

Lifestyle interventions to improve glycemic control in adults with type 2 diabetes living in
Low-and-Middle Income Countries: A Systematic Review and Meta-analysis of
Randomized Controlled Trials (RCTs)

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Table S1. Search Strategy.

Diabetes Type 2

"Type 2 diabetes mellitus" OR "Diabetes Mellitus, Noninsulin-Dependent" OR "Diabetes Mellitus, Ketosis-Resistant" OR "Diabetes Mellitus, Ketosis Resistant" OR "Ketosis-Resistant Diabetes Mellitus" OR "Diabetes Mellitus, Non-Insulin Dependent" OR "Diabetes Mellitus, Non-Insulin-Dependent" OR "Non-Insulin-Dependent Diabetes Mellitus" OR "Diabetes Mellitus, Stable" OR "Stable Diabetes Mellitus" OR "Diabetes Mellitus, Type II" OR "NIDDM" OR "Diabetes Mellitus, Noninsulin Dependent" OR "Diabetes Mellitus, Maturity-Onset" OR "Diabetes Mellitus, Maturity Onset" OR "Maturity-Onset Diabetes Mellitus" OR "Maturity Onset Diabetes Mellitus" OR "MODY" OR "Diabetes Mellitus, Slow-Onset" OR "Diabetes Mellitus, Slow Onset" OR "Slow-Onset Diabetes Mellitus" OR "Noninsulin-Dependent Diabetes Mellitus" OR "Noninsulin Dependent Diabetes Mellitus" OR "Maturity-Onset Diabetes" OR "Diabetes, Maturity-Onset" OR "Maturity Onset Diabetes" OR "Type 2 Diabetes" OR "Diabetes, Type 2" OR "Diabetes Mellitus, Adult-Onset" OR "Adult-Onset Diabetes Mellitus" OR "Diabetes Mellitus, Adult Onset"

AND

Lifestyle Interventions

"Exercises" OR "Physical Activity" OR "Activities, Physical" OR "Activity, Physical" OR "Physical Activities" OR "Exercise, Physical" OR "Exercises, Physical" OR "Physical Exercise" OR "Physical Exercises" OR "Acute Exercise" OR "Acute Exercises" OR "Exercise, Acute" OR "Exercises, Acute" OR "Exercise, Isometric" OR "Exercises, Isometric" OR "Isometric Exercises" OR "Isometric Exercise" OR "Exercise, Aerobic" OR "Aerobic Exercise" OR "Aerobic Exercises" OR "Exercises, Aerobic" OR "Exercise Training" OR "Exercise Trainings" OR "Training, Exercise" OR "Trainings, Exercise" OR "Cool-Down Exercise" OR "Gymnastics" OR "Muscle Stretching Exercises" OR "Physical Conditioning, Human" OR "Circuit-Based Exercise" OR "Endurance Training" OR "High-Intensity Interval Training" OR "Plyometric Exercise" OR "Resistance Training" OR "Running" OR "Jogging" OR "Swimming" OR "Walking" OR "Stair Climbing" OR "Warm-Up Exercise"

AND

"Diet" OR "Diet Fads" OR "Diet, Atherogenic" OR "Diet, Carbohydrate Loading" OR "Diet, High-Protein Low-Carbohydrate" OR "Diet, Ketogenic" OR "Diet, Cariogenic" OR "Diet, Diabetic" OR "Diet, Fat-Restricted" OR "Diet, Gluten-Free" OR "Diet, High-Fat" OR "Diet, High-Protein" OR "Diet, High-Protein Low-Carbohydrate" OR "Diet, Mediterranean" OR "Diet, Protein-Restricted" OR "Diet, Reducing" OR "Diet, Sodium-Restricted" OR "Diet, Vegetarian" OR "Diet, Macrobiotic" OR "Diet, Vegan" OR "Diet, Western" OR "Dietary Approaches To Stop Hypertension" OR "Energy Intake" OR "Caloric Restriction" OR "Fasting" OR "Healthy Diet" OR "Portion Size" OR "Serving Size"

OR

"Healthy Lifestyle" OR "Healthy Aging" OR "Healthy Diet" OR "Lifestyle, Healthy" OR "Lifestyles, Healthy" OR "Healthy Life Styles" OR "Healthy Lifestyles" OR "Healthy Life Style" OR "Life Style, Healthy" OR "Life Styles, Healthy"

OR

"Cessation, Smoking" OR "Smoking Cessations" OR "Stopping Smoking" OR "Smoking, Stopping" OR "Giving Up Smoking" OR "Smoking, Giving Up" OR "Smoking, Giving Up" OR "Up Smoking, Giving" OR "Quitting Smoking" OR "Smoking, Quitting" OR "Smoking Prevention"

OR

"Education, Health" OR "Community Health Education" OR "Education, Community Health" OR "Health Education, Community" OR "Consumer Health Information" OR "Health Literacy" OR "Health Education, Dental" OR "Health Fairs" OR "Health Promotion" OR "Healthy People Programs" OR "Weight Reduction Programs" OR "Patient Education as Topic" OR "Prenatal Education"

AND

Low-and Middle Income Countries

"Countries, Developing" OR "Country, Developing" OR "Developing Country" OR "Least Developed Countries" OR "Countries, Least Developed" OR "Country, Least Developed" OR "Developed Countries, Least" OR "Developed Country, Least" OR "Least Developed Country" OR "Less-Developed Countries" OR "Countries, Less-Developed" OR "Country, Less-Developed" OR "Less Developed Countries" OR "Less-Developed Country" OR "Under-Developed Nations" OR "Nation, Under-Developed" OR "Nations, Under-Developed" OR "Under Developed Nations" OR "Under-Developed Nation" OR "Third-World Countries" OR "Countries, Third-World" OR "Country, Third-World" OR "Third World Countries" OR "Third-World Country" OR "Third-World Nations" OR "Nation, Third-World" OR "Nations, Third-World" OR "Third World Nations" OR "Third-World Nation" OR "Under-Developed Countries" OR "Countries, Under-Developed" OR "Country, Under-Developed" OR "Under Developed Countries" OR "Under-Developed Country" OR "Developing Nations" OR "Developing Nation" OR "Nations, Developing" OR "Less-Developed Nations" OR "Less Developed Nations" OR "Less-Developed Nation" OR "Nation, Less-Developed" OR "Nations, Less-Developed" OR "Indigent*" OR "Indigency" OR "Low-Income Population" OR "Low-Income Populations" OR "Population, Low-Income" OR "Populations, Low-Income" OR "Low Income Population" OR "Low Income Populations" OR "Population, Low Income" OR "Populations, Low Income"

Table S2. Lifestyle interventions' characteristics.

Reference (Year)	Delivered by	Location	Duration	PA	Diet	Medication	Foot/ Skin care	Glucose Monitoring	Smoking Cessation	Stress Control	Monitor BP	Other
Chaveepojnkamjorn (2009)	Not stated	Healthcare and hospital setting	5 x 2-hour sessions monthly	√	√							Building good relationships, diabetes education, motivation for self-care activities Health seeking behaviour and psychological counselling Education on T2DM and complications Cardiovascular risk management
Chen (2019)	HCP/MDT	Healthcare and hospital setting	1 x 2 hour lecture every 2 months, with periodical follow-up interviews and an annual physical examination	√	√							
Chow (2016)	HCP/MDT	Home visits	2 home visits over 3 months. Average session = 62.47 (5.24) minutes		√	√						
Debussche (2018)	TPs	Health care setting	3 x 1.5 – 2-hour courses delivered over 1 year	√	√	√		√				
Essien (2017)	HCP/MDT	Hospital setting	12 x 2-hour education sessions (different themes) every 2 weeks, over 6 months	√	√	√	√	√	√			Lifestyle advice – no further details provided
Fottrell (2019)	TPLP	1) At home (to mobile)	1) 2 x weekly 1minute voice messages, x 14 months									
Gagliardino (2013)	TPLP	2) Community health centres Not stated	2) 1 x 2-hour session monthly x 14 months 4 x 90–120–minutes per week, with reinforcement session at 6 months	√	√		√	√				Advantages of weight loss and self-care and education on the effects of obesity
Gathu (2018)	TPLP	Hospital setting	3 x 1-hour sessions every 6 weeks over 6 months		√	√	√	√	√			
Goldhaber-Fiebert (2003)	HCP/MDT	Community health centres	11 x 90-minute nutrition classes weekly x 12 weeks +/- 3 x 60 minutes walking sessions per week x 12 weeks	√	√	√						Both intervention and control received a lecture on T2DM, it's symptoms, complications and treatment

Goodarzi (2012)	TPLP	Anywhere where access was possible by mobile phone	4 x weekly text messages x 12 weeks	√	√	√		√	
Grillo (2016)	HCP / MDT	Study centre	2-hour meeting weekly x 5 weeks, reinforcement meetings every 4 months for 1 year	√	√	√		√	
Huimin (2014)	Not stated	Not stated	1) 50% V02 max for 45 minutes, 3–5 times per week x 12 weeks 2) Supervised exercise—vigorous intensity (75% VO2 max for 45mins x 3 weekly x 12-weeks	√		√			
Jain (2018)	TPLP	Home visits	1 x home visit every 6 weeks, telephonic follow up and reminders every 15 days	√	√	√		√	
Ju (2018)	TPLP	Community health centres	At least once monthly x 12 months	√	√	√		√	
Li (2016)	HCP / MDT	Study centre	Nutrition classes every morning for 30 days, followed by discussion periods	√	√	√		√	
Malathy (2011)	HCP / MDT	Hospital and clinic setting	1 x 20-minute session per month x 3 months	√	√		√	√	√
Mash (2014)	TPLP	Community health centres	4 x 60-minute sessions			√			
Mohammadi (2018)	Not stated	Diabetes clinic	8 x 2-hour sessions	√	√	√		√	
Muchiri (2015)	HCP / MDT	Health care setting	8 x 2-hour weekly sessions, 4 x 1.5-hour monthly sessions & 2 x 1.5 hour bi-monthly sessions		√				
Ojieabu (2017)	HCP / MDT	Endocrinology clinics	4 x sessions over 4 months	√	√	√			
Ramadas (2018)	HCP / MDT	Medical or diabetes clinics	12 x diet plans over 6 months		√				
Salahshouri (2018)	HCP / MDT	Health care setting	8 x 1-hour sessions		√				

Overview of chronic diabetes complications

Overview of chronic diabetes complications

Participants lived together for 1 month where they received nutrition lectures about diabetes
Education on T2DM and complications

Education on self-efficacy,

Sanaeinasab (2020)	Not stated	Healthcare and hospital setting	Group face-to-face 1-hour weekly session for 6-weeks	√	√	√	√	√		behavioural change, economic management, religious laws, family support
Samtia (2013)	HCP / MDT	Diabetes clinic	Received self-management education over 5 months	√	√	√	√	√	√	Education on T2DM and complications
Ur Rehman (2017)	TPLP	Hospital Research Centre	3 days per week x 25 weeks	√	√	√				
Wattana (2007)	HCP / MDT	Community based	1 x 120-minute education class, 4 x 90-minute small group discussions, and 2 x 45-minute home visits per week	√	√	√	√		√	
Wichit (2017)	HCP / MDT	Hospital setting	3 x 2-hour education sessions (week 1, 5 and 9)	√	√		√	√		Coping with diabetes-related complications
Zhang (2018)	HCP / MDT	Hospital setting	Every month over 2 years	√	√	√	√	√	√	
Zheng (2019)	Not stated	Cardiac rehabilitation centre	1 x education session on initial visit, 1 x 45-minute education session, 1 x 40-minute practical session, 1 x 60-minute education session	√	√	√	√	√		Diabetes prevention, treating diabetes complications and developing personalised strategies for decision making
Zhong (2015)	TPLP	Community health centres	A.1.5 – 2 hours biweekly sessions x 12 weeks over 6 months	√	√	√	√		√	Depression, barriers to self-management, and obtaining resources and support

HCP / MDT: healthcare professional or a multidisciplinary team, intervention delivered by either a HCP or a MDT that included a health care professional. TPLP: trained peer or lay person, intervention delivered by a non-HCP but by a peer or lay person who had had training in diabetes education.

Table S3. Outcome measures reported in included trials.

Reference	Year	Outcome Measure(s)	Mean Pre-Value (SD)	Mean Post-Value (SD)	Change in Value	Lower 95% Confidence Interval	Upper 95% Confidence Interval	P-Value
Chaveepojnkamjorn Chen	2009	Quality of Life (EQ-5D-3L)	80.6 (7.5)	96.2 (5.8)	–	–	–	<0.001
	2019	Fasting Blood Glucose (mmol/L)	8.3	7.9	–	–	–	0.009
Chow Debussche	2016	HbA1c (%)	8.92 (2.02)	8.19 (1.43)	–	–	–	<0.001
	2018	BMI (kg/m ²)	28.3 (5.4)	–	–1.65	–2.25	–1.06	0.005
		Waist circumference (cm)	93.7 (12.1)	–	–3.34	–5.56	–1.13	0.003
		Systolic Blood Pressure (mmHg)	133 (27)	–	–6.46	–11.63	–1.28	0.003
		Diastolic Blood Pressure (mmHg)	82 (11)	–	–0.4	–2.27	3.07	0.36
		HbA1c (%)	10.6 (1.8)	–	–1.05	–1.54	–0.54	0.006
Essien	2017	HbA1c (%)	10.9 (1.7)	8.4	–	8.1	8.9	<0.0001
Fottrell	2019	BMI (kg/m ²)	21.9 (3.6)	–	–0.05	–0.28	0.17	0.631
		Systolic Blood Pressure (mmHg)	124.4 (20)	–	–1.05	–3.46	1.35	0.391
		Diastolic Blood Pressure (mmHg)	72.9 (11.2)	–	–1.12	–2.59	0.35	0.135
		Quality of Life (EQ-5D)	0.85	–	–0.01	–0.06	0.04	0.687
		BMI (kg/m ²)	22 (3.6)	–	0.08	–0.21	0.38	0.572
	2013	Systolic Blood Pressure (mmHg)	125.3 (19.6)	–	–0.19	–2.54	2.17	0.877
		Diastolic Blood Pressure (mmHg)	73.8 (11.2)	–	–0.25	–1.78	1.28	0.748
		Quality of Life (EQ-5D)	0.8	–	0.03	–0.02	0.08	0.253
		HbA1c (%)	7.8(1.4)	–	–0.34	–	–	–
		Systolic Blood Pressure (mmHg)	145(19)	–	–9	–	–	–
Gagliardino	2013	Triglycerides (mmol/L)	1.959 (0.875)	–	–0.03387	–	–	<0.05
		HbA1c (%)	7.5(1.5)	–	–0.68	–	–	–
		Systolic Blood Pressure (mmHg)	142(14)	–	–2	–	–	–
		Triglycerides (mmol/L)	1.9204 (0.4584)	–	–0.13548	–	–	<0.05
		HbA1c (%)	7.7(1.3)	–	–0.84	–	–	0.331

		Systolic Blood Pressure (mmHg)	141(18)	–	–16	–	–	<0.05
Gathu	2018	Triglycerides (mmol/L)	1.898 (0.5363)	–	–0.2032	–	–	<0.05
		BMI (kg/m ²)	28.5 (3.73)	28.9 (3.87)	–	–	–	0.86
		Systolic Blood Pressure (mmHg)	134.3 (14.63)	132.6 (15.320)	–	–	–	0.57
		Diastolic Blood Pressure (mmHg)	80.7 (10.53)	78 (9.04)	–	–	–	0.39
Goldhaber–Fiebert	2003	HbA1c (%)	9.7 (1.78)	8.8 (1.89)	–	–	–	0.37
		Body Weight (kg)	72.4 (14.6)	–	–1 (2.2)	–2.48	–0.15	0.028
Goodarzi	2012	BMI (kg/m ²)	30.1 (5.1)	–	–0.4 (0.9)	–1.06	–0.08	0.022
		Systolic Blood Pressure (mmHg)	138 (19)	–	–5 (23)	–10.75	10.06	0.95
		Diastolic Blood Pressure (mmHg)	84 (10)	–	–7 (9)	–8.57	0.24	0.06
		Total cholesterol (mmol/L)	6.837 (1.3447)	–	0.2069 (0.931)	0.6995	0.2242	0.31
		HDL cholesterol (mmol/L)	45 (12)	–	–5 (5)	–4.05	1.95	0.49
		LDL cholesterol (mmol/L)	4.024 (1.2154)	–	5 (36)	–12.43	24.02	0.53
		Triglycerides (mmol/L)	3.25 (2.76)	–	–0.54 (1.84)	–1.83	0.13	0.09
		HbA1c (%)	8.6 (3.7)	–	–1.8 (2.3)	–2.52	–0.15	0.028
		Total cholesterol (mmol/L)	4.68 (1.07)	4.29 (0.9873)	–	–	–	0.002
		HDL cholesterol (mmol/L)	1.13 (0.28)	1.13 (0.24)	–	–	–	0.448
		LDL cholesterol (mmol/L)	2.531 (0.8342)	2.274 (0.7745)	–	–	–	0.19
		Triglycerides (mmol/L)	2.03 (1.13)	1.8082 (0.8182)	–	–	–	0.372
Grillo	2016	HbA1c (%)	7.91 (1.24)	7.02 (1.02)	–	–	–	0.24
		BMI (kg/m ²)	30.7(5.7)	30.4(6.3)	–	–	–	<0.01
		Waist circumference (cm)	105(13)	103.9(13.6)	–	–	–	913
		Systolic Blood Pressure (mmHg)	141(19)	135(18)	–	–	–	<0.001
Huimin	2014	Diastolic Blood Pressure (mmHg)	81(12)	79(11)	–	–	–	<0.001
		HDL cholesterol (mmol/L)	43(12)	43(12)	–	–	–	<0.001
		LDL cholesterol (mmol/L)	108(37)	108(40)	–	–	–	<0.001
		Body Weight (kg)	78.8 (2.4)	79.7 (2.4)	–	–	–	–
		BMI (kg/m ²)	27.2 (0.7)	27.4 (0.7)	–	–	–	–
		Waist circumference (cm)	95.8 (2.2)	94.2 (1.9)	–	–	–	–
		Systolic Blood Pressure (mmHg)	131 (3)	129 (4)	–	–	–	<0.05

Jain	2018	Diastolic Blood Pressure (mmHg)	80 (1)	77 (2)	–	–	–	<0.05
		Fasting Blood Glucose (mmol/L)	10.3 (0.9)	9.6 (0.7)	–	–	–	–
		HbA1c (%)	8.8 (0.5)	7.7 (0.4)	–	–	–	–
		V02max (ml/kg/min)	23.1 (1)	25 (1.3)	–	–	–	–
		Body Weight (kg)	59.29 (16.3)	58.68 (13.68)	–	–	–	0.09
		BMI (kg/m²)	23.91 (4.48)	23.84 (4.5)	–	–	–	0.11
		Waist circumference (cm)	84.71 (12.39)	85.72 (13.86)	–	–	–	0.9
		Systolic Blood Pressure (mmHg)	125.14 (16.8)	126.04 (22.79)	–	–	–	0.63
		Diastolic Blood Pressure (mmHg)	77.04 (9.99)	80.23 (39.24)	–	–	–	0.53
		Total cholesterol (mmol/L)	4.753 (1.259)	4.477 (1.246)	–	–	–	0.02
		HDL cholesterol (mmol/L)	1.07 (0.35764)	1.2255 (0.7316)	–	–	–	0.03
		LDL cholesterol (mmol/L)	2.772 (1.1065)	2.544 (0.8384)	–	–	–	0.01
		Triglycerides (mmol/L)	1.897 (1.2802)	1.6355 (1.1508)	–	–	–	0.0007
		Fasting Blood Glucose (mmol/L)	9.83127 (4.08369)	8.2323 (3.724)	–	–	–	0
		HbA1c (%)	8.29 (2.42)	7.63 (2.16)	–	–	–	0
Ju	2018	Fasting Blood Glucose (FBG) (mmol/L)	7.89 (2.1)	7 (2.3)	–	–	–	0.008
		2 hour Fasting Blood Glucose (mmol/L)	12 (4.5)	10 (3.9)	–	–	–	0.252
		HbA1c (%)	6.8 (1.5)	6.6 (1.2)	–	–	–	0.868
Li	2016	Body Weight (kg)	69.1(11.5)	68.3(10.6)	–0.8(2.9)	–	–	0.012
		BMI (kg/m²)	25.7(3.7)	25.3(3.4)	–0.3(1.1)	–	–	0.02
		Fasting Blood Glucose (FBG) (mmol/L)	9.4(3.1)	8.3(2.8)	–1.1(2.4)	–	–	<0.001
		2 hour Fasting Blood Glucose (mmol/L)	17.9(5.6)	15.6(4.7)	–2.3(3.9)	–	–	<0.001
		HbA1c (%)	7.9(0.4)	7.3(0.9)	–0.6(0.9)	–	–	<0.001
Malathy	2011	Triglyceride (mmol/L)	1.8(0.9)	1.6(0.9)	–0.2(0.9)	–	–	0.008
		HDL cholesterol (mmol/L)	1.3(0.2)	1.3(0.3)	0.1(0.1)	–	–	<0.001
		LDL cholesterol (mmol/L)	3.0(0.7)	3.0(0.8)	0(0.7)	–	–	0.935
		Triglyceride (mmol/L)	1.7037	1.5874	–	–	–	<0.01
		HDL cholesterol (mmol/L)	0.9025	0.9465	–	–	–	<0.05
		LDL cholesterol (mg/dl)	3.649	3.1265	–	–	–	<0.001
		Total cholesterol (mmol/L)	5.332	4.802	–	–	–	<0.001
		Waist Circumference (cm)	101.9(14.1)	103.6(15.5)	–	–	–	0.396
Mash	2014							

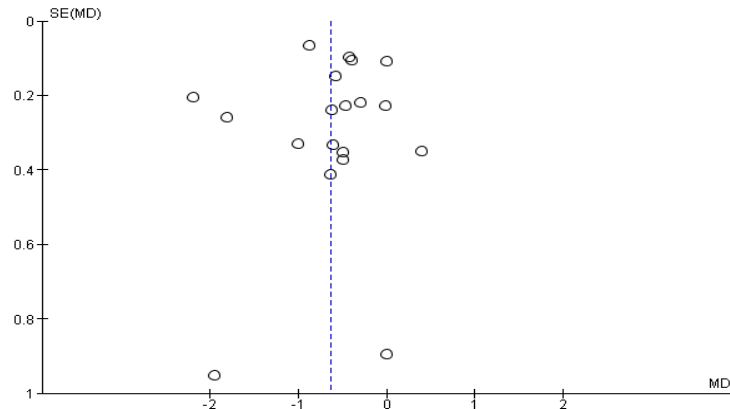
Mohammadi	2018	Body weight (kg)	84.4(18.7)	83.8(20.2)	–	–	–	0.392
		Systolic Blood Pressure (mmHg)	140.2(22.4)	143.1(24.2)	–	–	–	0.044
		Diastolic Blood Pressure (mmHg)	85.9(11.7)	85(11.9)	–	–	–	0.002
		Total Cholesterol (mmol/L)	5(1.1)	4.8(1.1)	–	–	–	0.066
		HBA1c (%)	8.9(2.3)	8.4(2)	–	–	–	0.967
		Body weight (kg)	72.2(7.84)	68.3(6.81)	–	–	–	0.001
		BMI (kg/m2)	27.1(1.92)	25.7(1.77)	–	–	–	0.001
		Waist Circumference (cm)	101(6.10)	98.7(5.71)	–	–	–	0.001
		LDL Cholesterol (mmol/L)	7.4(0.54)	5.6(0.42)	–	–	–	0.001
		HDL Cholesterol (mmol/L)	1.2(0.15)	1.3(0.16)	–	–	–	0.001
Muchiri	2015	Fasting Blood Glucose (mmol/L)	9.66(1.88)	7.6(0.68)	–	–	–	0.001
		HBA1c (%)	7.97(1.01)	7.29(0.66)	–	–	–	0.001
		Quality of Life (DQOL Total)	52.8(3.42)	57.6(3.99)	–	–	–	0.001
		HBA1c (%)	10.8(1.8)	9.8(0.3)	–	–	–	0.16
		BMI (kg/m2)	31.5(7)	30.6(0.3)	–	–	–	0.18
		Total Cholesterol (mmol/L)	4.8(1.2)	4.74(0.1)	–	–	–	0.37
		LDL Cholesterol (mmol/L)	3(0.90)	2.74(0.08)	–	–	–	0.49
		HDL Cholesterol (mmol/L)	1.1(0.27)	1.02(0.03)	–	–	–	0.17
		Systolic Blood Pressure (mmHg)	142.9(22.9)	141.1(2.9)	–	–	–	0.89
		BMI (kg/m2)	27.1(4.3)	26.7(5.6)	–	–	–	0.624
Ojieabu	2017	Systolic Blood Pressure (mmHg)	146.4(13.9)	133.8(18.5)	–	–	–	<0.001
		Diastolic Blood Pressure (mmHg)	85.8(13.3)	79.8(9.4)	–	–	–	0.002
		Fasting Blood Glucose (mmol/L)	8.7(1.69)	7.32(2.23)	–	–	–	<0.001
		HBA1c (%)	9.1(2)	8.5(1.8)	–	–	–	0.004
Ramadas	2018	Fasting Blood Glucose (mmol/L)	8.9(3.9)	7.9(2.5)	–	–	–	0.015
		HBA1c (%)	7.15(1.68)	6.18(0.9)	–	–	–	0
Salahshouri	2018	Fasting Blood Glucose (mmol/L)	8.21(2.8)	6.27(1.34)	–	–	–	0
		BMI (kg/m²)	31.98 (7.85)	29.25 (6.78)	–2.46	–	–	0.002
Samtia	2013	Waist circumference (cm)	95.5548 (16.002)	89.8652 (94.0054)	–5.6896	–	–	<0.001
		Fasting Blood Glucose (mmol/L)	9.9206 (3.3798)	8.8516 (3.0068)	–19.26	–	–	0.003

Sanaeinasab	2020	HbA1c (%)	8.51 (1.62)	7.5 (1.26)	-1.01	-	-	<0.001
		HbA1c (%)	8.8 (1.6)	7.9 (1.4)		0.73	0.93	<0.0001
		Fasting Blood Glucose (mmol/L)	11.9 (3.2)	9.6 (2.5)		1.7	2.8	<0.0001
		HDL Cholesterol (mmol/L)	1.3 (0.4)	1.2 (0.3)		-0.3	-0.2	<0.0001
		LDL Cholesterol (mmol/L)	3.5 (0.8)	3.3 (0.7)		0.2	-0.3	0.004
		BMI (kg/m ²)	29.2 (92.8)	28.3 (2.6)		0.45	-1/17	0.001
Ur Rehman	2017	BMI (kg/m ²)	29.95	27.73	-	-	-	0.017
Wattana	2007	HbA1c (%)	8.08 (1.87)	7.40 (1.25)	-0.68	-	-	0.014
Wichit	2017	HbA1c (%)	7.0 (2.0)	7.0 (1.2)	-	-	-	0.2
Zhang	2018	Quality of life (SF-12) (PCS)	46.7 (6.6)	49.9 (6.9)	-	-	-	0.04
		Quality of life (SF-12) (MCS)	54.1 (8.6)	58.4 (7.2)	-	-	-	0.03
		HbA1c (%)	7.86 (1.2)	6.91 (0.7)	-0.95 (0.4)	-	-	0.03
		Total cholesterol (mmol/L)	11.8 (3.6)	11.4 (3.8)	-0.4 (1.5)	-	-	0.77
		LDL cholesterol (mmol/L)	7.2 (0.5)	6.3 (0.8)	-0.8 (0.3)	-	-	<0.01
		HDL cholesterol (mmol/L)	3.5 (0.9)	3.6 (0.7)	0.1 (0.3)	-	-	0.77
		Systolic Blood Pressure (mmHg)	137.5 (15.4)	125.0 (8.26)	-12.5 (5.1)	-	-	0.02
		Diastolic Blood Pressure (mmHg)	89.0 (14.9)	85.8 (12.4)	-3.25 (5.6)	-	-	0.57
		BMI (kg/m ²)	25.33 (4.5)	24.67 (4.3)	-0.67 (1.8)	-	-	0.71
		Fasting Blood Glucose (mmol/L)	8.35 (1.21)	6.11 (0.72)	-	-	-	<0.01
Zheng	2019	2HBG (mmol/L)	13.67 (1.12)	9.04 (1.40)	-	-	-	<0.01
		HbA1C (%)	8.30 (1.02)	6.34 (0.87)	-	-	-	<0.01
		BMI (kg/m ²)	24.3 (2.88)	23.7 (2.80)	-	-	-	0.64
Zhong	2015	Systolic Blood Pressure (mmHg)	136 (14.91)	128 (11.29)	-	-	-	<0.001
		Diastolic Blood Pressure (mmHg)	82.5 (8.72)	79.1 (7.33)	-	-	-	<0.001
		Fasting Blood Glucose (FBG) (mmol/L)	7.68 (2.13)	6.76 (1.80)	-	-	-	0.02
		2HBG (mmol/L)	11.8 (3.54)	10.7 (3.65)	-	-	-	0.02

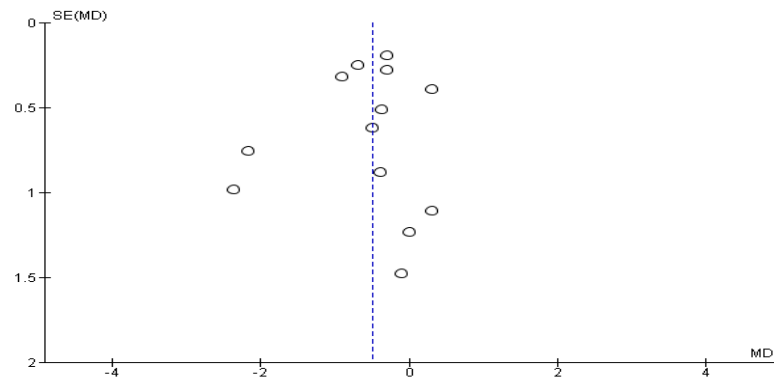
Table S4. Quality assessment ratings, scored using the EPHPP tool.

Study	Year	Selection Bias	Study Design	Confounders	Blinding	Data Collection Method	Withdrawals and Dropouts	Global Ratings
Chaveepojnkamjorn	2009	Moderate	Strong	Strong	Weak	Weak	Strong	Weak
Chen	2019	Moderate	Strong	Weak	Weak	Moderate	Strong	Weak
Chow	2016	Moderate	Strong	Strong	Weak	Strong	Moderate	Moderate
Debussche	2018	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Essien	2017	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Fottrell	2019	Strong	Strong	Strong	Moderate	Strong	Strong	Strong
Gagliardino	2013	Moderate	Strong	Strong	Weak	Strong	Moderate	Moderate
Gathu	2018	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Goldhaber-Fiebert	2003	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Goodarzi	2012	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Grillo	2016	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Huimin	2014	Moderate	Strong	Strong	Weak	Strong	Weak	Weak
Jain	2018	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Ju	2018	Weak	Strong	Strong	Weak	Strong	Moderate	Weak
Li	2016	Weak	Strong	Strong	Weak	Strong	Strong	Weak
Malathy	2011	Moderate	Strong	Weak	Weak	Strong	Weak	Weak
Mash	2014	Moderate	Strong	Weak	Weak	Weak	Weak	Weak
Mohammadi	2018	Moderate	Strong	Strong	Weak	Strong	Weak	Weak
Muchiri	2015	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Ojieabu	2017	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Ramadas	2018	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Salahshouri	2018	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Sanaeinasab	2020	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Samtia	2013	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Ur Rehman	2017	Moderate	Strong	Weak	Weak	Weak	Strong	Weak
Wattana	2007	Moderate	Strong	Strong	Weak	Strong	Weak	Weak
Wichit	2017	Weak	Strong	Strong	Weak	Strong	Strong	Moderate
Zhang	2018	Weak	Strong	Strong	Weak	Strong	Weak	Weak
Zheng	2019	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Zhong	2015	Weak	Strong	Weak	Weak	Strong	Weak	Weak

HbA1c



BMI



FBG

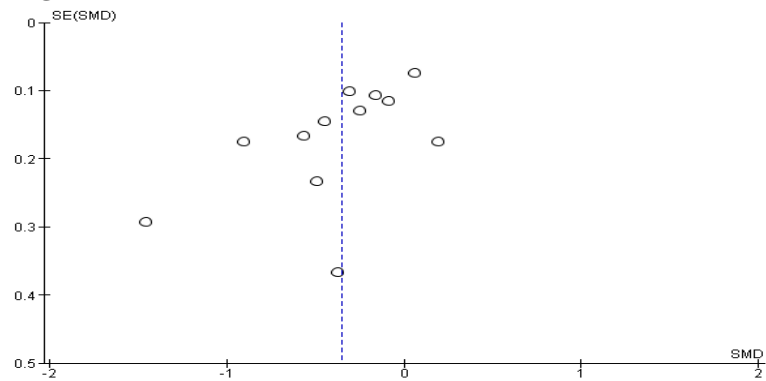


Figure S1: Funnel plots for the visual assessment of publication bias *.* Roughly symmetrical funnel plots indicated a low risk of publication bias and asymmetrical plots a high risk.

Table S5. GRADE assessment of Quality of Evidence.

Outcome Comparisons	Studies (<i>n</i>)	MD [95% Cis]	Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Rating
Overall Intervention Group								
Glycated Haemoglobin	19	−0.63 (−0.86 to −0.40)	1	−1 ^b	1	1	1	4: High
Body Mass Index	13	−0.50 (−0.80 to −0.20)	−1 ^a	1	1	1	1	4: High
Fasting Blood Glucose	13	−0.35 (−0.54 to −0.16)	−1 ^a	−1 ^b	1	1	1	3: Moderate
Intervention Type								
<i>– Self-management Education</i>								
Glycated Haemoglobin	15	−0.69 (−0.96 to −0.43)	1	−1 ^b	1	1	1	4: High
Body Mass Index	10	−0.54 (−0.79 to −0.29)	−1 ^a	1	1	1	1	4: High
Fasting Blood Glucose	10	−0.42 (−0.69 to −0.16)	−1 ^a	−1 ^b	1	1	1	3: Moderate
<i>– Structured diet/exercise/combined</i>								
Glycated Haemoglobin	4	−0.07 (−0.81 to 0.67)	−1 ^a	−1 ^b	1	−1 ^d	0 ^e	1: Very Low
Body Mass Index	3	−0.06 (−0.64 to 0.51)	−1 ^a	1	1	−1 ^d	0 ^e	2: Low
Fasting Blood Glucose	3	−0.14 (−0.76 to 0.48)	−1 ^a	−1 ^b	1	−1 ^d	0 ^e	1: Very Low
Intervention Delivery								
<i>– Healthcare Professional(s) /MDT</i>								
Glycated Haemoglobin	9	−0.71 (−1.01 to −0.41)	1	−1 ^b	1	1	0 ^e	3: Moderate
Body Mass Index	6	−0.48 (−1.11 to 0.15)	1	−1 ^b	1	−1 ^d	0 ^e	2: Low
Fasting Blood Glucose	7	−0.37 (−0.70 to −0.05)	1	−1 ^b	1	1	0 ^e	3: Moderate
<i>– Trained Peers / lay people</i>								
Glycated Haemoglobin	6	−0.24 (−0.47 to 0.00)	−1 ^a	−1 ^b	1	1	0 ^e	2: Low
Body Mass Index	3	−0.51 (−1.10 to 0.09)	1	1	1	−1 ^d	0 ^e	3: Moderate
Fasting Blood Glucose	2	−0.11 (−0.33 to 0.12)	1	−1 ^b	1	−1 ^d	0 ^e	3: Moderate

Intervention Setting*– Hospital / Clinic*

Glycated Haemoglobin	10	−0.77 (−1.08 to −0.56)	1	−1 ^b	1	1	0 ^e	3: Moderate
Body Mass Index	7	−0.61 (−1.07 to −0.15)	1	−1 ^b	1	−1 ^d	0 ^e	2: Low
Fasting Blood Glucose	7	−0.47 (−0.74 to −0.20)	−1 ^a	−1 ^b	1	1	0 ^e	2: Low

– Community

Glycated Haemoglobin	3	−0.20 (−0.59 to 0.19)	1	−1 ^b	1	1	0 ^e	3: Moderate
Fasting Blood Glucose	2	−0.12 (−0.48 to 0.24)	1	−1 ^b	1	1	0 ^e	3: Moderate

– Home

Glycated Haemoglobin	3	−0.48 (−1.44 to 0.49)	1	−1 ^b	1	−1 ^d	0 ^e	2: Low
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1 = not downgraded. −1^a = downgraded one place due to ≥ 40% of trials rated as having a high ROB on quality assessment. −1^b = downgraded one place due to unexplained heterogeneity (>50%)

−1^c = downgraded one place due to indirectness in intervention and/or outcome. −1^d = downgraded one place due to wide confidence interval (>0.8). 0^e = Funnel plots not completed due to < 10 studies included in the meta-analysis.

Table S6. PRISMA 2020 checklist.

Section and Topic	Item #	Checklist Item	Location Where Item is Reported
Title			
Title	1	Identify the report as a systematic review.	Page 1
Abstract			
Abstract	2	See the PRISMA 2020 for abstracts checklist.	Page 1
Introduction			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 1,2
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 2
Methods			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 3
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 2,3
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Suppl. File
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.	Page 3
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 3,4
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 3, Table 1
	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 3, Table 1
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.	Pages 3, 14 Suppl. File
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 10,11,12
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 3,4
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data	Pages 3,4

Section and Topic	Item #	Checklist Item	Location Where Item is Reported
		conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Pages 3,4
	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 3,4
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g., subgroup analysis, meta-regression).	Page 4
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Page 4
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Pages 4,14, Suppl. File
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Pages 4,14, Suppl. File
Results			
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.	Pages 4,5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Pages 4,5
Study characteristics	17	Cite each included study and present its characteristics.	Pages 6,7,8,9,10
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Page 14, Suppl. File
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.	Page 12
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Pages 11,12,13
	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.	Pages 12,13
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Pages 12,13
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Page 14
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Page 14
Certainty of	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Page 14

Section and Topic	Item #	Checklist Item	Location Where Item is Reported
evidence			
Discussion			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 14,15
	23b	Discuss any limitations of the evidence included in the review.	Pages 15,16
	23c	Discuss any limitations of the review processes used.	Page 16
	23d	Discuss implications of the results for practice, policy, and future research.	Page 16
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.	PROSPERO 2020: CRD42020151938
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	N/A
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.	N/A