

**Table E.1.4.b. People with hypertension, relationship between physical activity and health-related outcomes**

**Questions:** What is the association between **physical activity** and health-related outcomes? Is there a dose response association (volume, duration, frequency, intensity)? Does the association vary by type or domain of PA?

**Population:** People with hypertension

**Exposure:** Greater volume, duration, frequency, or intensity of physical activity

**Comparison:** No physical activity or lesser volume, duration, frequency, or intensity of physical activity

**Outcome:** Risk of co-morbid conditions, physical function, health-related QOL, cardiovascular disease progression, cardiovascular mortality

Systematic review evidence	No. of studies/ Study design	Quality Assessment					Description of evidence Summary of findings	Certainty	US PAGAC evidence (39)
		Risk of bias	Inconsistency	Indirectness†	Imprecision	Other			
Review credibility	No. of participants								
<b>Risk of co-morbid conditions</b>									
No systematic review identified								Insufficient evidence is available to determine whether a relationship exists between physical activity and risk of co-morbid conditions among adults with hypertension. <b>PAGAC Grade: Not assignable.</b>	
<b>Physical function</b>									
Costa 2018 (7) Low	9 RCTs N=245	No serious risk of bias	No serious inconsistency	Serious indirectness	No serious imprecision	None	Nine studies compared the effects of HIIT (60% men, mean age 57.8 years, mean BMI 30.6 kg/m <sup>2</sup> ) versus MICT (49% men, mean age 56.1 years, mean BMI 30.4 kg/m <sup>2</sup> ) including patients with chronic heart failure, coronary heart disease, MetS, abdominal obesity, and prediabetes on resting BP. Most studies included a 12- to 16-week intervention and were conducted in laboratory settings or cardiac rehabilitation centres under direct supervision.  Pooled analyses suggested significant differences in <b>VO2max</b> in favour of HIIT interventions (MD 2.13 ml/kg/min [95% CI, 1.00 to 3.27], <i>p</i> <0.01).	HIGH <sup>a</sup>	Insufficient evidence is available to determine whether a relationship exists between physical activity and physical function among adults with hypertension. <b>PAGAC Grade: Not assignable.</b>

Systematic review evidence	No. of studies/ Study design	Quality Assessment					Description of evidence Summary of findings	Certainty	US PAGAC evidence (39)
		Risk of bias	Inconsistency	Indirectness†	Imprecision	Other			
Review credibility	No. of participants								
<b>Health-related QOL</b>									
Cao 2019 (4) Moderate	1 RCT N=103	No serious risk of bias	Serious inconsistency	No serious indirectness	No serious imprecision	None	Mean age of participants was 51 years; exercise intervention was 12 weeks vs. no exercise control group. Significant improvements were observed in the exercise group in all domains of the WHOQoL-BREF (physical health: +23.33, $p<0.05$ ; psychological health +18.17, $p<0.05$ ; social relationships; +14.51, $p<0.05$ ; environment: +11.51, $p<0.05$ ). The control group also showed improvements in physical health, psychological health, and social relationship domains.	MODERATE <sup>b</sup>	Insufficient evidence is available to determine whether a relationship exists between physical activity and health-related quality of life among adults with hypertension. <b>PAGAC Grade: Not assignable.</b>
<b>CVD progression</b>									
Cao 2019 (4) Moderate	14 RCTs N=860	No serious risk of bias	Serious inconsistency	No serious indirectness	No serious imprecision	None	Mean age ranged from 40 to 83 years. SBP at baseline ranged from 130.3 to 170.5 mm Hg and DBP at baseline ranged from 67.5 to 95.2 mm Hg. Duration of exercise interventions ranged from 40 minutes to 6 months.  Compared with no exercise control groups, <b>SBP</b> and <b>DBP</b> were significantly reduced in pooled analysis among the exercise groups (SBP MD = -12.26 mm Hg [95% CI, -15.17 to -9.34] $p<0.05$ ; DBP MD = -6.12 mm Hg [95% CI, -7.76 to -4.48], $p<0.05$ ). Subgroup analyses found that interventions of shorter duration (with shorter follow-up, <8 weeks) achieved greater reductions in BP than those of longer duration (>12 weeks).	HIGH <sup>c</sup>	<a href="#">15 ESRs</a> Strong evidence demonstrates that physical activity reduces the risk of progression of cardiovascular disease among adults with hypertension. <b>PAGAC Grade: Strong.</b>
Costa 2018 (7) Low	9 RCTs N=245	No serious risk of bias	Serious inconsistency	No serious indirectness	No serious imprecision	None	Nine studies compared the effects of HIIT (60% men, mean age 57.8 years, mean BMI 30.6 kg/m <sup>2</sup> ) versus MICT (49% men, mean age 56.1 years, mean BMI 30.4 kg/m <sup>2</sup> ) including patients with chronic heart failure, coronary heart disease, MetS, abdominal obesity, and prediabetes on resting BP. Most studies included a 12- to 16-week intervention and were conducted in laboratory settings or cardiac rehabilitation centres under direct supervision.  Pooled analyses found no differences between HIIT vs. MICT groups in <b>SBP</b> (MD - 0.22 mmHg [CI 95%, -5.36 to 4.92], $p = 0.93$ ) or <b>DBP</b> (MD - 0.38 mmHg [CI 95%, -3.31 to 2.54], $p = 0.74$ ).	MODERATE <sup>d</sup>	Strong evidence demonstrates that, among adults with hypertension, physical activity reduces the disease progression indicator of blood pressure. <b>PAGAC Grade: Strong.</b>

Abbreviations: BMI = body mass index; BP = blood pressure; CI = confidence interval; CVD = cardiovascular disease; DBP = diastolic blood pressure; ESR = existing systematic review; HIIT = high-intensity interval training; kg/m = kilograms per meter; MD = mean difference; MetS = metabolic syndrome mm Hg = millimetres of mercury; MICT = moderate-intensity continuous training; NR = not reported; PAGAC = Physical Activity Guidelines Advisory Committee; QOL = quality-of-life; RCT = randomized clinical trial; SBP = systolic blood pressure

† Serious indirectness indicates measurement of intermediate/indirect outcomes or heterogeneity in exposures and comparisons assessed; certainty of evidence was not always downgraded for indirectness if it was not judged to impact the certainty in the findings for the outcome evaluated in the review

- <sup>a</sup> Certainty of evidence not downgraded (certainty graded for **effects** on VO2max)
- <sup>b</sup> Certainty of evidence downgraded given serious inconsistency (single study, unable to assess inconsistency)
- <sup>c</sup> Certainty of evidence not downgraded
- <sup>d</sup> Certainty of evidence downgraded given serious inconsistency (inconsistency in direction of effects across studies)