MJA
The Medical Journal of Australia

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: Tan C, Williams Z, Ashraful Islam M, et al. Interventions for Aboriginal and Torres Strait Islander people with type 2 diabetes that modify its management and cardiometabolic risk factors: a systematic review. Med J Aust 2024; doi: 10.5694/mja2.52508.

1. Search strategy examples

First search in Ovid

1st Search in Ovid - Search Date: 09 Sept 2020	
1	Indigenous Australians* or native Australia people* or Torres strait islander* or first nations of Australia* or first peoples of Australia* or first Australians* or Indigenous* or native* or tribe* or aboriginal* or first nation*
2	type 2 diabetes or type two diabetes or Diabetes Mellitus, Type 2 or non-insulin dependent diabetes
3	intervention* or medication* or device* or therapy* or treatment* or initiative* or health technology* or test* or appliance* or equipment* or machine* or system* or insulin* or Biguanide* or metformin* or Meglitinides* or Thiazolidinediones* or Dipeptidyl peptidase-4 inhibitors* or DPP-4 inhibitors* or Glucagon-like peptide-1 receptor agonists* or GLP-1 receptor agonists* or SGLT2 inhibitors*
4	clinical trials* or human trials* or diabetes trials*
5	1 and 2 and 3 and 4
6	limit 5 to dt="20100101 - 20200901"

Second search in Ovid

2nd Search in Ovid - Search Date: 12 Oct 2020	
1	Indigenous Australians* or native Australia people* or Torres strait islander* or first nations of Australia* or first peoples of Australia* or first Australians* or Indigenous* or native* or tribe* or aboriginal* or first nation*
2	type 2 diabetes or type two diabetes or Diabetes Mellitus, Type 2 or non-insulin dependent diabetes
3	randomised controlled trial or RCT or randomised control trial
4	1 and 2 and 3
5	limit 4 to dt="20100101 - 20200901"

Third search in Ovid

3rd Search in Ovid - Search Date: 08 Dec 2020	
1	Indigenous Australians* or native Australia people* or Torres strait islander* or first nations of Australia* or first peoples of Australia* or first Australians* or aboriginal*
2	type 2 diabetes or type two diabetes or Diabetes Mellitus, Type 2 or non-insulin dependent diabetes
3	1 and 2
4	limit 3 to dt="20000101 - 20100101"

Fourth search in Ovid

4th Search in Ovid – Search Date: 28 July 2021	
1	“T2DM”.tw.
2	“type II diabetes”.tw.
3	“type 2 diabetes”.tw.
4	((type 2 or type II) ADJ1 (diabet*)).tw.
5	“non-insulin dependent diabetes”.tw.
6	1 or 2 or 3 or 4 or 5
7	(Australia* ADJ2 (native or Indigenous or Aboriginal or Aborigin* or First Nation* or First People* or First)).tw.
8	(Aboriginal and Torres Strait Islander* or Torres Strait Islander*).tw.
9	(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).tw.

10	7 or 8
11	9 and 10
12	10 or 11
13	6 and 12
14	Limit 13 to dt="20000101-20201231"
15	Limit 14 to English language

2. Further information on data extraction and critical appraisal

The Cochrane Risk of Bias 2.0 Tool (https://methods.cochrane.org/risk-bias-2) was used in randomised trials. Five domains were evaluated for risk of bias: the randomisation process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. The Risk of Bias in Non-Randomized Studies–of Interventions tool (https://training.cochrane.org/handbook/current/chapter-25) was applied to non-randomised studies (including one follow-up study). Three sections (pre-intervention, at intervention, and post-intervention) were checked for bias from: confounding, participant selection, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes and selection of the reported results. The Newcastle–Ottawa Scale (https://www.ncbi.nlm.nih.gov/books/NBK115843/bin/appe-fm3.pdf) was used to appraise cohort studies. Three factors were examined: (1) *selection*, including representativeness of the exposed cohort, selection of the non-exposed cohort, ascertainment of exposure, and demonstration that at the start of the study the outcome of interest was not present; (2) *comparability*, assessed based on study design and analysis, and whether confounding variables were adjusted for; and (3) *outcome*, based on the follow-up period and cohort retention, and ascertained by independent blind assessment, record linkage, or self-report. Overall quality was rated as good/fair/poor for each domain.

3. Summary characteristics of the included publications

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
McDermott et al[12], 2001 The Torres Strait and Northern Peninsula arca, North QLD	Not provided	To evaluate a system for improving diabetes care in remote Aboriginal and/or Torres Strait Islander communities.	A randomised, unblinded cluster trial 12 months.	8 Intervention sites: N=250 13 control sites: N=305	Intervention site: 52.1 Control sites: 52.4	Not provided	Diabetes recall system, staff training in basic diabetes care, regular phone calls, a two-monthly newsletter and a mid-project workshop.	Weight, BP, serum lipid levels, glucose monitoring and control, ACR, etc.	Intervention sites showed greater improvement in most indicators than control sites (RR, 1.21; 95% CI, 1.03-143). The intervention group showed a 32% reduction in hospital admissions for diabetes-related conditions over the study period (P=0.012).
Bailie et al[13], 2004 Tiwi Islands and the Katherine West Region, NT	Not provided	To examine the diabetes care in participant outcomes after a multifaceted health-service intervention.	Follow-up study of a coordinated care trial. Three years.	N=137	Age range 23-86	38% (52)	Implementation of a multifaceted trial, including planning responsibility to local health boards, the development of clinical guidelines, staff training, and audit and feedback.	HbA1c, BP, and proportion of participants meeting targets.	The proportion of participants (HbA1c<7%) improved from 19% to 32%.
McDermott et al[14], 2004 The Torres Strait Islands	Not provided	To see whether improvement was sustained after three years of a RCT in Aboriginal and/or Torres Strait Islander patients.	Follow-up study of a randomised cluster trial. Audit records of 1999 and 2002.	1999: N=555 (Number on register) 2002:N=921.	Not provided	Not provided	Usage of registers, recall and reminder systems, diabetes care plans, together with a specialist outreach service.	HbA1c, weight, BP, serum lipids, etc.	The proportion of people with good glycemic control (HbA1c<7%) increased from 18% to 25% in line with increased use of insulin.
Harris et al[15], 2005 Wollongong, NSW	Dharawal	To support self-management of diabetes through a 5-Day Residential Camp.	Prospective study. Six months.	N=18	A=50.78	M=44% (8)	A 5-Day Diabetes Self-Management Residential Camp.	HbA1c, total cholesterol, triglycerides, etc.	HbA1c levels were significantly lower (8.13±1.72) at the 3 months period than at baseline (9.24±2.00).

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
Si et al[16], 2006 Tiwi Islands and the Katherine West Region, NT	Not provided	To assess the effect of employing Aboriginal health workers on delivery of diabetes care.	Prospective cohort study. (follow-up) Three years.	N=146	Not provided	M=38% (55)	Guideline scheduled diabetes services 1.basic measurements and vaccinations 2.clinical examinations 3. laboratory investigations 4. counselling.	Compliance with diabetes services. Measuring Aboriginal health workers profile and covariates. Intermediate HbA1c and BP.	The number of Aboriginal health workers was positively related to the delivery of guideline-scheduled diabetes services.
Shephard et al[17], 2006 Port Lincoln, the Riverland, and Meningie in SA, Kalgoorlie in WA.	Barngarla Erawirung Ngarrindjeri Wongatha	To evaluate the use of point of care testing services in 4 rural and remote Aboriginal medical centers in Australia.	Prospective cohort study. Three years.	N= 246 (Three communities)	A1=41 A2&3= 43	M1=47% M2=30% M3= 42%	Point of care testing services.	HbA1c, total cholesterol, LDL, weight, ACR, etc.	Point of care testing has significant reduction on HbA1c. There was significant improvement of satisfaction for diabetes service in study participants with diabetes.
Bailie et al[18], 2007 The Top End of the NT	Not provided	To assess the impact of a quality improvement (QI) intervention for the diabetes management in 12 Aboriginal and/or Torres Strait Islander health centers.	Retrospective audit. Three years.	N=295	48	M=39% (115)	The QI intervention featured two annual cycles of assessment, feedback workshops, action planning, and implementation of system changes.	HbA1c, BP and total cholesterol levels, adherence to guideline-scheduled services.	Mean HbA1c value improved from 9.3 to 8.9% (mean difference -0.4%, 95% CI -0.7, -0.1). Adherence to guideline-scheduled processes improved.

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
Battersby et al[19], 2008 Ceduna, SA Port Lincoln, SA	Barngarla Wirangu	To test the Flinders model of self-management care planning in diabetes self-management care.	Prospective cohort study. (pilot study) 12 months.	N=60	A=46	M=47% (28)	The Flinders model of care: 1. The involvement of Aboriginal health workers and GPs. 2. Identify participants' strength and barriers, and identify service, education and intervention needs. Customised the care planning including medical monitoring, preventative, and follow-up appointments.	HbA1c, a serum measure of blood sugar control, and BP.	There was a significant reduction in mean HbA1c levels from baseline (8.74) to 12 months after treatment (8.09) p<.01.
Si et al[20], 2010 The Top End of the NT, Far West NSW, WA, and North QLD.	Not provided	To see diabetes care quality assessment and analyse its diversity among 62 Aboriginal community health centers.	Retrospective audit. Five years.	N=1593	51	M=40% (637) Number of community health centers=62	Diabetes care (use the Audit and Best practice for Chronic Disease Extension project to assess).	Control of HbA1c, BP, total cholesterol and ACR. Adherence to diabetes care, treatment.	A broad range of variation was found among the different categories of diabetes care measures and centers.
Harch et al[21], 2012 The Fitzroy Valley of the Kimberley, WA	Bunuba	To evaluate a new model of partnership care.	Retrospective audit. 7 months.	N=341 Comparison: Within group comparison	49	M=39% (133) Aboriginal= 96.5% (329)	Regular community health promotion days for screening and education, and team outreach clinics for the development of self-management care plans with patients.	Process and intermediate outcome indicators.	There were statistically significant improvements in diabetes-related examination. Significant increases in the proportion of patients achieving cholesterol and triglycerides therapeutic targets occurred.

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
Marley et al[22], 2012 Derby, WA	Nyikina	To describe service characteristics of DAHS, document diabetes management activities and intermediate clinical outcomes.	Retrospective audit. 120 months.	Intervention (DAHS): N=254 Comparison Record of Aboriginal and/or Torres Strait Islander primary health care.	Intervention (DAHS): A=46	Intervention (DAHS): M=37% (94)	Well supported remote DAHS setting to patients with diabetes.	HbA1c, weight, lipid levels, blood pressure, etc. Proportions of patients achieving clinical targets.	There were significant improvements in systolic BP, diastolic BP and cholesterol levels and small improvements in HbA1c levels over the 10 years, proving a well-supported ACCHS is good for diabetes monitoring.
Chung et al[23], 2014 Winnunga Nimmityjah Aboriginal Health Service (Canberra), ACT	Ngunnawal	To evaluate the effectiveness of a primary care diabetes clinic in Winnunga.	A retrospective clinical audit of a random sample of 65 adults. 12 months.	Attended: N=29 Not attend: N=36	Attended: A=56.9 Not attend: A=54.5	Attended: M=41% (12) Aboriginal and/or Torres Strait Islander =93% (61)	Diabetes clinic attendees. The clinic provides cooking demonstrations and patient education on lifestyle changes and diabetes management. Non-attendees.	HbA1c, LDL, HDL, total cholesterol, triglycerides, BP, BMI, etc.	Statistically significant difference was found between diabetes clinic attendees and non-attendees in meeting diabetes check guidelines. But clinical outcomes between the two groups were not statistically different.
Stoneman et al[24], 2014 Kimberley, WA	Not provided	To compare service delivery and outcome measures between DAHS and other ACCHSs.	Retrospective audit. 12 months.	Intervention (Four sites: all ACCHS): N=348 Comparison Record of DAHS-2008-09	Intervention (Four sites: all ACCHS): A=52	Intervention (Four sites: all ACCHS): M=34% (118)	Well-designed health care delivery: clearly defined roles for staffs, involvement of Aboriginal health workers, efficient recall systems, and well-coordinated allied health services.	HbA1c, BP, WC, weight, total cholesterol, etc.	Well-designed health care delivery and CQI systems led to increased service delivery rates and improved clinical outcome measures in ACCHSs.

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
McDermott et al[25], 2015 Far North QLD	Not provided	To evaluate the effectiveness of a community-based health-worker led case management approach.	A pragmatic cluster RCT. 18 months.	Intervention (6 sites): N=83 Comparison (6 sites) N=108 A	Intervention site: 47.9 Control sites: 47.8	Intervention site: 42% (35) Control sites: 34% (37)	Received chronic care co-ordination from a community-based health worker. The waitlist control group received usual care.	HbA1c (%), BP, height, weight, serum fasting lipids, etc.	HbA1c reduction was significantly greater in the intervention group. A community level health-worker led model of diabetes care can be effective in improving diabetes control in remote Aboriginal and/or Torres Strait Islander communities.
O'Brien et al[26], 2016 Mooropna and Shepparton, VIC	Yorta Yorta	To achieve a substantial and durable weight loss, so that to achieve the remission of type 2 diabetes mellitus.	A prospective cohort study with comparative control data derived from an earlier RCT. 24 months.	Intervention (Aboriginal and/or Torres Strait Islander LAGB): N=30 Comparison (Non-Indigenous LAGB) N=30	Intervention (Aboriginal and/or Torres Strait Islander LAGB): A=44.6 Comparison (Non-Indigenous LAGB) A=46.6	Intervention (Aboriginal and/or Torres Strait Islander LAGB): M=13.3% (4) Comparison (Non-Indigenous LAGB) M=50% (23)	Aboriginal and/or Torres Strait Islander people received treatment of LAGB to lose weight. Controls: Non-indigenous Australians from an earlier RCT using a similar protocol.	Weight, HbA1c, remission of diabetes, insulin, lipids, etc.	There was a significant improvement in diabetes remission. Quality of life improved. The outcomes for weight loss and diabetes remission were not different from the LAGB group of the RCT.
Kapellas et al27, 2017 Darwin, Katherine, Alice Springs, NT	Larrakia Jawoyn Arrernte *Participants were recruited from a correctional facility in Larrakia (Darwin), and Arrernte (Alice Springs) so could be from other nations.	To report on the effect of periodontal therapy on glycemic control.	RCT. 3 months.	Intervention: N=35 Comparison N=27	Intervention: (SD)=45.5 (10.9) Comparison (SD)=46.4 (9.1)	Intervention: M=51% (18) Comparison M=63% (17)	Received full-mouth non-surgical periodontal scaling. Controls: untreated.	HbA1c, total cholesterol, HDL, CRP and periodontal status.	Non-surgical periodontal therapy did not significantly reduce HbA1c.

Reference, year, location	Aboriginal/Torres Strait Islander Nation	Aim	Study design; Duration	N=Sample Size;	Mean age;	M=Male (%)	Interventions/Controls	Outcome measures	Findings
Hays et al[28], 2017 Kimberley, NA	Kukatja Tjurabalan Walmajarri	To determine the effect of treatment for Strongyloides stercoralis infection on type 2 diabetes mellitus in Australian Aboriginal population.	Cohort study. Three years.	N= 259 Treated group= 91 Untreated=168	Not provided	M=41% (96)	Two doses of ivermectin 0.2 mg/kg/dose Controls: Untreated	HbA1c, BMI, Random blood glucose level.	Statistically significant glycemic control improvement in treatment group when the patients with pre-existing type 2 diabetes mellitus treated for S. stercoralis infection.

RCT, Randomised control trial; SD, Standard deviation; RR, relative risk; HbA1c, glycated haemoglobin; BMI, Body Mass Index; BP, blood pressure; HDL, High-density lipoprotein; WC, waist circumference; CRP, C-reactive protein; ACR, urine Albumin Creatinine Ratio. POCT, point of care testing; LAGB, laparoscopic adjustable gastric banding; ACCHS, Aboriginal community-controlled health service; DAHS, Derby Aboriginal Health Service; CQI, continuous quality improvement; AHWs, Aboriginal health workers; NSW, New South Wales; VIC, Victoria; WA, Western Australia; SA, South Australia; QLD, Queensland; NT, Northern Territory; ACT, Australian Capital Territory; NA, Northern Australia (includes those parts of Queensland and Western Australia north of latitude 26° and all the Northern Territory).

4. Quality assessment of included studies

Randomised controlled trials

Reference	Randomisation process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Bias
McDermott et al[12], 2001	Low	Low	Low	Low	Low	Low
McDermott et al[25], 2015	Low	Low	Low	Low	Low	Low
Kapellas et al[27], 2017	Low	Low	Low	Low	Low	Low

Non-randomised studies (follow-up studies)

Reference	Pre-intervention		At intervention	Post-Intervention				Overall risk of bias
	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported results	Low/moderate/serious/ critical
Bailie et al[13], 2004	Low	Low	Low	Low	Low	Low	Low	Low
McDermott et al[14], 2004	Low	Low	Low	Low	Low	Low	Low	Low
Si et al[16], 2006	Low	Low	Low	Low	Low	Low	Low	Low

Cohort studies

Reference	Representativeness of exposed cohort	Selection of the non-exposed cohort from the same community as the exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up of cohorts (follow-up≥6 months)	Quality score
Harris et al[20], 2005	Participants were somewhat representative: Aboriginal people diagnosed with diabetes and recorded on the Illawarra Aboriginal Medical Service data base. †	No setting of non-exposed group.	Ascertainment of exposure (a 5-Day Diabetes Self-Management Residential Camp) was held at a family resort facility 200km south of Wollongong. †	Yes. †	The study controlled for factors that the participants' diabetes status was poorly controlled over years, failing to respond to conventional medication and educational interventions. †	Outcome of HbA1c was measured through standard pathology protocols at a single pathology service in the Illawarra. Effectiveness of self-management was determined using the SE Type 2 scale, and this instrument was applied by a trained Psychologist. †	Yes. 6 months. †	No statement.	Good
Shephard et al[22], 2006	The participants of the study included from four rural and remote Australian Aboriginal medical services were somewhat representative: participants with chronic disease such as type 2 diabetes mellitus. †	No description of non-exposed cohort.	Exposure "Point of care testing" instruments were the Bayer DCA 2000 and the Cholestech LDX lipid analyser. Results were entered into patient management system and on single-page pro forma. †	Yes. †	The study compared the improvement in glycaemic control after the introduction of point of care testing with baseline data. Differences before and after point of care testing were analysed with paired sample t-tests. †	Assessment of outcome were independent urinalysis and blood sample analysis (HbA1C, weight, total cholesterol, LDL, albuminuria). †	3 years of assessment data from 2002 to 2004 were collected in this study. †	No statement.	Poor

Reference	Representativeness of exposed cohort	Selection of the non-exposed cohort from the same community as the exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up of cohorts (follow-up≥6 months)	Quality score
Bailie et al[18], 2007	Participants were truly representative: Retrospective audit of records for Aboriginal and/or Torres Strait Islander people 16 years or older who had a diagnosis of type 2 diabetes. †	No description of non-exposed cohort.	Exposure was the quality improvement intervention for diabetes management in 12 Aboriginal and/or Torres Strait Islander health centres. †	Yes. †	Multilevel regression models were used to assess changes in processes and intermediate outcomes of diabetes care. ††	Changes in process of diabetes care, in pharmacological treatment rates, and in intermediate patient outcomes (HbA1c, blood pressure, total cholesterol and ACR) were assessed. †	Enough. Two-year follow up. †	Adequate. Participants lived in the community for 6 months or more during the previous 12 months. †	Good
Battersby et al[19], 2008	Participants were truly representative: Aboriginal people had type 2 diabetes mellitus and aged 40 or above. †	No description of non-exposed cohort.	Exposure was the Flinders model of self-management diabetes care provided on Eyre Peninsula, South Australia. †	Yes. †	Data was analysed by comparing group pre- and post-scores for each measure and correlations between measures.	HbA1c, a serum measure of blood sugar control, and blood pressure were assessed at baseline, 6 and 12 months. †	Enough. 12-month follow-up. †	Follow up completed, but no statement of the follow-up rate.	Poor
Si et al[20], 2010	Participants were truly representative: clinical medical audits of community members type 2 diabetes in 62 Aboriginal community health centres from four states/territories participating in the ABCDE project. †	No description of non-exposed cohort.	Exposure "The Audit and Best-practice for Chronic Disease. †	Yes. †	The study controls for the health centre or individual patient level characteristics factors in its analysis. Multilevel random effects regression models (linear or logistic) were used to assess differences in quality of diabetes care between regions. ††	Patient intermediate outcomes were independently assessed, including most recent values of HbA1c, blood pressure, total cholesterol and ACR within 12 months prior to the audit. †	5 years of clinical data during 2005 – 2009 were used in this audit. †	Adequate. The study participant living in the community ≥6 months during study period. †	Good

Reference	Representativeness of exposed cohort	Selection of the non-exposed cohort from the same community as the exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up of cohorts (follow-up≥6 months)	Quality score
Harch et al[21], 2012	Participants were somewhat representative: a retrospective clinical audit of patients with type 2 diabetes attended Fitzroy Valley health service within 2008 and 2010, and 96.5% were Aboriginal. †	Yes. Outcomes were compared before and after the systematic proactive approach, so the non-exposed cohort was from the same community as exposed. †	Ascertainment of exposure (a new model of partnership care) was from the clinical information system. †	Yes. †	The study controls for the attendances at Fitzroy Valley health service within 2 years in its design. Differences in process and intermediate outcomes between the two time-points were analysed with paired sample t-tests. †	Process of care indicators and intermediate therapeutic outcomes (blood pressure, HbA1c, BMI, etc.) were benchmarked against the current regional guideline, The Kimberley Chronic Disease Therapeutic Protocols: Diabetes II. †	6 months of data were reviewed in this clinical audit. †	No statement.	Good
Marley et al[22], 2012	Participants were truly representative: Retrospective audit of records for Aboriginal and/or Torres Strait Islander patients 15 years old who had a confirmed diagnosis of type 2 diabetes. †	No. Non-exposed cohort was drawn from a different source (record of Aboriginal and/or Torres Strait Islander primary health care).	Ascertainment of exposure (received DAHS primary health care) was from Project Ferret (Pen Computer Systems), also verified with paper record. †	Yes. †	The study controls the participants were regular DAHS patients in its design. A non-parametric test for trend across ordered groups was used to assess trend over time. †	Clinical outcome measures were assessed each audit year. Overall median HbA1c and cholesterol levels were determined using medians for individual patients during each audit year. The proportions of patients with median HbA1c and cholesterol levels meeting recommended targets were determined for each audit year. †	Retrospective audit of records between 1 July 1999 and 30 June 2009. †	This audit included the participants with a minimum 6-month follow-up. †	Good
Chung et al[23], 2014	Participants were somewhat representative: a retrospective clinical audit of a random sample of 65 adult patients with type 2 diabetes attended Winnunga Nimmityjah Service in Canberra. †	Non-exposed group was from the same 'Winnunga community'. †	Diabetes clinic attendance was ascertained from clinic electronic medical record. †	Yes. †	The comparability of the cohort was done based on the attendance to the Winnunga diabetic clinic. †	Electronic medical patient records were audited using outcome targets and optimal monitoring. †	Retrospective clinical audit during 2012 and participants are active clients (ie visited Winnunga three or more times over 2 years). †	Complete follow up. †	Good

Reference	Representativeness of exposed cohort	Selection of the non-exposed cohort from the same community as the exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up of cohorts (follow-up≥6 months)	Quality score
Stoneman et al[24], 2014	Participants were truly representative: Retrospective audit of records for Aboriginal and/or Torres Strait Islander primary care patients aged ≥15 years with a confirmed diagnosis of type 2 diabetes mellitus at four Kimberley ACCHSs. †	Yes. Non-exposed cohort was from the same community but from a different period (DAHS Record of 2008-09). †	Ascertainment of exposure (well-designed health care delivery) was from MMEx, a patient information and recall system introduced across the four ACCHSs. †	Yes. †	The study takes the records of DAHS as a benchmark in its analysis. Results from ACCHS-2 to 4 were compared with DAHS using the $\chi 2$ test for service activity, and the Mann–Whitney test for clinical outcome measures. †	Outcomes were assessed in 6 months (weight, blood pressure, HbA1c and etc.), and were assessed annually (urine ACR, estimated glomerular filtration rate, total cholesterol etc). †	Retrospective audit of records from 1 July 2011 to 30 June 2012. †	Data of 6-month follow-up in DAHS and ACCHS-2 were analysed. The third and fourth ACCHS had substantially less complete follow up.	Good
O'Brien et al[26], 2015	Participants were somewhat representative: A prospective cohort study of 30 Aboriginal and/or Torres Strait Islander people living with obesity from the Rumbalara Aboriginal Co-operative in Central Victoria with diabetes diagnosed within the last 10 years. †	No. Outcomes were compared with those of non-Indigenous Australians from an earlier RCT using a similar protocol.	Ascertainment of exposure LAGB was from a web-based electronic data record. †	Yes. †	The comparability of the exposed group and the non-exposed group controlled for ethics, age, BMI and HbA1c. Single sample t test was used to compare 2-year data with the mean data for the non-surgical participants of the diabetes RCT. ††	Outcomes were assessed by medical check. Blood test (remission of diabetes examination) and weight loss examination. No self-reported weight data are included. †	Yes. 2 years of follow-up were done during August 2012. †	Follow-up (26/30=86.6%) at 2 years was completed. †	Good
Hays et al[28], 2017	Participants were somewhat representative: Strongyloides stercoralis infection on type 2 diabetes mellitus in an	Yes. Non-treatment group (patients with type 2 diabetes mellitus who were untreated for strongyloides infection) was from	Ascertainment of exposure (strongyloides stercoralis infection and treatment) was from laboratory	Yes. †	The study controlled for the treatment history and used an adjusted model for age, sex, baseline	Outcome assessments were independent parasitological testing and metabolic testing in blood specimens. †	Yes. 3 years of follow-up of exposed and non-exposed cohort were done in this study. †	Follow up was successful in 207(79.9%) of subjects. †	Good

Reference	Representativeness of exposed cohort	Selection of the non-exposed cohort from the same community as the exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up of cohorts (follow-up≥6 months)	Quality score
	Australian Aboriginal population. †	the same source as treated group. †	record. †		HbA1c and change in BMI. Multivariable linear regression was used, and adjustment was also undertaken for initial HbA1c and for adherence to prescribed medication. ††				

† one star awarded; †† two stars awarded. A study can be given a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability.

Thresholds for converting the Newcastle-Ottawa scales to AHRQ standards (good, fair, and poor):

Good quality: 3 or 4 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain

Fair quality: 2 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain

Poor quality: 0 or 1 star in selection domain OR 0 stars in comparability domain OR 0 or 1 stars in outcome/exposure domain

RCT, Randomised control trial; HbA1c, glycated haemoglobin; BMI, Body Mass Index; LDL, Low-density lipoprotein; ACR, urine Albumin Creatinine Ratio; LAGB, laparoscopic adjustable gastric banding; ACCHS, Aboriginal community-controlled health service; DAHS, Derby Aboriginal Health Service;

5. Proportion of participants with type 2 diabetes who achieved therapeutic targets after intervention

			Therapeutic targets						
Reference	**Intervention**	**Groups**	**HbA1c ≤ 7.0%**	**BP ≤130/80 mmHg**	**Total cholesterol <4 mmol/L or <5.5mmol/L**	**Triglycerides <2mmol/L or <1.5mmol/L**	**HDL>1 mmol/L**	**LDL<2.5 mmol/L**	**BMI<25 kg/m^2**
Chung, 2014[13]	Clinic attendance	clinic attendees	30	29	33	(trig<1.5) =19	41	59	0
		non-attendees	47	39	28	(trig<1.5) =19	55	42	4
Stoneman, 2014[16]	Well-design health care delivery	All ACCHSs	26	38	34	-	-	-	-
		DAHS	34	69	25	-	-	-	-
Marley, 2012[17]	Well supported health service	Aboriginal and/or Torres Strait Islander PHC	22-32		29	-	-	-	-
		Australians PHC	37-57	34	22	-	-	-	-
Bailie, 2004[19]	Multifaceted health service intervention	Baseline	19	39	-	-	-	-	-
		Month 6	16	35	-	-	-	-	-
		Year 1	17	31	-	-	-	-	-
		Year 2	29	39	-	-	-	-	-
		Year 3	32*	28	-	-	-	-	-
McDermott, 2004[21]	Improved diabetes care service	Pre	18.4	-	-	-	-	-	-
		Post	24.5	-	-	-	-	-	-
Shephard, 2006[22]	Point of care testing	Baseline point of care testing	18	-	-	-	-	-	-
		After point of care testing	24†	-	-	-	-	-	-
Si, 2010[23]	Diabetes care quality assessment	NT Top End	27	37	30	-	-	-	-
		NT Central Australia	27	43	34	-	-	-	-
		Far West NSW	34	19	19	-	-	-	-
		WA	22	29	22	-	-	-	-
		North QLD	25	40	28	-	-	-	-
		Total	27	36	29	-	-	-	-
Harch, 2012[28]	Partnership care	Pre	28.4	-	24.1	(trig<2) =39.4	-	-	19.7
		Post	28.7	-	28.1*	(trig<2) =44.7*	-	-	20.1†

* P<0.05 between groups.

HbA1c, glycated haemoglobin; BMI, Body Mass Index; BP, blood pressure; HDL, High-density lipoprotein; LDL, Low-density lipoprotein; ACCHS, Aboriginal community-controlled health service; DAHS, Derby Aboriginal Health Service; PHC, Primary health care; NSW, New South Wales; VIC, Victoria; QLD, Queensland; NT, Northern Territory.

6. Summary of ongoing registered intervention studies

Reference, year, study location	Aim	Study design	Plan sample size	Intervention/controls	Outcome Measure	Register/publish
Brown et al.[28], 2007 Unknown	To provide evidence regarding the medication appropriate for first line medication in type 2 diabetes mellitus in high-risk Aboriginal and/or Torres Strait Islander population.	Double blinded randomised controlled trial.	60	Intervention: Pioglitazone 15mg taken orally once a day for 4weeks if tolerated increased to 15mg oral twice a day taken for 6 months. Control: Metformin 500mg oral twice a day for 4 weeks if tolerated increased to 1g oral twice a day taken for 6 months.	HbA1c, medication side effects, weight distribution and weight gain.	WHO-ICTRP ACTRN12607000135415 Overall status: Withdrawn (Unable to secure supply of the study medication)
Schmidt et al.[29], 2012 North Queensland	To see the effectiveness of an integrated, family-centered and culturally safe model of care in chronic condition management.	Open parallel cluster randomised controlled trial.	150 participants in each treatment arm.	Intervention: employ an Aboriginal and/or Torres Strait Islander health worker who receive intensive clinical training to case manage participants. Control: participants receive usual care.	Reduction in HbA1c, clinical care process, avoidable hospitalisations, etc.	Publish: BMC Public Health
Paul et al.[30], 2013 NSW and Queensland	To examine the impact of a primarily web-based educational intervention on the diabetes care provided by General Practioners in rural areas.	Cluster randomised controlled trial.	11 towns in each treatment group.	Intervention: General Practioners are offered education on best practice diabetes care, a moderated discussion forum, access to targeted and specialist advice, and town-based performance feedback on diabetes monitoring and outcomes. Control: No interventions provided.	HbA1c (glycaemic control), frequency of HbA1c testing, blood lipid and urinary albumin testing and control etc.	Publish: Implementation Science. Australian New Zealand Clinical Trials Registry: ACTRN12611000553976
Cohen et al.[31], 2015 Remote communities	To investigate the efficacy of once weekly injection of exenatide- long-acting release in addition to standard diabetes care on blood glucose control.	Open randomised controlled trial.	No description.	Intervention: Exenatide long-acting release 2mg will be administered as a once weekly. Control: Standard hypoglycemic therapy.	Change in HbA1c, blood pressure, and urine albumin, etc.	WHO-ICTRP ACTRN12615000913572 Publication: Ekinci EI, Pyrlis F, Hachem M, et al. 2021[32]

HbA1c, glycated haemoglobin.

7. Other barriers to Aboriginal and Torres Strait Islander diabetes care that any intervention must take into consideration

- A lack of intensive and sustained diabetes care in some health centers/clinics, with diabetes service delivery varying between Aboriginal and Torres Strait Islander communities.
- High staff turnover in regional and remote communities.
- Lack of sufficient Aboriginal and Torres Strait Islander health workers and a lack of structured staff training, especially in areas with a high staff turnover.
- Lack of clear responsibility for diabetes management.
- Lack of regular audit and feedback.
- Lack of work-practice support.
- Fewer diabetes education services available for Aboriginal and Torres Strait Islander people.
- Reluctance of Aboriginal and Torres Strait Islander people attend the diabetes clinics or accept some acute, non-scheduled services.
- Racism in health care.

8. References

12. McDermott RA, Schmidt BA, Sinha A, Mills P. Improving diabetes care in the primary healthcare setting: a randomised cluster trial in remote Indigenous communities. Med J Aust 2001; 174: 497-502.
13. Bailie RS, Si D, Togni SJ, et al. A multifaceted health-service intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. Med J Aust 2004; 181; 195-200.
14. McDermott R, Tulip F, Sinha A. Sustaining better diabetes care in remote indigenous Australian communities. Qual Saf Health Care 2004; 13: 295-298.
15. Harris C, Curtis O. Supporting self-management of diabetes in Aboriginal people living with diabetes through a 5 day residential camp. Aborig Isl Health Work J 2005; 29: 4-11.
16. Si D, Bailie RS, Togni SJ, et al. Aboriginal health workers and diabetes care in remote community health centres: a mixed method analysis. Med J Aust 2006; 185: 40-45.
17. Shephard MD, Mazzachi BC, Shephard AK, et al. Point-of-care testing in Aboriginal hands-a model for chronic disease prevention and management in Indigenous Australia. Point Care 2006; 5: 168-176.
18. Bailie R, Si D, Dowden M, et al. Improving organisational systems for diabetes care in Australian Indigenous communities. BMC Health Serv Res 2007; 7: 67.
19. Battersby MW, Kit JA, Prideaux C, et al. Research 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.
20. Si D, Bailie R, Dowden M, et al. Assessing quality of diabetes care and its variation in Aboriginal community health centres in Australia. Diabetes Metab Res Rev 2010; 26: 464-473.
21. Harch S, Reeve D, Reeve C. Management of type 2 diabetes: a community partnership approach. Aust Fam Physician 2012; 41: 73-76.
22. Marley JV, Nelson C, O'Donnell V, Atkinson D. Quality indicators of diabetes care: an example of remote-area Aboriginal primary health care over 10 years. Med J Aust 2012; 197: 404-408.
23. Chung F, Herceg A, Bookallil M. Diabetes clinic attendance improves diabetes management in an urban Aboriginal and Torres Strait Islander population. Aust Fam Physician 2014; 43: 797-802.
24. Stoneman A, Atkinson D, Davey M, Marley JV. Quality improvement in practice: improving diabetes care and patient outcomes in Aboriginal Community Controlled Health Services. BMC Health Serv Res 2014; 14: 481.
25. McDermott RA, Schmidt B, Preece C, et al. Community health workers improve diabetes care in remote Australian Indigenous communities: results of a pragmatic cluster randomized controlled trial. BMC Health Serv Res 2015; 15: 68.
26. O'Brien PE, DeWitt DE, Laurie C, et al. The effect of weight loss on Indigenous Australians with diabetes: a study of feasibility, acceptability and effectiveness of laparoscopic adjustable gastric banding. Obes Surg 2016; 26: 45-53.
27. Kapellas K, Mejia G, Bartold PM, et al. Periodontal therapy and glycaemic control among individuals with type 2 diabetes: reflections from the PerioCardio study. Int J Dent Hyg 2017; 15: e42-e51.
28. Hays R, Giacomin P, Olma L, et al. The relationship between treatment for Strongyloides stercoralis infection and type 2 diabetes mellitus in an Australian Aboriginal population: a three-year cohort study. Diabetes Res Clin Pract 2017; 134: 8-16.
29. Schmidt B, Wenitong M, Esterman A, et al. Getting better at chronic care in remote communities: study protocol for a pragmatic cluster randomised controlled of community based management. *BMC Public Health* 2012; 12: 1017.
30. Paul CL, Piterman L, Shaw J, et al. Diabetes in rural towns: effectiveness of continuing education and feedback for healthcare providers in altering diabetes outcomes at a population level: protocol for a cluster randomised controlled trial. *Implement Sci* 2013; 8: 30.
31. Cohen N. Exenatide-LAR in addition to standard care in Indigenous Australians with type 2 diabetes and effect on glycaemic control 2018 [clinical trial registration]. Australian New Zealand Clinical Trials Registry ACTRN12615000913572; 2 Sept 2015; updated 17 Dec 2018. https://anzctr.org.au/ACTRN12615000913572.aspx (viewed Mar 2021).
32. Ekinci EI, Pyrlis F, Hachem M, et al. Feasibility of once weekly exenatide–LAR and enhanced diabetes care in Indigenous Australians with type 2 diabetes (Long-acting–once-weekly-exenatide laR–SUGAR, "Lower SUGAR" study). Intern Med J 2021; 51: 1463-1472.