

Supplemental Digital Content 1. A Summary of the Primary Literature Original and Updated

Systematic Search Strategy

Original searches run from 1940 to July 21, 2016. Total Citations: 1,666

Updated searches run from July 21, 2016 to February 26, 2020. Total Citations: 240

PubMed

From 1940 to July 21, 2016. Original Total Citations: 1,123. July 21, 2016 to February 26, 2020. Updated Total Citations: 197.

PubMed Search 1 was performed to obtain studies containing exercise, non-diet groups not on antihypertensive medications. PubMed Search 2 was performed to obtain studies containing exercise, non-diet groups on antihypertensive medications.

PubMed Search 1: hypertension/pre-hypertension AND exercise AND clinical trial NOT terms for exclusion with drugs. Original Citations: 417. Updated Citations: 158.

("Hypertension"[Mesh] OR hypertens*[tiab] OR "high blood pressure" OR "high blood pressures" OR "high arterial pressure" OR "high arterial pressures" OR "high systolic pressure" OR "high diastolic pressure" OR "high pulse pressure" OR "high venous pressure" OR "elevated blood pressure" OR "elevated blood pressures" OR "elevated arterial pressure" OR "elevated arterial pressures" OR "antihypertensive" OR "elevated systolic pressure" OR "elevated diastolic pressure" OR "elevated pulse pressure" OR "elevated venous pressure" OR "Prehypertension"[Mesh] OR prehypertens* OR "pre hypertension" OR "pre-hypertension") AND ("exercise"[majr] OR exercise[ti] OR exercises[ti] OR exercising[ti] OR postexercise[ti] OR running[mesh] OR running[ti] OR bicycling[mesh] OR bicycling OR bicycle* OR cycling[ti] OR treadmill* OR ergometer* OR "weight lifting" OR "weight training" OR "resistance training" OR "strength training" OR "endurance training" OR "speed training" OR "circuit training" OR "training duration" OR "training frequency" OR "training intensity" OR "aerobic endurance" OR "aerobic training" OR "interval training" OR "combination training" OR "combined training" OR plyometric* OR "HIIT" OR walking[mesh] OR walking[ti] OR swimming) AND (("clinical"[tiab] AND "trial"[tiab]) OR "clinical trials as topic"[mesh] OR "clinical trial"[pt] OR random*[tiab] OR "random allocation"[mesh] OR "therapeutic use"[sh]) NOT ("pulmonary hypertension" OR "pulmonary arterial hypertension" OR "heart transplant" OR "heart failure" OR "cystic fibrosis" OR "DASH"[tiab] OR cancer OR neoplasms OR fibromyalgia OR alzheimers OR alzheimer OR pregnant OR pregnancy OR "epidemiology"[Subheading] OR "obesity/drug therapy"[mesh] OR pharmacol*[ti] OR drug[ti] OR pharmacist*[ti] OR "diet therapy"[mesh] OR "diet therapy"[subheading] OR "nutritional intervention" OR "dietary intervention" OR "nutritional counseling" OR "dietary counseling" OR caffeine OR "eating change" OR "activities of daily living" OR "dehydration" OR "dehydrate" OR "dehydrated" OR "dietary salt" OR sodium OR epilepsy OR influenza OR flu OR pneumonia OR septicemia OR arthritis OR hiv OR "Acquired

Immunodeficiency Syndrome" OR meningitis OR "substance abuse" OR alcoholism OR "drug abuse" OR review[pt] OR "Cross-Sectional Studies"[MeSH Terms] OR Comment[pt] OR Editorial[pt] OR Letter[pt] OR "Case Reports"[pt] OR "case control"[ti] OR "case report"[ti] OR "case study"[ti] OR "case series"[ti] OR "Case-Control Studies"[Mesh] OR "Follow-Up Studies"[Mesh] OR "observational study"[ti] OR "prospective cohort"[ti] OR "cohort studies" [Mesh:NoExp] OR "cohort study"[ti] OR "Longitudinal Studies" [Mesh:NoExp] OR "Follow-Up Studies"[mesh] OR "Retrospective Studies"[mesh] OR "non-randomized"[ti] OR "follow up study"[ti] OR "animals"[MeSH Terms:noexp] OR rat[ti] OR rats[ti] OR mice[ti] OR mouse[ti] OR dog[ti] OR dogs[ti] OR cats[ti] OR horse*[ti] OR supplement*[ti] OR contraceptive*[ti] OR "water intake"[ti] OR "water ingestion"[ti] OR "spinal cord"[ti] OR "Sleep"[Majr] OR "Sleep Apnea Syndromes"[Majr] OR sleep[ti] OR "administration and dosage"[subheading] OR "pharmacology"[subheading] OR "drug effects"[subheading] OR "drug therapy"[subheading] OR meal[ti])

PubMed Search 2: hypertension/pre-hypertension AND exercise AND clinical trial AND anti-hypertensive agents NOT terms for exclusion omitting terms for drugs. Original Citations: 706. Updated Citations: 39.

("Hypertension"[Mesh] OR hypertens*[tiab] OR "high blood pressure" OR "high blood pressures" OR "high arterial pressure" OR "high arterial pressures" OR "high systolic pressure" OR "high diastolic pressure" OR "high pulse pressure" OR "high venous pressure" OR "elevated blood pressure" OR "elevated blood pressures" OR "elevated arterial pressure" OR "elevated arterial pressures" OR "antihypertensive" OR "elevated systolic pressure" OR "elevated diastolic pressure" OR "elevated pulse pressure" OR "elevated venous pressure" OR "Prehypertension"[Mesh] OR prehypertens* OR "pre hypertension" OR "pre-hypertension") AND ("exercise"[majr] OR exercise[ti] OR exercises[ti] OR exercising[ti] OR postexercise[ti] OR running[mesh] OR running[ti] OR bicycling[mesh] OR bicycling OR bicycle* OR cycling[ti] OR treadmill* OR ergometer* OR "weight lifting" OR "weight training" OR "resistance training" OR "strength training" OR "endurance training" OR "speed training" OR "circuit training" OR "training duration" OR "training frequency" OR "training intensity" OR "aerobic endurance" OR "aerobic training" OR "interval training" OR "combination training" OR "combined training" OR plyometric* OR "HIIT" OR walking[mesh] OR walking[ti] OR swimming) AND (("clinical"[tiab] AND "trial"[tiab]) OR "clinical trials as topic"[mesh] OR "clinical trial"[pt] OR random*[tiab] OR "random allocation"[mesh] OR "therapeutic use"[sh]) AND ("Antihypertensive Agents"[Mesh] OR "Antihypertensive Agents" [Pharmacological Action] OR "anti-hypertensive agent" OR "antihypertensive agent" OR "anti hypertensive agent" OR "anti-hypertensive agents" OR "antihypertensive agents" OR "anti hypertensive agents" OR "anti-hypertensive drug" OR "antihypertensive drug" OR "anti hypertensive drug" OR "anti-hypertensive drugs" OR "antihypertensive drugs" OR "anti hypertensive drugs" OR "anti-hypertensive medication" OR "antihypertensive medication" OR "anti hypertensive medication" OR "anti-hypertensive medications" OR "antihypertensive medications" OR "anti hypertensive medications" OR "anti-

hypertensives" OR antihypertensives OR "anti hypertensives" OR acebutolol OR aliskiren OR Ambrisentan OR amlodipine OR atenolol OR "azilsartan medoxomil" OR benazepril OR betaxolol OR bisoprolol OR bosentan OR "candesartan cilexetil" OR captopril OR carteolol OR carvedilol OR chlorthalidone OR clonidine OR cilazapril OR clevidipine OR deserpidine OR diazoxide OR diltiazem OR doxazosin OR enalapril OR enalaprilat OR "eprosartan mesylate" OR hydrochlorothiazide OR felodipine OR fenoldopam OR fosinopril OR guanabenz OR guanadrel OR guanethidine OR guanfacine OR hydralazine OR irbesartan OR isradipine OR labetalol OR lisinopril OR "losartan potassium" OR macitentan OR mecamlamine OR methyl dopa OR metoprolol OR metyrosine OR mibefradil OR minoxidil OR moexipril OR moxonidine OR nadolol OR nebivolol OR nifedipine OR nifedipine OR nisoldipine OR nitroprusside OR "olmesartan medoxomil" OR omapatrilat OR penbutolol OR perindopril OR phentolamine OR pindolol OR prazosin OR propranolol OR quinapril OR ramipril OR rescinamine OR reserpine OR sildenafil OR "sodium nitroprusside" OR tadalafil OR telmisartan OR terazosin OR timolol OR trandolapril OR treprostinil OR trimethaphan OR valsartan OR verapamil OR diuretic* OR thiazide OR "adrenergic beta-antagonist" OR "adrenergic beta-antagonists" OR "adrenergic alpha-antagonist" OR "adrenergic alpha-antagonists" OR "angiotensin-converting enzyme inhibitor" OR "angiotensin-converting enzyme inhibitors" OR "calcium channel blocker" OR "calcium channel blockers" OR "ganglionic blocker" OR "ganglionic blockers" OR "vasodilator agent" OR "vasodilator agents") NOT ("pulmonary hypertension" OR "pulmonary arterial hypertension" OR "heart transplant" OR "heart failure" OR "cystic fibrosis" OR "DASH"[tiab] OR cancer OR neoplasms OR fibromyalgia OR alzheimers OR alzheimer OR pregnant OR pregnancy OR "epidemiology"[Subheading] OR "obesity/drug therapy"[mesh] OR pharmacist*[ti] OR "diet therapy"[mesh] OR "diet therapy"[subheading] OR "nutritional intervention" OR "dietary intervention" OR "nutritional counseling" OR "dietary counseling" OR caffeine OR "eating change" OR "activities of daily living" OR "dehydration" OR "dehydrate" OR "dehydrated" OR "dietary salt" OR sodium OR epilepsy OR influenza OR flu OR pneumonia OR septicemia OR arthritis OR hiv OR "Acquired Immunodeficiency Syndrome" OR meningitis OR "substance abuse" OR alcoholism OR "drug abuse" OR review[pt] OR "Cross-Sectional Studies"[MeSH Terms] OR Comment[pt] OR Editorial[pt] OR Letter[pt] OR "Case Reports"[pt] OR "case control"[ti] OR "case report"[ti] OR "case study"[ti] OR "case series"[ti] OR "Case-Control Studies"[Mesh] OR "Follow-Up Studies"[Mesh] OR "observational study"[ti] OR "prospective cohort"[ti] OR "cohort studies" [Mesh:NoExp] OR "cohort study"[ti] OR "Longitudinal Studies" [Mesh:NoExp] OR "Follow-Up Studies"[mesh] OR "Retrospective Studies"[mesh] OR "non-randomized"[ti] OR "follow up study"[ti] OR "animals"[MeSH Terms:noexp] OR rat[ti] OR rats[ti] OR mice[ti] OR mouse[ti] OR dog[ti] OR dogs[ti] OR cats[ti] OR horse*[ti] OR supplement*[ti] OR contraceptive*[ti] OR "water intake"[ti] OR "water ingestion"[ti] OR "spinal cord"[ti] OR "Sleep"[Majr] OR "Sleep Apnea Syndromes"[Majr] OR sleep[ti])

Scopus

From 1823 to July 21, 2016. Original Citations: 1,449. July 21, 2016 to February 26, 2020

Updated Citations: 70

Limits: document type=article

Due to database limitations, Scopus searches were run in parts; the individual components of the searches were combined using the search history screen. Unless otherwise specified, terms were searched in the title, abstract, and keywords fields.

Scopus Search 1: hypertension/pre-hypertension AND exercise AND clinical trial NOT terms for exclusion with drugs. Original Citations: 992. Updated Citations:64.

Part 1:

hypertens* OR "high blood pressure" OR "high blood pressures" OR "high arterial pressure" OR "high arterial pressures" OR "high systolic pressure" OR "high diastolic pressure" OR "high pulse pressure" OR "high venous pressure" OR "elevated blood pressure" OR "elevated blood pressures" OR "elevated arterial pressure" OR "elevated arterial pressures" OR "antihypertensive" OR "elevated systolic pressure" OR "elevated diastolic pressure" OR "elevated pulse pressure" OR "elevated venous pressure" OR prehypertens* OR "pre hypertension" OR "pre-hypertension"

AND

Part 2:

(in title): exercise OR exercises OR exercising OR postexercise OR running OR running OR bicycling OR bicycle* OR cycling OR walking

OR

treadmill* OR ergometer* OR "weight lifting" OR "weight training" OR "resistance training" OR "strength training" OR "endurance training" OR "speed training" OR "circuit training" OR "training duration" OR "training frequency" OR "training intensity" OR "aerobic endurance" OR "aerobic training" OR "interval training" OR "combination training" OR "combined training" OR plyometric* OR "HIIT" OR swimming

AND

Part 3

clinical AND trial

OR

random*

NOT

Part 4

"pulmonary hypertension" OR "pulmonary arterial hypertension" OR "heart transplant" OR "heart failure" OR "cystic fibrosis" OR "DASH" OR cancer OR neoplasms OR fibromyalgia OR alzheimers OR alzheimer OR pregnant OR pregnancy OR "nutritional intervention" OR "dietary intervention" OR "nutritional counseling" OR "dietary counseling" OR caffeine OR "eating change" OR "activities of daily living" OR dehydration OR dehydrate OR dehydrated OR "dietary salt" OR sodium OR epilepsy OR influenza OR flu OR pneumonia OR septicemia OR arthritis OR hiv OR "Acquired Immunodeficiency Syndrome" OR meningitis OR "substance abuse" OR alcoholism OR "drug abuse"

OR

(in title): epidemiology OR pharmacol* OR drug OR pharmacist* OR diet OR review OR "Cross-Sectional" OR comment* OR editorial OR letter OR "case control" OR "case report" OR "case study" OR "case series" OR "follow-up" OR "follow up" OR observational OR cohort OR longitudinal OR retrospective OR "non-randomized" OR rat OR rats OR mice OR mouse OR dog OR dogs OR cats OR horse* OR supplement* OR contraceptive* OR "water intake" OR "water ingestion" OR meal OR "spinal cord" OR sleep

Scopus Search 2: hypertension/pre-hypertension AND exercise AND clinical trial AND anti-hypertensive agents NOT terms for exclusion omitting terms for drugs. Original Citations: 457. Updated Citations: 6.

Part 1:

hypertens* OR "high blood pressure" OR "high blood pressures" OR "high arterial pressure" OR "high arterial pressures" OR "high systolic pressure" OR "high diastolic pressure" OR "high pulse pressure" OR "high venous pressure" OR "elevated blood pressure" OR "elevated blood pressures" OR "elevated arterial pressure" OR "elevated arterial pressures" OR "antihypertensive" OR "elevated systolic pressure" OR "elevated diastolic pressure" OR "elevated pulse pressure" OR "elevated venous pressure" OR prehypertens* OR "pre hypertension" OR "pre-hypertension"

AND

Part 2:

(in title): exercise OR exercises OR exercising OR postexercise OR running OR running OR bicycling OR bicycle* OR cycling OR walking

OR

treadmill* OR ergometer* OR "weight lifting" OR "weight training" OR "resistance training" OR "strength training" OR "endurance training" OR "speed training" OR "circuit training" OR "training duration" OR "training frequency" OR "training intensity" OR "aerobic endurance" OR "aerobic training" OR "interval training" OR "combination training" OR "combined training" OR plyometric* OR "HIIT" OR swimming

AND

Part 3

clinical AND trial

OR

random*

AND

Part 4

"Anti-hypertensive Agent" OR "antihypertensive agent" OR "anti hypertensive agent" OR "anti-hypertensive agents" OR "antihypertensive agents" OR "anti hypertensive agents" OR "anti-hypertensive drug" OR "antihypertensive drug" OR "anti hypertensive drug" OR "anti-hypertensive drugs" OR "antihypertensive drugs" OR "anti hypertensive drugs" OR "anti-hypertensive medication" OR "antihypertensive medication" OR "anti hypertensive medication" OR "anti-hypertensive medications" OR "antihypertensive medications" OR "anti hypertensive medications" OR "anti-hypertensives" OR antihypertensives OR "anti hypertensives" OR acebutolol OR aliskiren OR Ambrisentan OR amlodipine OR atenolol OR "azilsartan medoxomil" OR benazepril OR betaxolol OR bisoprolol OR bosentan OR "candesartan cilexetil" OR captopril OR carteolol OR carvedilol OR chlorthalidone OR clonidine OR cilazapril OR clevidipine OR deserpidine OR diazoxide OR diltiazem OR doxazosin OR enalapril OR enalaprilat OR "eprosartan mesylate" OR hydrochlorothiazide OR felodipine OR fenoldopam OR fosinopril OR guanabenz OR guanadrel OR guanethidine OR guanfacine OR hydralazine OR irbesartan OR isradipine OR labetalol OR lisinopril OR "losartan potassium" OR macitentan OR mecamlamine OR methyldopa OR metoprolol OR metyrosine OR mibefradil OR minoxidil OR moexipril OR moxonidine OR nadolol OR nebivolol OR nicardipine OR nifedipine OR nisoldipine OR nitroprusside OR "olmesartan medoxomil" OR omapatrilat OR penbutolol OR perindopril OR phentolamine OR pindolol OR prazosin OR propranolol OR quinapril OR ramipril OR rescinnamine OR reserpine OR sildenafil OR "sodium nitroprusside" OR tadalafil OR telmisartan OR terazosin OR timolol OR trandolapril OR treprostinil OR trimethaphan OR valsartan OR verapamil OR diuretic* OR thiazide OR "adrenergic beta-antagonist" OR "adrenergic beta-

antagonists" OR "adrenergic alpha-antagonist" OR "adrenergic alpha-antagonists" OR "angiotensin-converting enzyme inhibitor" OR "angiotensin-converting enzyme inhibitors" OR "calcium channel blocker" OR "calcium channel blockers" OR "ganglionic blocker" OR "ganglionic blockers" OR "vasodilator agent" OR "vasodilator agents"

NOT

Part 5

"pulmonary hypertension" OR "pulmonary arterial hypertension" OR "heart transplant" OR "heart failure" OR "cystic fibrosis" OR "DASH" OR cancer OR neoplasms OR fibromyalgia OR alzheimers OR alzheimer OR pregnant OR pregnancy OR "nutritional intervention" OR "dietary intervention" OR "nutritional counseling" OR "dietary counseling" OR caffeine OR "eating change" OR "activities of daily living" OR dehydration OR dehydrate OR dehydrated OR "dietary salt" OR sodium OR epilepsy OR influenza OR flu OR pneumonia OR septicemia OR arthritis OR hiv OR "Acquired Immunodeficiency Syndrome" OR meningitis OR "substance abuse" OR alcoholism OR "drug abuse"

OR

(in title): epidemiology OR diet OR review OR "Cross-Sectional" OR comment* OR editorial OR letter OR "case control" OR "case report" OR "case study" OR "case series" OR "follow-up" OR "follow up" OR observational OR cohort OR longitudinal OR retrospective OR "non-randomized" OR rat OR rats OR mice OR mouse OR dog OR dogs OR cats OR horse* OR supplement* OR contraceptive* OR "water intake" OR "water ingestion" OR meal OR "spinal cord" OR sleep

CINAHL Plus with Full Text

From 1937 to July 7, 2016. Total Citations: 45

Limits: research article, exclude MEDLINE records, human, academic journals

CINAHL searches were identical to SCOPUS. Due to database limitations, CINAHL searches were run in parts; the individual components of the searches were combined using the search history screen. Unless otherwise specified, terms were searched in the title, abstract, and keywords fields.

CINAHL Search 1: hypertension/pre-hypertension AND exercise AND clinical trial NOT terms for exclusion with drugs. Citations: 21

CINAHL Search 2: hypertension/pre-hypertension AND exercise AND clinical trial AND anti-hypertensive agents NOT terms for exclusion omitting terms for drugs. Citations: 24

SPORTDiscusLibrary

From 1937 to July 21, 2016. Total Citations: 96

Limits: academic journals

SPORTDiscus searches were identical to SCOPUS. Due to database limitations, SPORTDiscus searches were run in parts; the individual components of the searches were combined using the search history screen. Unless otherwise specified, terms were searched in the title, abstract, and keywords fields.

SPORTDiscus Search 1: hypertension/pre-hypertension AND exercise AND clinical trial NOT terms for exclusion with drugs Citations: 88

SPORTDiscus Search 2: hypertension/pre-hypertension AND exercise AND clinical trial AND anti-hypertensive agents NOT terms for exclusion omitting terms for drugs. Citations: 8

Cochrane Library

Current information only

Cochrane Reviews Citations: 14; Other Reviews Citations: 41; Methods Studies Citations: 4. Total Citations: 59

hypertens* OR "high blood pressure" OR "high blood pressures" OR "high arterial pressure" OR "high arterial pressures" OR "high systolic pressure" OR "high diastolic pressure" OR "high pulse pressure" OR "high venous pressure" OR "elevated blood pressure" OR "elevated blood pressures" OR "elevated arterial pressure" OR "elevated arterial pressures" OR "antihypertensive" OR "elevated systolic pressure" OR "elevated diastolic pressure" OR "elevated pulse pressure" OR "elevated venous pressure" OR prehypertens* OR "pre hypertension" OR "pre-hypertension"

AND

exercise OR exercises OR exercising OR postexercise OR running OR running OR bicycling OR bicycle* OR cycling OR walking OR treadmill* OR ergometer* OR "weight lifting" OR "weight training" OR "resistance training" OR "strength training" OR "endurance training" OR "speed training" OR "circuit training" OR "training duration" OR "training frequency" OR "training intensity" OR "aerobic endurance" OR "aerobic training" OR "interval training" OR "combination training" OR "combined training" OR plyometric* OR "HIIT" OR swimming

NOT

"pulmonary hypertension" OR "pulmonary arterial hypertension" OR "heart transplant" OR "heart failure" OR "cystic fibrosis" OR "DASH" OR cancer OR neoplasms OR fibromyalgia OR alzheimers OR alzheimer OR pregnant OR pregnancy OR "nutritional intervention" OR "dietary intervention" OR "nutritional counseling" OR "dietary counseling" OR caffeine OR "eating change" OR "activities of daily living" OR "dehydration" OR "dehydrate" OR "dehydrated" OR "dietary salt" OR sodium OR epilepsy OR influenza OR flu OR pneumonia OR septicemia OR arthritis OR hiv OR "Acquired Immunodeficiency Syndrome" OR meningitis OR "substance abuse" OR alcoholism OR "drug abuse"