follow up less than 3 months	F<3 NRCT age
Nami, R., et al. (2000).	Aerobic exercise training fails to reduce blood pressure in nondipper-type hypertension.	American Journal of Hypertension 13(6 I): 593-600.	Not an RCT, 3 months follow up, single arm before and after measures	Not RCT	NRCT
Pasman, W. J., et al. (1999).	Effect of exercise training on long-term weight maintenance in weight-reduced men.	Metabolism: Clinical & Experimental 48(1): 15-21.	Not a true control with no intention to treat	Not RCT	NRCT
Talvi, A. I., et al. (1999).	A health promotion programme for oil refinery employees: changes of health promotion needs observed at three years.	Occupational Medicine 49(2): 93-101.	NOT an RCT	Not RCT	NRCT

Calderon, R., Jr. (2000).	Effects of nonpharmacological approaches on cholesterol levels in mild hypertensive African Americans: A pilot study of the transcendental meditation program and a health education program.	Dissertation Abstracts International: Section B: The Sciences and Engineering 61(3-B): 1619.	No exercise - meditation	No defined exercise intervention	NEI
James, W. P. and S. Group (2001).	Achieving weight-loss maintenance.	Postgraduate Medicine 109(6 Suppl): 19-28.	Drug Trial Sibutramine Trial of Obesity Red uction and Maintenance	No defined exercise intervention	NEI
Kakinoki, S., et al. (2001).	Effects of short- and long-acting calcium channel blockers on the relationship between blood pressure and physical activity.	American Journal of Hypertension 14(1): 66-69.	Drug trial and review of PA	No defined exercise intervention	NEI
Andersen, R. E., et al. (1999).	Effects of lifestyle activity vs structured aerobic exercise in obese women: a randomized trial.	JAMA 281(4): 335-340.	Mean (SD) age of 42.9 (8.3) years. Comparative effectiveness trial. Lacks true PA control. Both groups received PA intervention.	Mean (SD) age of 42.9 (8.3) years. Comparative effectiveness trial. Lacks true PA control. Both groups received PA intervention.	NRCT
Will, J. C., et al. (2001).	Reducing risk for cardiovascular disease in uninsured women: combined results from two WISEWOMAN projects.	Journal of the American Medical Womens Association 56(4): 161-165.	Mean age 64. Not and RCT	Demographic of study population	NRCT

(1999) The WISE WOMAN Workgroup.	Cardiovascular disease prevention for women attending breast and cervical cancer screening programs: the WISEWOMAN projects	Preventive Medicine 28, 496-502	State wide health screening in combination with breast and cervical screening. Mean age 58	Not RCT	NRCT
Balkestein, E. J., et al. (1999).	The effect of weight loss with or without exercise training on large artery compliance in healthy obese men.	Journal of Hypertension 17(12 Pt 2): 1831-1835.	Lacks true control. One group received diet only the other diet and exercise.	Not RCT	NRCT
Bond, V., et al. (1999).	Aerobic exercise attenuates blood pressure reactivity to cold pressor test in normotensive, young adult African-American women.	Ethnicity & Disease 9(1): 104-110.	Case control study. 6 weeks training. Healthy and sedentary participants	Not RCT	NRCT
Harada, A., et al. (2001).	Cost and effectiveness of exercise therapy for patients with essential hypertension	Nippon Koshu Eisei Zasshi - Japanese Journal of Public Health 48(9): 753-763.	Not a randomized control trial, assigned to exercise or drug therapy	Not RCT	NRCT
Himeno, E., et al. (1999).	A weight reduction and weight maintenance program with long-lasting improvement in left ventricular mass and blood pressure.	American Journal of Hypertension 12(7): 682-690.	No control group	Not RCT	NRCT
Iwane, M., et al. (2000).	Walking 10,000 steps/day or more reduces blood pressure and sympathetic nerve activity in mild essential hypertension.	Hypertension Research 23(6): 573-580.	Case Control Study Design. Not randomized. Mean Age 47 + 1.0 SEM Standard Deviation 8.2	Not RCT	NRCT

Mughal, M. A., et al. (2001).	The effects of aerobic exercise training on resting blood pressure in hypertensive patients	JPMA - Journal of the Pakistan Medical Association 51(6): 222-226.	Not an RCT	Not RCT	NRCT
Muto, T. and K. Yamauchi (2001).	Evaluation of a multicomponent workplace health promotion program conducted in Japan for improving employees' cardiovascular disease risk factors	Preventive Medicine: An International Journal Devoted to Practice and Theory 33(6): 571-577.	Selective allocation of participants from a pre-selecting employee work force. Mean age of control and intervention 42.3 (4.5) and 42.7 (2.7) years. Participants were not free to withdraw and had to comply with follow-up under contract.	Not RCT	NRCT
Nothwehr, F. K., et al. (2001).	Sequencing diet and exercise programs for African American women with diabetes.	Diabetes Educator 27(2): 245-251.	Mean age 49	Not RCT	NRCT
Ritter, C. and D. Aldridge (2001).	Qigong Yangsheng as a therapeutic approach for the treatment of essential hypertension in comparison with a western muscle relaxation therapy: A randomized, controlled pilot study. [German].	Chinesische Medizin 16(2): 48-63.	Lacks true control. Groups received either Qigong exercise or Jacobson's progressive muscle relaxation	Not RCT	NRCT
Lyford, J. (2001)	Long-term weight loss lowers BP in mildly hypertensive overweight patients.	Current Controlled Trials in Cardiovascular Medicine 2(1): 56-57	Protocol	Protocol	Protocol

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Ishikawa et al (1999)	Influence of Age and Gender on Exercise Training Induced Blood Pressure Reduction In Systemic Hypertension	Am J Cardiol. 1999 Jul 15;84(2):192-6.	No control group, follow up 8 weeks	Not RCT	NRCT
Dunn, A. L., et al. (1999).	Comparison of lifestyle and structured interventions to increase physical activity and cardiorespiratory fitness: a randomized trial.	JAMA 281(4): 327-334.	Healthy Cohort. Age 35 to 65, mean 45.9 (6.8), 46.2 (6.5), lacks true control both receive exercise intervention.	PL BP secondary. H excluded. 22% missing BP data.	PL
Hartard, M., et al. (2001).	Health training as a form of primordial disease prevention in a future working environment. [German].	Arbeitsmedizin Sozialmedizin Umweltmedizin 36(11): 521-531.	Health untrained participants over 39. Follow-up 8 weeks.	Follow-up less than 3 months	PL age, F<3
Georgiades, A., et al. (2000).	Effects of exercise and weight loss on mental stress-induced cardiovascular responses in individuals with high blood pressure	Hypertension 36(2): 171-176.	Secondary Analysis	Secondary Analysis	Secondary analysis
Meland, E., et al (1999)	The importance of self efficacy in c ardiovascular risk factor change.	Scandinavian Journal of Public Health 27(1): 11-17	Secondary Analysis	Secondary Analysis	Secondary analysis
Steffen, P. R., et al. (2001).	Effects of exercise and weight loss on blood pressure during daily life.	Medicine & Science in Sports & Exercise 33(10): 1635-1640.	Secondary Analysis	Secondary Analysis	Secondary analysis
Stevens, V. J., et al. (2001).	Long-term weight loss and changes in blood pressure: results of the Trials of Hypertension Prevention, phase II.	Annals of Internal Medicine 134(1): 1-11.	Secondary Analysis	Secondary Analysis	Secondary analysis

Jakicic, J.M., et al (2003)	Effect of Exercise Duration and Intensity on Weight Loss in Overweight, Sedentary Women	JAMA September 10, 2003 Vol 290. No 10.	Study powered for change in weight. Attrition 8%. Mean Age 37 (SD 5.7). BMI 32.6. All participants receive an exercise intervention. No control	No control	NRCT
Murchie, P., et al. (2003).	Secondary prevention clinics for coronary heart disease: four year follow up of a randomized controlled trial in primary care.	BMJ 326(7380): 84.	Secondary prevention in coronary heart disease population	cardiopulmonary disease secondary prevention	C2
Vestfold Heartcare Study, G. (2003).	Influence on lifestyle measures and five-year coronary risk by a comprehensive lifestyle intervention programme in patients with coronary heart disease.	European Journal of Cardiovascular Prevention & Rehabilitation 10(6): 429-437.	Established coronary artery disease	cardiopulmonary disease secondary prevention	C2
Balducci, S., et al. (2004).	Is a long-term aerobic plus resistance training program feasible for and effective on metabolic profiles in type 2 diabetic patients?	Diabetes Care 27(3): 841-842.	Mean age 60.9 (8.9)	Age of Cohort	D2 age
Gaede, P., et al. (2003)	Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes.	New England Journal of Medicine 348(5): 383-393.	Mean age 55.1 no range provided	Age of Cohort	D2 age
Kirk, A., et al. (2003).	Increasing physical activity in people with type 2 diabetes.	Diabetes Care 26(4): 1186-1192.	Mean age of 57.6 (7.9)	Age of Cohort	D2 age

Kirk, A., et al. (2004)	Effects of a 12-month physical activity counselling intervention on glycaemic control and on the status of cardiovascular risk factors in people with Type 2 diabetes.	Diabetologia 47(5): 821-832	Mean age of 57.6±7.9 years	Age of Cohort	D2 age
Krook, A., et al. (2003).	Reduction of risk factors following lifestyle modification programme in subjects with type 2 (non-insulin dependent) diabetes mellitus.	Clinical Physiology and Functional Imaging 23(1): 21-30.	Average age was 54 ± 0.6 years	Age of Cohort	D2 age
Egede, L. E. (2003).	Lifestyle modification to improve blood pressure control in individuals with diabetes: is physician advice effective?	Diabetes Care 26(3): 602-607.	Cohort study review of health status associated with record of health professional advice.	Not RCT, Age of Cohort	D2 age
Chiriac, S., et al. (2003).	The effects of the physical training on the hypertensive patients with glycoregulation disorder	Revista Medico-Chirurgicala a Societatii de Medici Si Naturalisti Din Iasi 107(1): 108-112.	Romanian language. Age criteria >60	Age of Cohort	H age
Appel, L. J., et al. (2003).	Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial.	JAMA 289(16): 2083-2093.	Mean age 50, SD of 8.9, age > 25 years	Age of Cohort	H age
Ard, J. D., et al. (2004).	The effect of the PREMIER interventions on insulin sensitivity	Diabetes Care 27(2): 340-347.	Mean age 50, SD of 8.9 age > 25	Age of Cohort	Secondary analysis

Igarashi, K., et al. (2004)	Sapporo Fitness Club Trial (SFCT)--design, recruitment and implementation of a randomized controlled trial to test the efficacy of exercise at a fitness club for the reduction of cardiovascular risk factor.	Circulation Journal 68(12): 1199-1204.	Mean age 67.3 (6.6), age criteria 40 to 85	Age of Cohort	H age
McGuire, H. L., et al. (2004)	Comprehensive lifestyle modification and blood pressure control: a review of the PREMIER trial.	Journal of Clinical Hypertension 6(7): 383-390.	Mean age 50. paper with age sub-group analysis picked up in 2005-06, age > 25 years	Age of Cohort	Secondary analysis
Miller, E. R., 3rd, et al. (2002)	Results of the Diet, Exercise, and Weight Loss Intervention Trial (DEW-IT).	Hypertension 40(5): 612-618.	Hypocalorific dietary intervention plus exercise. Mean age 54 (9), 9 week follow-up, age 22 to 70	Age of Cohort	H age
Rauramaa, R., et al. (2004)	Effects of aerobic physical exercise on inflammation and atherosclerosis in men: the DNASCO Study: a six-year randomized, controlled trial	Annals of Internal Medicine 140(12): 1007-1014.	Mean age 57.1 (56.4–57.8)	Age of Cohort	H age
Woollard, J., et al. (2003)	Effects of general practice-based nurse-counselling on ambulatory blood pressure and antihypertensive drug prescription in patients at increased risk of cardiovascular disease.	Journal of Human Hypertension 17(10): 689-695	Mean age 60.3 (59.6, 63.0), 61 (59, 63), 59.5 (57.5, 61.5)	Age of Cohort	H age

Ishikawa-Takata, K., et al. (2003)	How much exercise is required to reduce blood pressure in essential hypertensives: a dose-response study.	Journal of Human Hypertension 17(10): 689-695	8 week follow-up mean age > 40 (49.6 ± 7.4 48.6 ± 7.7 50.3 ± 6.7 52.1 ± 6.9 51.0 ± 7.4)	Follow-up less than 3 months, Age of Cohort	H age
Tsai, J.-C., et al. (2002)	Beneficial effect on blood pressure and lipid profile by programmed exercise training in Taiwanese patients with mild hypertension.	Clinical & Experimental Hypertension 24(4): 315-324.	MEAN age 46.2±5.6 49.6±9.3 (Group mean 48.2). Attrition 17%	Age of Cohort	H age
Wang, L. and J. Li (2003)	Role of educational intervention in the management of comorbid depression and hypertension.	Blood Pressure 12, 198-202	Mean Age (years) 62.7 sd 7.9 and 63.2 sd 10.7	Age of Cohort	H Age
Svetkey, L. P., et al. (2003)	Premier: a clinical trial of comprehensive lifestyle modification for blood pressure control: rationale, design and baseline characteristics.	Annals of Epidemiology 13(6): 462-471.	PREMIER STUDY	Age of Cohort	H age
Frolova, E. V., et al. (2004)	Efficacy of nondrug correction of hypertension in general medical practice	Kardiologiia 44(2): 35-39.	Lacking true control	NRCT	NRCT
Poston, W. S. C., et al. (2003)	Weight loss in obese Mexican Americans treated for 1-year with orlistat and lifestyle modification.	International Journal of Obesity & Related Metabolic Disorders: Journal of the International Association for the Study of Obesity 27(12): 1486-1493.	Mean BMI 37.8, drug plus exercise, weight list control. Attrition 33% at 6 months and 39% at 12 months	Drug trial	NEI

An, P., et al. (2003).	Evidence of major genes for exercise heart rate and blood pressure at baseline and in response to 20 weeks of endurance training: the HERITAGE family study.	International Journal of Sports Medicine 24(7): 492-498.	Pre-post analysis. Not randomized.	Not RCT	NRCT
Briffa, K. and T. Briffa (2002)	Aerobic exercise reduces blood pressure in both hypertensive and normotensive persons.	Australian Journal of Physiotherapy 48(3): 238.	Review paper out	Not RCT	NRCT
Izdebska, E., et al. (2004)	Effects of moderate physical training on blood pressure variability and hemodynamic pattern in mildly hypertensive subjects.	Journal of Physiology & Pharmacology 55(4): 713-724.	Case Control Study Not RCT	Not RCT	NRCT
Lalonde, L., et al. (2002)	Comparing the benefits of diet and exercise in the treatment of dyslipidemia.	Preventive Medicine 35(1): 16-24	Diet and exercise intervention. All participants received dietary advice to follow 2 different diets and either self-directed exercise or supervised exercise. Lacks a control	Not RCT	NRCT
Miyatake, N., et al. (2003).	Evaluation of exercise prescription for hypertensive obese men by ventilatory threshold.	Journal of the Chinese Medical Association: JCMA 66(10): 572-578.	Case control. Before after study	Not RCT	NRCT
Rice, T., et al. (2002).	Heritability of HR and BP response to exercise training in the HERITAGE Family Study	Medicine & Science in Sports & Exercise 34(6): 972-979.	Cross sectional	Not RCT	NRCT

Watkins, D., et al. (2004)	Trends in blood pressure over 10 years in adolescents: analyses of cross sectional surveys in the Northern Ireland Young Hearts project.	BMJ 329(7458): 139.	Cross sectional	Not RCT	NRCT
. Burke, V., et al. (2003)	Physical activity and nutrition programs for couples: a randomized controlled trial.	Journal of Clinical Epidemiology 56, 421-432	Healthy adult population at baseline. Couple intervention.	Demographic of study population	PL
Mattila, R., et al. (2003).	Effectiveness of multidisciplinary lifestyle intervention for hypertension: a randomized controlled trial.	Journal of Human Hypertension 17(3): 199-205.	Mean age 49.9 (0.31)	PL age, excluded participants with blood pressure above 140/90	PL age, excluded participants with blood pressure above 140/90
Mattila, R., et al. (2004)	Effects of lifestyle intervention on neck, shoulder, elbow and wrist symptoms.	Scandinavian Journal of Work, Environment & Health 30(3): 191-198.	Mean age 49.9 (0.31)	PL age, excluded participants with blood pressure above 140/90	Secondary analysis
Hinderliter, A., et al. (2002).	Reduction of left ventricular hypertrophy after exercise and weight loss in overweight patients with mild hypertension.	Archives of Internal Medicine 162(12): 1333-1339.	Secondary analysis of Blumenthal et al 2000. Already included.	Secondary analysis of Blumenthal et al 2000. Already included.	Secondary analysis
Havlik, R. J., et al. (2005).	Walking may be related to less vascular stiffness in the Activity Counseling Trial (ACT).	American Heart Journal 150(2): 270-275.	Clinical population with coronary disease	Demographic of study population	C2

Allen, P., et al. (2006)	Dietary, physical activity and metabolic changes among young urban Native American women with prediabetes participating in a primary prevention program.	American Public Health Association 134th Annual Meeting & Exposition; Boston,MA	Mean age 57 (12)	Mean age 57 (12)	D1 age
Sturt, J., et al. (2006).	The Diabetes Manual trial protocol - a cluster randomized controlled trial of a self-management intervention for type 2 diabetes [ISRCTN06315411].	BMC Family Practice 7: 45.	Protocol	Protocol	D2, Protocol
Dasgupta, K., et al. (2006).	Impact of modified glucose target and exercise interventions on vascular risk factors.	Diabetes Research & Clinical Practice 72(1): 53-60.	Mean age 54 (IQR 47, 58)	Age of Cohort	D2 Age
Bjorgaas, M., et al. (2005).	Relationship between pedometer-registered activity, aerobic capacity and self-reported activity and fitness in patients with type 2 diabetes.	Diabetes, Obesity & Metabolism 7(6): 737-744.	Mean age = 57.4 (7.8) years	Age of Cohort	D2 Age
Kim, S. H., et al. (2006)	Effects of lifestyle modification on metabolic parameters and carotid intima-media thickness in patients with type 2 diabetes mellitus.	Metabolism: Clinical and Experimental 55, 1053-1059 DOI: 10.1016/j.metabol.2006.03.017	Mean age 55.0 (8.1)	Age of Cohort	D2 age
Lazarevic, G., et al. (2006).	A physical activity programme and its effects on insulin resistance and oxidative defense in obese male patients with type 2 diabetes mellitus.	Diabetes & Metabolism 32(6): 583-590.	Mean age 54±7.32 years	Age of Cohort	D2 Age

Menard, J., et al. (2005).	Efficacy of intensive multitherapy for patients with type 2 diabetes mellitus: a randomized controlled trial.	CMAJ Canadian Medical Association Journal 173(12): 1457-1466.	Mean age 53.7 (7.5)	Age of Cohort	D2 age
Burke, V., et al. (2005)	Effects of a lifestyle programme on ambulatory blood pressure and drug dosage in treated hypertensive patients: a randomized controlled trial.	Journal of Hypertension 23(6): 1241-1249.	Mean age 57.5(7), age criteria 40 to 70	Age of Cohort	H Age
Clark, A. M. (2006)	Randomized Controlled Trial on Lifestyle Modification in Hypertensive Patients	Western Journal of Nursing Research 28(2): 210-213.	Mean age 52.2 (8.6), age criteria 18 to 65	Age of Cohort	H Age
Elmer, P. J., et al. (2006).	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 144(7): 485-495.	PREMIER Trial Mean age 50	Age of Cohort	H Age
Eriksson, K. M., et al. (2006).	A randomized trial of lifestyle intervention in primary healthcare for the modification of cardiovascular risk factors.	Scandinavian Journal of Public Health 34(5): 453-461.	Mean age 55.3 (6.9), criteria 18 to 65	Age of Cohort	H Age

Stewart, A., et al. (2005)	Adherence to cardiovascular risk factor modification in patients with hypertension.	Cardiovascular Journal of Southern Africa 16(2): 102-107.	No age presented in paper. Description Patients in this sample were late middle aged and were representative of all population groups	Age of Cohort	H Age
Tully, M. A., et al. (2005).	Brisk walking, fitness, and cardiovascular risk: A randomized controlled trial in primary care.	Preventive Medicine 41(2): 622-628.	Age 50-65, mean 55.52 (3.99)	Age of Cohort	H Age
McCaffrey, R., et al. (2005).	The effects of yoga on hypertensive persons in Thailand.	Holistic nursing practice 19(4): 173-180	8 week follow up, mean age 56.7	Age of Cohort, Follow-up less than 3 months	H Age
Aldana, S. G., et al. (2006).	The behavioral and clinical effects of therapeutic lifestyle change on middle-aged adults	Preventing Chronic Disease 3(1): A05.	Mean age 50 sd not provided, age criteria > 18	Age of Cohort	H Age
Moore, G. E. and M. J. LaMonte (2006).	Can exercise lower blood pressure in mildly hypertensive older persons? Commentary.	Clinical Journal of Sport Medicine 16(5): 451-452.	Editorial	Not RCT	NRCT
Nowson, C. A., et al. (2005)	Blood pressure change with weight loss is affected by diet type in men.	American Journal of Clinical Nutrition 81(5): 983-989.	Nutritional intervention, all participants exercised to same level	Not RCT	NRCT
van Weel, C., et al. (2006).	Long-term outcome of cardiovascular prevention: a Nijmegen Academic Family Practices Network study.	Journal of the American Board of Family Medicine: JABFM 19(1): 62-68.	General Primary Care population - 18 year follow-up of a primary care prevention trial	Not RCT	NRCT

Egan, B. M., et al. (2005).	Metabolic syndrome and insulin resistance in the TROPHY sub-study: contrasting views in patients with high-normal blood pressure	American Journal of Hypertension 18(1): 3-12.	Pharmacological management in prehypertension primary study - no exercise intervention	Pharmacological management in prehypertension primary study - no exercise intervention	NEI
Smith, G. D., et al. (2005)	Incidence of type 2 diabetes in the randomized multiple risk factor intervention trial.	Annals of Internal Medicine 142(5): 313-322.	Mean age 46 range 35 - 56 IN	Secondary analysis of MRFIT study, no exercise component.	No exercise, secondary analysis
Becker, D. M., et al. (2005).	Impact of a community-based multiple risk factor intervention on cardiovascular risk in black families with a history of premature coronary disease.	Circulation 111(10): 1298-1304.	Mean age 49 (7)	Comparative effectiveness study. Lacks true control	NRCT
Lakka, T. A., et al. (2005).	Effect of exercise training on plasma levels of C-reactive protein in healthy adults: the HERITAGE Family Study.	European Heart Journal 26(19): 2018-2025.	Healthy Sedentary, before after study, no control	Demographic of study population and no control	NRCT
Izdebska, E., et al. (2006).	Moderate exercise training reduces arterial chemoreceptor reflex drive in mild hypertension.	Journal of Physiology & Pharmacology 57 Suppl 11: 93-102.	Case control study. Not RCT	Not RCT	NRCT
Masuo, K., et al. (2005).	Rebound weight gain as associated with high plasma norepinephrine levels that are mediated through polymorphisms in the beta2-adrenoceptor.	American Journal of Hypertension 18(11): 1508-1516.	Before and after study. No control	Not RCT	NRCT

Moriguchi, J., et al. (2005)	Low frequency regular exercise improves flow-mediated dilatation of subjects with mild hypertension.	Hypertension Research - Clinical & Experimental 28(4): 315-321.	Case control study. Not RCT	Not RCT	NRCT
Paschal, A. M., et al. (2006).	Evaluating the impact of a hypertension program for African Americans.	Journal of the National Medical Association 98(4): 607-615.	Before and after study. Not RCT OUT	Not RCT	NRCT
Kim, Y. H. and Y. O. Yang (2005)	Effects of walking exercise on metabolic syndrome risk factors and body composition in obese middle school girls. [Korean].	Taehan Kanho Hakhoe chi 35(5): 858-867.	Mean age 14 (0.5) and 13.8(0.3)	Demographic of study population	PP
Orchard, T. J., et al. (2005).	The effect of metformin and intensive lifestyle intervention on the metabolic syndrome: the Diabetes Prevention Program randomized trial.	Annals of Internal Medicine 142(8): 611-619.	Main paper published 2002	Secondary Analysis	Secondary analysis
Svetkey, L. P., et al. (2005).	Effect of lifestyle modifications on blood pressure by race, sex, hypertension status, and age.	Journal of Human Hypertension 19(1): 21-31.	SUB-GROUP analysis of PREMIER IN	Secondary Analysis	Secondary analysis
Choi, K. M., et al. (2007). .	Effect of exercise training on plasma visfatin and eotaxin levels.	European Journal of Endocrinology 157(4): 437-442.	Query power calculation. Primary objective was not to report BP but to report change in adipokines in association with risk factors.	Mean age of study subjects was 47.1 SD 6.4	H Age

Muller-Ehmsen, J., et al. (2008).	Decreased number of circulating progenitor cells in obesity: Beneficial effects of weight reduction.	European Heart Journal 29(12): 1560-1568.	mean age 52.5+12.0 years, range 16 to 76 years	Mean age 52.5 SD 12	H Age
Babazono, A., et al. (2007)	Patient-motivated prevention of lifestyle-related disease in Japan: A randomized, controlled clinical trial.	Disease Management and Health Outcomes 15, 119-126 DOI: 10.2165/00115677-200715020-00007	Mean age 64.3 (7.1)	Age of Cohort	H Age
Baynard, T., et al. (2008).	Short-term training effects on diastolic function in obese persons with the metabolic syndrome	Obesity 16(6): 1277-1283.	Follow up after 10 days Mean age 52 (1)	Age of Cohort, Follow-up less than 3 months	F<3
Bruckert, E., et al. (2008)	Effect of an educational program (PEGASE) on cardiovascular risk in hypercholesterolaemic patients	Cardiovascular Drugs and Therapy 22(6): 495-505.	Mean age 56.9±10.1 58.1±12.0, age criteria > 18	Age of Cohort	H Age
Coghill, N. and A. R. Cooper (2008).	The effect of a home-based walking program on risk factors for coronary heart disease in hypercholesterolaemic men. A randomized controlled trial.	Preventive Medicine 46(6): 545-551.	Age (55.1 (4.9) years), age criteria 45 to 65 years	Age of Cohort	H Age
Hardcastle, S., et al. (2008).	A randomized controlled trial on the effectiveness of a primary health care based counselling intervention on physical activity, diet and CHD risk factors.	Patient Education & Counseling 70(1): 31-39.	Mean age 51.10 (0.58), age criteria 18 to 65	Age of Cohort	H Age

Tully, M. A., et al. (2007).	Randomized controlled trial of home-based walking programmes at and below current recommended levels of exercise in sedentary adults.	Journal of Epidemiology & Community Health 61(9): 778-783.	Age 40-61, mean 47.80 (5.97) 46.37 (4.76) 49.05 (6.31	Exclusively recruited 40 to 60 age group.	H Age
Brun, J. F., et al. (2008).	One year endurance training at the level of the ventilatory threshold in type-2 diabetics reduces by 50% health costs: A randomized trial. [French].	Science and Sports 23(3-4): 193-197.	BP not reported. Over 20% attrition and no intention to treat.	BP not reported. Over 20% attrition and no intention to treat.	Attrition
Makrides, L., et al. (2008).	Evaluation of a workplace health program to reduce coronary risk factors.	Clinical Governance 13(2): 95-105.	Attrition greater than 20%	Attrition greater than 20%	Attrition
Simmons, R. K., et al. (2008).	Increasing overall physical activity and aerobic fitness is associated with improvements in metabolic risk: cohort analysis of the ProActive trial.	Diabetologia 51(5): 787-794.	Powered for PA and participant numbers discussed with regard primary outcome. Not sure how many had BP measured etc. Mean age 40.2 (5.8), 40.8 (6.1) (mean 40.6 sd 6). Attrition and missing dats 12%. Intention to treat.	Powered for PA and participant numbers discussed with regard primary outcome. Not sure how many had BP measured etc. Mean age 40.2 (5.8), 40.8 (6.1) (mean 40.6 sd 6). Attrition and missing dats 12%. Intention to treat. Included in Kinmonth et al	Secondary analysis
Belardinelli, R., et al. (2008)	Trimetazidine potentiates the effects of exercise training in patients with ischemic cardiomyopathy referred for cardiac rehabilitation.	European Journal of Cardiovascular Prevention and Rehabilitation 15, 533-540 DOI: 10.1097/HJR.0b013e328304feec	Ischaemic Cardiomyopathy	Cardiopulmonary disease secondary prevention	C2

Figueroa, A., et al. (2008)	Resistance exercise training improves heart rate variability in women with fibromyalgia.	Clinical Physiology and Functional Imaging 28(1): 49-54.	Fibromyalgia population (Musculoskeletal Chronic Pain Syndrome)	Cardiopulmonary disease secondary prevention	C2
Jiang, X., et al. (2007)	A nurse-led cardiac rehabilitation programme improves health behaviours and cardiac physiological risk parameters: evidence from Chengdu, China.	Journal of Clinical Nursing 16(10): 1886-1897.	Recruited Coronary Heart Disease population	Cardiopulmonary disease secondary prevention	C2
Jolly, K., et al. (2007).	The Birmingham Rehabilitation Uptake Maximisation Study (BRUM). Home-based compared with hospital-based cardiac rehabilitation in a multi-ethnic population: Cost-effectiveness and patient adherence.	Health Technology Assessment 11(35): iii-93.	Recruited Coronary Heart Disease	Cardiopulmonary disease secondary prevention	C2
Lennon, O., et al. (2008).	A pilot randomized controlled trial to evaluate the benefit of the cardiac rehabilitation paradigm for the non-acute ischaemic stroke population.	Clinical Rehabilitation 22(2): 125-133.	Recruited Coronary Heart Disease	Cardiopulmonary disease secondary prevention	C2
Marquis, K., et al. (2008)	Effects of aerobic exercise training and irbesartan on blood pressure and heart rate variability in patients with chronic obstructive pulmonary disease. [French].	Canadian Respiratory Journal 15, 355-360	COPD patient group	Cardiopulmonary disease secondary prevention	C2

Mefferd, K., et al. (2007)	A cognitive behavioral therapy intervention to promote weight loss improves body composition and blood lipid profiles among overweight breast cancer survivors.	Breast Cancer Research & Treatment 104(2): 145-152.	Breast Cancer Survivors	Cardiopulmonary disease secondary prevention	C2
Plüss, C. E., et al. (2008)	Effects of an expanded cardiac rehabilitation programme in patients treated for an acute myocardial infarction or a coronary artery by-pass graft operation.	Clinical Rehabilitation 22, 306-318 DOI: 10.1177/0269215507085379	Coronary Artery Disease	Cardiopulmonary disease secondary prevention	C2
Redfern, J., et al. (2008)	Patient-centered modular secondary prevention following acute coronary syndrome: a randomized controlled trial.	Journal of Cardiopulmonary Rehabilitation & Prevention 28(2): 107-115; quiz 116-107.	Coronary Artery Disease	Cardiopulmonary disease secondary prevention	C2
Salyer, J., et al. (2007)	Community-based weight management in long-term heart transplant recipients: a pilot study.	Progress in Transplantation 17(4): 315-323.	Heart transplant recipient mean age 57 years	Cardiopulmonary disease secondary prevention	C2
Sol, B. G. M., et al. (2008).	The role of self-efficacy in vascular risk factor management: a randomized controlled trial.	Patient Education & Counseling 71(2): 191-197.	Vascular Disease patients	Cardiopulmonary disease secondary prevention	C2
Yates, B. C., et al. (2007).	Comparing two methods of rehabilitation for risk factor modification after a cardiac event.	Rehabilitation Nursing Journal 32(1): 15-22.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2

Zutz, A., et al. (2007).	Utilization of the internet to deliver cardiac rehabilitation at a distance: a pilot study	Telemedicine Journal & E-Health 13(3): 323-330.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2
Naser, A., et al. (2008).	Cardiac risk factor changes through an intensive multifactorial life style modification program in CHD patients: Results from a two year follow up.	Journal of Biological Sciences 8(2): 248-257.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2
Peschel, T., et al. (2007	High, but not moderate frequency and duration of exercise training induces downregulation of the expression of inflammatory and atherogenic adhesion molecules.	European Journal of Cardiovascular Prevention and Rehabilitation 14(3): 476-482.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2
Plaza, I., et al. (2007)	Secondary prevention program: impact on cardiovascular risk	Revista Espanola de Cardiologia 60(2): 205-208.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2
Soja, A. M. B., et al. (2007).	Use of intensified comprehensive cardiac rehabilitation to improve risk factor control in patients with type 2 diabetes mellitus or impaired glucose tolerance--the randomized DANish StUdy of impaired glucose metabolism in the settings of cardiac rehabilitation (DANSUK) study	American Heart Journal 153(4): 621-628.	Recruited Coronary Artery Disease Population	Cardiopulmonary disease secondary prevention	C2

Roumen, C., et al. (2008).	Impact of 3-year lifestyle intervention on postprandial glucose metabolism: the SLIM study.	Diabetic Medicine 25(5): 597-605.	Mean age 54.2 ± 5.8	Age of Cohort	D1 Age
Dunstan, D.W. (2008)	Aerobic exercise resistance trainining for the management of type 2 diabetes mellitus.	Nature Clinical Practice and Endocrinology and Metabolism 4(5): 250-251	Full data not presented. Age range 39 to 70	Editorial commentary; Sigal, R.J., et al (2007) .Effects of aerobic training, resistance training, or both on glycaemic control in type 2 diabetes: a randomized trial. Annals of Internal Medicine 147(6): 357-369	D2 age
Allen, N. A., et al. (2008)	Continuous glucose monitoring counseling improves physical activity behaviors of individuals with type 2 diabetes: A randomized clinical trial.	Diabetes Research and Clinical Practice 80(3): 371-379.	Less than 6 months and mean age 57 (12)	Age of Cohort	D2 age
Balducci, S., et al. (2008).	The Italian Diabetes and Exercise Study (IDES): design and methods for a prospective Italian multicentre trial of intensive lifestyle intervention in people with type 2 diabetes and the metabolic syndrome.	Nutrition Metabolism & Cardiovascular Diseases 18(9): 585-595.	Mean age 58.8 years (SD 8.5)	Age of Cohort	D2 age
Bjorgaas, M. R., et al. (2008).	Regular use of pedometer does not enhance beneficial outcomes in a physical activity intervention study in type 2 diabetes mellitus.	Metabolism: Clinical & Experimental 57(5): 605-611.	Mean age 56.4 ± 11.0, 61.2 (9.7)	Demographic of study population	D2 age

Cohen, N. D., et al. (2008)	Improved endothelial function following a 14-month resistance exercise training program in adults with type 2 diabetes.	Diabetes Research and Clinical Practice 79, 405-411 DOI: 10.1016/j.diabres.2007.09.020	Mean 60.6 ± 6.9, 60.4 (8.5)	Age of Cohort	D2 age
Gordon, L., et al. (2008).	Changes in clinical and metabolic parameters after exercise therapy in patents with type 2 diabetes.	Archives of Medical Science 4(4): 427-437.	Age range 40 - 70 mean age 63.9	Age of Cohort	D2 Age
Guo, L. X., et al. (2008)	Effect of short term intensive multitherapy on carotid intima-media thickness in patients with newly diagnosed type 2 diabetes mellitus.	Chinese Medical Journal 121(8): 687-690.	Mean age 49.34±8.80	Age of Cohort	D2 Age
Kadoglou, N. P. E., et al. (2007).	The anti-inflammatory effects of exercise training in patients with type 2 diabetes mellitus	European Journal of Cardiovascular Prevention & Rehabilitation 14(6): 837-843.	Mean age 56.83±6.76	Age of Cohort	D2 age
Krousel-Wood, M. A., et al. (2008).	Does home-based exercise improve body mass index in patients with type 2 diabetes?.	Diabetes Research and Clinical Practice 79(2): 230-236.	Mean age 56.6 ± 9.6 years.	Age of Cohort	D2 age
Lam, P., et al. (2008)	Improving glycaemic and BP control in type 2 diabetes - The effectiveness of tai chi.	Australian Family Physician 37(10): 884-887.	Mean age 63.2 (8.6)	Age of Cohort	D2 age
Lazarevic, G., et al. (2008).	Effects of regular exercise on cardiovascular risk factors profile and oxidative stress in obese type 2 diabetic patients in regard to SCORE risk.	Acta Cardiologica 63(4): 485-491.	aged 48.8 +/- 6.0 years	Age of Cohort	D2 Age

McBride, P. E., et al. (2008).	Putting the Diabetes Prevention Program into practice: a program for weight loss and cardiovascular risk reduction for patients with metabolic syndrome or type 2 diabetes mellitus	Journal of Nutrition, Health & Aging 12(10): 745S-749S.	mean age 51.3 (8.9)	Age of Cohort	D2 Age
Menard, J., et al. (2007).	Quality of life in type 2 diabetes patients under intensive multitherapy.	Diabetes & Metabolism 33(1): 54-60.	Mean age 54.8, SD 8.1 OUT	Age of Cohort	D2 age
Meulepas, M. A., et al. (2008).	Patient-oriented intervention in addition to centrally organised checkups improves diabetic patient outcome in primary care.	Quality & Safety in Health Care 17(5): 324-328.	Mean age 69 (11.3)	Age of Cohort	D2 age
Sigal, R.J., et al (2007)	Effects of aerobic training, resistance training, or both on glycaemic control in type 2 diabetes: a randomized trial.	Annals of Internal Medicine 147(6): 357-369	Mean age 53.5 (7.3)	Age of Cohort	D2 age
Figueroa, A., et al. (2007).	Endurance training improves post-exercise cardiac autonomic modulation in obese women with and without type 2 diabetes.	European Journal of Applied Physiology 100(4): 437-444.	Acute exercise response - measures up to 35 minutes post exercise	Follow-up less than 3 months	D2 Age, F<3
Hordern, M. D., et al. (2008).	Determinants of changes in blood glucose response to short-term exercise training in patients with Type 2 diabetes.	Clinical Science 115(9): 273-281.	Baseline and 4 week measures. Diabetic population	Follow-up less than 3 months	D2 Age, F<3

Hjelstuen, A., et al. (2007).	Effect of lifestyle and/or statin treatment on soluble markers of atherosclerosis in hypertensives.	Scandinavian Cardiovascular Journal 41(5): 313-320.	Mean age 54.3 (8.8)	Age of Cohort	Drug Age
Cohen, B. E., et al. (2008).	Restorative yoga in adults with metabolic syndrome: a randomized, controlled pilot trial.	Metabolic Syndrome & Related Disorders 6(3): 223-229.	Changes in metabolic outcomes and questionnaire measures from the baseline to 10 weeks were calculated, mean age 52(sd9)	Follow-up less than 3 months	F<3
Collier, S. R., et al. (2008).	Effect of 4 weeks of aerobic or resistance exercise training on arterial stiffness, blood flow and blood pressure in pre- and stage-1 hypertensives.	Journal of Human Hypertension 22(10): 678-686.	Follow-up - end of training 4 weeks , mean age 49.8 (1.6)	Follow-up less than 3 months	F<3
Petrofsky, J. S., et al. (2008).	The effect of a diet and exercise program with a mini medicine ball on cardiovascular fitness, weight loss, and strength.	Journal of Applied Research 8(2): 116-129.	Baseline, 3day, 10 day and 2 week follow-up	Follow-up less than 3 months	F<3
Wu, T. Y., et al. (2007).	The effects of simple eight-week regular exercise on cardiovascular disease risk factors in middle-aged women at risk in Taiwan.	Acta Cardiologica Sinica 23(3): 169-176.	8 week follow up	Follow-up less than 3 months	F<3
Staffileno, B. A., et al. (2007).	Blood pressure responses to lifestyle physical activity among young, hypertension-prone African-American women	Journal of Cardiovascular Nursing 22(2): 107-117.	8 week intervention with pre-post measures. Follow less than 12 weeks	Follow-up less than 3 months	F<3

Cornelli, U., et al. (2008)	Use of polyglucosamine and physical activity to reduce body weight and dyslipidemia in moderately overweight subjects.	Minerva cardioangiologica 56(5 Suppl): 71-78.	Supplements and weight loss.	Follow-up less than 3 months	F<3, NEI
Bosworth, H. B., et al. (2007).	Hypertension Intervention Nurse Telemedicine Study (HINTS): Testing a multifactorial tailored behavioral/educational and a medication management intervention for blood pressure control.	American Heart Journal 153(6): 918-924.	Mean age 64 (10), no age criteria	Age of Cohort	H Age
Bosworth, H. B., et al. (2008).	Take Control of Your Blood pressure (TCYB) study: A multifactorial tailored behavioral and educational intervention for achieving blood pressure control.	Patient Education and Counseling 70(3): 338-347.	Mean age 60.5, no defined age criteria	Age of Cohort	H Age
Burke, V., et al. (2008).	Long-term follow-up of participants in a health promotion program for treated hypertensives (ADAPT).	Nutrition, Metabolism and Cardiovascular Diseases 18(3): 198-206.	Mean age 55.3 (7.5) 57.1 (7.2), participants 40 to 70 years.	Age of Cohort	H Age
Burke, V., et al. (2008).	Changes in cognitive measures associated with a lifestyle program for treated hypertensives: a randomized controlled trial (ADAPT)	Health Education Research 23(2): 202-217.	Mean Age 55.3 (7.5), 57.1 (7.2), participants 40 to 70 years.	Age of Cohort	Secondary analysis

Fontana, L., et al. (2007).	Calorie restriction or exercise: effects on coronary heart disease risk factors. A randomized, controlled trial.	American Journal of Physiology - Endocrinology & Metabolism 293(1): E197-202.	Mean age 57 (3.0), participants 50 to 60 years old	Age of Cohort	H Age
Lien, L. F., et al. (2007).	Effects of PREMIER lifestyle modifications on participants with and without the metabolic syndrome.	Hypertension 50(4): 609-616.	Mean age 50 (sd9), participants > 25	Age of Cohort	H Age
Oh, E. G., et al. (2008).	A randomized controlled trial of therapeutic lifestyle modification in rural women with metabolic syndrome: a pilot study.	Metabolism: Clinical and Experimental 57(2): 255-261.	Mean age 64.6 (10.2), focus on older women. No defined lower limit	Age of Cohort	H Age
Payne, W. R., et al. (2008).	Effect of a low-resource-intensive lifestyle modification program incorporating gymnasium-based and home-based resistance training on type 2 diabetes risk in Australian adults.	Diabetes Care 31(12): 2244-2250.	Mean age 52.6 sd (8.6), age > 35	Age of Cohort	H Age
Pugliese, R., et al. (2007).	Efficacy of lifestyle change psychological intervention in coronary risk reduction.	Arquivos Brasileiros de Cardiologia 89(4): 225-230.	Group receiving behaviour coaching. Mean age 53 (8), age criteria 35 to 63	Age of Cohort	H Age
Puglisi, M. J., et al. (2008).	Raisins and additional walking have distinct effects on plasma lipids and inflammatory cytokines.	Lipids in Health and Disease 7(14).	Mean age 55 (3.8), targeting postmenopausal women	Age of Cohort	H Age

Wister, A., et al. (2007).	One-year follow-up of a therapeutic lifestyle intervention targeting cardiovascular disease risk	CMAJ Canadian Medical Association Journal 177(8): 859-865.	Mean age 58 (5.5), age 45 to 65	Age of Cohort	H Age
Xue, F., et al. (2008).	A randomized trial of a 5 week, manual based, self-management programme for hypertension delivered in a cardiac patient club in Shanghai.	BMC Cardiovascular Disorders 8(10).	Mean age 57.5 (6.96), 18 to 69	Age of Cohort	H Age
Obarzanek, E., et al. (2007).	Effects of individual components of multiple behavior changes: the PREMIER trial.	American Journal of Health Behavior 31(5): 545-560.	PREMIER TRIAL Mean Age 50 (9)	Age of Cohort, Secondary Analysis	H Age Secondary analysis
Westhoff, T. H., et al. (2007)	Beta-blockers do not impair the cardiovascular benefits of endurance training in hypertensives.	Journal of Human Hypertension 21(6): 486-493.	Mean age 67.8 (4.7), age > 60 years	Age of Cohort	H Age
Westhoff, T. H., et al. (2008)	The cardiovascular effects of upper-limb aerobic exercise in hypertensive patients.	Journal of Hypertension 26, 1336-1342 DOI: 10.1097/HJH.0b013e3282ffac13	Mean age 66.1 (sd 4), no lower age restriction	Age of Cohort	H Age
Sohn, A. J., et al. (2007).	Impact of exercise (walking) on blood pressure levels in African American adults with newly diagnosed hypertension.	Ethnicity & Disease 17(3): 503-507.	Mean age of intervention 46.9 (5.2) BMI 32 n=8, control age 42 (6). BMI 37 n = 10 Lack of balance across groups with BMI > 35 in control and Age greater than 40 for intervention.	Lacks true control as both intervention and control group provided pedometers to self-monitor.	Age, BMI and NRCT

Hill, A. M., et al. (2007).	Combining fish-oil supplements with regular aerobic exercise improves body composition and cardiovascular disease risk factors.	American Journal of Clinical Nutrition 85(5): 1267-1274.	Nutritional Supplements. Triacylglycerol primary outcome.	Pharmacological intervention. Mean age of groups 47 to 52 SD 2.	NEI
Cubeddu, L. X., et al. (2008).	Lowering the threshold for defining microalbuminuria: effects of a lifestyle-metformin intervention in obese .normoalbuminuric. non-diabetic subjects	American Journal of Hypertension 21(1): 105-110.	Mean age 43.7 (1.7), dual pharma/lifestyle interventions	Drug intervention	NEI
Davison, K., et al. (2008).	Effect of cocoa flavanols and exercise on cardiometabolic risk factors in overweight and obese subjects.	International Journal of Obesity 32(8): 1289-1296.	Nutritional Intervention. Lacks true control	Not RCT	NEI
Okura, T., et al. (2007)	Effect of weight reduction on concentration of plasma total homocysteine in obese Japanese men.	Obesity Research & Clinical Practice 1, 213-221 DOI: 10.1016/j.orcp. 2007.07.003	Lacks true control; diet vs exercise. Mean age 49.5 ± 10.3	Lacks true control; diet vs exercise. Mean age 49.5 ± 10.3	NRCT
Richter, H., et al. (2008)	Effects of a telephone intervention in patients with type 2 diabetes].	Deutsche Medizinische Wochenschrift 133(43): 2203-2208.	Not an RCT. Matched control.	Not an RCT. Matched control.	NRCT
Thompson, J. L., et al. (2008)	Reducing diabetes risk in American Indian women.	American Journal of Preventive Medicine 34(3): 192-201.	Delayed intervention. Control offered intervention at end of trial. mean age 29.6 (6.6) and 28.9 (6.7)	Delayed intervention. Control offered intervention at end of trial. mean age 29.6 (6.6) and 28.9 (6.7)	NRCT

Woo, J., et al. (2007).	Effectiveness of a lifestyle modification programme in weight maintenance in obese subjects after cessation of treatment with Orlistat.. Journal of Evaluation in Clinical Practice 13(6): 853-859.	Journal of Evaluation in Clinical Practice 13(6): 853-859.	Lacks true control. Does not disclose mean age of population. Diabetic population treated with olistat then randomized.	Lacks true control. Does not disclose mean age of population. Diabetic population treated with olistat then randomized.	NRCT
Laterza, M. C., et al. (2007)	Exercise training restores baroreflex sensitivity in never-treated hypertensive patients.	Hypertension 49(6): 1298-1306.	Mean age 44±1, 42±2	Case control with normotensive population	NRCT
Schjerve, I. E., et al. (2008	Both aerobic endurance and strength training programmes improve cardiovascular health in obese adults.	Clinical Science 115(9): 283-293.	12 week follow up. Mean age 46.2 +− 2.9, 44.4 +− 2.1, 46.9 +− 2.2 OUT	No non exercising control	NRCT
Thomson, R. L., et al. (2008).	The effect of a hypocaloric diet with and without exercise training on body composition, cardiometabolic risk profile, and reproductive function in overweight and obese women with polycystic ovary syndrome.	Journal of Clinical Endocrinology & Metabolism 93(9): 3373-3380.	Mean BMI 36.1 (0.5), Attrition by 6 months 50%	NCRT, lacks true control. All participants receive an intervention: diet only, exercise only or diet and exercise	NRCT, Attrition
Slavicek, J., et al. (2007)	Lifestyle modification helps to reduce the risk factors of cardiovascular disease. [Czech]	Cor et Vasa 49(3): 88-91.	Follow-up 1 week. Not an RCT	Follow-up less than 3 months	NRCT

de Luis, D. A., et al. (2007).	Influence of the Trp64Arg polymorphism in the beta 3 adrenoreceptor gene on insulin resistance, adipocytokine response, and weight loss secondary to lifestyle modification in obese patients.	European Journal of Internal Medicine 18(8): 587-592.	OUT - not randomized and less than 6 months	Not RCT	NRCT
Gemson, D. H., et al. (2008)	Promoting weight loss and blood pressure control at work: impact of an education and intervention program.	Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine 50, 272-281	Not randomized. Work site intervention. With matched control site.	Not RCT	NRCT
Gokal, R., et al. (2007)	Positive impact of yoga and pranayam on obesity, hypertension, blood sugar, and cholesterol: A pilot assessment.	The Journal of Alternative and Complementar y Medicine 13(10): 1056-1057.	Before and after study. Mean age 58	Not RCT	NRCT
Hamilton, K. M. (2007)	The effects of cooperative learning and self-efficacy on woman's diet and exercise practice for cardiovascular risk factors.	Dissertation Abstracts International Section A: Humanities and Social Sciences 67(11-A): 4094.	Not RCT OUT	Not RCT	NRCT
Harden, K. A., et al. (2007).	Effects of lifestyle intervention and metformin on weight management and markers of metabolic syndrome in obese adolescents.	Journal of the American Academy of Nurse Practitioners 19(7): 368-377.	Retrospective analysis of metformin verse exercise in adolescent obesity	Not RCT	NRCT

Meckling, K. A. and R. Sherfey (2007)	A randomized trial of a hypocaloric high-protein diet, with and without exercise, on weight loss, fitness, and markers of the Metabolic Syndrome in overweight and obese women.	Applied Physiology, Nutrition and Metabolism 32(4): 743-752.	Nutritional intervention with or without exercise. No usual care or true control group.	Not RCT	NRCT
Merrill, R. M. and S. G. Aldana (2008)	Cardiovascular risk reduction and factors influencing loss to follow-up in the coronary health improvement project.	Medical Science Monitor 14(4): PH17-PH25.	Not RCT, quasi-experimental design	Not RCT	NRCT
Niranjan, M., et al. (2008)	Effect of supervised integrated exercise on deep breathing-heart rate variability in male hypertensive patients.	Journal of Medical Sciences 8(4): 350-356.	Participants allocated to groups without randomisation	Not RCT	NRCT
PausJenssen, A. M., et al. (2008)	Cardiovascular risk reduction via telehealth: a feasibility study.	Canadian Journal of Cardiology 24(1): 57-60.	Telehealth intervention. No randomisation to groups. Comparison group usual care.	Not RCT	NRCT
Ren, J., et al. (2007)	Nutritional intervention in the metabolic syndrome.	Asia Pacific Journal of Clinical Nutrition 16(SUPPL.1): 418-421.	Mean age 48, nutritional intervention with no clearly defined exercise intervention. Hospital attendees between ages 36-55	Nutritional intervention, Age of Cohort	D1 Age
Schobersberger, W., et al. (2008)	Vacation as chance for changes in lifestyle in patients with metabolic syndrome. [German].	Aktuelle Ernahrungsmedizin 33(3): 132-137.	Not RCT OUT	Not RCT	NRCT

Hewitt, J. A., et al. (2008)	The effects of a graduated aerobic exercise programme on cardiovascular disease risk factors in the NHS workplace: a randomized controlled trial.	Journal of Occupational Medicine & Toxicology 3: 7.	Healthy sedentary population.	Primary prevention low risk	PL
Arao, T., et al. (2007).	Impact of lifestyle intervention on physical activity and diet of Japanese workers.	Preventive Medicine 45(2-3): 146-152.	Mean age 54.9 (5.0)	Primary prevention low risk	PL age
Park, T. G., et al. (2007).	Lifestyle plus exercise intervention improves metabolic syndrome markers without change in adiponectin in obese girls.	Annals of Nutrition and Metabolism 51(3): 197-203.	Age 13-15	Demographic of study population	PP
Borgermans, L., et al. (2008).	A cluster randomized trial to improve adherence to evidence-based guidelines on diabetes and reduce clinical inertia in primary care physicians in Belgium: study protocol [NTR 1369].	Implementation Science 3: 42.	Protocol	Protocol	Protocol
Claes, N. and N. Jacobs (2007).	The PreCardio-study protocol - A randomized clinical trial of a multidisciplinary electronic cardiovascular prevention programme.	BMC Cardiovascular Disorders 7(27).	Protocol	Protocol	Protocol

Price, H. C., et al. (2008).	The impact of individualised cardiovascular disease (CVD) risk estimates and lifestyle advice on physical activity in individuals at high risk of CVD: a pilot 2 x 2 factorial understanding risk trial.	Cardiovascular Diabetology 7: 21.	Protocol	Protocol	Protocol
Rose, S. B., et al. (2007).	The 'Women's Lifestyle Study', 2-year randomized controlled trial of physical activity counselling in primary health care: rationale and study design.	BMC Public Health 7: 166.	Protocol - age 40 to 70	Demographic of study population	Protocol Age
Carroll, S., et al. (2007).	Short-term effects of a non-dieting lifestyle intervention program on weight management, fitness, metabolic risk, and psychological well-being in obese premenopausal females with the metabolic syndrome.	Applied Physiology, Nutrition and Metabolism 32(1): 125-142.	Sub-analysis. Full study results published 2012. Primary aim of study was to assess response to heart rate variability and cardiorespiratory fitness.	Secondary analysis, subgroup study.	Secondary analysis
Perreault, L., et al. (2008)	Sex differences in diabetes risk and the effect of intensive lifestyle modification in the Diabetes Prevention Program	Diabetes Care 31(7): 1416-1421.	Out	Secondary analysis of the DPP diabetic prevention programme. Lifestyle compared to metformin and control. Mean age of cohort 50.6 (SD 10.7). Blood pressure was not reported in the primary paper.	Secondary analysis

Smith, P. J., et al. (2007)	Effects of exercise and weight loss on depressive symptoms among men and women with hypertension.	Journal of Psychosomatic Research 63(5): 463-469.	Secondary Analysis	Secondary Analysis	Secondary analysis
Li, G., et al. (2009).	Is lifestyle modification combined with blood pressure lowering medication a better strategy for the intervention targeting CVD risk reduction in Chinese pre-diabetes population? Lesson from the China Da Qing diabetes prevention outcome study (CDQDPOS)	Journal of Clinical Hypertension Conference: 24th Annual Scientific Meeting and Exposition of the American Society of Hypertension, ASH San Francisco, CA United States. Conference Publication:(var.pagings). 11 (4 SUPPL. 1): A118-A119.	Mean age 44.7 (0.4), Drug trial plus exercise	Drug trial plus exercise	Drug trial
Bronas, U. G. (2009).	Exercise training and reduction of cardiovascular disease risk factors in patients with chronic kidney disease.	Advances in Chronic Kidney Disease 16(6): 449-458.	Renal Disease Group	Cardiopulmonary disease secondary prevention	C2
Casey, A., et al. (2009)	A model for integrating a mind/body approach to cardiac rehabilitation: outcomes and correlators.	Journal of Cardiopulmonary Rehabilitation & Prevention 29(4): 230-238; quiz 239-240.	Cardiac Rehab population	Cardiopulmonary disease secondary prevention	C2

Vona, M., et al. (2009).	Efficacy of two long-term intervention strategies to promote long-term adherence to lifestyle changes and to reduce cardiovascular events in patients with coronary artery disease.	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2009 Barcelona Spain. Conference Publication: (var.pagings). 30: 474.	Mean age 57 +/- 9	Cardiopulmonary disease secondary prevention	C2
Stensvold, D., et al. (2009).	Aerobic interval training versus strength training as a treatment for the metabolic syndrome.	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2009 Barcelona Spain. Conference Publication: (var.pagings). 30: 466.	Mean age: 50.2 ± 9.5 yr	Age of Cohort	D1 Age
Tuomilehto, H., et al. (2009).	Sleep duration, lifestyle intervention, and incidence of type 2 diabetes in impaired glucose tolerance: The Finnish Diabetes Prevention Study	Diabetes Care 32(11): 1965-1971.	Mean age 52.5 (7.4) 54.1 (7.0) 56.0 (7.2) 57.2 (6.7)	Age of Cohort	D1 Age
Tuomilehto, J., et al. (2009).	Effects of lifestyle intervention on mortality and cardiovascular risk in persons with impaired glucose tolerance - the finnish diabetes prevention study.	Diabetes. Conference: 69th Annual Meeting of the American Diabetes Association New Orleans, LA United States.	Mean age 52.5 (7.4) 54.1 (7.0) 56.0 (7.2) 57.2 (6.7)	Age of Cohort	D1 Age

Yamashiro, T., et al. (2009)	Two years follow-up of lifestyle intervention for Japanese subject with pre-metabolic syndrome (Tabaruzaka study).	Diabetes. Conference: 69th Annual Meeting of the American Diabetes Association New Orleans, LA United States.	Mean age 61.6 ± 0.8, 61.9 (0.8), 60.9 (1.1)	Age of Cohort	D1 Age
Yates, T., et al. (2009)	Effectiveness of a pragmatic education program designed to promote walking activity in individuals with impaired glucose tolerance: a randomized controlled trial	Diabetes Care 32, 1404-1410 DOI: 10.2337/dc09-0130	Mean 65 (sd 8)	Age of Cohort	D1 Age
Karunapema, P. and C. Wijerathna (2009).	Effectiveness of a simple lifestyle intervention in primary prevention of type 2 diabetes among semi-urban South Asian population with impaired fasting glucose.	Journal Of Diabetes Conference: 3rd International Congress on Prediabetes and the Metabolic Syndrome Nice France. Conference Publication: (var.pagings). 1: A143-A144.	Cluster randomized trial.	No individual participant randomisation.	D1 NRCT
Doucette, W. R., et al. (2009	Community pharmacist-provided extended diabetes care.	Annals of Pharmacotherapy 43(5): 882-889.	Diabetic. Mean age 58.7 (13.3)	Age of Cohort	D2 age
Johnson, S. T., et al. (2009).	Improved cardiovascular health following a progressive walking and dietary intervention for type 2 diabetes.	Diabetes, Obesity and Metabolism 11(9): 836-843.	Diabetic. mean + s.d.: age = 56.5 + 7.2 years	Age of Cohort	D2 age

Kirk, A., et al. (2009).	A randomized trial investigating the 12-month changes in physical activity and health outcomes following a physical activity consultation delivered by a person or in written form in Type 2 diabetes: Time2Act.	Diabetic Medicine 26(3): 293-301.	Diabetic. Mean age 60.9 ± 9.6, 63.2 (10.6) 59.2 (10.4)	Age of Cohort	D2 age
Kirk, A. F., et al. (2009).	Twelve month changes in physical a outcomes following a written or person delivered physical activity consultation in Type 2 diabetes (TIME2ACT): A randomized trial	Diabetic Medicine Conference: Diabetes UK's Annual Professional Conference 2009 Glasgow United Kingdom. Conference Publication: (var.pagings). 26: 167.	Diabetic Mean age 60.9 ± 9.6, 63.2 (10.6) 59.2 (10.4)	Age of Cohort	D2 age
Murrock, C. J., et al. (2009).	Dance and peer support to improve diabetes outcomes in African American women.	Diabetes Educator 35(6): 995-1003.	Diabetic. Mean Age 58.5 (12.2), 67.1 (7.9)	Age of Cohort	D2 Age
Price, H. C., et al. (2009).	Impact of a brief lifestyle advice intervention on physical activity	Diabetologia Conference: 45th EASD Annual Meeting of the European Association for the Study of Diabetes Vienna Austria.	Diabetic Participants had median (IQR) age 62.3 (54.9, 66.1) year	Age of Cohort	D2 Age
Ralston, J. D., et al. (2009)	Web-based collaborative care for type 2 diabetes: a pilot randomized trial.	Diabetes Care 32(2): 234-239.	Diabetic. Mean age 57 range/sd not provided	Age of Cohort	D2 Age

Sigal, R. (2009).	Effects of aerobic training, resistance training, or both on glycemic control in type 2 diabetes: A randomized trial.	Journal Of Diabetes Conference: 3rd International Congress on Prediabetes and the Metabolic Syndrome Nice France. Conference Publication: (var.pagings). 1: A16.	Diabetic. mean age of groups 53.5 (7.3) 53.9 (6.6) 54.7 (7.5) 54.8 (7.2)	Age of Cohort	D2 Age
Skoro-Kondza, L., et al. (2009)	Community based yoga classes for type 2 diabetes: an exploratory randomized controlled trial.	BMC Health Services Research 9: 33.	Diabetic. mean age 60 (10)	Age of Cohort	D2 Age
Vadstrup, E. S., et al. (2009).	Effects of group-based lifestyle rehabilitation on glycaemic control, physical fitness and risk factors for cardiovascular disease in patients with type 2 diabetes.	Diabetologia Conference: 45th EASD Annual Meeting of the European Association for the Study of Diabetes Vienna Austria. Conference Publication:(var.pagings). 52 (S1): S14.	Diabetic. mean age 58.5 ± 9.0 58.0 ± 10.3	Age of Cohort	D2 Age
Leehey, D. J., et al. (2009).	Aerobic exercise in obese diabetic patients with chronic kidney disease: A randomized and controlled pilot study.	Cardiovascular Diabetology 8(62).	Diabetes and chronic renal disease population	Cardiopulmonary disease secondary prevention	D2 C2
Young, D. R., et al. (2009).	Can individuals meet multiple physical activity and dietary behavior goals?	American Journal of Health Behavior 33(3): 277-286.	PREMIER TRIAL mean age 50.2 (9.3)	Age of Cohort	H Age

Dolor, R. J., et al. (2009)	Hypertension Improvement Project (HIP): study protocol and implementation challenges.	Trials [Electronic Resource] 10: 13.	Age, mean years (SD) 60.5 (11.4), Age criteria > 25	Age of Cohort	H Age
Eriksson, M. K., et al. (2009).	A 3-year randomized trial of lifestyle intervention for cardiovascular risk reduction in the primary care setting: the Swedish Bjorknas study.	PLoS ONE [Electronic Resource] 4(4): e5195.	Mean age 55.7 (6.6), criteria 18 to 65	Age of Cohort	H Age
Haruyama, Y., et al. (2009).	Fifteen-month lifestyle intervention program to improve cardiovascular risk factors in a community population in Japan.	Tohoku Journal of Experimental Medicine 217(4): 259-269.	Mean age 60.5 (9.3), participant 39 to 70	Age of Cohort	H age
Maruthur, N. M., et al. (2009).	Lifestyle interventions reduce coronary heart disease risk: results from the PREMIER Trial.	Circulation 119(15): 2026-2031.	Mean age 50.0 (8.9), participants > 25	Age of Cohort	H Age
Viecili, P. R. N., et al. (2009).	Dose-response curve to exercise in hypertensive individuals: analysis of the number of sessions to the hypotensive effect	Arquivos Brasileiros de Cardiologia 92(5): 361-367.	Aged 58 +/- 11 years, no defined age criteria	Age of Cohort	H Age
Saptharishi, L., et al. (2009)	Community-based Randomized Controlled Trial of Non-pharmacological Interventions in Prevention and Control of Hypertension among Young Adults.	Indian Journal of Community Medicine 34(4): 329-334.	8 week follow-up	Follow-up less than 3 months	F<3

Svetkey, L. P., et al. (2009).	Hypertension improvement project: randomized trial of quality improvement for physicians and lifestyle modification for patients.	Hypertension 54(6): 1226-1233.	Mean age 60.5 (11.4), participants > 25	Demographic of study population	H-Age
Dale, K. S., et al. (2009).	Sustainability of lifestyle changes following an intensive lifestyle intervention in insulin resistant adults: Follow-up at 2-years.	Asia Pacific Journal of Clinical Nutrition 18(1): 114-120.	Mean age 46.5 range 31 to 68	Lacks true control. Control group received a 2 week lifestyle intervention. Intervention groups received 4 months. BP not primary outcome Mean age 46	NRCT
Balducci, S., et al. (2009).	Physical activity/exercise training in type 2 diabetes. The role of the Italian Diabetes and Exercise Study.	Diabetes/Metabolism Research Reviews 25 Suppl 1: S29-33.	Review article	Not RCT	Review
Swearingin, B. (2009).	The comparison of the effects of lifestyle activity and structured cardiovascular exercise on obesity-related risk factors of African-American women ages 22--55.	Dissertation Abstracts International: Section B: The Sciences and Engineering 69(12-B): 7452.	PHD thesis, no associated peer review publication. Primary objective was increase in PA	Not RCT	NRCT
Jansink, R., et al. (2009)	Nurse-led motivational interviewing to change the lifestyle of patients with type 2 diabetes (MILD-project): protocol for a cluster, randomized, controlled trial on implementing lifestyle recommendations.	BMC Health Services Research 9, 19 DOI: 10.1186/1472-6963-9-19	Protocol	Protocol	Protocol

Vadstrup, E. S., et al. (2009).	Lifestyle intervention for type 2 diabetes patients: trial protocol of The Copenhagen Type 2 Diabetes Rehabilitation Project	BMC Public Health 9: 166.	Protocol	Protocol	Protocol
Milani, R. V. and C. J. Lavie (2009).	Impact of worksite wellness intervention on cardiac risk factors and one-year health care costs.	American Journal of Cardiology 104(10): 1389-1392.	Low risk Sedentary Healthy Work Place population	Demographic of study population	PL
Racette, S. B., et al. (2009)	Worksite Opportunities for Wellness (WOW): effects on cardiovascular disease risk factors after 1 year	Preventive Medicine 49(2-3): 108-114.	General sedentary workplace population	Demographic of study population	PL
Goodpaster, B. H., et al. (2010).	Effects of diet and physical activity interventions on weight loss and cardiometabolic risk factors in severely obese adults: a randomized trial	JAMA 304(16): 1795-1802.	Mean age 46.7 (6.5) but BMI 43.5 (SD 4.8)	Body weight of cohort. All participant receive an exercise intervention, weight list control, attrition 22%	BMI > 35, NRCT
Simmons, R. K., et al. (2010)	Who will increase their physical activity? Predictors of change in objectively measured physical activity over 12 months in the ProActive cohort.	BMC Public Health 10, 226 DOI: 10.1186/1471-2458-10-226	Secondary analysis of the Proactive study.	Secondary analysis of the Proactive study.	Secondary Analysis

Wolfgang, W. J., et al. (2010).	Randomized controlled trial of long-term use of yoga and progressive relaxation in cardiovascular rehabilitation.	European Journal of Cardiovascular Prevention and Rehabilitation Conference: EuroPRevent 2010 Prague Czech Republic. Conference Publication: (var.pagings). 17: S58.	Cardiac rehab	Cardiopulmonary disease secondary prevention	C2
Straznicky, N. E., et al. (2010).	Sympathetic neural adaptation to hypocaloric diet with or without exercise training in obese metabolic syndrome subjects.	Diabetes 59(1): 71-79.	Mean age 55 (1)	Age of Cohort	D1 Age
Anderson, D. R., et al. (2010).	Managing the space between visits: a randomized trial of disease management for diabetes in a community health center	Journal of General Internal Medicine 25(10): 1116-1122.	Intervention intensity was assigned and graded for individuals with different HBA1c. No defined exercise intervention. BMI of intervention group >35. Age not disclosed in paper, criteria > 18 years. 29% attrition.	No defined exercise intervention and BMI > 35, age not disclosed. Focus of intervention was self-management of diabetes and medication adherence	D2, BMI >35, Attrition 29%, No defined exercise intervention

Okada, S., et al. (2010)	Effect of exercise intervention on endothelial function and incidence of cardiovascular disease in patients with type 2 diabetes.	Journal of Atherosclerosis and Thrombosis 17, 828-833	Diabetic population; Mean age over 60. 64.5 (5.9)	Mean age over 60. 64.5 (5.9)	D2, age
Piette, J., et al. (2010).	12-month outcomes from a randomized trial of telephone cognitive behavioral therapy for depressed patients with type 2diabetes.	Journal of General Internal Medicine Conference: 33rd Annual Meeting of the Society of General Internal Medicine Minneapolis, MN United States. Conference Publication: (var.pagings). 25: S205.	Diabetic, Mean age over 50. 56.0 ± 10.1 56.0±10.9 55.1± 9.4	Mean age over 50. 56.0 ± 10.1 56.0±10.9 55.1± 9.4	D2 Age
Balducci, S., et al. (2010).	Effect of an intensive exercise intervention strategy on modifiable cardiovascular risk factors in subjects with type 2 diabetes mellitus: a randomized controlled trial: the Italian Diabetes and Exercise Study (IDES).	Archives of Internal Medicine 170(20): 1794-1803.	Diabetic, Mean age 58.8±8.6	Age of Cohort	D2 Age
Diedrich, A., et al. (2010).	Promoting physical activity for persons with diabetes.	Diabetes Educator 36(1): 132-140.	Mean age 56 sd 13	Age of Cohort	D2 Age
Heinrich, E., et al. (2010)	Effect evaluation of a Motivational Interviewing based counselling strategy in diabetes care.	Diabetes Research & Clinical Practice 90(3): 270-278.	Mean age 59 years (SD = 5.27)	Age of Cohort	D2 Age

Khunti, K., et al. (2010).	Randomized controlled trial of the DESMOND structured education programme for people newly diagnosed with type 2 diabetes: Follow-up results at three years.	Diabetic Medicine Conference: Diabetes UK Annual Professional Conference Liverpool United Kingdom. Conference Publication:(var.pagings). 27 (2 SUPPL. 1): 22-23.	Mean age 57.6 (12.5)	Age of Cohort	D2 Age
Khunti, K., et al. (2010).	Randomized controlled trial of the DESMOND structured education programme for people newly diagnosed with type 2 diabetes: Biomedical outcomes, psychosocial measures and illness beliefs at three years.	Diabetologia Conference: 46th Annual Meeting of the European Association for the Study of Diabetes, EASD 2010 Stockholm Sweden. Conference Publication: (var.pagings). 53: S411.	Mean age 57.6 (12.5)	Age of Cohort	D2 Age
Perron, P., et al. (2010).	Coaching by a dietician: A cost-effective alternative to diabetes management	Diabetologia Conference: 46th Annual Meeting of the European Association for the Study of Diabetes, EASD 2010 Stockholm Sweden. Conference Publication: (var.pagings). 53: S412.	Age (60+10/60+11 yrs),	Age of Cohort	D2 Age

Salem, M., et al. (2010).	Is exercise a therapeutic tool for improvement of cardiovascular risk factors in adolescents with type 1 diabetes mellitus? A randomized controlled trial.	Pediatric Diabetes Conference: 36th Annual Meeting of the International Society for Pediatric and Adolescent Diabetes, ISPAD Buenos Aires Argentina.. Conference Publication: (var.pagings). 11: 42.	Mean age 15 (2.55)	Age of Cohort	D2 AGE
Salem, M. A., et al. (2010)	Is exercise a therapeutic tool for improvement of cardiovascular risk factors in adolescents with type 1 diabetes mellitus? A randomized controlled trial.	Diabetology & metabolic syndrome 2(1): 47.	Mean age 15 (2.55)	Age of Cohort	D2 AGE
Sone, H., et al. (2010).	Long-term lifestyle intervention lowers the incidence of stroke in Japanese patients with type 2 diabetes: a nationwide multicentre randomized controlled trial (the Japan Diabetes Complications Study).	Diabetologia 53(3): 419-428	mean age 58.5 (6.9)	Age of Cohort	D2 Age
Sridhar, B., et al. (2010)	Increase in the heart rate variability with deep breathing in diabetic patients after 12-month exercise training.	Tohoku Journal of Experimental Medicine 220, 107-113	Mean age 61.78 (3.10)	Age of Cohort	D2 Age

Vadstrup, E. S., et al. (2010).	Lifestyle intervention by group-based rehabilitation versus individual counselling in type 2 diabetes: 1-year follow-up.	Diabetologia Conference: 46th Annual Meeting of the European Association for the Study of Diabetes, EASD 2010 Stockholm Sweden. Conference Publication: (var.pagings). 53: S411.	Mean age 58.5 (9.0) 58.0 (10.3)	Age of Cohort	D2 Age
Palomo, I., et al. (2010)	Physical activity reduces circulating TNF-alpha but not pro-thrombotic factors levels in patients with metabolic syndrome.	Diabetes and Metabolic Syndrome: Clinical Research and Reviews 4(4): 234-238.	Age 39 to 62 Follow up 18 weeks	MS population. Mean ge over 50. 9 men (51.7 ± 7.7 years old) and 18 women (48.2 ± 5.1 years) and the NI-MS group by 24 subjects, 12 men (50.9 ± 6.4 years) and 12 women (51.3 ± 4.2 years)	ECD
Alavi, R., et al. (2010).	The impact of achieving recommended lifestyle goals on CHD risk: Results from the premier trial.	Journal of General Internal Medicine Conference: 33rd Annual Meeting of the Society of General Internal Medicine Minneapolis, MN United States. Conference Publication: (var.pagings). 25: S404-S405.	Mean age 50 ± 8.9 years.	Demographic of study population	Secondary Analysis

Miyachi, M., et al. (2010).	Effects of pedometer-based physical activity intervention on abdominal fat and blood pressure: Saku communitybased randomized crossover intervention study.	Journal of Clinical Hypertension Conference: 25th Annual Scientific Meeting and Exposition of the American Society of Hypertension, Inc. New York, NY United States. Conference Publication: (var.pagings). 12: A14.	Age 50 to 65, cross over design	Age of Cohort	H Age
Trovato, G. M., et al. (2010).	Lifestyle interventions, insulin resistance, and renal artery stiffness in essential hypertension.	Clinical & Experimental Hypertension (New York) 32(5): 262-269.	Mean age 50.72 ± 7.56, no age criteria	Age of Cohort	H Age
Sponton, C. H. G., et al. (2010).	Women with TT genotype for eNOS gene are more responsive in lowering blood pressure in response to exercise.	European Journal of Cardiovascular Prevention & Rehabilitation 17(6): 676-681.	Mean age 54.7 (sd 3.3), post menopausal women	Age of Cohort	H Age
Waib, P., et al. (2010).	Improvement on insulin sensitivity and muscle blood flow in aerobic trained overweight-obese hypertensives is not associated with ambulatory blood pressure.	Journal of Hypertension Conference: 20th European Meeting on Hypertension of the European Society of Hypertension, ESH Oslo Norway. Conference Publication: (var.pagings). 28: e398.	Fifty-five patients (30 women and 25 men; mean age, 49 [47–52] years) in the AEX group and 24 patients (18 women and 6men; mean age, 53[50–56) years	Age of Cohort	H Age

Blumenthal, J. A., et al. (2010)	Effects of the DASH diet alone and in combination with exercise and weight loss on blood pressure and cardiovascular biomarkers in men and women with high blood pressure: the ENCORE study	Archives of Internal Medicine 170(2): 126-135.	Mean age 52 (Sd 10), age > 35	Age of Cohort	H Age
Blumenthal, J. A., et al. (2010).	Effects of the dietary approaches to stop hypertension diet alone and in combination with exercise and caloric restriction on insulin sensitivity and lipids.	Hypertension 55(5): 1199-1205.	Mean age 52 (sd 10), age > 35	Age of Cohort	H Age
Bosworth, H., et al. (2010).	Racial differences in two self management hypertension interventions.	Journal of General Internal Medicine Conference: 33rd Annual Meeting of the Society of General Internal Medicine Minneapolis, MN United States. Conference Publication: (var.pagings). 25: S375-S376	Mean age 61 (12), no age restrictions	Age of Cohort	H Age
Friedberg, M. W. (2010).	Exercise, weight management, and DASH diet are superior to DASH diet alone for lowering blood pressure.	Journal of Clinical Outcomes Management 17(4): 8-10.	Study summary. Mean 52, no sd. Participant inclusion over 35	Age of Cohort	H Age

Garcia-Ortiz, L., et al. (2010).	Effect on cardiovascular risk of an intervention by family physicians to promote physical exercise among sedentary individuals.	Revista Espanola de Cardiologia 63(11): 1244-1252.	Mean Age 52 sd 12, age 20 to 80	Age of Cohort	H Age
Luders, S., et al. (2010).	Improvement of hypertension management by structured physician education and feedback system: Cluster randomized trial.	European Journal of Cardiovascular Prevention and Rehabilitation 17(3): 271-279.	Mean age 64.5 and 67.2 sd less than 11, no age restrictions, no break down by age	Age of Cohort	H Age
Pouchain, D., et al. (2010).	Effects of a multifaceted intervention on the cardiovascular risk factors in high risk hypertensive patients in primary prevention (ESCAPE Trial).	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2010 Stockholm Sweden.. Conference Publication: (var.pagings). 31: 673.	Age 45 to 75	Age of Cohort	H Age
Smith, P. J., et al. (2010).	Effects of the dietary approaches to stop hypertension diet, exercise, and caloric restriction on neurocognition in overweight adults with high blood pressure	Hypertension 55(6): 1331-1338.	Mean 52.3 (9.6), age > 35	Age of Cohort	Secondary Analysis
Stewart, L. K., et al. (2010).	Effects of different doses of physical activity on C-reactive protein among women	Medicine & Science in Sports & Exercise 42(4): 701-707.	Mean age 57.3 sd 6.4, participant 45 to 75 yrs old	Age of Cohort	H Age
Young, D. R., et al. (2010).	Effects of the PREMIER interventions on health-related quality of life.	Annals of Behavioral Medicine 40(3): 302-312.	PREMIER STUDY Mean ages 49.5±8.8 50.2±8.6 50.2±9.3	Secondary Analysis	Secondary Analysis

Mikio, A., et al. (2010).	Effects of walking-exercise on blood pressure and novel risk factors in metabolic syndrome randomized control design.	Journal of Hypertension Conference: 20th European Meeting on Hypertension of the European Society of Hypertension, ESH Oslo Norway. Conference Publication: (var.pagings). 28: e373-e374.	8 week intervention followed by 8 week wash out. Mean age 53.7 (sd 13.) no age restriction	Cross over study design and age criteria	H Age
Saremi, A., et al. (2010).	Effects of aerobic training on serum omentin-1 and cardiometabolic risk factors in overweight and obese men	Journal of Sports Sciences 28(9): 993-998.	Matched control, not all participants were randomized; 42.2 ± 3.8 years; age 43.1 ± 4.7 years	Overweight participant assigned treatment groups and compared to normal weight matched controls	NRCT
Ciolac, E. G., et al. (2010).	Haemodynamic, metabolic and neuro-humoral abnormalities in young normotensive women at high familial risk for hypertension.	Journal of Human Hypertension 24(12): 814-822.	Acute exercise response. OUT	Follow-up less than 3 months	F<3
Kasimay, O., et al. (2010).	Diet-supported aerobic exercise reduces blood endothelin-1 and nitric oxide levels in individuals with impaired glucose tolerance.	Journal of Clinical Lipidology 4(5): 427-434.	Not an RCT. No control	Not an RCT. No control	NRCT

Liu, X., et al. (2010).	A preliminary study of the effects of Tai Chi and Qigong medical exercise on indicators of metabolic syndrome, glycaemic control, health-related quality of life, and psychological health in adults with elevated blood glucose.	British Journal of Sports Medicine 44(10): 704-709.	aged 42-65 years	Not an RCT. Pilot study	NRCT
Santos, A. B. S., et al. (2010).	Early regression of diastolic function parameters in patients with metabolic syndrome submitted to a lifestyle modification program.	Echocardiography Conference: 22nd Brazilian Congress of Echocardiography Held in Conjunction with the 17th World Congress of the International Cardiac Doppler Society, ICDS Belo Horizonte Brazil. Conference Publication:(var.pagings). 27 (6): 745.	Case control	Mean age (43.3 ± 7.9 years, 65% male), and 30 healthy controls (CTR; 40.9 ± 6.6 years, 63% male).	NRCT
Belyeva, O., et al. (2010).	Body composition, hemodynamic parameters on hypocaloric diet and physical training in patients with abdominal obesity.	Journal of Hypertension Conference: 20th European Meeting on Hypertension of the European Society of Hypertension, ESH Oslo Norway. Conference Publication: (var.pagings). 28: e573.	Mean age 43.2 (0.8). Lacks true control	Demographic of study population	NRCT

Hornbuckle, L. (2010).	The effects of resistance training and ambulation on cardiovascular risk factors in African-American women.	Dissertation Abstracts International: Section B: The Sciences and Engineering 70(12-B): 7519.	Mean age: 49 + 5 years. Lacks true control	Demographic of study population	NRCT
Rahimian, M. Z., et al. (2010).	The effect of aerobic training and diet on cardiovascular risk factors and blood pressure in overweight and obese women with hypertension.	Iranian Journal of Endocrinology and Metabolism 12(4).	Lacks true control	NRCT	NRCT
Thomas, T. R., et al. (2010).	Exercise and the metabolic syndrome with weight regain.	Journal of Applied Physiology 109(1): 3-10.	Weight loss followed by structured weight gain	No exercise intervention	NRCT
Berks, D., et al. (2010).	Postpartum lifestyle intervention after complicated pregnancy proves feasible.	Pregnancy Hypertension Conference: 17th World Congress of the International Society for the Study of Hypertension in Pregnancy, ISSHP Melbourne, VIC Australia. Conference Publication: (var.pagings). 1: S25.	Not an RCT, before after assessment, no control	Not RCT	NRCT
Chen, H.-H., et al. (2010)	Effects of one-year swimming training on blood pressure and insulin sensitivity in mild hypertensive young patients.	Chinese Journal of Physiology 53(3): 185-189.	Not an RCT, case control groups	Not RCT	NRCT

D'Eramo Melkus, G., et al. (2010).	The effect of a diabetes education, coping skills training, and care intervention on physiological and psychosocial outcomes in black women with type 2 diabetes.	Biological Research for Nursing 12(1): 7-19.	Diabetic population. Diabetic self management and coping skills. Attrition was 29%	D2	D2, attrition
Harati, H., et al. (2010).	Reduction in incidence of type 2 diabetes by lifestyle intervention in a middle eastern community	American Journal of Preventive Medicine 38(6): 628-636.e621.	Cluster randomized trial. Mean Age 43 (sd 13) Lost to follow up greater than 40%	Attrition	Attrition
Pasqualini, L., et al. (2010).	Lifestyle intervention improves microvascular reactivity and increases serum adiponectin in overweight hypertensive patients.	Nutrition Metabolism & Cardiovascular Diseases 20(2): 87-92.	Case control study, follow up less than 12 weeks	Not RCT	NRCT
Collins, C. E., et al. (2010).	Evaluation of a commercial web-based weight loss and weight loss maintenance program in overweight and obese adults: a randomized controlled trial	BMC Public Health 10: 669.	Study Protocol - full article available 2013 IN	Protocol	Protocol
Kelishadi, R., et al. (2010).	Effects of a lifestyle modification trial among phenotypically obese metabolically normal and phenotypically obese metabolically abnormal adolescents in comparison with phenotypically normal metabolically obese adolescents.	Maternal and Child Nutrition 6(3): 275-286.	Mean age 14.1 (1.7) years	Demographic of study population	PP

Stutzman, S. S., et al. (2010).	The effects of exercise conditioning in normal and overweight pregnant women on blood pressure and heart rate variability.	Biological Research for Nursing 12(2): 137-148.	Pregnant population	Demographic of study population	Pregnancy Intervention
Dekkers, J. C., et al. (2011).	Comparative effectiveness of lifestyle interventions on cardiovascular risk factors among a Dutch overweight working population: a randomized controlled trial.	BMC Public Health 11(1): 49.	Mean age 45. Attrition greater than 20%	Mean age 45. Attrition greater than 20%	Attrition
Hjellset, V. T. and A. Hostmark (2011)	Effect of a culturally adapted intervention program on components of the metabolic syndrome in Pakistani immigrant women living in Oslo, Norway. The innvadiab-deplan study.	Journal of Diabetes Conference: 4th International Congress on Prediabetes and the Metabolic Syndrome Madrid Spain. Conference Publication: (var.pagings). 3: 91.	BP not reported as an outcome.	Weight loss primary outcome. BP not reported as a secondary outcome. Mean age 41-42 Attrition > 20%. Cross over with control given group session and trainers after follow-up	BPN Attrition
Punita, P., et al. (2011).	Effect of 12 week yoga therapy on cardiac autonomic functions in patients of essential hypertension.	Indian Journal of Physiology and Pharmacology Conference: 57th Annual Conference of Association of Physiologists and Pharmacologists of India New Delhi India. 20111217. Conference Publication:(var.pagings). 55 (5 SUPPL. 1): 42-43.	Pharmacological intervention plus exercise	Attrition 30% no intention to treat.	Attrition

Telle Hjellset, V. (2011).	Effect of a culturally adapted intervention program on components of the metabolic syndrome in Pakistani immigrant women living in Oslo, Norway.	Tropical Medicine and International Health Conference: 7th European Congress on Tropical Medicine and International Health Barcelona Spain. Conference Publication: (var.pagings). 16: 51-52.	Weight loss primary outcome. BP not reported as a secondary outcome. Mean age 41-42	Weight loss primary outcome. BP not reported as a secondary outcome.	BPN
Wilcox (2011)	A Randomized Trial of a Diet and Exercise Intervention for Overweight and Obese Women from Economically Disadvantaged Neighborhoods: Sisters Taking Action for Real Success (STARS)	Contemp Clin Trials. 2011 November ; 32(6): 931–945. doi:10.1016/j.cct.2011.08.003.	Mean age 38.9 ± 7.5	Blood pressure not reported.	BPN
Ades, P. A., et al. (2011).	The effect of weight loss and exercise training on flow-mediated dilatation in coronary heart disease: A randomized trial	Chest 140(6): 1420-1427.	Recruited Coronary Artery Disease Patient	Cardiopulmonary disease secondary prevention	C2
Lehmann, N., et al. (2011)	Effects of lifestyle modification on coronary artery calcium progression and prognostic factors in coronary patients-3-Year results of the randomized SAFE-LIFE trial.	Atherosclerosis 219(2): 630-636.	Recruited Coronary Artery Disease Patient	Cardiopulmonary disease secondary prevention	C2

Moreno-Palanco, M. A., et al. (2011).	Impact of comprehensive and intensive treatment of risk factors concerning cardiovascular mortality in secondary prevention: MIRVAS Study. [Spanish]	Revista Espanola de Cardiologia 64(3): 179-185.	Recruited Coronary Artery Disease Patient	Cardiopulmonary disease secondary prevention	C2
Neubeck, L., et al. (2011).	Four-year follow-up of the Choice of Health Options In prevention of Cardiovascular Events randomized controlled trial.	European Journal of Cardiovascular Prevention & Rehabilitation 18(2): 278-286.	Recruited Coronary Artery Disease Patient	Cardiopulmonary disease secondary prevention	C2
Pal, A., et al. (2011).	Effect of yogic practices on lipid profile and body fat composition in patients of coronary artery disease.	Complementary Therapies in Medicine 19(3): 122-127.	Recruited Coronary Artery Disease Patient	Cardiopulmonary disease secondary prevention	C2
Rocha, A., et al. (2011)	Age does not determine the physical, functional and psychosocial response to a cardiac rehabilitation program.	Revista Portuguesa de Cardiologia 30(5): 479-507.	Cardiac Rehab	Cardiopulmonary disease secondary prevention	C2
Connolly, S., et al. (2011).	MyAction: An innovative approach to the prevention of cardiovascular disease in the community	British Journal of Cardiology 18(4): 171-176.	Mean age 61 (9)	Cardiopulmonary disease secondary prevention	C2 age
Hermann, T. S., et al. (2011).	Effect of high intensity exercise on peak oxygen uptake and endothelial function in long-term heart transplant recipients.	American Journal of Transplantation 11(3): 536-541.	Blood pressure and biomarkers were measured before and after 8 weeks. Heart transplant population	Cardiopulmonary disease secondary prevention	C2 age

Howden, E., et al. (2011).	A one-year lifestyle intervention improves myocardial function in patients with chronic kidney disease.	Journal of Science and Medicine in Sport Conference: 2011 Australian Conference of Science and Medicine in Sport . Perth, WA Australia.. Conference Publication: (var.pagings). 14: e21-e22.	Patient group with established chronic kidney disease	Cardiopulmonary disease secondary prevention	C2 age
Howden, E. J., et al. (2011).	A one-year lifestyle intervention improves myocardial function and exercise capacity in patients with chronic kidney disease.	Nephrology Conference: 47th Annual Scientific Meeting of the Australian and New Zealand Society of Nephrology Adelaide, SA Australia. Conference Publication: (var.pagings). 16: 39-40.	Patient group with established chronic kidney disease	Cardiopulmonary disease secondary prevention	C2 Age
Jorstad, H. T., et al. (2011).	Improvement of risk factor control after an acute coronary syndrome by a nurse coordinated prevention program: Results from a randomized trial	Journal of the American College of Cardiology Conference: 60th Annual Scientific Session of the American College of Cardiology New Orleans, LA United States. Conference Publication:(var.pagings). 57 (14 SUPPL. 1): E549.	Acute coronary patients	Cardiopulmonary disease secondary prevention	C2 Age

Kamakura, T., et al. (2011).	Efficacy of out-patient cardiac rehabilitation in low prognostic risk patients after acute myocardial infarction in primary intervention era.	Circulation Journal 75(2): 315-321.	Cardiac rehab	Cardiopulmonary disease secondary prevention	C2 age
Christian, J. G., et al. (2011).	Christian, J. G., et al. (2011). .A computer support program that helps clinicians provide patients with metabolic syndrome tailored counseling to promote weight loss.	Journal of the American Dietetic Association 111(1): 75-83.	Weight loss primary target. Attrition 5%. Practice level randomisation. Mean age in control cohort 50 (11.79), age 18 to 75.	Weight loss primary target. Attrition 5%. Practice level randomisation. Mean age in control cohort 50 (11.79), age 18 to 75.	D1 Age
Roumen, C., et al. (2011).	Predictors of lifestyle intervention outcome and dropout: The SLIM study.	European Journal of Clinical Nutrition 65(10): 1141-1147.	55.0 sd 6.5	Age of Cohort	D1 Age
Athyros, V. G., et al. (2011)	Safety and impact on cardiovascular events of long-term multifactorial treatment in patients with metabolic syndrome and abnormal liver function tests: A post hoc analysis of the randomized ATTEMPT study.	Archives of Medical Science 7, 796-805 DOI: 10.5114/aoms. 2011.25554	Mean age 58 (7)	Age of Cohort	D1 Age
Avram, C., et al. (2011).	Dietary and physical activity counseling in high-risk asymptomatic patients with metabolic syndrome - A primary care intervention	Journal of Food, Agriculture and Environment 9(3-4): 16-19.	Mean age 55.6 (8.3)	Age of Cohort	D1 Age

Barham, K., et al. (2011).	Diabetes prevention and control in the workplace: a pilot project for county employees.	Journal of Public Health Management & Practice 17(3): 233-241.	Mean age 51.2 (+ 8.0) years	Age of Cohort	D1 Age
Kanaya, A. M., et al. (2011).	A telephone-based lifestyle intervention to lower risk factors in ethnic minority and lower socioeconomic status adults at risk of diabetes.	Journal of General Internal Medicine Conference: 34th Annual Meeting of the Society of General Internal Medicine Phoenix, AZ United States. Conference Publication:(var.pagings). 26 (10): 1219.	Participants over 60, Mean age 72	Age of Cohort	D1 age
Lu, Y.-H., et al. (2011).	Outcome of intensive integrated intervention in participants with impaired glucose regulation in China.	Advances in Therapy 28(6): 511-519.	Age 62.44 (sd 9.16)	Age of Cohort	D1 Age
Shapiro, S., et al. (2011)	Smartphone technology versus paper-based logs for type II diabetes prevention: Psychological and behavioral outcomes.	Canadian Journal of Cardiology Conference: 64th Annual Meeting of the Canadian Cardiovascular Society, CCS 2011 Vancouver, BC Canada. Conference Publication:(var.pagings). 27 (5 SUPPL. 1): S180-S181.	Age range 18-70. Poster Abstract Full data not available	Conference abstract no primary article. Diabetic population.	D2 Age

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Zhou, J. (2011)	Life style interventions study on the effects of impaired glucose regulations in Shanghai urban communities]. [Chinese].	Wei sheng yan jiu [Journal of hygiene research] 40, 331-333	Chinese Language publication. Diabetic prevention. Population Cluster randomly selected prior to randomisation. Age of participants not disclosed	Diabetic prevention. Population Cluster randomly selected prior to randomisation. Age of participants not disclosed	D1. Age. NRCT
Wallymahmed, M. E., et al. (2011)	Nurse-led cardiovascular risk factor intervention leads to improvements in cardiovascular risk targets and glycaemic control in people with Type 1 diabetes when compared with routine diabetic clinic attendance.	Diabetic Medicine 28, 373-379	Treatment to target intervention to optimise glucose and blood pressure prescription control. No defined or consistent exercise advice. Intervention individualised to meet patient needs.	Type 1 Diabetic population. Mean age 34. No defined exercise intervention	D2, NEI
Brazeau, A. S., et al. (2011).	Physical activity promotion in adults with type 1 diabetes: The PAP-1 pilot program.	Diabetes Conference: 71st Scientific Sessions of the American Diabetes Association San Diego, CA United States. Conference Publication: (var.pagings). 60: A576.	Mean 44.6 ± 13.3 years, primary objective increase in total energy expenditure	Type 1 diabetic population. BP not reported outcome.	D2, BPN
Hordern, M. D., et al. (2011)	Acute response of blood glucose to short-term exercise training in patients with type 2 diabetes.	Journal of Science & Medicine in Sport 14(3): 238-242.	Measures continued for 4 weeks of intervention.	Diabetic population. 4 week exercise programme.Mean age 58.5 ± 9.4	D2 Age

O'Connor, E., et al. (2011).	Differences in vascular conductance adaptations to exercise training between men and women with type 2 diabetes.	Irish Journal of Medical Science Conference: Royal Academy of Medicine in Ireland, RAMI Section of Biomedical Sciences Annual Meeting 2011 Dublin Ireland. Conference Publication: (var.pagings). 180: S289-S290.	Diabetic population. Mean age 52 sd 7	Diabetic population. Mean age 52 sd 7	D2 Age
Al Lenjawi, B. A. (2011).	Culturally sensitive patient-centered educational program for self-management type II diabetes: A randomized controlled trial.	Diabetes Conference: 71st Scientific Sessions of the American Diabetes Association San Diego, CA United States. Conference Publication: (var.pagings). 60: A198.	Mean age 52.8 (9)	Demographic of study population	D2 age
Andrews, R. C., et al. (2011).	Diet or diet plus physical activity versus usual care in patients with newly diagnosed type 2 diabetes: the Early ACTID randomized controlled trial.	Lancet 378(9786): 129-139.	Mean age 60 (9.7)	Demographic of study population	D2 age
Cohen, L. B., et al. (2011)	Pharmacist-led shared medical appointments for multiple cardiovascular risk reduction in patients with type 2 diabetes.	Diabetes educator 37, 801-812 DOI: 10.1177/01457 21711423980	Mean age 69.8 (10.7)	Demographic of study population	D2 age

Hegde, S. V., et al. (2011).	Effect of 3-month yoga on oxidative stress in type 2 diabetes with or without complications: A controlled clinical trial.	Diabetes Care 34(10): 2208-2210.	Mean ± SD age was 59.8 ± 9.9 years	Demographic of study population	D2 age
Ishani, A., et al. (2011).	Effect of Nurse case management compared with usual care on control of cardiovascular risk factors in patient with diabetes: A randomized controlled trial.	Diabetes Care 34(8): 1689-1694	Mean Age 64.9 (8.9)Q	Demographic of study population	D2 age
Jorge, M. L. M. P., et al. (2011).	The effects of aerobic, resistance, and combined exercise on metabolic control, inflammatory markers, adipocytokines, and muscle insulin signaling in patients with type 2 diabetes mellitus.	Metabolism: Clinical & Experimental 60(9): 1244-1252.	Mean age 57.90 ± 9.82	Demographic of study population	D2 Age
Kempf, K., et al. (2011).	Long-term effects of self-monitoring of blood glucose on glucometabolic control in patients with type 2 diabetes mellitus: Follow up data from ROSSO-in-praxi international.	Diabetologia Conference: 47th Annual Meeting of the European Association for the Study of Diabetes, EASD 2011 Lisbon Portugal. Conference Publication: (var.pagings). 54: S392.	Mean Age 58.2 (sd 9.3)	Demographic of study population	D2 Age

Kurban, S., et al. (2011)	Effect of chronic regular exercise on serum ischemia-modified albumin levels and oxidative stress in type 2 diabetes mellitus.	Endocrine research 36, 116-123 DOI: 10.3109/07435800.2011.566236	Mean age 53.77 ± 8.2 years	Demographic of study population	D2 Age
Lucotti, P., et al. (2011).	Aerobic and resistance training effects compared to aerobic training alone in obese type 2 diabetic patients on diet treatment	Diabetes Research & Clinical Practice 94(3): 395-403.	Mean age 58.1 ± 9.9	Demographic of study population	D2 Age
Parker, R., et al. (2011).	Prevalence of abnormal liver function and response to lifestyle interventions in newly diagnosed type 2 diabetes: Preliminary results of a UK randomized controlled study.	Gut Conference: Annual General Meeting of the British Society of Gastroenterology Birmingham United Kingdom. Conference Start: Conference Publication: (var.pagings). 60: A59.	Mean age 59·5 (11·1)	Demographic of study population	D2 age
Parker, R., et al. (2011).	Prevalence of abnormal liver function and response to lifestyle interventions in newly diagnosed type 2 diabetes: Preliminary results of a UK randomized controlled study.	Journal of Hepatology Conference: 46th Annual Meeting of the European Association for the Study of the Liver. Conference Publication: (var.pagings). 54: S343.	Mean 59·5 (11·1)	Demographic of study population	D2 age
Piette, J. D., et al. (2011).	A randomized trial of telephonic counseling plus walking for depressed diabetes patients	Medical Care 49(7): 641-648.	Mean age 56 (10.1)	Demographic of study population	D2 Age

Piette, J. D., et al. (2011)	Clinical complexity and the effectiveness of an intervention for depressed diabetes patients.	Chronic Illness 7(4): 267-278.	Mean age 56 (10.1)	Demographic of study population	D2 Age
Plotnikoff, R. C., et al. (2011).	The effects of a supplemental, theory-based physical activity counseling intervention for adults with type 2 diabetes	Journal of Physical Activity & Health 8(7): 944-954.	Mean age 61 (11.7)	Demographic of study population	D2 Age
Rosal, M. C., et al. (2011).	Randomized trial of a literacy-sensitive, culturally tailored diabetes self-management intervention for low-income latinos: latinos en control.	Diabetes Care 34(4): 838-844.	83% of participants over 45 yrs no separation of outcomes across	Demographic of study population	D2 Age
Silva, M., et al. (2011).	Diabetes self-management education in South Auckland, New Zealand, 2007-2008.	Preventing Chronic Disease 8(2): A42.	Mean age was 57.6 (12.6)	Demographic of study population	D2 Age
Smith, S. M., et al. (2011)	Peer support for patients with type 2 diabetes: cluster randomized controlled trial.	BMJ (Clinical research ed.) 342, d715	Mean age 66.1 (11.1)	Demographic of study population	D2 Age
Snel, M., et al. (2011)	Immediate and long-term effects of addition of exercise to a 16-week very low calorie diet on low-grade inflammation in obese, insulin-dependent type 2 diabetic patients.	Food and Chemical Toxicology 49, 3104-3111 DOI: http://dx.doi.org/10.1016/j.fct.2011.09.032	Mean Age 56 (sd2.0)	Demographic of study population	D2 Age

Vadstrup, E. S., et al. (2011).	Effect of a group-based rehabilitation programme on glycaemic control and cardiovascular risk factors in type 2 diabetes patients: The Copenhagen Type 2 Diabetes Rehabilitation Project.	Patient Education and Counseling 84(2): 185-190.	Mean age 58.5 (9.0)	Demographic of study population	D2 Age
Yang, K., et al. (2011).	Utilization of 3-month yoga program for adults at high risk for type 2 diabetes: a pilot study.	Evidence-Based Complementary & Alternative Medicine: eCAM 2011: 257891.	Mean age 51.7 years (SD = 4.9)	Demographic of study population	D2 age
Fortin, P. R., et al. (2011).	A randomized clinical trial of a comprehensive behavioral intervention in systemic lupus erythematosus demonstrates improvement in mental health but not in physical health, cardiovascular risks or endothelial function at one year.	Arthritis and Rheumatism. Conference: Annual Scientific Meeting of the American College of Rheumatology and Association of Rheumatology Health Professionals 63(10 SUPPL. 1).	Inflammatory vasculitis population, SLE management	Established Chronic Disease	ECD
Harvie, M., et al. (2011).	The breast-activity and healthy eating after diagnosis (B-AHEAD) study - A randomized comparison of weight control programmes during adjuvant treatment.	Cancer Research. Conference: 34th Annual CTRC AACR San Antonio Breast Cancer Symposium San Antonio, TX United States. Conference Start 71(24 SUPPL. 3).	Cancer survival group	Cancer patients	ECD

Biddle, M. G., et al. (2011).	Randomized controlled trial of informal team sports for cardiorespiratory fitness and health benefit in Pacific adults.	Journal of Primary Health Care 3(4): 269-277.	Follow up 4 weeks	Follow up less than 3 months	F<3
Sen, S., et al. (2011).	Aerobic exercise improves endothelial dysfunction in pre-diabetes patients.	Circulation. Conference: American Heart Association's Scientific Sessions 124(21 SUPPL. 1).	Follow-up less than 3 months	Follow up less than 3 months	F<3
Aminuddin, A., et al. (2011).	Effect of graded aerobic exercise training on blood pressure changes in women with elevated blood pressure	International Medical Journal 18(3): 207-211.	Follow-up less than 3 months	Follow-up less than 3 months	F<3
Boutcher, Y. N., et al. (2011).	Acute effect of a single bout of aerobic exercise on vascular and baroreflex function of young males with a family history of hypertension.	Journal of Human Hypertension 25(5): 311-319.	Follow-up less than 3 months	Follow-up less than 3 months	F<3

Chrispino, T. C., et al. (2011).	Autonomic changes after resistance exercise in individuals with untreated stage 1 hypertension.	Clinical Autonomic Research Conference: 1st Joint Meeting of the International Society for Autonomic Neuroscience and the American Autonomic Society, ISAN/AAS 2011 Buzios, Rio de Janeiro Brazil.. Conference Publication:(var.pagings). 21 (4): 298-299.	Acute exericse responses elevating the effects of single bout of exercise	Follow-up less than 3 months	F<3
Collier, S. R., et al. (2011).	Sex differences in resting hemodynamics and arterial stiffness following 4 weeks of resistance versus aerobic exercise training in individuals with pre-hypertension to stage 1 hypertension.	Biology of sex differences 2(1): 9.	Mean age 44 (1.5)	Follow-up less than 3 months	F<3
Glazachev, O., et al. (2011).	Hypoxic-hyperoxic preconditioning in metabolic and cardiovascular risk factors correction and prevention.	European Journal of Cardiovascular Prevention and Rehabilitation Conference: EuroPRevent 2011 Geneva Switzerland. Conference Publication:(var.pagings). 18 (1 SUPPL. 1): S11.	Short intervention with 3 week measures described in the results	Follow-up less than 3 months	F<3

Lamina, S. (2011).	Comparative effect of interval and continuous training programs on serum uric acid in management of hypertension: Arandomized controlled trial.	Journal of Strength and Conditioning Research 25(3): 719-726.	No randomized 8 week intervention with measure at end	Follow-up less than 3 months	F<3
Melville, G., et al. (2011).	Fifteen minutes of yoga postures or guided meditation in the office can elicit psychological and physiological relaxation.	Journal of Science and Medicine in Sport Conference: 2011 Australian Conference of Science and Medicine in Sport. Perth, WA Australia. Conference Publication: (var.pagings). 14: e83.	Acute effects of yoga	Follow-up less than 3 months	F<3
Miyashita, M., et al. (2011).	Accumulating short bouts of running reduces resting blood pressure in young normotensive/pre-hypertensive men.	Journal of Sports Sciences 29(14): 1473-1482.	Ten normotensive/ pre-hypertensive men, aged 25.0 ± 4.2 years (mean ± s), participated in three 2-day trials at least one week apart	Follow-up less than 3 months	F<3
Subramanian , H., et al. (2011)	Non-pharmacological Interventions in Hypertension: A Community-based Cross-over Randomized Controlled Trial.	Indian Journal of Community Medicine 36(3): 191-196.	8 week intervention. Before and after measures, less than 12 weeks follow-up	Follow-up less than 3 months	F<3

Ferreira, J., et al. (2011)	Inspiratory muscle training reduces blood pressure and sympathetic activity in hypertensive patients: A randomized controlled trial.	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2011 Paris France. Conference Publication: (var.pagings). 32: 384-385.	Less than 3 month follow-up, mean age 61.8 ± 11.1 52.1 ± 8.8, no age criteria	Age of Cohort	H Age
Jafar, T. H., et al. (2011	Cost-effectiveness of community-based strategies for blood pressure control in a low-income developing country: Findings from a cluster-randomized, factorial-controlled trial.	Circulation 124(15): 1615-1625.	Mean age 54.0 sd 11.5, age > 40	Demographic of study population	H Age
Waib, P. H., et al. (2011)	Improvements in insulin sensitivity and muscle blood flow in aerobic-trained overweight-obese hypertensive patients are not associated with ambulatory blood pressure	Journal of Clinical Hypertension 13(2): 89-96.	Mean age, 49 [47–52] years, participant > 40	Mean age 49 range 47 to 52	H Age
Baruth, M., et al. (2011).	Changes in CVD risk factors in the activity counselling trial	International journal of general medicine 4: 53-62.	Mean age 50.7(9.6), 35 to 74	Age of Cohort	H Age
Bove, A. A., et al. (2011).	Reducing cardiovascular disease risk in medically underserved urban and rural communities.	American Heart Journal 161(2): 351-359.	Mean age 62.6 (9.6), age criteria 18 to 85	Age of Cohort	H Age

Cardoso Jr, C. G., et al. (2011).	Aerobic training abolishes ambulatory blood pressure increase induced by estrogen therapy: A double blind randomized clinical trial.	Maturitas 69(2): 184-189.	Mean age 50 (1), age 45 to 65	Age of Cohort	H Age
Cleanthous, X., et al. (2011).	A pilot comprehensive lifestyle intervention program (CLIP)--comparison with qualitative lifestyle advice and simvastatin on cardiovascular risk factors in overweight hypercholesterolaemic individuals.	Nutrition Metabolism & Cardiovascular Diseases 21(3): 165-172.	Mean age 50 (9), 6 week follow up, age 20 to 69	Age of Cohort	H Age
Cocco, G. and S. Pandolfi (2011).	Physical exercise with weight reduction lowers blood pressure and improves abnormal left ventricular relaxation in pharmacologically treated hypertensive patients.	Journal of Clinical Hypertension 13(1): 23-29.	Mean age 59 (4), no age restriction	Age of Cohort	H Age
Cohen, D. L., et al. (2011).	Iyengar yoga versus enhanced usual care on blood pressure in patients with prehypertension to stage i hypertension: A randomized controlled trial.	Evidence-based Complementary and Alternative Medicine 2011(546428).	Mean age 48.2 ± 1.6, age 22 to 69	Lacks true control. Control group receive nutrition and behavioral coaching	H Age

Perl, S., et al. (2011)	Randomized evaluation of the effects of a structured education program on blood pressure (BP) in essential hypertensive patients (PTS) (Herz.Leben).	Journal fur Kardiologie Conference: Osterreichische Kardiologische Gesellschaft Annual Conference 2011 Salzburg Austria. Conference Publication:(var.pagings). 18 (5-6): 213.	Mean age 62 (sd11)	Age of Cohort	H Age
Powers, B. J., et al. (2011)	The effectiveness of personalized coronary heart disease and stroke risk communication.	American Heart Journal 161(4): 673-680.	Mean age 67 (8), age > 55	Age of Cohort	H Age
Smith, P. J. (2011).	Aerobic exercise, diet, and neurocognition among individuals with high blood pressure.	Dissertation Abstracts International: Section B: The Sciences and Engineering 71(8-B): 5107.	Mean age 52 (sd 9.5), age > 35	Age of Cohort	H Age
Ruffin, M. T. t., et al. (2011).	Effect of preventive messages tailored to family history on health behaviors: the Family Healthware Impact Trial.	Annals of Family Medicine 9(1): 3-11.	Mean age 50.3 (8.4), age 35 to 65	Age of Cohort	H Age
Ukena, C., et al. (2011).	Cardiorespiratory response to exercise after renal sympathetic denervation in patients with resistant hypertension.	Journal of the American College of Cardiology 58(11): 1176-1182.	Participant group have had a renal denervation intervention, outcome measures limited to 3 months	Acute response to exercise , 3 months post renal denervation	F<3

Ukena, C., et al. (2011).	Cardiorespiratory response to exercise after renal sympathetic denervation in patients with resistant hypertension.	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2011 Paris France. Conference Publication: (var.pagings). 32: 960.	Participant group have had a renal denervation intervention, outcome measures limited to 3 months	Acute response to exercise , 3 months post renal denervation	F<3
Ashok Kumar, M., et al. (2011).	Improving medication adherence and clinical outcomes of hypertensive patients through patient counseling.	Research Journal of Pharmaceutical, Biological and Chemical Sciences 2(3): 231-241.	Medication adherence. 4 months follow-up, Drug trial improving medication adherence	Drug trial improving medication adherence	NEI
David Nebieridze, D., et al. (2011).	The efficacy of integration in clinical practice of electronic version of SCORE in treating hypertensive patients.	European Journal of Cardiovascular Prevention and Rehabilitation Conference: EuroPRevent 2011 Geneva Switzerland. Conference Publication:(var.pagings). 18 (1 SUPPL. 1): S81.	Discussion of cardiovascular risk score. No PA intervention. Poster	No exercise intervention	NEI

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Astell, K. J., et al. (2011).	The effect of caralluma fimbriata extract in combination with lifestyle intervention on the risk factors of metabolic syndrome.	Australasian Medical Journal Conference: 35th Annual Scientific Meeting Joint Annual Scientific Meeting of the Nutrition Society of New Zealand and the Nutrition Society of Australia Queenstown New Zealand.. Conference Publication:(var.pagings). 4 (12): 743.	Followed at 6 weeks and 12 weeks. Nutritional supplement trial plus exercise. No exercise control	Nutritional supplement trial plus exercise. No exercise control	NRCT
Korhonen, T., et al. (2011).	Smoking cessation program with exercise improves cardiovascular disease biomarkers in sedentary women.	Journal of Women's Health 20(7): 1051-1064.	Subgroup analysis - follow-up measures at 15 weeks.	Smoking cessation programme with exercise. No age disclosed.	NRCT
Toschi-Dias, E., et al. (2011).	Effects of diet and exercise training on sympathetic hyperactivation and baroreflex sensitivity in patients with metabolic syndrome and obstructive sleep apnea.	Circulation. Conference: American Heart Association's Scientific Sessions 124(21 SUPPL. 1).	Sleep apnoea population. Study investigating metabolic dysfunction and sleep apneoa.	Not a randomized study.	NRCT
Wang, J. (2011).	Social problem solving and adherence to self-monitoring in association with changes in weight and cardiometabolic risk factors in a behavioral weight loss trial	Dissertation Abstracts International: Section B: The Sciences and Engineering 72(1-B): 193.	BP not a outcome measure	Secondary analysis on weight loss programme evaluating effectiveness of different self-monitoring strategies. No true control. Primary outcome weight loss. Mean age 47.73±8.46	NRCT

Williams, M., et al. (2011).	Type 2 diabetes and obesity: How effective is a lifestyle intervention at promoting physical activity and nutrition.	Obesity Research and Clinical Practice Conference: Australian and New Zealand Obesity Society Annual Scientific Meeting 2011 Adelaide, SA Australia. Conference Publication: (var.pagings). 5: S26.	Full text not available. BP and age not presented in abstract	BP not reported, study lacks control, comparing telephone and face to face intervention	NRCT
McNeill, J. A., et al. (2011).	A family history intervention: enhancing cardiovascular risk assessment.	AAOHN Journal 59(4): 181-192; quiz 193-184.	Mean age 45	Demographic of study population	NRCT
Zweiker, R., et al. (2011).	Randomized evaluation of the effects of a structured educational program (HERZ.LEBEN) on blood pressure in essential hypertensive patients.	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2011 Paris France. Conference Publication: (var.pagings). 32: 219.	Limited data. Cross over design. Lacks true Control	Limited data. Cross over design. Lacks true Control	NRCT
Agte, V. V., et al. (2011).	The effects of Sudarshan Kriya Yoga on some Physiological and biochemical parameters in mild hypertensive patients.	Indian Journal of Physiology and Pharmacology 55(2): 183-187.	Non-randomized , less than 6 month follow-up	Not RCT	NRCT

Berks, D., et al. (2011).	Postpartum lifestyle intervention after complicated pregnancy proves feasible.	Reproductive Sciences Conference: 58th Annual Scientific Meeting of the Society for Gynecologic Investigation, SGI 2011 Miami Beach, FL United States. Conference Publication:(var.pagings). 18 (3 SUPPL. 1): 349A-350A.	Not randomized. Case control	Not RCT	NRCT
Claes, N., et al. (2011).	Effectiveness of cardiovascular prevention programs in primary care (PreCardio): A randomized clinical trial.	European Journal of Cardiovascular Prevention and Rehabilitation Conference: EuroPRevent 2011 Geneva Switzerland. Conference Publication:(var.pagings). 18 (1 SUPPL. 1): S102.	Work place intervention. Age 40 (10) Population not screened. Mean Bp 130 (19). Not true control	Not RCT	NRCT
DeHaven, M. J., et al. (2011).	The GoodNEWS (Genes, Nutrition, Exercise, Wellness, and Spiritual Growth) Trial: a community-based participatory research (CBPR) trial with African-American church congregations for reducing cardiovascular disease risk factors--recruitment, measurement, and randomization.	Contemporary Clinical Trials 32(5): 630-640.	Community Intervention Age not presented	Not RCT	NRCT

Eggermont, N., et al. (2011).	Evaluation of a peer-education program for diabetes and hypertension in rural Cambodia.	Tropical Medicine and International Health Conference: 7th European Congress on Tropical Medicine and International Health Barcelona Spain. Conference Publication: (var.pagings). 16: 343-344.	Retrospective study	Not RCT	NRCT
Fanghanel, G., et al. (2011).	Impact of waist circumference reduction on cardiovascular risk in treated obese subjects.	Cirugia y Cirujanos 79(2): 175-181.	Not an RCT	Not RCT	NRCT
Hermans, M., et al. (2011).	Evaluating benchmarking to optimize management of type 2 diabetes patients: The Belgian data from the optimise study.	Acta Cardiologica Conference: 30th Annual Scientific Meeting of the Belgian Society of Cardiology Brussels Belgium. Conference Publication:(var.pagings). 66 (1): 124-125.	Research Audit of Physician Care reporting percentage attainment of treatment targets.	Not RCT	NRCT
Itteera, R., et al. (2011).	Clinical outcomes of a community pharmacist managed employee hypertension program.	Journal of the American Pharmacists Association Conference: APhA2011 Seattle, WA United States. Conference Publication:(var.pagings). 51 (2): 276-277.	Retrospective study design	Not RCT	NRCT

Jackson, J., et al. (2011).	Blood Pressure Success Zone: You Auto Know. A worksite-based program to improve blood pressure control among auto workers.	Population Health Management 14(5): 257-263.	No control group	Not RCT	NRCT
Kasawara, K. T., et al. (2011).	Assessment of physical exercise for pregnant women with risk for preeclampsia development: Preliminary data.	Journal of Perinatal Medicine. Conference: 10th World Congress of Perinatal Medicine 20111108(20111111).	Pregnant population.	Pregnancy	Pregnancy
Linmans, J. J., et al. (2011)	Effect of lifestyle intervention for people with diabetes or prediabetes in real-world primary care: propensity score analysis.	BMC Family Practice 12: 95.	Not randomized study	Not RCT	NRCT
Oba, N., et al. (2011).	Development of a community participation program for diabetes mellitus prevention in a primary care unit, Thailand.	Nursing & health sciences 13(3): 352-359.	No control group	Not RCT	NRCT
Xinhua, T., et al. (2011)	Effects of stage goal management for hypertension control in community.	Journal of Hypertension Conference: 8th Asian Pacific Congress of Hypertension Taipei Taiwan (Republic of China). Conference Publication: (var.pagings). 29: e60.	No randomisation.	Not RCT	NRCT

Drieling, R. L., et al. (2011).	Evaluating clinic and community-based lifestyle interventions for obesity reduction in a low-income Latino neighborhood: Vivamos Activos Fair Oaks Program.	BMC Public Health 11: 98.	Protocol - no paper published	Protocol	Protocol
Janicke, D. M., et al. (2011).	The Extension Family Lifestyle Intervention Project (E-FLIP for Kids): Design and methods.	Contemporary Clinical Trials 32(1): 50-58.	Protocol	Protocol	Protocol
Masuo, K. et al (2011).	Different mechanisms in weight loss-induced blood pressure reduction between a calorie-restricted diet and exericse	Hypertension Research (2012) 35, 41–47; doi:10.1038/hr.2011.134; published online 4 August 2011	Lacks true control.	Not RCT	NRCT
Plotz, S. C., et al. (2011).	Effectiveness of a multilateral weight reduction conception on cardiovascular risk factors.	Obesity Reviews Conference: 18th European Congress on Obesity, ECO 2011 Istanbul Turkey. Conference Publication: (var.pagings). 12: 205.	Drug intervention. Primary outcome BMI	Drug/Nutritional intervention.	Drug intervention
Sheikholeslami Vatani, D., et al. (2011).	Changes in cardiovascular risk factors and inflammatory markers of young, healthy, men after six weeks of moderate or high intensity resistance training.	Journal of Sports Medicine & Physical Fitness 51(4): 695-700.	Healthy Young men- no established risk factors, F<3	Demographic of study population	PL
Tully, M. A. and M. E.	UNISTEP (university students exercise and physical activity)	Journal of Physical Activity &	Healthy sedentary students,	Demographic of study population	PL

Cupples (2011).	study: a pilot study of the effects of accumulating 10,000 steps on health and fitness among university students.	Health 8(5): 663-667.	follow up < 3 months		
Goodpaster, B. H., et al. (2012)	Effects of diet and physical activity interventions on weight loss and cardiometabolic risk factors in severely obese adults: a randomized trial.	JAMA : the journal of the American Medical Association 304, 1795-1802 DOI: 10.1001/jama.2010.1505	mean BMI 43.5 and mean age 47.1	Body Weight, BMI > 40	Duplication 2010
Fernandez, J. M., et al. (2012)	Moderate-to-high-intensity training and a hypocaloric Mediterranean diet enhance endothelial progenitor cells and fitness in subjects with the metabolic syndrome.	Clinical Science 123(6): 361-373.	Age 50 - 66, means 57.2±4.29 59.05±5.47	Lacks true control.	NRCT
Malin, S. K. (2012)	Metformin and/or exercise training affect metabolic health in men and women with prediabetes	Dissertation Abstracts International: Section B: The Sciences and Engineering 72(10-B): 5933.	Full paper published 2012. BP not reported	Drug intervention.	Drug intervention
Canuto, K., et al. (2012).	Pragmatic randomized trial of a 12-week exercise and nutrition program for Aboriginal and Torres Strait Islander women: clinical results immediate post and 3 months follow-up.. BMC Public Health 12: 933	BMC Public Health 12: 933	Attrition over 40%. Mean age not provided. Waitlist control. Lacks true control.	Attrition over 40%. Mean age not provided. Waitlist control. Lacks true control.	BP2. Attrition

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Aadahl, M., et al. (2012).	Reduction of sitting time in sedentary men and women. A randomized controlled trial (Sedentary Intervention Trial.	Journal of Science and Medicine in Sport Conference: Be Active 2012 Sydney, NSW Australia. Conference Publication: (var.pagings). 15: S302.	General population no bp measure full paper Motivational Counseling to Reduce Sitting Time: A Community-Based Randomized Controlled Trial in Adults	Full paper available 2014.	BPN
Durrer, D. (2012).	Whole-body vibration in obese women improves body composition and aerobic fitness and decreases cardio-metabolic risk factors.	Obesity Facts Conference: 19th European Congress on Obesity, ECO2012 Lyon France. Conference Publication: (var.pagings). 5: 210.	Conference abstract, No primary article.	Conference abstract, No primary article.	BPN
W, I. J., et al. (2012).	The effect of a comprehensive lifestyle intervention on cardiovascular risk factors in pharmacologically treated patients with stable cardiovascular disease compared to usual care: a randomized controlled trial	BMC Cardiovascular Disorders 12(71).	Established CVD	Cardiopulmonary disease secondary prevention	C2
Cezaretto, A., et al. (2012)	Benefits on quality of life concomitant to metabolic improvement in intervention program for prevention of diabetes mellitus.	Quality of Life Research 21(1): 105-113.	Mean age 55 sd 12	Age of Cohort	D1 Age

ONLINE SUPPLEMENT

Kanaya, A. M., et al. (2012).	The Live Well, Be Well study: a community-based, translational lifestyle program to lower diabetes risk factors in ethnic minority and lower-socioeconomic status adults.	American Journal of Public Health 102(8): 1551-1558.	Mean age 58 (sd 16)	Age of Cohort	D1 Age
Debussche, X., et al. (2012).	Quarterly individual outpatients lifestyle counseling after initial inpatients education on type 2 diabetes: the REDIA Prev-2 randomized controlled trial in Reunion Island.	Diabetes & Metabolism 38(1): 46-53.	Diabetic. Mean age 53.8 ± 11.3	Age of Cohort	D2 Age
Agurs, T. D. (2012)	Efficacy of a weight loss and exercise intervention for older African-Americans with non-insulin-dependent diabetes mellitus.	Diabetes Care. 1997 Oct;20(10):1503-11.	Originally published 1997. Diabetic. Age 55-79	Age of Cohort	D2 Age
Andrews, R. C., et al. (2012)	Diet or diet plus physical activity versus usual care in patients with newly diagnosed type 2 diabetes: the Early ACTID randomized controlled trial.	Lancet 378, 129-139 DOI: 10.1016/s0140-6736(11)60442-x	Diabetic. Mean Age 60.0 (sd 9.7)	Age of Cohort	D2 Age
Balducci, S., et al. (2012).	Supervised exercise training counterbalances the adverse effects of insulin therapy in overweight/obese subjects with type 2 diabetes.	Diabetes Care 35(1): 39-41.	Diabetic. Mean age 59.6 (sd8.7)	Age of Cohort	D2 Age
Dobrosielski, D. A., et al. (2012).	Effect of exercise on blood pressure in type 2 diabetes: a randomized controlled trial	Journal of General Internal Medicine 27(11): 1453-1459.	Diabetic. out mean age 56 (sd 6)	Age of Cohort	D2 Age

Glasgow, R. E., et al. (2012).	Twelve-month outcomes of an Internet-based diabetes self-management support program.	Patient Education & Counseling 87(1): 81-92	Mean age 58.4 sd 9.2	Age of Cohort	D2 Age
Khunti, K., et al. (2012).	Effectiveness of a diabetes education and self management programme (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: three year follow-up of a cluster randomized controlled trial in primary care	BMJ 344: e2333	Diabetic. Mean age 57.6 (12.5)	Age of Cohort	D2 Age
Michel, G. and Optimise (2012)	The OPTIMISE study (Optimal Type 2 Diabetes Management Including Benchmarking and Standard Treatment]. Results for Luxembourg].	Bulletin de la Société des sciences médicales du Grand-Duché de Luxembourg 43-49	Mean age was 65.7 10.8 years	Age of Cohort	D2 Age
Nam, S., et al. (2012).	Predictors of exercise intervention dropout in sedentary individuals with type 2 diabetes.	Journal of Cardiopulmonary Rehabilitation & Prevention 32(6): 370-378.	Mean age 56.39 ±6.08	Age of Cohort	D2 Age
Sigal, R. (2012)	Effects of aerobic training, resistance training, or both on glycemic control in type 2 diabetes: A randomized trial.	Journal Of Diabetes 11, A16 DOI: 10.1111/j.1753-0407.2009.00017.x	Diabetic mean age 53.6 (SD 6-7 across groups)	Age of Cohort	D2 Age

Fluker, J. G. (2012)	Self-regulation intervention by telephone to reduce weight and blood pressure in overweight women with elevated blood pressure.	[Thesis]. Augusta (GA): Medical College of Georgia; 2005.	10 week follow up	Follow-up less than 3 months	F<3
Rodriguez, M. A. (2012).	Is behavior change sustainable for diet, exercise, and medication adherence?	Dissertation Abstracts International: Section B: The Sciences and Engineering 73(3-B): 1860	Recruited Veterans - older population	Age of Cohort	H Age
Swift, D. L., et al. (2012).	Exercise training and habitual physical activity: a randomized controlled trial	American Journal of Preventive Medicine 43(6): 629-635.	Mean age 57.3 (6.2), post menopausal women	Age of Cohort	H Age
Arroll, B. (2012)	The Auckland blood pressure control study: a randomized controlled trial of physical activity and salt restriction in persons,	Medical and Health Sciences PhD,	Abstract of PhD thesis, original study conducted in 1989-1990. Mean age 55.	Age of Cohort	H Age
Blom, K., et al. (2012).	Hypertension analysis of stress reduction using mindfulness meditation and yoga: Results from a randomized controlled trial.	Canadian Journal of Cardiology Conference: 65th Annual Meeting of the Canadian Cardiovascular Society Toronto, ON Canada. Conference Publication:(var.pagings). 28 (5 SUPPL. 1): S418-S419.	Mean age 55 (11), age 20 to 75, follow-up less than 3 months	Age of Cohort	F<3, H age

Bonardi, J. M. T., et al. (2012).	The blood pressure fall after aerobic exercise is associated to the loss of fat mass in hypertensive older individuals with overweight.	Journal of Clinical Hypertension. Conference: American Society of Hypertension, Inc. 27th Annual Scientific Meeting and Exposition New York, NY United States. Conference Start 20120519(20120522).	Mean age 68 (4), exclusively older adults	Age of Cohort	H Age
Burke, V., et al. (2012)	A lifestyle program for treated hypertensives improves cardiovascular risk factors: A randomized controlled trial.	Atherosclerosis. Supplements 7, 386	ADAPT trial participants 40 to 70, mean age 57 (7)	Age of Cohort	H Age
Cochrane, T., et al. (2012)	Cochrane, T., et al. (2012). .NHS health checks through general practice: randomized trial of population cardiovascular risk reduction.	BMC Public Health 12: 944.	Age (years) Mean (SD) 63.9 (6.5) 63.3 (6.4), age > 35	Age of Cohort	H Age
Epstein, D. E., et al. (2012)	Determinants and consequences of adherence to the dietary approaches to stop hypertension diet in African-American and white adults with high blood pressure: results from the ENCORE trial	Journal of the Academy of Nutrition & Dietetics 112(11): 1763-1773.	Mean age 51.3 (sd9), age > 35	Age of Cohort	H Age

Ferrara, A. L., et al. (2012).	Lifestyle educational program strongly increases compliance to nonpharmacologic intervention in hypertensive patients: a 2-year follow-up study.	Journal of Clinical Hypertension 14(11): 767-772	Mean age 56.6 (sd 9), no age restriction. No separation of results by age	Age of Cohort	H Age
Ferre, R., et al. (2012).	Effects of therapeutic lifestyle changes on peripheral artery tonometry in patients with abdominal obesity.	Nutrition Metabolism & Cardiovascular Diseases 22(2): 95-102.	Age (years) 54.1 (10.1), age criteria 30 to 75	Age of Cohort	H Age
Gadde, K., et al. (2012)	12-month weight loss and antihypertensive benefits with PHEN/TPM in overweight and obese subjects with hypertension.	European Journal of Cardiovascular Prevention and Rehabilitation 17, S2	Group ages 51-52 sd 10.6, no age restrictions.	Supplement trial, no exercise control	Drug intervention
Harris, M. F., et al. (2012)	A cluster randomized controlled trial of vascular risk factor management in general practice.	Medical Journal of Australia 197(7): 387-393.	Age of population 40 to 64, 75% were over 56 years	Age of Cohort	H Age
Kuller, L. H., et al. (2012).	The Women on the Move Through Activity and Nutrition (WOMAN) study: final 48-month results.	Obesity 20(3): 636-643.	Age 52 to 62, mean age 57 sd 3.7	Age of Cohort	H Age
Logan, A. G., et al. (2012).	Effect of home blood pressure telemonitoring with self-care support on uncontrolled systolic hypertension in diabetics.	Hypertension 60(1): 51-57.	Mean age 63.1±9.0, 62.7 (7.8)	Age of Cohort	D2 age

Martikainen, J. A., et al. (2012)	Cost-effectiveness of a lifestyle intervention for hypertension: An open randomized controlled trial.	Value in Health 9, A340-A, Abstract no: PCV310	Mean age 54.4 (10.1), 25 to 74 years	Age of Cohort	H Age
Merino, J., et al. (2012).	Effects of therapeutic lifestyle changes on peripheral artery tonometry in patients with abdominal obesity. [Spanish].	Clinica e Investigacion en Arteriosclerosis 24(1): 3-11.	Mean age 54.1 (10.1), 25 to 74 years	Age of Cohort	H Age
Migneault, J. P., et al. (2012).	A culturally adapted telecommunication system to improve physical activity, diet quality, and medication adherence among hypertensive African-Americans: a randomized controlled trial.	Annals of Behavioral Medicine 43(1): 62-73.	Mean age 56.3 (10.6), age > 35	Age of Cohort	H Age
Molmen-Hansen, H. E., et al. (2012).	Aerobic interval training reduces blood pressure and improves myocardial function in hypertensive patients.	European Journal of Preventive Cardiology 19(2): 151-160.	Mean age (52.0+7.8 years,) age less than 65	Age of Cohort	H Age
Stewart, S., et al. (2012)	Effect of intensive structured care on individual blood pressure targets in primary care: multicentre randomized controlled trial.	BMJ (Clinical research ed.) 345, e7156	Mean age 58 (12)	Drug intervention	Drug intervention
Ulmer, M., et al. (2012)	Usefulness of a run-in period to reduce drop-outs in a randomized controlled trial of a behavioral intervention.	Contemporary Clinical Trials 29, 705-710	Mean age 64.7 (40.7–87.6)	Age of Cohort, Secondary analysis	Secondary analysis

Mikio, A., et al. (2012)	Effects of walking-exercise on blood pressure and novel risk factors in metabolic syndrome randomized control design.	Journal of Hypertension 28, e373-374	Mean age 53.7. 8 week intervention then 8 week follow-up	Age of Cohort and Follow-up less than 3 months	H Age F < 3
Liu, X., et al. (2012).	The effect of therapeutic lifestyle intervention on the circadian rhythm of ambulatory blood pressure.	Heart Conference: 23rd Great Wall International Congress of Cardiology, Asia Pacific Heart Congress 2012 Beijing China. Conference Publication: (var.pagings). 98: E38.	Drug plus exercise. Lacks true control	No control group	NRCT
Thorndike, A. N., et al. (2012).	Weight maintenance after a worksite nutrition and exercise program: A randomized controlled trial	Circulation. Conference: Epidemiology and Prevention/Physical Activity, Nutrition and Metabolism 125(10 SUPPL. 1).	Hospital staff. Work site intervention. 17% hypertensive but results not presented separating from disease free sedentary	Demographic of study population	Attrition greater than 20%
Collins, B. S. (2012)	A behavioral approach in conjunction with antihypertensive drug therapy for control of hypertension: A worksite clinical trial.	Dissertation originally published 1989 University of Maryland	Pharmacologic al intervention	No exercise intervention	NEI

Potteiger, J. A., et al. (2012).	Resistance exercise and aerobic exercise when paired with dietary energy restriction both reduce the clinical components of metabolic syndrome in previously physically inactive males	European Journal of Applied Physiology 112(6): 2035-2044.	Not RCT	Not RCT. Lacks True Control	NRCT
Okawa, J. (2012)	A Systems Approach to Mild Essential Hypertension: Educational Lifestyle Adjustments Versus Biobehavioral Techniques.	Journal of Human Hypertension 26, 214-219 DOI: 10.1038/jhh.2011.22	Thesis, mean age 48 sd less then 8	No control group	NRCT
Sales, A. R. K., et al. (2012).	Diet and exercise training reduce blood pressure and improve autonomic modulation in women with prehypertension	European Journal of Applied Physiology 112(9): 3369-3378.	Case control study	NOT an RCT	NRCT
Lin, G., et al. (2012)	Heart rate variability biofeedback decreases blood pressure in prehypertensive subjects by improving autonomic function and baroreflex.	Journal of alternative and complementary medicine (New York, N.Y.) 18, 143-152 DOI: 10.1089/acm.2010.0607	No exercise intervention, no randomisation	Not RCT	NEI
Moraes, M. R., et al. (2012).	Effect of 12 weeks of resistance exercise on post-exercise hypotension in stage 1 hypertensive individuals	Journal of Human Hypertension 26(9): 533-539.	No control. Pre post exercise training measures	Not RCT	NRCT

Sarrafzadegan, N., et al. (2012).	How does the impact of a community trial on cardio-metabolic risk factors differ in terms of gender and living area? Findings from the Isfahan healthy heart program.	Journal of Research in Medical Sciences 17(8): 732-740.	Mass population intervention	Not RCT	NRCT
Yao, G., et al. (2012).	Impact of comprehensive interventions on awareness, treatment and control of hypertension from communities in ShenZhen City, China.	Circulation Conference: World Congress of Cardiology Scientific Sessions, Dubai United Arab Emirates. Conference Publication:(var.pagings). 125 (19): e878.	Population intervention	Not RCT	NRCT
Kolbe-Alexander, T. L., et al. (2012).	Working on wellness (WOW): a worksite health promotion intervention programme	BMC Public Health 12: 372.	Protocol	Protocol	Protocol
van der Heijden, M. M. P., et al. (2012).	Testing the effectiveness of a self-efficacy based exercise intervention for inactive people with type 2 diabetes mellitus: design of a controlled clinical trial.	BMC Public Health 12: 331.	Protocol	Protocol	Protocol

Burgos, C. S. G., et al. (2012).	The effect of exercise in pregnant women with chronic hypertension and/or previous preeclampsia on blood pressure and heart rate variability.	Pregnancy Hypertension Conference: 18th World Congress of the International Society for the Study of Hypertension in Pregnancy Geneva Switzerland: Conference Publication:(var.pagings). 2 (3): 263-264.	Intervention during gestation, pregnant population	Pregnant population	Pregnant
Masuo, K., et al. (2012).	Different mechanisms in weight loss-induced blood pressure reduction between a calorie-restricted diet and exercise.	Hypertension Research - Clinical & Experimental 35(1): 41-47.	Lacks true control	Not RCT	NRCT
Sanchez-Benito, J. L., et al. (2012).	Weight loss intervention has achieved a significant decrease of blood pressure and cholesterol. [Spanish]..	Clinica e Investigacion en Arteriosclerosis 24(5): 241-249.	No control	Not RCT	NRCT
Shook, R. P., et al. (2012).	Cardiorespiratory fitness reduces the risk of incident hypertension associated with a parental history of hypertension.	Hypertension 59(6): 1220-1224.	Population study OUT	Not RCT	NRCT

Chow, C. K., et al. (2012).	Design and rationale of the tobacco, exercise and diet messages (TEXT ME) trial of a text message-based intervention for ongoing prevention of cardiovascular disease in people with coronary disease: a randomized controlled trial protocol.	BMJ Open 2(1): e000606.	Protocol	Protocol	Protocol
Korshoj, M., et al. (2012)	Cardiorespiratory fitness, cardiovascular workload and risk factors among cleaners; a cluster randomized worksite intervention..	BMC Public Health 12: 645.	Protocol	Protocol	Protocol
Ohta, M., et al. (2012).	Effects of exercise therapy alone and in combination with a calcium channel blocker or an angiotensin receptor blocker in hypertensive patients.	Clinical & Experimental Hypertension (New York) 34(7): 523-529.	Lacks control. Exercise alone or plus drug. Mean age 61.6 (7)	Demographic of study population	NRCT Age
Mandeville, A., et al. (2012).	Assessing the feasibility of a diabetes risk reduction program for multiethnic adolescents and young adults.	Journal of Investigative Medicine Conference: American Federation for Medical Research; Carmel, CA United States. Conference Publication:(var.pagings). 60 (1): 219.	Healthy baseline. No established risk factors.	Demographic of study population	PL

Gerstel, E., et al. (2013)	Gerstel, E., et al. (2013). .Impact of lifestyle intervention on body weight and the metabolic syndrome in home-care providers	Diabetes and Metabolism 39(1): 78-84.	Occupational base intervention, Age not reported. Attrition 26 %.	Attrition 26 %.	Attrition
Annesi, J. J. (2013).	Association of multimodal treatment-induced improvements in stress, exercise volume, nutrition, and weight with improved blood pressure in severely obese women.	International Journal of Behavioral Medicine 20(3): 397-402.	Mean BMI 41, Cohort design, pre post intervention measures	Body Weight and No control group.	BMI > 35, NRCT
Danielsen, K. K., et al. (2013).	Changes in body composition, cardiovascular disease risk factors, and eating behavior after an intensive lifestyle intervention with high volume of physical activity in severely obese subjects: a prospective clinical controlled trial.	Journal of Obesity 2013: 325464.	Mean BMI 42	Body Weight, Attrition 30.2%	BMI > 35, Attrition greater than 30.2%
Ding, E. L., et al. (2013).	Microclinic social network lifestyle intervention for weight loss and obesity management: A 10-month randomized controlled trial	Circulation. Conference: American Heart Association's Epidemiology and Prevention/Physical Activity, Nutrition and Metabolism 127	Diabetic Cohort, Mean BMI 36, cross over design with control group receiving condensed programme after 6 months	Body Weight > 35 and lacks true control with cross over study design after 6 months	BMI > 35, lacks true Control

Elian, V. I., et al. (2013).	c	Romanian Journal of Diabetes Nutrition & Metabolic Diseases / Vol. 19 / no. 4 / 2012	Mean BMI > 36 in intervention arm	Body Weight, Attrition 35.7%	BMI > 35 and Attrition
Unick, J. L., et al. (2013).	The long-term effectiveness of a lifestyle intervention in severely obese individuals	American Journal of Medicine 126(3): 236-242.	Age 45 to 76, Mean BMI > 35, long term follow-up of study from 2003. Attrition 52%	Body Weight, Mean age 58.6 sd 6.8 at baseline.	Age, BMI > 35
Orchard, T. J., et al. (2013)	Long-term effects of the Diabetes Prevention Program interventions on cardiovascular risk factors: A report from the DPP Outcomes Study.	Diabetic Medicine 30(1): 46-55.	Mean age 51 but 1000 included below 45.	Mean Age 51 sd (10)	D1 Age
Pedley, C. F., et al. (2013).	24 month metabolic benefits of a community-based translation of the diabetes prevention program.	Journal of General Internal Medicine Conference: 36th Annual Meeting of the Society of General Internal Medicine, SGIM 2013 Denver, CO United States. Conference Publication: (var.pagings). 28: S2-S3.	Mean age 58	Mean age 58	D1 Age
Hale, E. R., et al. (2013).	Relationship of weekly activity minutes to metabolic syndrome in prediabetes: The healthy living partnerships to prevent diabetes.	Journal of Physical Activity & Health 10(5): 690-698.	Mean age 57.9 ± 9.5 years	Age of Cohort	D1 Age

Lee, Y. H., et al. (2013).	Design and preliminary results of a metropolitan lifestyle intervention program for people with metabolic syndrome in South Korea.	Diabetes Research and Clinical Practice 101(3): 293-302.	Not RCT mean age 50 SD <10	Age of Cohort	D1 Age
Admiraal, W. M., et al. (2013)	Intensive lifestyle intervention in general practice to prevent type 2 diabetes among 18 to 60-year-old South Asians: 1-year effects on the weight status and metabolic profile of participants in a randomized controlled trial.	PLoS ONE [Electronic Resource] 8(7): e68605.	0nly 52% of randomized group followed up. Mean Age 44 (10)	0nly 52% of randomized group followed up. Mean Age 44 (10)	D1 Attrition
Sanghani, N. B., et al. (2013).	Impact of lifestyle modification on glycemic control in patients with type 2 diabetes mellitus.	Indian Journal of Endocrinology and Metabolism 17(6): 1030-1039.	Diabetic. All participants received an active intervention of 4 weeks exercise, involving 24 sessions before being randomized to different intensity of follow-up intervention.	Type 2 Diabetes population. Mean age 45 (8). Lacks true exercise control	D2, NRCT
Youngwanichsetha, S., et al. (2013).	The effects of tai chi qigong exercise on plasma glucose levels and health status of postpartum Thai women with type 2 diabetes.	Focus on Alternative and Complementary Therapies 18(4): 182-187.	Diabetic. Postpartum intervention recruited at 6 weeks post delivery.	Type 2 diabetic population.	D2, Pregnancy

Adeniyi, A. F., et al. (2013).	Time course of improvement of metabolic parameters after a 12 week physical exercise programme in patients with type 2 diabetes: the influence of gender in a Nigerian population.	BioMed Research International 2013: 310574.	Diabetic. Mean age 49.6 + 3.7 years	Age of Cohort	D2, Age
Beverly, E. A., et al. (2013).	Impact of reinforcement of diabetes self-care on poorly controlled diabetes: a randomized controlled trial	Diabetes Educator 39(4): 504-514.	Diabetic, BP not primary outcome	Diabetes intervention. Mean age 59±9 years old	D2 Age
Kempf, K. and S. Martin (2013)	Autonomous exercise game use improves metabolic control and quality of life in type 2 diabetes patients - a randomized controlled trial	BMC Endocrine Disorders2013 13:57 DOI: 10.1186/1472-6823-13-57	Diabetic. BP not primary outcome, mean age 62 (11)	Type 2 diabetes study. Mean Age 62 (11)	D2 Age
Barakat, A., et al. (2013).	Changes in physical activity and modelled cardiovascular risk following diagnosis of diabetes: 1-year results from the ADDITION-Cambridge trial cohort.	Diabetic Medicine 30(2): 233-238.	Diabetic. Mean age > 60 SD <8	Age of Cohort	D2 Age
Barone Gibbs, B., et al. (2013).	The effect of exercise training on ankle-brachial index in type 2 diabetes.	Atherosclerosis 230(1): 125-130.	Diabetic. Mean age 56 SD less 2	Age of Cohort	D2 Age

Carrasquillo, O., et al. (2013).	Preliminary findings from a randomized trial of a community health worker led intervention to improve diabetes intermediate outcomes among latinos with poorly controlled diabetes.	Journal of General Internal Medicine Conference: 36th Annual Meeting of the Society of General Internal Medicine, SGIM 2013 Denver, CO United States. Conference Publication: (var.pagings). 28: S153-S154	Diabetic. Mean Age 57 SD <8	Age of Cohort	D2 Age
Castro-Sanchez, A. M., et al. (2013).	A program of 3 physical therapy modalities improves peripheral arterial disease in diabetes type 2 patients: a randomized controlled trial.	Journal of Cardiovascular Nursing 28(1): 74-82.	Diabetic Peripheral Vascular Disease Group treated with Ultrasound	Age of Cohort	D2 Age
Gagliardino, J. J., et al. (2013).	Type 2 diabetes patients educated by other patients perform at least as well as patients trained by professionals.	Diabetes/Metabolism Research Reviews 29(2): 152-160.	Mean age 60 SD 10	Age of Cohort	D2 Age
Hollekim, S. M., et al. (2013).	The effect of exercise on cardiac function in patients with type 2 diabetes and diastolic dysfunction	European Heart Journal Conference: European Society of Cardiology, ESC Congress 2013 Amsterdam Netherlands. Conference Publication: (var.pagings). 34: 183	Diabetic mean age 56,6 years	Age of Cohort	D2 Age

Islam, N. S., et al. (2013).	A randomized-controlled, pilot intervention on diabetes prevention and healthy lifestyles in the New York City Korean community	Journal of Community Health 38(6): 1030-1041.	Diabetic, Mean age 59.7 SD (8.1)	Age of Cohort	D2 Age
Kadoglou, N. P. E., et al. (2013).	The differential anti-inflammatory effects of exercise modalities and their association with early carotid atherosclerosis progression in patients with type 2 diabetes.	Diabetic Medicine 30(2): e41-50.	Diabetic. Mean Age 57.9 ± 7.2	Age of Cohort	D2 Age
Kuznetsov, L., et al. (2013).	Predictors of change in objectively measured and self-reported health behaviours among individuals with recently diagnosed type 2 diabetes: longitudinal results from the ADDITION-Plus trial cohort.	International Journal of Behavioral Nutrition & Physical Activity 10: 118.	Diabetic. Mean age 59 SD 7.5	Age of Cohort	D2 Age
Reaney, M., et al. (2013).	Impact of conversation map education tools versus regular care on diabetes-related knowledge of people with type 2 diabetes: A randomized, controlled study	Diabetes Spectrum 26(4): 236-245.	Diabetic. Mean age 62 sd less than 10	Age of Cohort	D2 Age

Waki, K., et al. (2013).	Dial betics: Smart phone-based self-management for type 2 diabetes patients.	Journal of Diabetes Science and Technology Conference: 12th Annual Diabetes Technology Meeting Bethesda, MD United States.. Conference Publication:(var.pagings). 7 (1): A151.	Diabetic, mean age 63.8 + 4.4 years	Age of Cohort	D2 Age
Zhao, P., et al. (2013).	An effective complementary therapy for reducing blood pressure in hypertensive adults with type II diabetes.	Heart Conference: 24th Great Wall International Congress of Cardiology, Asia Pacific Heart Congress 2013, International Congress of Cardiovascular Prevention and Rehabilitation 2013 Beijing China. Conference Publication: (var.pagings). 99: A139-A140.	Diabetic. Age 45-64 years	Age of Cohort	D2 Age
Kim, J. D., et al. (2013)	A randomized, controlled, open-label study to evaluate the efficacy of smart phone application based diabetes self-management program in patients with type 2 diabetes.	Diabetes Conference: 73rd Scientific Sessions of the American Diabetes Association Chicago, IL United States. Conference Publication: (var.pagings). 62: A333-A334.	Diabetic. BP results not reported.	Age of Cohort, BP not reported	D2 Age

Beck, D. T., et al. (2013).	Exercise training improves endothelial function in young prehypertensives.	Experimental Biology and Medicine 238(4): 433-441.	Follow up 8 Weeks	Follow-up less than 3 months	F < 3
Beck, D. T., et al. (2013).	Exercise training reduces peripheral arterial stiffness and myocardial oxygen demand in young prehypertensive subjects.	American Journal of Hypertension 26(9): 1093-1102.	Follow up 8 weeks	Follow-up less than 3 months	F < 3
Dhameja, K., et al. (2013).	Therapeutic effect of yoga in patients with hypertension with reference to GST gene polymorphism.	Journal of Alternative and Complementar y Medicine 19(3): 243-249.	Less than 12 week follow-up	Follow-up less than 3 months	F < 3
Jones, J. L., et al. (2013).	Three behaviorally-based lifestyle interventions produce weight loss and decrease markers of cardiovascular disease risk in obese adults	FASEB Journal. Conference: Experimental Biology 20130420(20130424).	F<3, BP not primary	F< 3	F<3
Lin, P. H., et al. (2013).	The Influence of a Physician and Patient Intervention Program on Dietary Intake.	Journal of the Academy of Nutrition and Dietetics 113(11): 1465-1475.	Mean age 60.6 11.1 years	Demographic of study population	Secondary analysis
Young, D., et al. (2013).	Relationships among changes in C-reactive protein and cardiovascular disease risk factors with lifestyle interventions.	Nutrition, Metabolism and Cardiovascular Diseases 23(9): 857-863	Mean Age 52. (sd 9). Criteria 30 to 64.	Mean Age 52. (sd 9). Criteria 30 to 64.	H Age

ONLINE SUPPLEMENT

Baker, B., et al. (2013).	The effects of a mindfulness program on sustained blood pressure: The harmony study(hypertension analysis of stress reduction using mindfulness meditation and yoga	Psychosomatic Medicine Conference: 71st Annual Scientific Meeting of the American Psychosomatic Society Miami, FL United States. Conference Publication:(var.pagings). 75 (3): A-38.	Mean age of 55 + 11 years, 20 to 75 age range	Age of Cohort	F<3, H Age
Brumby, S., et al. (2013).	The effect of physical activity on psychological distress, cortisol and obesity: results of the farming fit intervention program.	BMC Public Health 13: 1018	Mean age 51.72(10.55), age 18 to 75	Age of Cohort	H Age
Chang, A., et al. (2013).	Association of a reduction in central obesity and phosphorus intake with changes in urinary albumin excretion: the PREMIER study.	American Journal of Kidney Diseases 62(5): 900-907.	Mean age 51 SD < 9 Premier study population	Secondary Analysis	Secondary analysis
Fahs, P. S., et al. (2013).	Promoting heart health in rural women.	Journal of Rural Health 29(3): 248-257.	Mean age 51 SD <8, 35 to 65	Age of Cohort	H Age
Goyer, L., et al. (2013).	Randomized controlled trial on the long-term efficacy of a multifaceted, interdisciplinary lifestyle intervention in reducing cardiovascular risk and improving lifestyle in patients at risk of cardiovascular disease.	Journal of Behavioral Medicine 36(2): 212-224.	Mean Age 53 SD < 9.5, 35 to 70	Age of Cohort	H Age

Hardcastle, S. J., et al. (2013).	Effectiveness of a motivational interviewing intervention on weight loss, physical activity and cardiovascular disease risk factors: a randomized controlled trial with a 12-month post-intervention follow-up.	International Journal of Behavioral Nutrition & Physical Activity 10: 40.	Mean age 50.0 SD <1, 18 to 65	Age of Cohort	H Age
Harrison, T. N., et al. (2013).	A randomized controlled trial of an automated telephone intervention to improve blood pressure control.	Journal of Clinical Hypertension 15(9): 650-654.	Mean Age 61.4 SD 14.4	F<3 and exercise not defined	F<3, H Age, no clear exercise intervention
Mao, H. N. and P. Sha (2013)	Effect of Tai Chi exercise on blood pressure, plasma nitrogen monoxidum and endothelin in hypertensive patients.	Chinese journal of clinical rehabilitation [Zhongguo lin chuang kang fu] 10, 65-67	F<3. Exercise and prescription meds	Demographic of study population	F<3
Maruf, F. A., et al. (2013).	Effects of aerobic exercise and drug therapy on blood pressure and antihypertensive drugs: a randomized controlled trial.	African Health Sciences 13(1): 1-9.	Mean age 50.38±8.4 years	Drug intervention	Drug intervention
Paoli, A., et al. (2013)	Effects of high-intensity circuit training, low-intensity circuit training and endurance training on blood pressure and lipoproteins in middle-aged overweight men.	Lipids in Health & Disease 12: 131.	Mean age 61 + 3.3 yrs, age > 55	Age of Cohort	H Age

Sheridan, S. L., et al. (2013).	A randomized trial of a web-based versus counsellor based intervention to reduce CHD risk.	Journal of General Internal Medicine Conference: 36th Annual Meeting of the Society of General Internal Medicine, SGIM 2013 Denver, CO United States. Conference Publication: (var.pagings). 28: S13.	Mean age 62 SE 0.4	Included drug intervention	Drug intervention
Stuckey, M. I., et al. (2013).	Does a prescriptive exercise program with mobile health tracking improve cardio-metabolic risk factors to a greater extent than exercise prescription alone?	Circulation. Conference: American Heart Association 128(22 SUPPL. 1).	Mean age 57.4 (9.1), no age restriction	Age of Cohort	H Age
Tiessen, A. H., et al. (2013).	Which patient and treatment factors are related to successful cardiovascular risk score reduction in general practice? Results from a randomized controlled trial.	BMC Family Practice 14: 123	Age 50 to 75	Age of Cohort	H Age
Wingo, B. C., et al. (2013).	Self-efficacy as a predictor of weight change and behavior change in the PREMIER trial.	Journal of Nutrition Education & Behavior 45(4): 314-321.	Mean age of 50 ± 8.9 years, Premier study population	Secondary Analysis	Secondary analysis
Wolff, M., et al. (2013).	Impact of yoga on blood pressure and quality of life in patients with hypertension - a controlled trial in primary care, matched for systolic blood pressure	BMC Cardiovascular Disorders 13.	Not an RCT, mean age 66.2 (7.7) 64.0 (10.3) 60.8 (11.0), age range 20 to 80	Demographic of study population	NRCT

Ziv, A., et al. (2013).	Comprehensive Approach to Lower Blood Pressure (CALM-BP): A randomized controlled trial of a multifactorial lifestyle intervention.	Journal of Human Hypertension 27(10): 594-600.	Mean age was 57±9 years, 22 to 75	Age of Cohort	H Age
Scala, D., et al. (2013).	Telephone counselling for hypertensive patients: Does it improve patient adherence?	Value in Health Conference: ISPOR 18th Annual International Meeting New Orleans, LA United States. Conference Publication:(var.pagings). 16 (3): A290-A291.	Primary aim to promote adherence to medication	Evaluatin of compliance with medication.	NEI
Scala, D., et al. (2013).	Telephone counselling for hypertensive patients: Does it work?	International Journal of Clinical Pharmacy Conference: 41st ESCP Symposium on Clinical Pharmacy: Personalised and Safe Therapy Barcelona Spain. Conference Publication:(var.pagings). 35 (5 SUPPL. 2): 867.	Replication above	Evaluatin of compliance with medication.	NEI
Collins et al	Efficacy of Standard Versus Enhanced Features in a Web-Based Commerical Weight-Loss Program fir Obese Adults, Part 2: RCT	J Med Internet Res 2013;15(7):e140 DOI: 10.2196/jmir.2626	Primary outcome weight loss. Lacks a true control	No true RCT	NRCT

ONLINE SUPPLEMENT

Carr, L. J., et al. (2013).	Multicomponent intervention to reduce daily sedentary time: a randomized controlled trial.	BMJ Open 3(10): e003261.	BP not primary outcome. Mean Age 42 - 47.	Waitlist control. Lacks true control.	NRCT
Landry, A. S., et al. (2013).	African American community members sustain favorable blood pressure outcomes through 12-month telephone motivational interviewing (MI) maintenance.	FASEB Journal. Conference: Experimental Biology 20130420(20130424).	All participants receive same intervention at different intensity	Lacks control	NRCT
Ash, G. I., et al. (2013).	Antihypertensive effects of exercise among those with resistant hypertension.	Hypertension 61(1): e1.	Editorial	Not RCT	Review
Dallam, G. M. and C. P. Foust (2013).	A comparative approach to using the diabetes prevention program to reduce diabetes risk in a worksite setting.	Health Promotion Practice 14(2): 199-204.	Comparative effectiveness of different intervention delivery methods	Not RCT	NRCT
Dimeo, F., et al. (2013).	Response to the antihypertensive effects of exercise among those with resistant hypertension.	Hypertension 61(1): e2.	Editorial	Not RCT	Review
Kuo, Y. C., et al. (2013).	Can diet control and exercise intervention ameliorate the sexual function in people with metabolic syndrome? - A prospective controlled study.	Journal of Sexual Medicine. Conference: 14th Biennial Meeting of the Asia Pacific Society for Sexual Medicine Kanazawa Japan. Conference Start 10(pp 210): 210.	Non-randomized, assigned groups.	Not RCT	NRCT

Ribas De Farias Costa, P., et al. (2013).	Influence of nutritional orientation and physical training on glycemia and blood pressure. [Spanish].	Salud(i)Ciencia 20(3): 257-	Quasi-experimental study, before and after assessment with restrospect subgroup analysis. No control.	Not RCT	NRCT
Buhse, S., et al. (2013).	An evidence-based shared decision making programme on the prevention of myocardial infarction in type 2 diabetes: protocol of a randomized-controlled trial	BMC Family Practice 14: 155.	Protocol	Protocol	Protocol
Cohen, D. L., et al. (2013).	Lifestyle Modification in Blood Pressure Study II (LIMBS): study protocol of a randomized controlled trial assessing the efficacy of a 24 week structured yoga program versus lifestyle modification on blood pressure reduction.	Contemporary Clinical Trials 36(1): 32-40.	Protocol	Protocol	Protocol
Crowley, M. J., et al. (2013).	Tailored Case Management for Diabetes and Hypertension (TEACH-DM) in a community population: study design and baseline sample characteristics.	Contemporary Clinical Trials 36(1): 298-306.	Protocol	Protocol	Protocol

Droste, D. W., et al. (2013).	ICT-supported CVD prevention through phone-based automated lifestyle coaching.	Journal of the Neurological Sciences Conference: 21st World Congress of Neurology Vienna Austria. Conference Publication: (var.pagings). 333: e257.	Description of an online service	Protocol	NRCT
Ebell, M. H. (2013)	Intensive lifestyle intervention fails to improve patient-oriented outcomes in persons with obesity and diabetes.	American Family Physician 88, 864a	Mean age 59 range 45-75	Age of Cohort	D2, age
Glynn, L. G., et al. (2013).	SMART MOVE - a smartphone-based intervention to promote physical activity in primary care: study protocol for a randomized controlled trial.	Trials [Electronic Resource] 14: 157.	Protocol	Protocol	Protocol
Hesselink, A. E., et al. (2013).	A cluster-randomized controlled trial to study the effectiveness of a protocol-based lifestyle program to prevent type 2 diabetes in people with impaired fasting glucose.	BMC Family Practice 14: 184.	Protocol	Protocol	Protocol
Kandula, N. R., et al. (2013)	The South Asian Heart Lifestyle Intervention (SAHELI) study to improve cardiovascular risk factors in a community setting	Contemporary Clinical Trials 36, 479-487 DOI: 10.1016/j.cct.2013.09.007	Protocol	Protocol	Protocol

Claes N 2013	Comparing the effectiveness of two cardiovascular prevention programmes for highly educated professionals in general practice: a randomized clinical trial.	BMC Cardiovascular Disorders2013 13:38 DOI: 10.1186/1471-2261-13-38	Selected population with no control. Intervention is heterogeneous . Unable to establish dose of intervention	Not RCT	NRCT
Berezina, A., et al. (2013).	Relationship between adiponectin level and metabolic syndrome after weight loss in patients with abdominal obesity.	Circulation. Conference: American Heart Association's Epidemiology and Prevention/Physical Activity, Nutrition and Metabolism 127	Mean age 43,2±0,8 yrs, lacks control	Demographic of study population	NRCT
Ritzwoller, D. P., et al. (2013).	Economic analyses of the be fit be well program: A weight loss program for community health centers.	Journal of General Internal Medicine 28(12): 1581-1588.	Mean age 54.4 sd 11	Age of Cohort	PL Age
Sigal, R. J., et al. (2013).	Effects of aerobic exercise, resistance exercise or both on % body fat in overweight adolescents: The HEARTY trial.	Diabetes Conference: 73rd Scientific Sessions of the American Diabetes Association Chicago, IL United States. Conference Publication: (var.pagings). 62: A185.	Mean age 15.4 Sd 1.4	Age of Cohort	PP

Sigal, R. J., et al. (2013).	Effects of aerobic exercise, resistance exercise or both on percent body fat in overweight adolescents: the hearty trial.	Canadian Journal of Diabetes Conference: 16th Annual Canadian Diabetes Association/ Canadian Society of Endocrinology and Metabolism Professional Conference Montreal, QC Canada. Conference Publication: (var.pagings). 37: S9-S10	Mean age 15.4 Sd 1.4	Age of Cohort	PP
Gibbs, B. B. and J. M. Jakicic (2013).	Use of AHA ideal cardiovascular health vs. The framingham risk score to measure the effect of a 24-month lifestyle intervention in overweight and obese women.	Circulation. Conference: American Heart Association's Epidemiology and Prevention/Physical Activity, Nutrition and Metabolism 127	Secondary analysis of 2003 JAMA publication. Primary objective weight loss.	Secondary analysis	Secondary analysis
Llaberia, M. R. P., et al. (2013).	Pas a pas program: A community randomized intervention study of physical activity.	Annals of Nutrition and Metabolism Conference: Mediterranean Foods on Health and Disease - World Forum for Nutrition Research Conference 2013 Reus Spain. Conference Publication: (var.pagings). 62: 71.	Participants over 40 years old. Below 40 excluded	Age of Cohort	Young adults excluded. Age

Kearney, T. M., et al. (2014).	Accumulated brisk walking reduces arterial stiffness in overweight adults: evidence from a randomized control trial.	Journal of the American Society of Hypertension 8(2): 117-126.	Mean age 45 ± 6.2. BP not primary outcome. Attrition 32% intention to treat analysis	Mean age 45 ± 6.2. Attrition 32%	Attrition
Chen, P., et al. (2014).	A smart web aid for preventing diabetes in rural china: preliminary findings and lessons.	Journal of Medical Internet Research 16(4): e98.	Participants exclusive 40 and older, BP not primary	Age of Cohort	D1 Age
Shek, N. W. M., et al. (2014).	Lifestyle modifications in the development of diabetes mellitus and metabolic syndrome in Chinese women who had gestational diabetes mellitus: a randomized interventional trial.	Archives of Gynecology & Obstetrics 289(2): 319-327.	Gestational diabetes population and diabetes prevention. BP not primary outcome. Powered for incidence of Diabetes. Attrition 35%. Intention to treat. BP presented as figures and sd not presented. Mean age 39 sd 4.6	Gestational diabetes population and diabetes prevention. BP not primary outcome. Powered for incidence of Diabetes. Attrition 35%. Intention to treat. BP presented as figures and sd not presented. Mean age 39 sd 4.6	D1 Attrition > 20%. BP not primary.
Youngwanichsetha, S., et al. (2014)	The effects of tai chi qigong exercise on plasma glucose levels and health status of postpartum Thai women with type 2 diabetes.	Focus on Alternative and Complementary Therapies 18, 182-187 DOI: 10.1111/fct.12064	Diabetic population. BP not primary outcome. Mean age 35.00 (5.63). Study published 2013	Diabetic population. BP not primary outcome. Mean age 35.00 (5.63). Study published 2013	D2, Pregnancy/ Postpartum
Reaney, M., et al. (2014)	Impact of conversation map education tools versus regular care on diabetes-related knowledge of people with type 2 diabetes: A randomized, controlled study.	Diabetes Spectrum 26, 236-245 DOI: http://dx.doi.org/10.2337/diaspect.26.4.236	Mean age 62.9 SD 9.59	Age of Cohort	D2 Age

Stewart, K. J., et al. (2014)	Exercise Training Fails to Reduce Blood Pressure in Type 2 Diabetes: A Randomized Controlled Trial [abstract]. Circulation 124, A12827	Circulation 124, A12827	Mean age (SD) 56.4±6.1 years	Age of Cohort	D2 Age
Khan, Z. A., et al. (2014).	Effect of lifestyle physical activity on arterial compliance	Journal of the American College of Cardiology Conference: 63rd Annual Scientific Session of the American College of Cardiology Washington, DC United States. Conference Publication:(var.pagings). 63 (12 SUPPL. 1): A1364.	Follow-up only 8 weeks. Mean age 39±6, BP not primary outcome	Follow-up only 8 weeks. Mean age 39±6, BP not primary outcome	F<3
Lee, E. N. (2014)	The effects of tai chi exercise program on blood pressure, total cholesterol and cortisol level in patients with essential hypertension. Taehan Kanho Hakhoe chi 34, 829-837	Taehan Kanho Hakhoe chi 34, 829-837	Follow-up 6 weeks. Reference to 2004 publication	Follow-up less than 3 months	F<3

Brekke, H. K., et al. (2014).	Diet and exercise interventions among overweight and obese lactating women: randomized trial of effects on cardiovascular risk factors	PLoS ONE [Electronic Resource] 9(2): e88250.	Feasibility study. No power calculation for BP or secondary measures. Weight loss primary outcome. Mean age 34 sd (4). BP not primary outcome. 17% attrition	Feasibility study. No power calculation for BP or secondary measures. Weight loss primary outcome. Mean age 34 sd (4). BP not primary outcome. 17% attrition	Pregnancy/ Postpartum
Dorough, A. E., et al. (2014).	DASH to wellness: Emphasizing self-regulation through E-health in adults with prehypertension	Health Psychology 33(3): 249-254.	Abstract. Mean Age 54.3, no age restriction	Age of Cohort	H Age
Green, B. B., et al. (2014).	E-care for heart wellness: A feasibility trial to decrease blood pressure and cardiovascular risk.	American Journal of Preventive Medicine 46(4): 368-377.	Mean Age over 55 SD 7, age 30 to 69	Age of Cohort	H Age
Guimaraes, G. V., et al. (2014).	Heated water-based exercise training reduces 24-hour ambulatory blood pressure levels in resistant hypertensive patients: a randomized controlled trial (HEx trial).	International Journal of Cardiology 172(2): 434-441.	Mean age 53.7 ± 6.0, age 40 to 65	Age of Cohort	H Age
Hagins, M., et al. (2014).	A randomized controlled trial comparing the effects of yoga with an active control on ambulatory blood pressure in individuals with prehypertension and stage 1 hypertension.	Journal of Clinical Hypertension 16(1): 54-62.	Mean age intervention 56 SD 9.78, age 21 to 70	Age of Cohort	H Age

Hinderliter, A. L., et al. (2014).	The long-term effects of lifestyle change on blood pressure: One-year follow-up of the ENCORE study.	American Journal of Hypertension 27(5): 734-741.	Mean Age 52 SD 10, age > 35	Age of Cohort	H Age
Niiranen, T. J., et al. (2014).	Lack of impact of a comprehensive intervention on hypertension in the primary care setting.	Journal of Hypertension 27(3): 489-496.	Mean age 62.9 SD 8, age 35 to 74	Age of Cohort	H Age
Beasley, J., et al. (2014).	Associations between change in DASH diet scores and CVD risk factors in the PREMIER Trial.	FASEB Journal. Conference: Experimental Biology 28(1 SUPPL. 1).	Premier Study secondary analysis	Premier secondary analysis	Secondary Analysis
Stuart, K. L., et al. (2014).	A telephone-supported cardiovascular lifestyle programme (CLIP) for lipid reduction and weight loss in general practice patients: a randomized controlled pilot trial.	A telephone-supported cardiovascular lifestyle programme (CLIP) for lipid reduction and weight loss in general practice patients: a randomized controlled pilot trial.	Mean aged 48·0 (sd 5·88), age range 35–56	Age H, pilot study, not powered. No primary objective.	H Age
Croymans, D. M., et al. (2014).	Effects of resistance training on central blood pressure in obese young men.	Effects of resistance training on central blood pressure in obese young men.	Pilot study Non-parametric data presented. Authors contacted and did not provide information	Pilot study Non-parametric data presented. Authors contacted and did not provide information	Non-parametric data

Limas, N., et al. (2014).	The effect of sleep counseling in women wanting to lose weight: A pilot study.	Journal of Investigative Medicine Conference: American Federation for Medical Research, New Orleans, LA United States. Conference Publication:(var.pagings). 62 (2): 573.	Pilot study sleep intervention.	Sleep intervention. BP not primary outcome.	NEI
Lin, P. H., et al. (2014)	The influence of a physician and patient intervention program on dietary intake.	Journal of the Academy of Nutrition and Dietetics 113, 1465-1475 DOI: 10.1016/j.jand.2013.06.343	Mean Age 60. SD 11	Demographic of study population	NEI
Lambert, B. S., et al. (2014).	Aquatic treadmill training reduces blood pressure reactivity to physical stress.	Medicine & Science in Sports & Exercise 46(4): 809-816.	Health volunteers, sedentary, no risk factors	Demographic of study population	PL
Carrasquillo, O., et al. (2014).	Rationale and design of the Miami Healthy Heart Initiative: a randomized controlled study of a community health worker intervention among Latino patients with poorly controlled diabetes.	International journal of general medicine 7: 115-126.	Protocol	Protocol	Protocol

Jakicic, J. M. (2015)	Short-Term Weight Loss with Diet and Physical Activity in Young Adults: The IDEA Study	Obesity	Primary Outcome Weight Loss. Mean age is young. 30 years. All study participants receive a 6 month exercise and weight loss intervention. Then are randomized to different follow-up. Lacks true contol	NRCT	NRCT
Rautio, Nina (2015)	Changes in lifestyle modestly reduce the estimated cardiovascular disease risk in one-year follow-up of the Finnish diabetes prevention program	European Journal of Cardiovascular Nursing	Mean age 56.0 (9.8), cohort including ischaemic heart disease patients.	Age	C2 Age
Perez-Idarraga, Alexandra (2015)	Intervention with rumba and nutrition education to modify cardiovascular risk factors in adults with metabolic syndrome	Pan American Journal of Public Health	Mean age 49.2 (8.7) and 52.0 (6.8)	Age	D1 Age
Pedley, C. F. (2015)	Healthy living partnerships to prevent diabetes (help PD): A randomized controlled trialto prevent diabetes through diet and exercise: 2 year effects on the metabolic syndrome	Conference Abstract. Previously published	Primary Outcome not BP. Mean age 57.3±10.1 58.5±9.0 57.9±9.5	Age	D1 Age

Gomez-Huelgas, R. (2015)	Effects of a long-term lifestyle intervention program with Mediterranean diet and exercise for the management of patients with metabolic syndrome in a primary care setting	European Journal of Internal Medicine	Mean age 54.0 ± 14. Primary outcome change incidence of Metabolic Syndrome	Age	D1 Age
Eakin, Elizabeth G. (2014)	Living well with diabetes: 24-month outcomes from a randomized trial of telephone-delivered weight loss and physical activity intervention to improve glycemic control	Diabetes Care	Age 58.0 (8.6)	Age	D2 Age
Edelman, David (2015)	Nurse-led behavioral management of diabetes and hypertension in community practices: a randomized trial	Journal of General Internal Medicine	Mean age 58.7 (10.9). Participants Type 2 diabetes and hypertension	Age	D2 Age
Thompson, Dylan (2014)	Effect of diet or diet plus physical activity versus usual care on inflammatory markers in patients with newly diagnosed type 2 diabetes: the Early ACTivity in Diabetes (ACTID) randomized, controlled trial	Journal of the American Heart Association	Mean age: 60 (10) 60 (10)	Age	D2 age

Maindal, H. T. (2014)	Effect of a participant-driven health education programme in primary care for people with hyperglycaemia detected by screening: 3-year results from the Ready to Act randomized controlled trial (nested within the ADDITION-Denmark study)	Diabetic medicine	Mean age 62.	Age	D2 Age
Johnston, C. A. (2014)	Cardiovascular Effects of Intensive Lifestyle Intervention in Type 2 Diabetes	Current Atherosclerosis Reports	Secondary analysis of paper presented in 2009. Diabetic cohort. Mean age 58.7±6.8 years	Age	D2 Age
Hollekim-Strand, S. M. (2014)	High-intensity interval exercise effectively improves cardiac function in patients with type 2 diabetes mellitus and diastolic dysfunction: A randomized controlled trial	Journal of the American College of Cardiology	Mean age 55.9 ± 6.0 years	Age	D2 Age
Cox, D. (2014)	Randomized clinical trial of an innovative lifestyle realignment program for the treatment of adults recently diagnosed with type 2 diabetes (T2D)	Diabetes. vol. 63. 2014	Diabetic Glycaemic control study.	Age	D2 Age

Roos, R. (2014)	Effects of an Education and Home-Based Pedometer Walking Program on Ischemic Heart Disease Risk Factors in People Infected with HIV: A Randomized Trial	Journal of Acquired Immune Deficiency Syndromes	Population demographic - HIV population	Established chronic disease ECD	ECD
Franklin, Nina C. (2015)	Circuit resistance training attenuates acute exertion-induced reductions in arterial function but not inflammation in obese women	Metabolic Syndrome & Related Disorders	Intervention/follow-up less than 9 week.	F<3	F<3
Paula, T. P. (2014)	Dash diet and walking reduced ambulatory blood pressure values in patients with type 2 diabetes and uncontrolled hypertension	Diabetes	4 week intervention	F<3	F<3
Koniak-Griffin, Deborah (2015)	A community health worker-led lifestyle behavior intervention for Latina (Hispanic) women: feasibility and outcomes of a randomized controlled trial	International Journal of Nursing Studies	Feasibility study. BP not included as primary outcome and study actively excluded participants below 35 years old with 23 participants excluded because they were below 35.	Age	H Age
Tolbanos Roche, L (2015)	Application of an integrative yoga therapy programme in cases of essential arterial hypertension in public healthcare	Complementary therapies in clinical practice	Feasibility study and participants all 40 to 71	Age	H Age
Dedier, J. J (2015)	Randomized controlled trial of a culturally adapted,	Journal of General Internal	Mean age was 58 years. No age restriction	Age	H Age

	automated telephone exercise coach to improve physical activityamong hypertensive African-Americans.	Medicine. vol. 29. 233			
Arca, E. A. (2015)	Aquatic exercise is as effective as dry land training to blood pressure reduction in postmenopausal hypertensive women	Physiotherapy research international	Mean age 64 ± 7.0 years. Post-menopausal	Age	H Age
Hasandokht, Tolou (2014)	Lifestyle interventions for hypertension treatment among Iranian women in primary health-care settings: Results of a randomized controlled trial	Journal of Research in Medical Sciences	Mean age was 55 ± 4.8 years for the intervention and 54 ± 4.9 for the control group, age 35 to 65	Age	H Age
Friedberg, J. P. (2014)	Effectiveness of a tailored behavioral intervention to improve hypertension control: Primary outcomes of a randomized controlled trial	Hypertension	Mean age 66.4 (0.66) 66.5 (0.96) 65.4 (0.76, recruitinmg older adults	Age	H Age
Pagonas, N. (2014)	The impact of aerobic exercise on blood pressure variability	Journal of Human Hypertension	Mean age 66, no age restriction	Age	H Age
Mohr, Magni (2014)	High-intensity intermittent swimming improves cardiovascular health status for women with mild hypertension	BioMed Research International	Mean age 44 SD 2, NRCT - participants were recruited for 2 studies and selective allocation occurred	Age	H Age
Mohr, M. (2014)	Football training improves cardiovascular health profile in	Scandinavian Journal of Medicine &	Mean age 44 SD 2, NRCT - participants were recruited	Age	H Age

	sedentary, premenopausal hypertensive women	Science in Sports	for 2 studies and selective allocation occurred		
Ma, Chunhua (2014)	Evaluation of the effect of motivational interviewing counselling on hypertension care	Patient Education & Counseling	Mean age 59.17 ± 11.42, age > 18	Age	H Age
Luley, C. (2014)	Weight Loss by Telemonitoring of Nutrition and Physical Activity in Patients with Metabolic Syndrome for 1 Year	Journal of the American College of Nutrition	Mean age 50.3 ± 7.8 50.3 ± 8.0 50.1 ± 8.1, participants under 30 excluded	Age	H Age
Lais Cruz, L. G. B. (2014)	Physical capacity and resistant hypertension: A sub analysis of the heated water based exercise training trial (HEX trial)	International Journal of Cardiology	Mean age 53.7 ± 6.0 55.0 ± 5.9 52.4 ± 5.9	Secondary analysis Age	Secondary analysis Age
Lai, J. Y. (2014)	Influence of health education by nurses on effects of blood pressure control in hypertensive patients: A clinical controlled trial	Chinese Journal of Evidence-Based Medicine	Mean age 66.5±7.1 67.7±8.0 , no age restrictions	Age	H Age
Kulzer, B. (2014)	Primary prevention of type 2 diabetes by lifestyle modification. Results of the PRAEDIAS prevention program. [German]	Diabetologe	Mean 56.3 ± 10.1 years Secondary analysis	Age	D1 Age
Kranjcevic, K. (2014)	Is a targeted and planned GP intervention effective in cardiovascular disease prevention? A randomized controlled trial	Medical Science Monitor	Participants aged 40 -69. Median 50-59. Cluster randomized design	Age	H Age

Dodani, S. (2015)	Heals hypertension control program for stroke prevention in african american communities	Conference: American Heart Association/American Stroke Association	Process evaluation of faith based health promotion, no study population details.	NRCT	NRCT
Salazar, M. R. (2014)	Blood pressure response to a community-based program and long-term cardiovascular outcome	American Journal of Hypertension	Population level intervention. No direction intervention on individual participants	NRCT	NRCT
Safari, M. (2014)	The effect of physical exercise and healthy diet on reducing the risk factors ofcardiovascular diseases in diabetic patients; a community based participatory research	European Heart Journal	Not and RCT. Cross-section screening with single arm intervention	NRCT	NRCT
Ramkumar, T. (2014)	Addition of yoga therapy to standard lifestyle modification improve cardiovascular autonomic function and metabolic derangement in prehypertensive subjects: A randomized controlled study	European Journal of Preventive Cardiology	No true control	NRCT	NRCT
Pal, R. (2014)	Age-related changes in cardiovascular system, autonomic functions, and levels of BDNF of healthy active males: role of yogic practice	Age (Dordrecht, Netherlands)	Cohort study. Not RCT	NRCT	NRCT

Kozey Keadle, Sarah (2014)	The independent and combined effects of exercise training and reducing sedentary behavior on cardiometabolic risk factors	Applied Physiology, Nutrition, & Metabolism	Pilot. Non-randomized study. Control entered study after control period.	NRCT	NRCT
Karalliedde, J. (2014)	Intensive lifestyle modification reduces cardiometabolic events in young South Asians: Diabrisk-Sri Lanka trial	Diabetes	Lacked true control. Tested delivering intervention at different intensities	NRCT	NRCT
Zhang, G. (2014)	Comparing a dvd to a face-to-face delivered worksite lifestyle intervention	Diabetes	Not an RCT design. Comparing DVT verse Face to Face intervention. Occupational cohort.	NRCT	NRCT
Hanley, C. (2014)	Is change in ectopic fat following a weight loss intervention associated with change in vascular stiffness in young men and women?	Circulation	Conference abstract. Secondary analysis of SAVE study presented 2012. Vascular stiffness primary outcome. Mean age 38.	NRCT	NRCT
Donley, David A. (2014)	Aerobic exercise training reduces arterial stiffness in metabolic syndrome	Journal of Applied Physiology	Not RCT.	NRCT	NRCT
Dodani, S. (2014)	Heals lifestyle intervention through african american churches to control hypertension	Conference Abstract. Circulation	No randomized intervention. Feasibility study	NRCT	NRCT

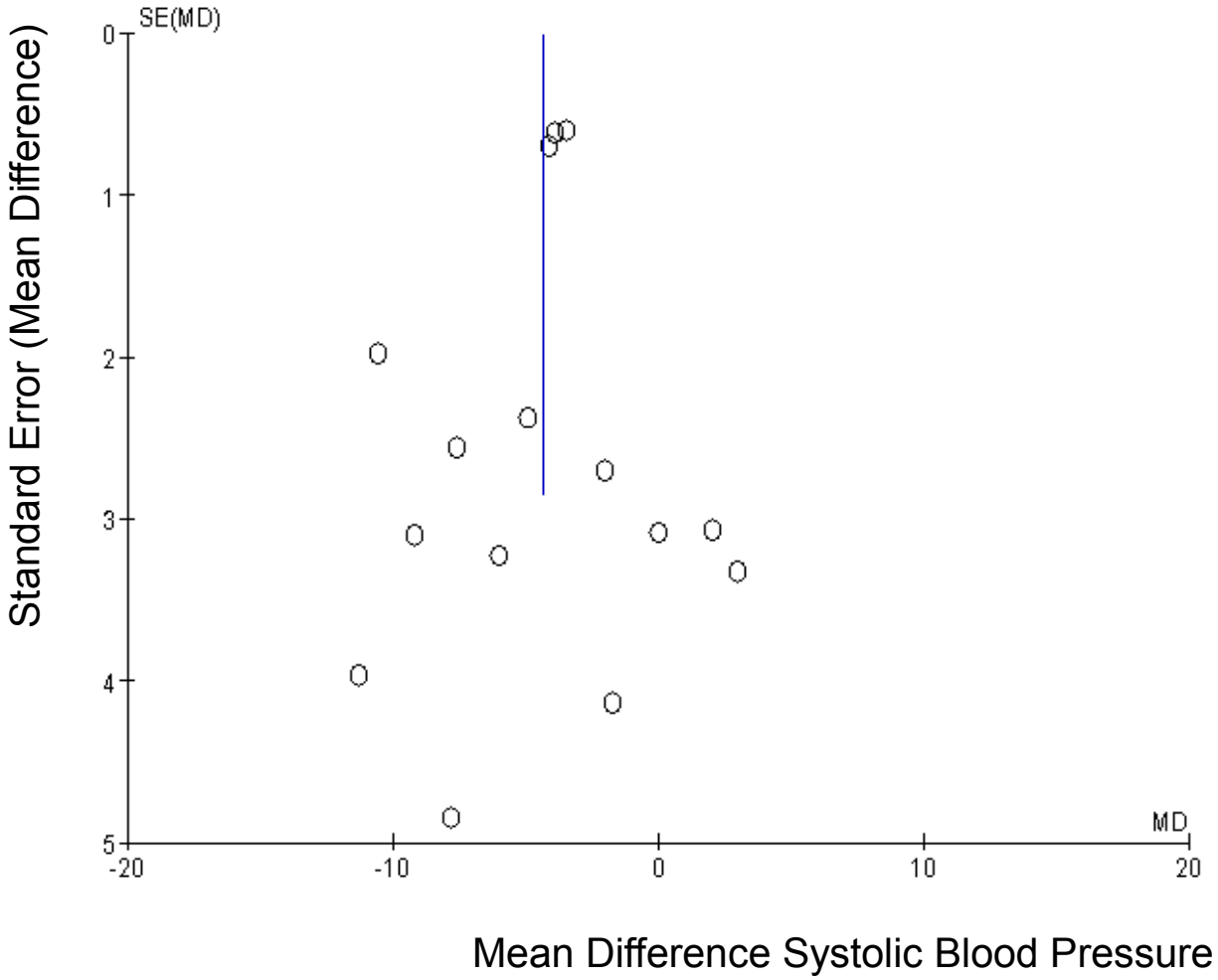
Cohen, D. L. (2014)	Results of the limbs study: Yoga, alone or in combination with other lifestyle measures reduces BP in untreated prehypertension and stage 1 hypertension	Circulation	Comparative effectiveness trial. Lacks true control	NRCT	NRCT
Beck, D. T. (2014)	Exercise training improves endothelial function in resistance arteries of young prehypertensives	Journal of Human Hypertension	Not RCT. Follow-up less than 3 months.	NRCT	NRCT
Santos Rosa, M. (2014)	Effect of lifestyle modification on autonomic nervous system and endothelial dysfunction in obese hypertensive patients	Journal of Clinical Hypertension	Not RCT.	NRCT	NRCT
Cohen Debbie, L. (2014)	Preliminary results of the limbs study: Assessing effects of yoga on blood pressure reduction	Journal of Clinical Hypertension	Comparative effectiveness. Lacks true control	NRCT	NRCT
Foraker, Randi E. (2014)	Effect of a Low-Fat or Low-Carbohydrate Weight-Loss Diet on Markers of Cardiovascular Risk Among Premenopausal Women: A Randomized Trial	Journal of Women's Health	Dietary intervention no physical activity control.	NRCT	NRCT

Hageman, P. A. (2014)	Effectiveness of tailored lifestyle interventions, using web-based and print-mail, for reducing blood pressure among rural women with prehypertension: Main results of the Wellness for Women: DASHing towards Health clinical trial		Comparative effectiveness trial. Participants under 40 excluded.	NRCT Age	NRCT Age
Mainsbridge, C. P. (2014)	The Effect of an e-Health Intervention Designed to Reduce Prolonged Occupational Sitting on Mean Arterial Pressure	Journal of Occupational and Environmental Medicine	Health participants, sedentary intervention reducing sitting time.	PL	PL
Hur, Sun (2014)	The Effects of Exercise Therapy on CVD Risk Factors in Women	Journal of Physical Therapy Science	Participant demographic and age. Study investigated personality type D (no defined risk) and response to intervention. 47.8±1.8, 47.6 (2.5), 46.6 (2.4), 46.7 (1.9)	Age	H Age
Frappier, A. (2015)	Effects of aerobic training, resistance training or both in obese adolescents with the metabolic syndrome: The hearty randomized controlled trial	Abstract/Dissertation	Mean age 15.6 ± 1.4 years	Age	Age
Cesa, Claudia Ciceri (2015)	Effectiveness of physical exercise to reduce cardiovascular risk factors in youths: a randomized clinical trial	Journal of Clinical Medicine Research	Mean age 12.3 ± 2.5 12.7 ± 3.1	Age	Age

Carpenter, K. (2015)	Effect of sit-stand workstations on metabolic risk in sedentary workers: A randomized controlled trial	FASEB Journal. Conference: Experimental Biology	Trial results not published	Protocol	Protocol
Sjogaard, G. (2015)	Intelligent physical exercise training intervention at the workplace for health promotion among office workers: A randomized controlled trial	Journal of Science and Medicine in Sport	Protocol	Protocol	Protocol
Barrett-Connor, E. (2015)	Looking back at looking ahead	8th International Conference on Advanced Technologies and Treatments for Diabetes	Secondary analysis. Original study mean age 58.6 ± 6.8 58.9 ± 6.9	Secondary analysis Age	Secondary analysis Age

Coding Key for grouping Excluded Studies
D2 = Diabetes secondary prevention
D1 = Diabetes primary prevention
PL = primary prevention low risk
NRCT = non-rct/study design/limited or no control
H Age = Hypertension Study, Age of Cohort
C2 = cardiopulmonary disease secondary prevention
F<3 = Follow-up less than 3 months
PP = Paediatric Population
NEI = No exercise intervention
Attrition
BPN = Blood pressure not reported
ECD = Established chronic disease (other)
SA = Secondary Analysis

Figure S1: Funnel plot of intervention effects on systolic blood pressure exploring publication bias within reported trial intervention arms at 3 to 6 months follow-up.

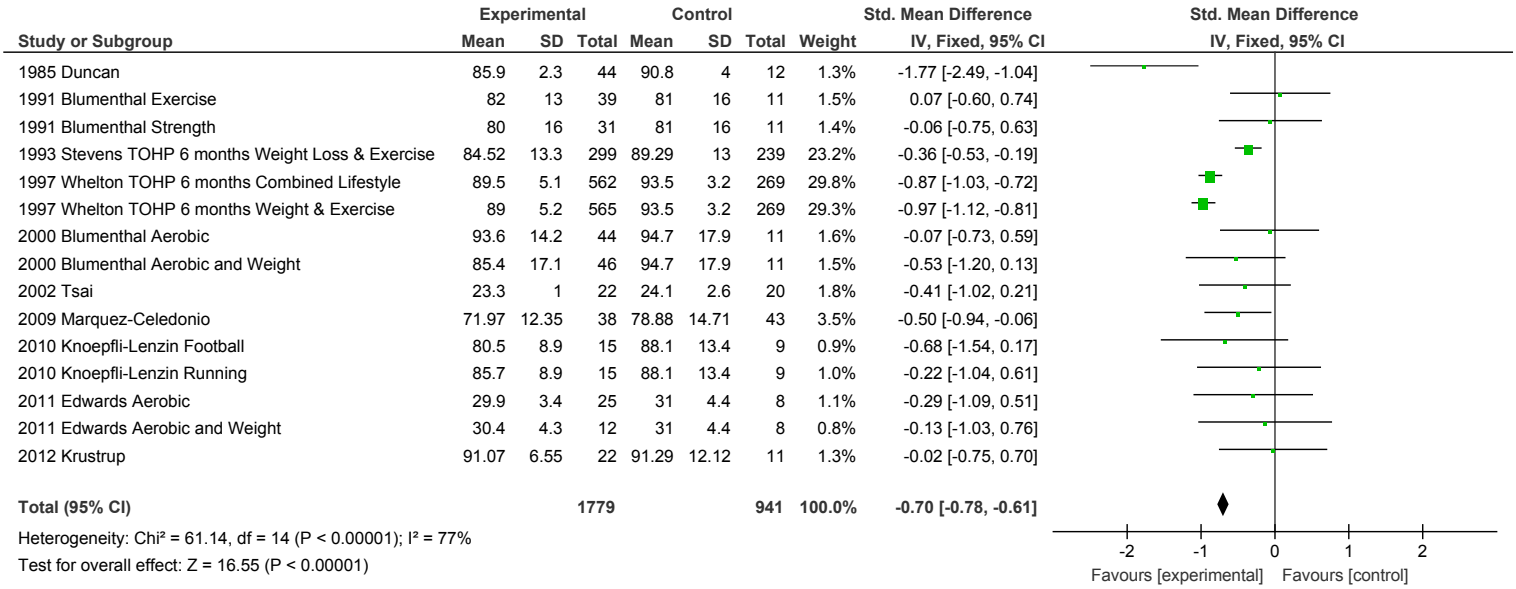


ONLINE SUPPLEMENT

Figure S2: Risk of Bias and Quality Assessment of Included Trials

Study	Allocation Sequence Generation	Allocation Concealment	Incomplete Outcome Data	Selective Outcome Reporting	Comparable Groups at Base-Line	Contamination Between Groups	Outcome Measures Applied appropriately	Outcome Measures Repeated for regression to the mean	Final Analysis Adjusted for Baseline Blood Pressure	Outcome assessment independent and Blinded	Intention To Treat	Overall Risk of Bias
Duncan 1985	Unclear	Unclear	Low	Low	Low	Unclear	Low	HIgh	Low	Unclear	Unclear	Medium
Stamler 1989	Computer assisted	Unclear	Low	Low	Low	Unclear	Low	Low	Low	Low	Low	Low
Blumenthal 1991	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low	Unclear	Unclear	Medium
Stevens 1993 TOHP Phase 1	Low	Low	Low	Medium – PA self-report not disclosed	Medium- Gender difference	Low	Low	Low	Low	Low	Low	Low
Whelton 1997 TOHP Phase 2	Low	Low	Low	Medium – PA self-report not disclosed	Low	Low	Low	Low	Low	Low	Low	Low
Blumenthal 2000	Unclear	Unclear	Low	Low	Medium	Low	Low	Low	Low	Unclear	Low	Low
Tsai 2002	Unclear	Unclear	High	HIgh	Low	Low	Low	High	Low	Unclear	High	High
Esposito 2003	Low	Low	Low	Low	Low	Low	Unclear	Unclear	Unclear	Low	Low	Low
Olson 2006	Low	Unclear	Low	Low	Low	Low	Low	Low	Low	Unclear	Unclear	Low
Kinmonth 2008	Low	Low	Low	Low	Low	Low	Low	Unclear	Low	Low	Low	Low
Marquez Celedonio 2009	Unclear	Unclear	High	Low	Low	Low	Unclear	Unclear	Unclear	Unclear	High	High
Knoepfli-Lenzin 2010	Unclear	Unclear	High	Low	Low	Low	Unclear	Unclear	Unclear	Unclear	High	High
Edwards 2011	Low	Low	Low	Low	Low	Low	Low	High	Low	Unclear	Low	Low
Krustrup 2012	Low	Low	Low	Low	Low	High	Low	Low	Low	Unclear	Low	Low

Figure S3a: Standard mean difference intervention effects on weight loss between control and exercise group at 3 to 6 months follow-up.



Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
1985 Duncan	85.9	2.3	44	90.8	4	12	1.3%	-1.77 [-2.49, -1.04]
1991 Blumenthal Exercise	82	13	39	81	16	11	1.5%	0.07 [-0.60, 0.74]
1991 Blumenthal Strength	80	16	31	81	16	11	1.4%	-0.06 [-0.75, 0.63]
1993 Stevens TOHP 6 months Weight Loss & Exercise	84.52	13.3	299	89.29	13	239	23.2%	-0.36 [-0.53, -0.19]
1997 Whelton TOHP 6 months Combined Lifestyle	89.5	5.1	562	93.5	3.2	269	29.8%	-0.87 [-1.03, -0.72]
1997 Whelton TOHP 6 months Weight & Exercise	89	5.2	565	93.5	3.2	269	29.3%	-0.97 [-1.12, -0.81]
2000 Blumenthal Aerobic	93.6	14.2	44	94.7	17.9	11	1.6%	-0.07 [-0.73, 0.59]
2000 Blumenthal Aerobic and Weight	85.4	17.1	46	94.7	17.9	11	1.5%	-0.53 [-1.20, 0.13]
2002 Tsai	23.3	1	22	24.1	2.6	20	1.8%	-0.41 [-1.02, 0.21]
2009 Marquez-Celedonio	71.97	12.35	38	78.88	14.71	43	3.5%	-0.50 [-0.94, -0.06]
2010 Knoepfli-Lenzin Football	80.5	8.9	15	88.1	13.4	9	0.9%	-0.68 [-1.54, 0.17]
2010 Knoepfli-Lenzin Running	85.7	8.9	15	88.1	13.4	9	1.0%	-0.22 [-1.04, 0.61]
2011 Edwards Aerobic	29.9	3.4	25	31	4.4	8	1.1%	-0.29 [-1.09, 0.51]
2011 Edwards Aerobic and Weight	30.4	4.3	12	31	4.4	8	0.8%	-0.13 [-1.03, 0.76]
2012 Krustrup	91.07	6.55	22	91.29	12.12	11	1.3%	-0.02 [-0.75, 0.70]
Total (95% CI)			**1779**			**941**	**100.0%**	**-0.70 [-0.78, -0.61]**

Heterogeneity: Chi² = 61.14, df = 14 (P < 0.00001); I² = 77%

Test for overall effect: Z = 16.55 (P < 0.00001)

Figure S3b. Funnel plot of standard mean difference of weight between intervention and control at 3 to 6 month follow-up exploring weight loss publication bias within reported trial intervention arms.

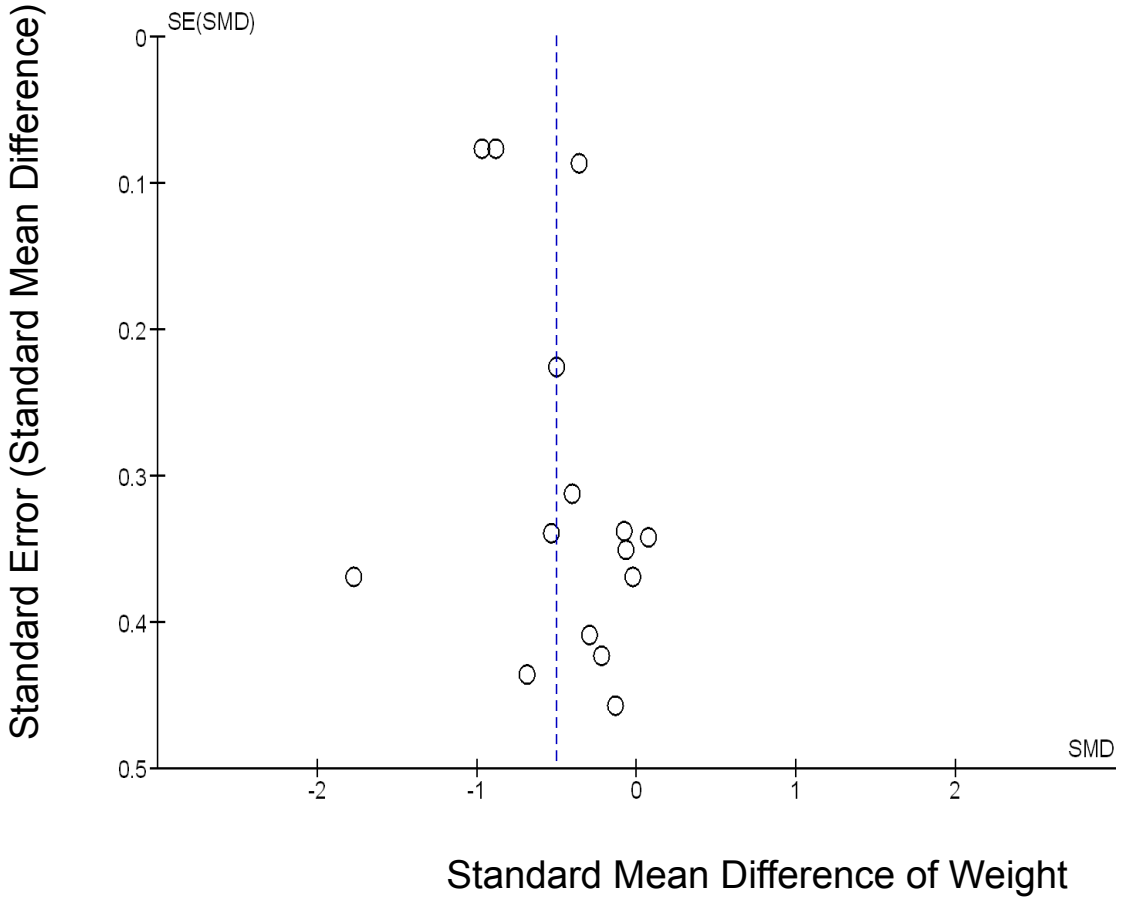


Figure S4a: Forest plot of mean difference in systolic blood pressure between control and exercise group at 3 to 6 months follow-up.

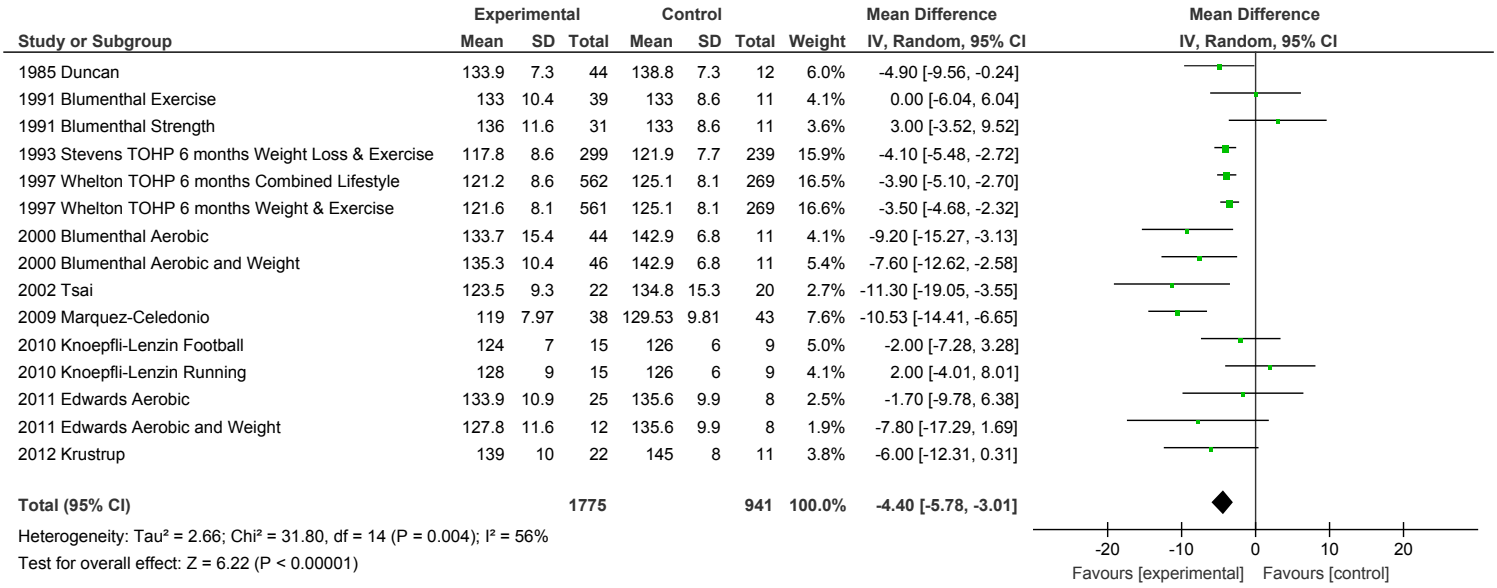
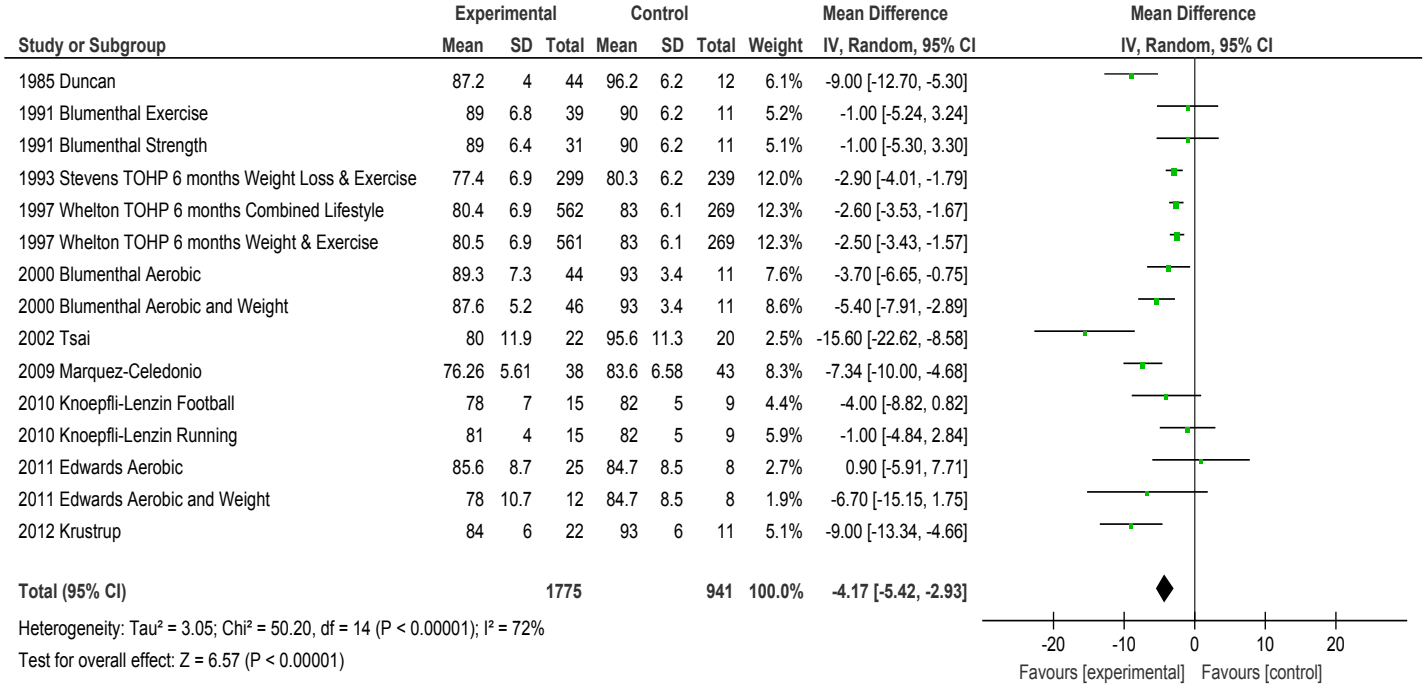


Figure S4b: Forest plot of mean difference in diastolic blood pressure between control and exercise group at 3 to 6 months follow-up.

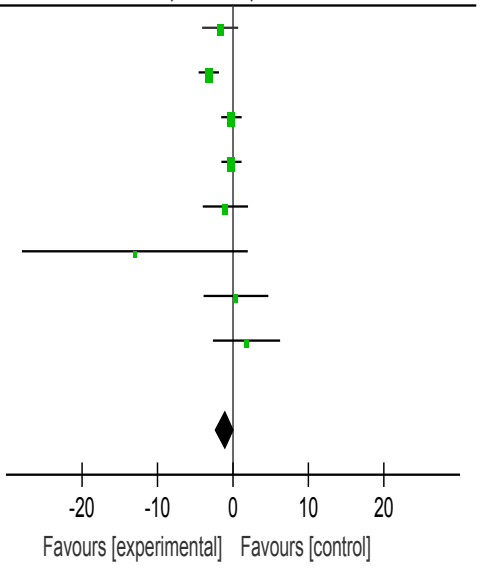


S5a: Forest plot of mean difference in systolic blood pressure between control and exercise group at extended follow-up after 12 months.

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
1989 Stamler	119.8	7.6	102	121.5	8.9	99	14.1%	-1.70 [-3.99, 0.59]
1993 Stevens 18 months Weight Loss & Exercise	118.9	7.01	308	122.1	8	256	20.1%	-3.20 [-4.45, -1.95]
1997 Whelton TOHP 36 months Combined Lifestyle	126.8	9.3	597	127	8.9	298	20.1%	-0.20 [-1.46, 1.06]
1997 Whelton TOPH 36 months Weight Loss & Exercise	126.8	9	595	127	8.9	298	20.1%	-0.20 [-1.44, 1.04]
2003 Esposito	121	8.4	60	122	7.8	60	11.2%	-1.00 [-3.90, 1.90]
2006 Olson	104	27	15	117	11.6	15	0.8%	-13.00 [-27.87, 1.87]
2008 Kinmonth In Person	119.6	12.5	103	119.2	13	55	7.0%	0.40 [-3.80, 4.60]
2008 Kinmonth Telephone	121	14.1	107	119.2	13	55	6.7%	1.80 [-2.55, 6.15]
Total (95% CI)			**1887**			**1136**	**100.0%**	**-1.02 [-2.34, 0.29]**

Heterogeneity: Tau² = 1.84; Chi² = 19.66, df = 7 (P = 0.006); I² = 64%

Test for overall effect: Z = 1.53 (P = 0.13)



S5b: Forest plot of mean difference in diastolic blood pressure between control and exercise group at extended follow-up after 12 months

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
1989 Stamler	81.2	5.2	102	82.5	6.3	99	14.3%	-1.30 [-2.90, 0.30]
1993 Stevens 18 months Weight Loss & Exercise	77.5	5.2	308	80.1	6.4	256	19.4%	-2.60 [-3.58, -1.62]
1997 Whelton TOHP 36 months Combined Lifestyle	83	6.7	597	83.4	7.1	298	19.5%	-0.40 [-1.37, 0.57]
1997 Whelton TOPH 36 months Weight Loss & Exercise	82.7	6.6	595	83.4	7.1	298	19.5%	-0.70 [-1.66, 0.26]
2003 Esposito	82	4.6	60	83.2	4.5	60	14.1%	-1.20 [-2.83, 0.43]
2006 Olson	62	19.4	15	68	7.7	15	0.8%	-6.00 [-16.56, 4.56]
2008 Kinmonth In Person	76.2	9.7	103	75.1	9.6	55	6.5%	1.10 [-2.05, 4.25]
2008 Kinmonth Telephone	77.4	11.4	107	75.1	9.6	55	5.9%	2.30 [-1.03, 5.63]
Total (95% CI)			**1887**			**1136**	**100.0%**	**-0.91 [-1.85, 0.02]**

Heterogeneity: Tau² = 0.92; Chi² = 18.51, df = 7 (P = 0.010); I² = 62%

Test for overall effect: Z = 1.92 (P = 0.06)