



## **Supporting Information**

### **Supplementary methods and results**

**This appendix was part of the submitted manuscript and has been peer reviewed. It is posted as supplied by the authors.**

Appendix to: Kelly RJ, Macniven R, Churilov L, et al. Physical activity interventions to prevent and manage type 2 diabetes in Aboriginal and Torres Strait Islander people: a systematic review. *Med J Aust* 2024; doi: 10.5694/mja2.52483.

**Table 1. Search terms used to identify reports in English of physical activity interventions for preventing and managing type 2 diabetes in Aboriginal and Torres Strait Islander adults: summary**

Key Term	Variations
Type 2 Diabetes	"T2DM" or "type II diabetes" or "diabetes mellitus" or "non-insulin dependent diabetes" or "Adult onset diabetes" or "impaired glucose tolerance" or "impaired fasting glucose" or "pre-diabetes"
Indigenous	"Oceanic ancestry group" or aborigin* or "torres strait" or Indigenous or "first nation*"
Australia	austr* or "New South Wales" or NSW or Queensland or Qld or Victoria or Vic or Tasmania or Tas or "South Australia" or SA or "Western Australia" or WA or "Northern Territory" or NT or "Australian Capital Territory" or ACT
Physical Activity	exercis* or "physical activit*" or "resistance training" or lifestyle

**Table 1a. Search strategy for databases Medline, Scopus and CINAHL**

Concept	Medline	Number	Scopus	Number	CINAHL	Number
Type 2 Diabetes	exp Diabetes Mellitus, Type 2/	132305		1320426	"Diabetes Mellitus" OR "type 2 diabetes" OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	64830
	"Type 2 diabetes".mp.	124120	TITLE-ABS-KEY ( ("Diabetes Mellitus" OR "type 2 diabetes" ) OR "type II diabetes"	762592		
	"Type II diabetes".mp	8320	OR "non-insulin dependent diabetes"			
	"Non-insulin dependent diabetes".mp.	8616	OR "Adult onset diabetes" )			
	"Adult onset diabetes".mp.	446				
Combined	184593					
Aboriginal and Torres Strait Islander populations	Oceanic Ancestry Group/	10178				
	(Aborigin* or "torres strait")	9973	TITLE-ABS-KEY ( "Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*" )	151876	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	43633
	((Indigenous or "first nation*") adj5 (Austr* or oceania or "New South Wales" or NSW or Queensland or Qld or Victoria or Vic or Tasmania or Tas or "South Australia" or SA or "Western Australia" or WA or "Northern Territory" or NT or "Australian Capital Territory" or ACT)	2841	TITLE-ABS-KEY ( austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act )	2013045	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	259895
	Combined	16459				
Physical activity	exp Exercise/	194179				
	("physical activit*" or exercis* or "Resistance training")	435992	TITLE-ABS-KEY ( exercis* OR "physical activit*" OR "resistance training" OR lifestyle )	939139	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	283458
(Lifestyle adj5 (traditional or intervention))	5975					

Concept	Medline	Number	Scopus	Number	CINAHL	Number
			(TITLE-ABS-KEY ( ( "Diabetes Mellitus" OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes" ) ) AND ( TITLE-ABS-KEY ( "Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*" ) ) AND ( TITLE-ABS-KEY ( austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act ) ) AND ( TITLE-ABS-KEY ( exercis* OR "physical activit*" OR "resistance training" OR lifestyle ) )			
	Combined	486864				
	<b>Total</b>	<b>106</b>	<b>Total</b>	228	Total	64

**Table 1b. Search strategy for databases PsycINFO, Informit Complete, Embase, ProQuest Dissertations and Theses, ProQuest Health and Medicine, SportsDiscus**

Concept	PsycINFO	Informit Complete	Embase	ProQuest Dissertations and Theses	ProQuest Health and Medicine	SportsDiscus
Type 2 Diabetes	('Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	('Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	('Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	"Diabetes Mellitus" OR "type 2 diabetes" OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	"Diabetes Mellitus" OR "type 2 diabetes" OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"	Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes"
Aboriginal and Torres Strait Islander populations	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"	"Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*"
	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act	austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act
Physical activity	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	exercis* OR "physical activit*" OR "resistance training" OR lifestyle	exercis* OR "physical activit*" OR "resistance training" OR lifestyle

Concept	PsycINFO	Informit Complete	Embase	ProQuest Dissertations and Theses	ProQuest Health and Medicine	SportsDiscus
Combined	Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes" AND "Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*" AND austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act AND exercis* OR "physical activit*" OR "resistance training" OR lifestyle	((('Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes") AND ("Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*") AND (austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act) AND (exercis* OR "physical activit*" OR "resistance training" OR lifestyle)	((('Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes") AND ("Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*") AND (austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act) AND (exercis* OR "physical activit*" OR "resistance training" OR lifestyle)			Diabetes Mellitus OR "type 2 diabetes" ) OR "type II diabetes" OR "non-insulin dependent diabetes" OR "Adult onset diabetes" AND "Oceanic ancestry group" OR aborigin* OR "torres strait" OR indigenous OR "first nation*" AND austr* OR "New South Wales" OR nsw OR queensland OR qld OR victoria OR vic OR tasmania OR tas OR "South Australia" OR sa OR "Western Australia" OR wa OR "Northern Territory" OR nt OR "Australian Capital Territory" OR act AND exercis* OR "physical activit*" OR "resistance training" OR lifestyle
	Total - 25	Total - 68	Total - 97	Total - 4	Total - 95	Total - 16

**Table 2. Characteristics of the included studies**

<p>O'Dea 1984<sup>21</sup></p>	<ul style="list-style-type: none"> <li>• <b>Location:</b> Western Australia; remote community in the Kimberley region</li> <li>• <b>Aboriginal/Torres Strait Islander Nation:</b> Nyikina</li> <li>• <b>Participants:</b> Indigenous Australian men and women: 7 men, 7 women; age range, 47-65 years; mean age (diabetes): 53.9 years (SD not reported); mean age (no diabetes: 52.3 years (SD not reported)</li> <li>• <b>Study design:</b> Prospective cohort study; Staying on country, eating traditional foods</li> <li>• <b>Groups:</b> Intervention only (with and without diabetes)</li> <li>• <b>Intervention:</b> 7-weeks; only foods consumed were hunted or collected by participants; 1100-1300 kcal/person/day; coastal and inland locations; macronutrient breakdown ranged depending on location between 50%-80% protein, 13%-40% fat, and &lt;5%-33% carbohydrate</li> <li>• <b>Assessments:</b> Anthropometric measures: weight, fasting blood glucose, blood pressure, physical activity, OGTT, fasting triglycerides, total cholesterol, HDL, LDL, VLDL; food composition analysed</li> <li>• <b>Major findings:</b> Change from baseline to 7 weeks for the diabetes group: ↓ Fasting plasma glucose from 11.6 ±1.2mmol/L to 6.6 ±0.5 mmol/L (-5.0 mmol/L, P &lt; 0.001); ↓ OGTT (Change shown in graph with exact figures not provided) (P &lt; 0.005); improved glucose tolerance in those with type 2 diabetes (change shown in graph with exact figures not provided) (P &lt; 0.001); ↓ Total AUC for glucose from 50.0 ±3.8 mmol/L/h, to 31.5 ±2.2 mmol/L/h (-37%, P &lt; 0.001); ↓ Incremental AUC for glucose from 15.0 ±1.2 mmol/L/h, to 11.7 ±1.2 mmol/L/h (-22%, P &lt; 0.005); ↑ Incremental AUC for insulin from 61 ±18 mU/L/h, to 104 ±21 mU/L/h (P &lt; 0.05); ↓ Fasting plasma insulin from 23 ±3 mU/L, to 12 ±1 mU/L (-11 mU/L, P &lt; 0.005); ↓ Weight, ↓ BMI – weight loss went from 81.9 ±3.4 kg, to 73.8 ±2.8 kg, and was highly correlated with baseline BMI which went from (27.2 ±1.1 kg/m<sup>2</sup>, to 24.5 ±0.8 kg/m<sup>2</sup>)(r=0.819, P &lt; 0.01); ↓ Total plasma triglycerides from 4.02 ±0.46 mmol/L, to 1.15 ±0.10 mmol/L (-2.87 mmol/L, P &lt; 0.001); ↓ VLDL cholesterol from 1.01 ±0.15 mmol/L, to 0.18 ±0.03 mmol/L (-0.83 mmol/L, P &lt; 0.001); ↓ HDL cholesterol from 1.29 ±0.16 mmol/L, to 0.69 ±0.06 mmol/L (-0.6 mmol/L, P &lt; 0.005). Physical activity did not correlate with total weight loss. Improved glucose tolerance in those without type 2 diabetes with incremental AUC for plasma glucose reducing from 6.0 ±1.7 mmol/L, to 2.8 ±0.9 mmol/L (P &lt; 0.05)</li> </ul>
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<p><b>Rowley et al, 2000<sup>22</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: Western Australia; Remote community in Kimberley region</li> <li>• Aboriginal/Torres Strait Islander Nation: Nyikina</li> <li>• Participants: Indigenous Australian men and women; Program 1 – high risk individuals: 15 men, 34 women; Program 2 - Community wide: 66 men, 134 women; average age, Intervention: 49 ± 3 years, Non- intervention: 43 ± 4 years</li> <li>• Study design: Prospective Cohort Study; Community living; Single location</li> <li>• Groups: Program 1: Intervention and non-intervention; Program 2: Community wide</li> <li>• Intervention: Program 1: High risk community members with increased weight or diabetes. Formal and informal education sessions. Physical activity groups. Cooking classes and store tours; Program 2: Community wide; Strategies in Program 1 offered to whole community. Emphasis on Program 1 participants spreading their new knowledge with family</li> <li>• Assessments: Anthropometric measure: Height, Weight, BMI, OGTT, Fasting plasma triglyceride and insulin concentration; Diet and activity questionnaire.</li> <li>• Major findings: Program 1 (change reported, with results shown in graph. Exact pre- post- figures not provided): ↓ OGTT at 6 months (-1.6 mmol/L, P=0.010) but back to baseline at 12months; ↓ Mean fasting plasma glucose at 6 months (-0.9 mmol/L, P=0.021)(SD not reported) but back to baseline at 12 months; ↓ Fasting insulin at 18 months (P=0.004); ↓ 2h Plasma glucose between groups at 24 months (mean change [95%CI]= -0.9 [-1.9-0.2] mmol/L for the intervention group, and an increase of 1.5 mmol/L for the non-intervention group) (P=0.030); ↓ Triglycerides between groups at 24 months (mean change [95% CI] = -0.27 [-0.73 – 0.20]mmol/L in the intervention group, and an increase of 0.85 [-0.22-1.91] mmol/L in the non-intervention group) (P=0.016); ↓ BMI from baseline to 6 months (P=0.001), but not significant at 12 months (P=0.60); ↓ BMI from baseline to 6 months was larger for the intervention group than for the non-intervention group (P=0.012), but no difference at 12 months;</li> <li>Program 2: ↓ Mean fasting insulin concentration among those &gt;35 years of age from 21 μU/ml, to 16 μU/ml (-5 μU/ml, P=0.05)(SD not reported); ↑ BMI for 15-34 year olds from 22.6 kg/m<sup>2</sup>, to 24.8 kg/m<sup>2</sup> (+2.2 kg/m<sup>2</sup>, P=0.05). BMI unchanged for &gt;35 year olds; ↑ in physical activity; ↓ in fat and sugar consumption; Mean fasting plasma glucose unchanged; Fasting plasma triglycerides unchanged</li> </ul>
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<p><b>Rowley et al, 2000<sup>23</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: Northern Territory; Remote: Central Australia</li> <li>• Aboriginal/Torres Strait Islander Nation: Not identified</li> <li>• Participants: Indigenous Australian men and women; 1988: 189 men, 248 women; 1995: 184 men, 240 women; Age range: 15 years and over</li> <li>• Study design: Repeat cross-sectional study; Community living: several remote homelands</li> <li>• Groups: Intervention only (with and without diabetes)</li> <li>• Intervention: Health promotion: Informal education by clinicians during routine practice, dietary advice including to eat traditional bush foods, benefits of physical activity (including traditional hunting). Messaging reinforced among family groups and wider community.</li> <li>• Assessments: Anthropometric measures: Weight, height, waist circumference, hip circumference, plasma lipids; Smoking</li> <li>• Major findings: At 7-year follow-up: ↓ prevalence of impaired glucose tolerance (IGT) from 22.5% to 10.1% in women (P &lt; 0.001), and from 12.2% to 6.5% in men (P = 0.074); ↑ Mean BMI from 22.8 kg/m<sup>2</sup>, to 24.2 kg/m<sup>2</sup> (+1.4 kg/m<sup>2</sup>, P &lt; 0.001)(SD not reported). This increase was similar in both sexes and all age-groups; ↑ Mean [95% CI] body weight for the aggregated population from 64.5kg to 67.7kg across the 7 year period (+3.2kg, P&lt;0.005); ↓ Hypercholesterolemia (Women: 37% of population in 1988 and 26% of population in 1995, P = 0.006; Not significant for men: 52% of population in 1988 and 44% of population in 1995, P = 0.147); ↓ Total plasma cholesterol from 5.4 mmol/L, to 5.2 mmol/L (P=0.001); Smoking was rare among women (&lt;4%), and decreased among men from 52.9%, to 40.8% across the 7 years (P= &lt; 0.05).</li> </ul>
<p><b>Gracey et al, 2006<sup>24</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: Western Australia; 4 remote locations (Each community is located approx. 150-200km from nearest town): Edge of Gibson Desert, Pilbara region. Population 200, West Kimberley region (2 locations). Population 400 and 350, East Kimberly region. Population 400.</li> <li>• Aboriginal/Torres Strait Islander Nation: Not identified</li> <li>• Participants: Indigenous Australian men and women; 181 men, 237 women; Age range: 18-88 years; mean age: 38.7 ±14.9 years (men), 41.0 ±17.4 years (women)</li> <li>• Study design: Prospective Cohort Study; Community living: Four locations</li> <li>• Groups: Intervention only (with and without diabetes)</li> <li>• Intervention: Aboriginal-driven community-based lifestyle program that included education on nutrition, physical activity, and chronic disease. Schools, food stores and community groups were involved in design and implementation.</li> <li>• Assessments: Anthropometric measures: Weight, BMI, waist circumference, abdominal circumference, blood pressure; HbA1c; total plasma cholesterol; HDL; LDL</li> <li>• Major findings: *Results are for individual communities rather than all locations and described as between baseline and 'several months'. No data table provided for results. Statistical significance not reported: ↓ HbA1c in 54% of participants; ↓ Weight in 49% of participants; ↓ BMI of -0.6kg/m<sup>2</sup> in 61% of participants; ↓ Waist circumference in 60% of participants; ↓ Abdominal circumference in 60% of participants; ↓ Total Plasma Cholesterol of -0.134 mmol/L in 59% of participants; ↑ HDL by 0.38mmol/L; ↓ LDL decreased by 0.38mmol/L</li> </ul>

<p><b>Chan et al, 2007<sup>25</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: Queensland; Urban: North Stradbroke Island and Redland Bay</li> <li>• Aboriginal/Torres Strait Islander Nation: Not identified</li> <li>• Participants: Indigenous Australian men and women. 26 men, 75 women; 44 with diabetes, 11 with Impaired fasting glucose, and 46 were euglycaemic. Age range: 20 years and over</li> <li>• Study design: Prospective cohort efficacy study; Community living; Single location</li> <li>• Groups: Intervention only (with and without diabetes)</li> <li>• Intervention: Lifestyle intervention (time period not stated). Culturally appropriate, community-based education program that includes self-monitoring of fasting plasma glucose in participants with diabetes and self-monitoring of physical activity modification with pedometers for all.</li> <li>• Assessments: Anthropometric measures: Weight, height, waist circumference, hip circumference; HbA1c; fasting plasma glucose; insulin resistance; cholesterol; triglycerides; homocysteine; creatinine; albumin; blood pressure; diet; steps.</li> <li>• Major findings: At 6 months (only data for mean difference from baseline provided): ↑ Mean HbA1c: +0.31% [95% CI: 0.18-0.44] (P&lt;0.001); ↓ Mean waist circumference: -3.1cm [95% CI: -0.7 to -5.4] (P=0.01); ↓ Mean diastolic blood pressure: -4.6mmHg [95% CI: -1.2 to -8.0] (P=0.01); ↓ Mean arterial blood pressure: -4.2 mmHg [95% CI: -0.6 to -7.7] (P=0.02) (SD not reported); ↓ Total cholesterol: -0.26 mmol/L [95% CI: -0.10 to -0.42] (P=0.002); ↓ Triglycerides: -0.18 mmol/L [95% CI: -0.02 to -0.33] (P=0.03); ↓ HDL cholesterol -0.09 mmol/L [95% CI: -0.05 to -0.13] (P&lt;0.001)</li> </ul>
<p><b>Battersby et al, 2008<sup>26</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: South Australia; Remote: Ceduna, Port Lincoln</li> <li>• Aboriginal/Torres Strait Islander Nation: Not identified</li> <li>• Participants: Aboriginal men and women. 28 men, 32 women. Age: 46 years (median; IQR not reported)</li> <li>• Study design: Pre- post- study; Community living; two locations</li> <li>• Groups: Intervention only (all with diabetes)</li> <li>• Intervention: Diabetes self-management program (Flinders model) provided by Aboriginal Health Workers; Problem and Goal approach; Patient and General Practitioner negotiated 12-month care plan including medical monitoring (HbA1c, blood pressure, lipids), preventative appointments (podiatry, retinal examination), self-management education, and self-management goals (weight, nutrition, physical activity)</li> <li>• Assessments: Diabetes Assessment Form (DAF) including adapted Partners in Health scale which has 6 self-management domains (knowledge of condition, knowledge of treatment, sharing decisions, monitoring, physical/social/emotional impact, and lifestyle); HbA1c; Quality of Life (SF-12); Work and Social Adjustment Scale (WSAS); Problems and goals (P&amp;G) semi-structured interviews and focus groups.</li> <li>• Major findings: ↓ HbA1c: 8.79% (72.0 mmol/mol) (SD not reported) at baseline to 8.09% (64.9 mmol/mol) (SD not reported) at twelve months</li> </ul>

<p><b>Canuto et al, 2012<sup>27</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: South Australia; Urban: Adelaide</li> <li>• Aboriginal/Torres Strait Islander Nation: Kurna</li> <li>• Participants: Indigenous Australian women. 100 women; Age range: 18-65 years: Active: Mean age- 39.8 years (SD not reported); Waitlisted: Mean age- 40.7 years (SD not reported)</li> <li>• Study design: RCT; Pre- vs Post test; Community living; First two programs at City East Campus of the University of South Australia, Adelaide; Third in an outer suburb (30 km from Adelaide CBD)</li> <li>• Groups: Intervention and control (with and without diabetes)</li> <li>• Intervention: 12 week program focused on group physical activity classes, incidental activity and walking, nutrition workshops and positive reinforcement and encouragement; 2 x group physical activity sessions per week, each consisting of aerobic and anaerobic activities. Participants encouraged to complete 10,000 steps per day and provided with pedometer; 4 x nutrition sessions across 12 weeks; Fortnightly newsletter containing healthy recipes, nutrition and physical activity tips; Control group received pedometer, access to nutrition sessions, monthly newsletters and access to 4 nutrition sessions</li> <li>• Assessments: Anthropometric measures: Height, weight, waist circumference, hip circumference; Blood pressure; fasting blood glucose; fasting serum insulin; total cholesterol; high-density lipoprotein (HDL); low density lipoprotein (LDL); triglyceride concentrations; HbA1C; CRP; HOMA-IR</li> <li>• Major findings: Change in HbA1c was not statistically significant, however results were not separated for those with and without type 2 diabetes; ↓ Mean weight between groups at 3 months: -2.5kg [95% CI: -4.46 to -0.54] (P=0.013); ↓ BMI between groups at 3 months: -1.03 kg/m<sup>2</sup> [95% CI: -1.79 to -0.27] (P=0.009); Low attendance for physical activity sessions – Mean of 9.5 sessions attended of a possible 24 sessions [95% CI: +7.4 to +11.6] (SD not reported). Seven people attended no session; Low attendance for nutrition workshop – Mean of 1 session attended out of a possible 4 workshops (SD not reported). 24 out of the 51 participants did not attend a workshop.</li> </ul>
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<p><b>Mendham et al, 2015<sup>28</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: New South Wales; Regional: 254km west of Sydney</li> <li>• Aboriginal/Torres Strait Islander Nation: Wiradjuri</li> <li>• Participants: Indigenous Australian men; currently inactive. 26 men; Mean age: 48.6 (±6.6) years</li> <li>• Study design: RCT; Pre- vs Post test; Community living; Single location</li> <li>• Groups: Intervention and Control (with and without diabetes)</li> <li>• Intervention: 12-week physical activity program; Duration 45-60 minutes; Intensity 70%-75% H<sub>max</sub>; 2 x sessions per week (weeks 1-6); 3 sessions per week (weeks 7-12); Combination of cardiovascular and resistance training and small-sided games</li> <li>• Assessments: Anthropometric Measures: Height, weight, waist circumference, hip circumference; Blood pressure; OGTT; Graded exercise test (Peak oxygen consumption, maximal aerobic workload); Lipid profile; CRP; Insulin; Glucose; HbA1c; Total leucocyte count; Interleukin (IL)-6; IL-1 receptor (ra); IL-1B; Tumour necrosis factor (TNF)-a; PAR-Q</li> <li>• Major findings: Change from baseline to 12 weeks for the diabetes group: ↑ HbA1c (Did not reach significance: Increase of 0.4% in the intervention group and an increase of 0.8% in the control group); ↓ HOMA-IR from 4.1 ±2.8 to 3.2 ±1.6 (-0.9mg/mL, P&lt;0.05). Increase of 0.08mg/mL in the control group – Control group did not reach significance; ↓ Glucose AUC from 13.6 ±3.4 mmol L<sup>-1</sup>(120min)<sup>-1</sup> to 12.9 ±2.8 mmol L<sup>-1</sup>(120min)<sup>-1</sup> (-0.7 mmol L<sup>-1</sup>(120min)<sup>-1</sup>, P&lt;0.05). No change for the control group; ↓ Insulin AUC from 213.5 ±133.2 mmol L<sup>-1</sup>(120min)<sup>-1</sup> to 152.7 ±80.9 mmol L<sup>-1</sup>(120min)<sup>-1</sup> (-60.8 mmol/L<sup>-1</sup>(120min)<sup>-1</sup>, P&lt;0.05). Increase of 7.9 mmol/L<sup>-1</sup>(120min)<sup>-1</sup> in the control group; ↓ Insulin resistance; ↑ Insulin sensitivity; ↑ Matsuda ISI from 3.8 ±3.1 μl/U/mL<sup>-1</sup>, mg ml<sup>-1</sup> to 4.2 ±2.3 μl/U/mL<sup>-1</sup>, mg ml<sup>-1</sup> (+0.4 μl/U/mL<sup>-1</sup>, mg ml<sup>-1</sup>, P&lt;0.05). Decrease of -0.4 (μl/U/mL<sup>-1</sup>, mg ml<sup>-1</sup> in the control group; ↓ BMI from 31.6 ±3.1kg/m<sup>2</sup> to 27.1 ±3.0 kg/m<sup>2</sup> (-4.5 kg/m<sup>2</sup>, P&lt;0.05); Increase of 0.2 kg/m<sup>2</sup> in the control group; ↓ Body mass from 95.4 ±11.5 kg to 94.1 ±11.8 kg (-1.3kg, P&lt;0.05); Increase of 0.8kg in the control group)</li> </ul>
<p><b>Power et al 2021<sup>29</sup></b></p>	<ul style="list-style-type: none"> <li>• Location: New South Wales; Urban: Western Sydney</li> <li>• Aboriginal/Torres Strait Islander Nation: Dharug</li> <li>• Participants: Indigenous Australian men and women; 3 men, 18 women; Age not provided</li> <li>• Study design: Mixed methods: Prospective cohort study and qualitative focus groups; Community living; Single location</li> <li>• Groups: Intervention only; 15 with type 2 diabetes, 4 with pre-diabetes, and 1 with type 1 diabetes</li> <li>• Intervention: 10-week lifestyle program; Physical activity program and meal plan provided; Participants attend weekly weigh ins; Information provided via website and printed copies, as well as daily motivational videos sent via SMS</li> <li>• Assessments: Anthropometric measure: Weight; HbA1c; blood pressure; focus group</li> <li>• Major findings: Change from baseline to 10 weeks: ↓ mean HbA1c: from 8.15 ±1.61 % (65.4 mmol/mol (SD:1.61%) to 6.29 ±1.04 % (45.2 mmol/mol) (SD:1.04%) (-1.68%, P &lt; 0.001); ↓ Weight from 112.61 ± 26.49 kg to 105.15 ± 24.38 kg (-7.46kg, P&lt;0.001); ↓ Systolic blood pressure from 135.00 ±14.75 mmHg to 126.00 ±13.71 mmHg (-8.88 mmHg, P=0.001).</li> </ul>

ACR: albumin to creatinine ratio; AUC: area under the curve; BMI: body mass index; CRP: C-reactive protein; HbA1c: glycated haemoglobin; HDL: high-density lipoprotein; HOMA-IR: homeostatic Model assessment for insulin resistance; HR<sub>max</sub>: maximum heart rate; IFG: impaired fasting glucose; IGT: impaired glucose tolerance; IQR: inter-quartile range; ISI: insulin sensitivity index; LDL: low density lipoprotein; OGTT: oral glucose tolerance test; PAR-Q: Physical Activity Readiness Questionnaire; RCT: randomised controlled trial; SD: standard deviation; SF-12: 12-Item Short Form Health Survey; VLDL: very low density lipoprotein; VO<sub>2</sub>Peak: volume of oxygen uptake during peak exercise. Confidence interval (CI) included in table if reported in the study.

**Table 3. Summary of community involvement in study design and study characteristics for the nine included publications**

Publication	Study characteristics									
	Community involved	Indigenous first author	Control group	Follow-up	HbA <sub>1c</sub> assessed	Weight assessed	Supervised physical activity	Physical activity outcomes assessed	Community setting	Bush foods promoted
O'Dea 1984 <sup>21</sup>	Yes	No	No	No	No	Yes	No	No	Yes	Yes
Rowley et al, 2000 <sup>22</sup>	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Rowley et al, 2000 <sup>23</sup>	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes
Gracey et al, 2006 <sup>24</sup>	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No
Chan et al, 2007 <sup>25</sup>	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No
Battersby et al, 2008 <sup>26</sup>	Yes	No	No	Yes	Yes	No	No	No	Yes	No
Canuto et al, 2012 <sup>27</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mendham et al, 2015 <sup>28</sup>	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No
Power et al, 2021 <sup>29</sup>	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

HbA<sub>1c</sub> = glycated haemoglobin.

**Table 3. Johanna Briggs Institute (JBI) critical appraisal tool questions<sup>30</sup>**

<p>Randomised Controlled Trials</p> <ol style="list-style-type: none"> <li>1. Was true randomisation used for assignment of participants to treatment groups?</li> <li>2. Was allocation to treatment groups concealed?</li> <li>3. Were treatment groups similar at the baseline?</li> <li>4. Were participants blind to treatment assignment?</li> <li>5. Were those delivering treatment blind to treatment assignment?</li> <li>6. Were outcomes assessors blind to treatment assignment?</li> <li>7. Were treatment groups treated identically other than the intervention of interest?</li> <li>8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?</li> <li>9. Were participants analyzed in the groups to which they were randomized?</li> <li>10. Were outcomes measured in the same way for treatment groups?</li> <li>11. Were outcomes measured in a reliable way?</li> <li>12. Was appropriate statistical analysis used?</li> <li>13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?</li> </ol>
<p>Cohort Studies</p> <ol style="list-style-type: none"> <li>1. Two groups similar and recruited from the same population?</li> <li>2. Were the exposures measured similarly to assign people to both exposed and unexposed groups?</li> <li>3. Was the exposure measured in a valid and reliable way?</li> <li>4. Were confounding factors identified?</li> <li>5. Were strategies to deal with confounding factors stated?</li> <li>6. Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?</li> <li>7. Were the outcomes measured in a valid and reliable way?</li> <li>8. Was the follow-up time reported and sufficient to be long enough for outcomes to occur?</li> <li>9. Was follow-up complete, and if not, were the reasons to loss of follow-up described and explored?</li> <li>10. Were strategies to address incomplete follow-up utilised?</li> <li>11. Was appropriate statistical analysis used?</li> </ol>
<p>Quasi-Experimental Studies</p> <ol style="list-style-type: none"> <li>1. Is it clear in the study what is the 'cause' and what is the 'effect'?</li> <li>2. Were the participants included in any comparisons similar?</li> <li>3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?</li> <li>4. Was there a control group?</li> <li>5. Were there multiple measurement of the outcome both pre and post the intervention/exposure?</li> <li>6. Was follow up complete, and if not, were differences between groups in terms of their follow up adequately described and analyzed?</li> <li>7. Were the outcomes of participants included in any comparisons measured in the same way?</li> <li>8. Were outcomes measured in a reliable way?</li> </ol>

9. Was appropriate statistical analysis used?

Qualitative Studies

1. Is there congruity between the stated philosophical perspective and the research methodology?
2. Is there congruity between the research methodology and the research question or objectives?
3. Is there congruity between the research methodology and the methods used to collect data?
4. Is there congruity between the research methodology and the representation and analysis of data?
5. Is there congruity between the research methodology and the interpretation of results?
6. Is there a statement locating the researcher culturally or theoretically?
7. Is the influence of the researcher on the research, and vice-versa, addressed?
8. Are participants, and their voices, adequately represented?
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Cross-Sectional Studies

1. Were the criteria in the sample clearly defined?
2. Were the study subjects and the setting described in detail?
3. Was the exposure measured in a valid and reliable way?
4. Were objective, standard criteria used for measurement of the condition?
5. Were the confounding factors identified?
6. Were the strategies to deal with confounding factors stated?
7. Were the outcomes measured in a valid and reliable way?
8. Was appropriate statistical analysis used?

**Table 4. Assessment of study quality using the Johanna Briggs Institute (JBI) critical appraisal tool\***

Randomised Controlled Trials	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Overall
Mendham et al - A 12-week sports-based exercise programme for inactive Indigenous Australian men improved clinical risk factors associated with type 2 diabetes mellitus (2015)	U	N/A	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Medium 7.5/13 (58%)
Canuto et al - Pragmatic randomised 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 (2012)	Y	N/A	Y	N/A	N/A	U	N/A	Y	Y	Y	Y	Y	Y	Medium 8.5/13 (65%)
Cohort Studies	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11			Overall
Gracey et al - An Aboriginal-driven program to prevent, control and manage nutrition-related "lifestyle" diseases including diabetes (2006)	N/A	N/A	N	N	N	N	Y	Y	N	N	N			Low 2/11 (18%)
Rowley et al - Effectiveness of a community-directed 'healthy lifestyle program in a remote Australian Aboriginal community (2000)	Y	N	Y	N	N	N	Y	Y	Y	Y	Y			Medium 7/11 (64%)
O'Dea - Marked improvement in carbohydrate and lipid metabolism in diabetic Australian Aborigines after temporary reversion to traditional lifestyle (1984)	N/A	N/A	Y	N	N	Y	Y	Y	Y	N/A	Y			Medium 6/11 (55%)
Power et al - A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program (2021)	N/A	N/A	Y	U	N	Y	Y	Y	N	N	Y			Medium 5.5/11 (50%)
Chan et al - Short term efficacy of a lifestyle intervention programme on cardiovascular health outcome in overweight Indigenous Australians with and without type 2 diabetes mellitus The healthy lifestyle programme (HELP) (2007)	N	N/A	U	Y	N	U	Y	Y	N	N	Y			Medium 5/11 (45%)
Qualitative Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				Overall
Power et al - A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program (2021)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High 10/10 (100%)
Quasi-Experimental Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9					Overall
Battersby et al - Implementing the flinders model of self-management support with aboriginal people who have diabetes: Findings from a pilot study (2008)	Y	N/A	N/A	N	N	U	N/A	U	N					Low 2/9 (22%)
Cross-Sectional Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8						Overall
Rowley et al - Reduced prevalence of impaired glucose tolerance and no change in prevalence of diabetes despite increasing BMI among aboriginal people from a group of remote homeland communities (2000)	Y	Y	N/A	Y	Y	N/A	Y	Y						High 6/8 (75%)

\* Y = Yes (Score 1); U = Unsure (Score 0.5); N = No (Score 0); N/A = Not Applicable (Score 0). Overall: >70% = High; 70-50% = Medium; <50% = Low



**Table 5. Centre of Research Excellence in Aboriginal Chronic Disease Knowledge Translation and Exchange (CREATE) critical appraisal tool questions<sup>31</sup>**

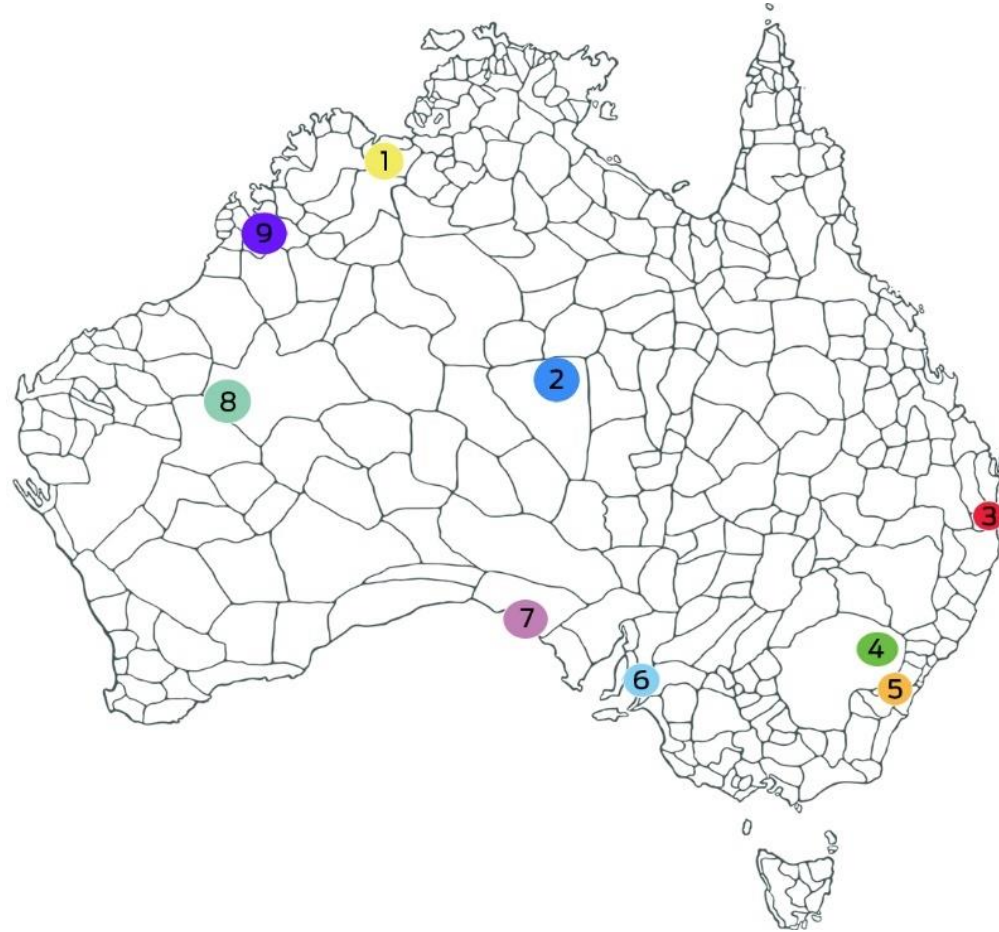
CREATE Critical Appraisal Questions
<ol style="list-style-type: none"><li>1. Did the research respond to a need or priority determined by the community?</li><li>2. Was community consultation and engagement appropriately inclusive?</li><li>3. Did the research have Aboriginal and Torres Strait Islander research leadership?</li><li>4. Did the research have Aboriginal and Torres Strait Islander governance?</li><li>5. Were local community protocols respected and followed?</li><li>6. Did the researchers negotiate agreements in regards to rights of access to Aboriginal and Torres Strait Islander peoples existing intellectual and cultural property?</li><li>7. Did the researchers negotiate agreements to protect Aboriginal and Torres Strait Islander peoples ownership of intellectual and cultural property created through the research?</li><li>8. Did Aboriginal and Torres Strait Islander peoples and communities have control over the collection and management of research materials?</li><li>9. Was the research guided by an Indigenous research paradigm?</li><li>10. Does the research take a strengths-based approach, acknowledging and moving beyond practices that have harmed Aboriginal and Torres Strait peoples in the past?</li><li>11. Did the researchers plan and translate the findings into sustainable changes in policy and/or practice?</li><li>12. Did the research benefit the participants and Aboriginal and Torres Strait Islander communities?</li><li>13. Did the research demonstrate capacity strengthening for Aboriginal and Torres Strait Islander individuals?</li><li>14. Did everyone involved in the research have opportunities to learn from each other?</li></ol>

**Table 6. Assessment of study quality, and ethical and methodological quality from the Indigenous perspective using the Centre of Research Excellence in Aboriginal Chronic Disease Knowledge Translation and Exchange (CREATE) critical appraisal tool\***

Author/Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Outcome
O'Dea - Marked improvement in carbohydrate and lipid metabolism in diabetic Australian Aborigines after temporary reversion to traditional lifestyle (1984)	Y	U	N	U	U	U	U	N	N	P	P	Y	Y	U	5
Rowley et al - Effectiveness of a community-directed 'healthy lifestyle program in a remote Australian Aboriginal community (2000)	Y	Y	P	Y	Y	U	U	Y	N	Y	Y	Y	Y	Y	11
Rowley et al - Reduced prevalence of impaired glucose tolerance and no change in prevalence of diabetes despite increasing BMI among aboriginal people from a group of remote homeland communities (2000)	U	Y	N	U	Y	U	U	Y	U	Y	P	Y	P	U	7
Gracey et al - An Aboriginal-driven program to prevent, control and manage nutrition-related "lifestyle" diseases including diabetes (2006)	U	P	N	P	U	U	U	U	N	N	N	Y	U	U	3
Chan et al - Short term efficacy of a lifestyle intervention programme on cardiovascular health outcome in overweight Indigenous Australians with and without type 2 diabetes mellitus The healthy lifestyle programme (HELP) (2007)	U	P	N	U	U	U	U	U	N	P	P	P	P	U	5
Battersby et al - Implementing the flinders model of self-management support with aboriginal people who have diabetes: Findings from a pilot study (2008)	Y	Y	P	P	U	N	N	P	U	Y	Y	Y	Y	U	9
Canuto et al - Pragmatic randomised 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 (2012)	U	Y	Y	Y	P	U	U	P	P	P	U	Y	Y	U	9
Mendham et al - A 12-week sports-based exercise programme for inactive Indigenous Australian men improved clinical risk factors associated with type 2 diabetes mellitus (2015)	Y	Y	N	N	U	U	U	N	N	Y	Y	Y	N	U	5
Power et al - A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program (2021)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	14
Total per question	5	8	4	5	4	1	1	5	2	8	7	9	7	2	

\* Y = Yes; P = Partial; U = Unsure; N = No.

**Figure 1. Indigenous nations of Australia, and the study locations for the publications included in our review\***



\* Study locations: 1. Gracey et al, 2006;<sup>24</sup> 2. Rowley et al, 2000;<sup>23</sup> 3. Chan et al, 2007;<sup>25</sup> 4. Mendham et al, 2015;<sup>28</sup> 5. Power et al, 2021;<sup>29</sup> 6. Canuto et al, 2012;<sup>27</sup> 7. Battersby et al, 2008;<sup>26</sup> 8. Gracey et al;<sup>24</sup> 9. O’Dea, 1984,<sup>21</sup> Rowley et al, 2000,<sup>22</sup> Gracey et al, 2006.<sup>24</sup>

## References

- 21 O’Dea K. Marked improvement in carbohydrate and lipid metabolism in diabetic Australian Aborigines after temporary reversion to traditional lifestyle. *Diabetes* 1984; 33: 596-603.
- 22 Rowley KG, Daniel M, Skinner K, et al. Effectiveness of a community-directed “healthy lifestyle” program in a remote Australian Aboriginal community. *Aust N Z J Public Health* 2000; 24: 136-144.
- 23 Rowley KG, Gault A, McDermott R, et al. Reduced prevalence of impaired glucose tolerance and no change in prevalence of diabetes despite increasing BMI among aboriginal people from a group of remote homeland communities. *Diabetes Care* 2000; 23: 898-904.
- 24 Gracey M, Bridge E, Martin D, et al. An Aboriginal-driven program to prevent, control and manage nutrition-related “lifestyle” diseases including diabetes. *Asia Pac J Clin Nutr* 2006; 15: 178-188.
- 25 Chan LCK, Ware R, Kesting J, et al. Short term efficacy of a lifestyle intervention programme on cardiovascular health outcome in overweight Indigenous Australians with and without type 2 diabetes mellitus: the healthy lifestyle programme (HELP). *Diabetes Res Clin Pract* 2007; 75: 65-71.
- 26 Battersby M, Ah Kit J, Prideaux C, et al. Implementing the Flinders Model of self-management support with Aboriginal people who have diabetes: findings from a pilot study. *Aust J Prim Health* 2008; 14: 66-74.
- 27 Canuto K, Cargo M, Li M, et al. Pragmatic randomised 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* 2012; 12: 933.
- 28 Mendham AE, Duffield R, Marino F, Coutts AJ. A 12-week sports-based exercise programme for inactive Indigenous Australian men improved clinical risk factors associated with type 2 diabetes mellitus. *J Sci Med Sport* 2015; 18: 438-443.
- 29 Power T, East L, Gao Y, et al. A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program. *Aust N Z J Public Health* 2021; 45: 143-149.
- 30 Aromataris E, Munn Z, editors. *JBİ manual for evidence synthesis*. Adelaide: Joanna Briggs Institute, 2020. <https://jbi-global-wiki.refined.site/space/MANUAL/355863557/Previous+versions> (viewed Nov 2023).
- 31 Harfield S, Pearson O, Morey K, et al. Assessing the quality of health research from an Indigenous perspective: the Aboriginal and Torres Strait Islander quality appraisal tool. *BMC Med Res Methodol* 2020; 20: 79.

**PRISMA 2020 checklist (note: page numbers refer to the submitted manuscript, not to the published article or its Supporting Information file)**

Section and Topic	Item #	Checklist item	Location where item is reported
<b>TITLE</b>			
Title	1	Identify the report as a systematic review.	Page 1
<b>ABSTRACT</b>			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 1
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 2-3
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 3
<b>METHODS</b>			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Pages 4-5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Pages 4-5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 4
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Pages 4-5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Pages 4-5
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 5
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 5
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Pages 16-24
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Pages 5, 7,8

	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 5
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Pages 6, 16-24
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Pages 6, 16-24
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	NA
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	NA
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	NA
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 7
<b>RESULTS</b>			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 15
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	NA
Study characteristics	17	Cite each included study and present its characteristics.	Pages 16-24
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Pages 27, 29
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Pages 16-24
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Pages 16-26, 28, 30
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	NA
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	NA
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	NA
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Page 7
<b>DISCUSSION</b>			

Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 9-10
	23b	Discuss any limitations of the evidence included in the review.	Page 10
	23c	Discuss any limitations of the review processes used.	Page 10
	23d	Discuss implications of the results for practice, policy, and future research.	Page 11
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 3
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Page 6
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 6
Competing interests	26	Declare any competing interests of review authors.	Page 11
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	NA