Social determinants of health interventions for diabetes in Black and South Asian-origin populations: An international systematic review

Supplemental material

WELLESLEY INSTITUTE

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Wellesley Institute advances population health and reduces health inequities by driving change on the social determinants of health through applied research, effective policy solutions, knowledge mobilization and innovation.

About this document

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List of tables

Table 1. Search strategy for MEDLINE

#	Search term	Result
1	diabetes mellitus/	145,495
2	diabetes mellitus, type 1/	88,558
3	diabetes mellitus, type 2/	181,641
4	latent autoimmune diabetes in adults/	197
5	prediabetic state/	9,814
6	diabetes complications/	44,813
7	Hyperglycemia/	32,931
8	Glucose Intolerance/	10,107
9	Glycated Hemoglobin/	45,082
10	diabet*.tw,kf.	828,946
11	(T1D or T2D).tw,kf.	29,262
12	(prediabet* or pre-diabet*).tw,kf.	15,302
13	hyperglycem*.tw,kf.	65,594
14	blood glucose.tw,kf.	92,542
15	insulin.tw,kf.	422,899
16	glucose intoleran*.tw,kf.	12,937
17	(iddm or niddm).tw,kf.	12,719
18	or/1-17	1,148,584
19	Black or African American/	75,191
20	Black People/	41,023
21	(black or afro-canad* or afric* or caribbean* or acb).tw,kf.	499,799
22	(haiti* or nigeria* or ethiopia* or somali* or congo* or ghana* or trini* or cameroon* or jamaica* or barbadian* or bajan*).tw,kf.	154,500
23	South Asian People/	128
24	(south asia* or brown).tw,kf.	90,473
25	(desi or desis).tw,kf.	1,254
26	(afghan* or bangladesh* or bengali* or bhutan* or india* or maldiv* or nepal* or pakistan* or sri lanka* or tamil*).tw,kf.	303,190
27	(racializ* or bipoc or "people of color" or "people of colour" or poc or "person of color" or "person of colour" or "persons of color" or "persons of colour").tw,kf.	12,426
28	or/19-27	1,017,840
29	Social Determinants of Health/	7,564
30	sdoh.tw,kf.	1,673
31	(social or socio* or structural).tw,kf.	1,872,169
32	Socioeconomic factors/ or Social Factors/ or Social Change/ or Social Conditions/ or Social Structure/	198,493
33	Economic factors/ or Economic stability/ or Financial Stress/	1,587

#	Search term	Result
34	Economic Status/ or Social Class/ or Low Socioeconomic Status/ or Social Mobility/	46,908
35	(SES or wealth* or financ* or econom*).tw,kf.	638,929
36	(class or caste).tw,kf.	523,985
37	Housing Instability/ or Home Environment/ or Housing Quality/	595
38	Housing/ or Housing for the Elderly/ or Public Housing/ or Independent Living/	36,161
39	(hous* or rent* or lodging* or dwelling* or apartment* or overcrowd* or living or home* or residen* or tenant*).tw,kf.	1,625,513
40	ill-housed persons/ or homeless youth/	11,574
41	(homeless* or unhous* or shelter* or street people or street youth*).tw,kf.	28,240
42	Poverty/ or Poverty Areas/ or Medical Indigency/	54,179
43	(poor or poverty or indigen*).tw,kf.	87,3721
44	Social Environment/	44,870
45	Community Networks/	7,223
46	(communit* or group* or relation*).tw,kf.	7,181,848
47	Neighborhood Characteristics/ or Residential Segregation/ or Census Tract/	539
48	(environment* or pollut*).tw,kf.	1,584,532
49	(neighborhood* or neighbourhood* or urban* or rural or segregat* or census area* or census tract*).tw,kf.	477,807
50	(geograph* or green* or park* or outdoor*).tw,kf.	735,208
51	Social Integration/ or Social Cohesion/ or Social Inclusion/ or Social Capital/	2,329
52	(shared or solidarity or cohes* or inclus*).tw,kf.	645,520
53	Social Isolation/ or Loneliness/ or Social Alienation/ or Ostracism/	23,678
54	(isolat* or lonel* or alienat* or ostrac*).tw,kf.	1,590,159
55	Social Deprivation/ or Cultural Deprivation/ or Psychosocial Deprivation/	3,305
56	depriv*.tw,kf.	110,871
57	Social Marginalization/ or Social Vulnerability/	941
58	(marginal* or vulnerab*).tw,kf.	337,164
59	Educational Status/ or Literacy/	64,209
60	(educat* or literate or literacy or illiter*).tw,kf.	872,787
61	Employment/ or Job Security/ or Unemployment/	58,035
62	(employ* or unemploy* or underemploy* or occupation*or part-time).tw,kf.	860,249
63	Income/	35,851
64	(income or salar* or wage*).tw,kf.	215,771

#	Search term	Result
65	Pensions/ or "Salaries and Fringe Benefits"/ or Family Leave/ or Parental Leave/ or Health Benefit Plans, Employee/ or Sick Leave/	37,323
66	(pension* or retirement* or benefits or health insurance or family leave or parental leave or paternity leave or maternity leave or care leave).tw,kf.	539,492
67	Workplace/ or Working Conditions/ or Workforce Diversity/	31,277
68	(work* or job*).tw,kf.	2,197,753
69	Nutritional Status/	56,629
70	food supply/ or food deserts/ or food insecurity/ or access to healthy foods/ or food security/	17,678
71	(nutrition* or diet*).tw,kf.	1,012,248
72	(food* or grocer* or supermarket*).tw,kf.	669,617
73	Family Characteristics/ or Family Structure/ or Extended Family/ or Nuclear Family/ or Single-Parent Family/ or Marital Status/ or Divorce/ or Marriage/ or Single Person/ or Single Parent/ or Widowhood/	73,327
74	(famil* or household* or generation* or multigeneration* or stepfamily* or stepparent* or parent* or marital or marri* or divorc* or unmarried or single or singles or widow*).tw,kf.	4,442,158
75	Emigration and Immigration/ or Refugees/	38,843
76	(migrant* or immigra* or emigra* or refugee* or asylum or displaced or visa).tw,kf.	128,293
77	Communication Barriers/ or Limited English Proficiency/ or Nonverbal Communication/	11,791
78	(communicat* or language* or nonverbal or non verbal).tw,kf.	660,373
79	Internet/ or Internet Access/ or Digital Divide/ or Computer Literacy/	84,939
80	(internet or digital divide or digital divide or digital gap or digital inclusion or computer*).tw,kf.	442,400
81	Health Services Accessibility/ or Access to Primary Care/ or Health Equity/ or Right to Health/	92,665
82	(access* or health care or healthcare or health service* or primary care or health equity or health rights or quality of care or virtual care).tw,kf.	1,700,102
83	Culturally Competent Care/ or Cultural Competency/	8,780
84	(cultural* competen* or cultural* sensitive*).tw,kf.	12,783
85	Health Inequities/ or Gender Equity/ or Health Status Disparities/ or Healthcare Disparities/ or Socioeconomic Disparities in Health/	42,463
86	(equality or inequality or equit* or inequit* or disadvant* or disparit* or barrier*).tw,kf.	732,360
87	Social Discrimination/ or Social Stigma/	15,310

#	Search term	Result
88	(discriminat* or marginali* or stigma*).tw,kf.	377,482
89	Prejudice/ or Ageism/ or Bias, Implicit/ or Disability Discrimination/ or Homophobia/ or Racism/ or Systemic Racism/ or Sexism/ or Weight Prejudice/ or Xenophobia/	38,398
90	(prejudice or ageis* or bias or ableis* or homophob* or transphob* racis* or racial* or sexis* or misogyn* or fatphob* or xenophob*).tw,kf.	333,164
91	or/29-90	18,642,640
92	Canada/	112,042
93	Canad*.tw,kf.	174,480
94	Alberta/ or British Columbia/ or Manitoba/ or New Brunswick/ or "Newfoundland and Labrador"/ or Northwest Territories/ or Nova Scotia/ or Nunavut/ or Ontario/ or Prince Edward Island/ or Quebec/ or Saskatchewan/ or Yukon territory/	80,847
95	(British Columbia or Colombie Britannique or Alberta* or Saskatchewan or Manitoba* or Ontario or Quebec or (New Brunswick not New Jersey) or Nouveau Brunswick or Nova Scotia or Nouvelle Ecosse or Prince Edward Island or Newfoundland or Labrador or Nunavut or NWT or Northwest Territories or Yukon or Nunavik or Inuvialuit).tw,kf.	91,457
96	(Abbotsford or Airdrie or Ajax or Aurora or Barrie or Belleville or Blainville or Brampton or Brantford or Brossard or Burlington or Burnaby or Caledon or Calgary or Cape Breton or Chatham Kent or Chilliwack or Clarington or Coquitlam or Drummondville or Edmonton or Fredericton or Fort McMurray or Gatineau or Granby or Grande Prairie or Sudbury or Guelph or Halton Hills or Iqaluit or Inuvik or Kamloops or Kawartha Lakes or Kelowna or Kingston or Kitchener or Langley or Laval or Lethbridge or Levis or Longueuil or Maple Ridge or Markham or Medicine Hat or Milton or Mirabel or Mississauga or Moncton or Montreal or Nanaimo or New Westminster or Newmarket or Niagara Falls or Norfolk County or North Bay or North Vancouver or Oakville or Oshawa or Ottawa or Peterborough or Pickering or Port Coquitlam or Prince George or Quebec City or Red Deer or Regina or Repentigny or Richmond or Richmond Hill or Saanich or Saguenay or Saint John or Saint-Hyacinthe or Saint-Jean-sur-Richelieu or Saint-Jerome or Sarnia or Saskatoon or Sault Ste Marie or Sherbrooke or St Albert or St Catharines or St John's or Strathcona County or Surrey or Terrebonne or Thunder Bay or Toronto or Trois-Rivieres or Vancouver or Vaughan or Cambridge or Halifax or Hamilton or London or Victoria or Waterloo	170,391

#	Search term	Result
	or Welland or Whitby or Windsor or Whitehorse or Winnipeg or Wood Buffalo or	
97	Or/92-96	428,189
98	(English not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 English)).tw,kf.	130,898
99	(GB or "G.B." or Britain or British* or UK or "U.K." or United Kingdom or England or Northern Ireland or Northern Irish or Scotland or Scottish or Wales or "South Wales" or Welsh).tw,kf.	3,665,550
100	(National Health Service* or NHS).tw,kf.	54,913
101	(Aberdeen or Dundee or Edinburgh or Glasgow or Inverness or Perth or Stirling).tw,kf.	46,992
102	(Armagh or Belfast or Lisburn or Londonderry or Derry or Newry).tw,kf.	1,589
103	(Bath or (Birmingham not Alabama) or Bradford or Brighton or Bristol or Carlisle or (Cambridge not (Massachusetts or Boston or Harvard)) or Canterbury or Chelmsford or Chester or Chichester or Coventry or Derby or (Durham not (Carolina or NC)) or Ely or Exeter or Gloucester or Hereford or Hull or Lancaster or Leeds or Leicester or (Lincoln not Nebraska) or Liverpool or London or Manchester or Newcastle or Norwich or Nottingham or Oxford or Peterborough or Plymouth or Portsmouth or Preston or Ripon or Salford or Salsbury or Sheffield or Southampton or St Albans or Stoke or Sunderland or Truro or Wakefield or Wells or Westminster or Winchester or Wolverhampton or (Worcester not (Massachusetts or Boston or Harvard)) or (York not ("New York" or NY))).tw,kf.	204,651
104	United Kingdom/ or Channel Islands/ or England/ or Northern Ireland/ or Scotland/ or Wales/	380,143
105	Or/98-104	934,608
106	Australia/	132,745
107	Austral*.tw,kf.	199,688
108	Australian Capital Territory/ or New South Wales/ or Northern Territory/ or Queensland/ or South Australia/ or Tasmania/ or Victoria/ or Western Australia/	49,574
109	(Australian Capital Territory or New South Wales or nsw or Northern Territory or Queensland or South Australia or Tasmania or Victoria or Western Australia).tw,kf.	55,029
110	(Sydney or Melbourne or Brisbane or Perth or Adelaide or Hobart or Darwin or Sunshine Coast or Central Coast or Wollongong or Toowoomba or Ballarat or Bendigo or Albury or Wodonga or Gold Coast or Tweed Heads or Newcastle or Maitland or Geelong or	59,185

#	Search term	Result
	Townsville or Cairns or Canberra or Queanbeyan).tw,kf.	
111	Or/106-110	301,290
112	97 or 105 or 111	1,501,971
113	18 and 28 and 91 and 112	2,739
114	Limit 114 to yr="2000-Current"	2,404

Table 2. Study characteristics

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Banerjee et al. (2022) Canada	A single-arm intervention study using a pre-post-test design informed by community-based participatory research to evaluate diabetes knowledge, risk factors and health behaviours among South Asian-origin adolescents with a family history of diabetes. A 10-week program where participants engaged in weekly educational sessions such as hand-on activities with healthy cooking and	**Progression from prediabetes to diabetes.** Outcomes measured at baseline and one week after the intervention. Patient-reported outcomes: - Brief diabetes knowledge test - Survey of social and environmental diabetes risk factors - Risk perception (no chance, slight chance, moderate chance, high chance) - Self-reported behaviour changes	Access to services Social support	N=49 participants - Mean age: 14.5 years - 57.1% females - Household income: $60-99,999 (22.4%), >$100,000 (16.3%), Don't know/prefer not to answer (61.2%) - Family history of type 2 diabetes: Mother (32.7%), Father (36.7%), Maternal grandmother (34.7%), Maternal grandfather (26.5%), Paternal grandmother (36.6%), Paternal grandfather (28.6%)	At baseline, most participants felt they had a moderate (38.8%) or high (34.7%) chance of developing diabetes. Over half (59.1%) showed no change in their risk perception after the intervention. There was a 3.32-point increase (out of 21) in knowledge about the symptoms, definition and complications of type 2 diabetes (p<.001). A 1.4-point increase (out of 20) in the total score on knowledge about diabetes risk factors was observed from baseline to post-intervention (p<.001). 73.2% of participants increased their overall

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	exercise demos, discussions on social/ environmental factors, and grocery store visits to promote healthy food options. Family involvement is also encouraged (final session for participants' parents or grandparents). Participants also received consultations with dietitians and kinesiologists to create personal diet and exercise plans.				physical activity, 70.7% motivated their family to be more active, and 70.7% walked more frequently to reach destinations. Additionally, most adolescents cut back on sweets and junk food (80.5%), were less likely to eat out (85.4%), and urged their family members to adopt healthier eating habits (80.5%).

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Bhopal et al. (2014) United Kingdom	A non-blinded, family-cluster randomized controlled trial. Family volunteers were also recruited to aid in behaviour change among participants. Eligible participants had waist circumstance of 80 cm or more (women) or 90 cm or more (men), no diabetes diagnosis, and impaired glucose tolerance determined by oral glucose tolerance test. Intervention group received 15 dietitian-led sessions over 3	**Progression from prediabetes to diabetes.** Outcomes measured at baseline and every year for three years. Clinical outcomes: - Weight - BMI - Waist circumference - Hip circumference - Waist-to-hip ratio - Fasting glucose - 2h glucose - Blood pressure	Access to services Social support	N=171 participants Intervention group (individual-level n=85; family-level n=78) - 34% Indian - 66% Pakistani - 44% women - Mean age: 52.8 years - 38% no education Control group (individual-level n=86; family-level n=78) - 33% Indian - 67% Pakistani - 45% women - Mean age: 52.2 years - 28% no education	After three years, the intervention group showed improved weight (adjusted mean difference = -1.64 kg, $p<.001$), BMI (-0.60 kg/m2, $p<.01$), waist circumference (-1.89 cm, $p<.001$), hip circumference (-1.54 cm, $p<.05$). No significant changes were reported for glycemia levels or blood pressure. A higher proportion of individuals in the intervention group (39%) lost 2.5 kg over three years compared to the control group (14%), and more participants in the intervention group (25%) lost 5% of their body weight compared to the control group (5%). However, approximately 20% of participants in both

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	years. Dietitians offered advice to participants and their family on weight loss through a calorie-deficit diet and physical activity, utilizing culturally adapted and translated materials. Control group received only four dietitian visits for the same period.				groups gained 2.5 kg during the study. Diabetes progression was less common in the intervention group compared to the control group (OR=0.68), although the difference was not statistically significant.
Chatterjee et al. (2018) United Kingdom	A real-world, mixed-methods evaluation of individuals with type 2 diabetes who participated in the Diabetes Education and Self-Management for Ongoing and	**Diabetes management and complications.** Outcomes measured at baseline, 6 months, and 12 months.	Access to services	N=1,678 participants - 28% South Asian - 53.3% male - Mean age: 59.5 years - Mean HbA1c: 8.0	A significant reduction in HbA1c was observed, with a 0.96% decrease at six months and a 0.70% decrease at 12 months (both $p<.005$). Qualitative feedback gathered from 302 (18% response rate) after

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	Newly Diagnosed (DESMOND) courses between January 2014 and March 2015.	Clinical outcomes: - HbA1c Patient-reported outcomes: - Survey gathered participants' feedback on the course's accessibility, delivery, and content.			attending the DESMOND courses indicated that the program was positively received, with participants reporting improved self-management of their diabetes.
Choudhury et al. (2008) United Kingdom	A mixed-methods intervention study with a pre-post-test design assessing the effectiveness of a culturally adapted X-PERT diabetes education program delivered by peer educators. The program, tailored to the cultural and linguistic needs of	**Diabetes management and complications.** Feedback collected through a questionnaire and content analysis of recorded discussions. Patient-reported outcomes: - Summary of	Access to services	N=42 participants - 66.7% females - Mean duration of type 2 diabetes diagnosis: 6.7 years (1 month to 18 years)	72 participants registered for the courses and there was a 58% attendance rate. All participants self-reported benefiting from the course, with high enjoyment of group discussions and interactive posters. The SDSCA questionnaire revealed a positive trend in self-care behaviours,

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	the Bangladeshi population, was conducted in a single 4-hour session. It was led by trained peer educators who spoke Sylheti, had type 2 diabetes and was well-known within the community. The content focused on diabetes management, including dietary and exercise advice, self-care, and lifestyle changes, with the use of visual aids and group discussions to enhance participant engagement.	Diabetes Self-Care Activities (SDSCA) questionnaire.			showing increases in general diet (from 4.4 to 4.7 days), exercise (from 2.5 to 2.6 days), and foot care (from 5.3 to 5.4 days), although the changes were not statistically significant.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Dallosso et al. (2022) United Kingdom	A parallel, cluster-randomized controlled trial with a pre-post-test design to assess the effectiveness of a culturally adapted version of the DESMOND program, which focused on diabetes self-management and lifestyle modifications for individuals with type 2 diabetes.	**Diabetes management and complications.** Outcomes measured at baseline, 6 and 12 months. Clinical outcomes: - HbA1c levels - Weight - BMI - Lipid profile - Blood pressure - Waist circumference Patient-reported outcomes: - EQ-5D - Revised Illness Perceptions Questionnaire - Diabetes Illness Representations Questionnaire - Hospital Anxiety	Access to services	N=367 participants Intervention (n=184): - 36.4% South Asian - 34.2% women - 62.3 years mean age Control (n=183): - 16.9% South Asian - 37.7% women - 64.9 years mean age	68% of intervention participants attended the education program. Intervention group showed a greater reduction in outcomes, though there was no statistically significant difference between the groups. Impact of the intervention was less pronounced in racialized participants compared to non-racialized participants, with the HbA1c difference between the intervention and control groups being 0.61% higher in non-racialized participants. At 6 months, the intervention group lost 0.82 kg, and at 12 months, they lost 1.06 kg (both p=.03). There was a significant decrease

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
		and Depression Scale - Problem Areas in Diabetes Scale - SF-International Physical Activity Questionnaire			in BMI of −0.39 kg/m² at 12 months in the intervention group (p=.02). No other biomedical or anthropometric outcomes were significantly different from baseline after 6 or 12 months. Intervention group had significantly higher self-reported physical activity compared to the control group. No other group differences were seen for any other patient-reported outcome.
Gill et al. (2010) United Kingdom	Evaluation of a diabetes education program with pre-post-test design. Program was adapted from the X-PERT diabetes education model to	**Diabetes management and complications.** Outcomes measured at baseline, 2 months and 6 months.	Access to services	N=96 individuals enrolled in the program - 80% Indian - 14% Pakistani - 60% women - 70% were over 60 years	75% attended all five sessions of the education program while 90% attended four out of five sessions. Knowledge scores increased from an average of 55% at baseline to 71% following the program.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	cater to the cultural and linguistic needs of South Asian-origin communities. Five-week structured education program adapted from X-PERT model, tailored to meet the cultural and linguistic needs of South Asian-origin communities. Education delivered in Punjabi and Hindi, with visual aids to support participants with different literacy levels. Sessions were held in community spaces such as gurdwaras (Sikh temples), mosques, and community centres.	Clinical outcomes: - HbA1c - Blood pressure - BMI - Total blood cholesterol - Waist circumference Patient-reported outcomes: - Diabetes knowledge and empowerment measured with Michigan Diabetes Knowledge Test and the Diabetes Empowerment Scale-Short Form			Empowerment scores also rose from 60% at baseline to 76%. The change in HbA1c levels showed a mean difference of -0.11% at 2 months and -0.13% at 6 months (not statistically significant). The proportion of participants with HbA1c levels over 8% decreased from less than 25% at baseline to 15% at the 6-month mark. For BMI, the mean difference was -0.24 kg/m² at 2 months (statistically significant) and -0.14 kg/m² at 6 months. Systolic blood pressure decreased significantly, with a mean difference of -2.96mmHg, from baseline to 2 months.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					Waist circumference also decreased significantly, with a mean difference of -1.61 cm, from 2 months to 6 months. Participants with baseline HbA1c values over 6.5% (n=56) saw a reduction from 7.56% (59 mmol/mol) to 7.31% (56 mmol/mol) at 2 months. At the 6-month follow-up, HbA1c levels decreased further, from 7.51% (58 mmol/mol) to 7.20% (55 mmol/mol).
Goff et al. (2021a) United Kingdom	A mixed-methods controlled feasibility trial to HEAL-D, a culturally tailored diabetes self-management education and support (DSMES) program specifically designed for	**Diabetes management and complications.** Outcomes measured at baseline and 6 months after participant started intervention.	Access to services Social support	N=55 participants Intervention (n=27): - 37% African, 59% Caribbean, 4% mixed race - 67% female - Age: <45 (4%); 45-54 (33%), 55-64 (30%), 65-74 (22%), 75+ (11%) - 15% unemployed	High retention with 93% completing the trial. 85% of participants completed the program, attending at least five sessions. There was a reduction in HbA1c in the intervention group (−2.4 mmol/mol) compared to a slight increase in the control

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	Black-British adults. The intervention included 7 group-based sessions (total of 14 hours) which focused on diet and lifestyle education, support for behaviour change, and supervised physical activity. Sessions were led by lay educators of Black-British ethnicity, as well as a registered dietitian. They were held in community locations (such as church halls or community centres) at times that were convenient for the participants.	Clinical outcomes: - HbA1C - Weight - Blood pressure - BMI - Waist circumference Patient-reported outcomes: - Perceived Diabetes & Dietary Competence - International Physical Activity Questionnaire - Short Form - Short Diabetes Knowledge Instrument - Diabetes Empowerment Scale - Short Form - Multidimensional Scale of		- 78% were first-generation immigrants - 59% did not receive welfare benefits Control (n=28): - 57% African, 43% Caribbean, 0% mixed race - 71% female - Age: <45 (7%), 45-54 (25%), 55-64 (43%), 65-74 (21%), 75+ (4%) - 21% unemployed - 68% were first-generation immigrants - 39% did not receive welfare benefits	group (0.5 mmol/mol) (significance was not tested). The intervention group showed a larger improvement in self-reported physical activity, with a 17% decrease in the proportion reporting low physical activity, while the control group had a smaller improvement. There were no significant changes in any of the patient-reported outcomes. Participants and educators found intervention acceptable. Use of culturally relevant materials (e.g., lay educators, community-based videos) helped improve engagement and made the

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	Control group included treatment as usual.	Perceived Social Support - Problem Areas In Diabetes Scale (PAID-5) Process Measures: - Recruitment rate - Retention rate - Attendance rate Acceptability assessed through focus groups and interviews with participants and educators.			program more relatable. Group-based sessions encouraged social support, which was important for motivating participants and helping them learn from each other.
Goff et al. (2021b) United Kingdom	An intervention development study using a participatory research approach with key stakeholders to design a culturally tailored, diabetes self-management education and	**Diabetes management and complications.** Outcomes included key priorities for intervention development, as well as feedback	Access to services Social support Employment	N=41 participants - 44% Caribbean, 56% African ethnicity - 66% women - Mean age: 62 years - 88% were first-generation migrants - Most common	Phase 1: Focus groups and interviews revealed participants highly valued support from friends and family for diabetes information, especially women. There was trust for healthcare providers overall, and community spaces were viewed as

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	support (DSMES) program for Black-British adults, called Healthy Eating and Active Lifestyles for Diabetes (HEAL-D).	on intervention design, materials, and language.		countries of birth were Nigeria (n=17) and Jamaica (n=13) - All had type 2 diabetes	more accessible for the intervention delivery. There was a strong preference for straightforward, clear and direct advice or messages. Participants also highlighted challenges in attending appointments due to work, travel and caregiving responsibilities. Phase 2: Workshops emphasized key priorities, including a reluctance to engage in medical environments, the need for educators who are both well-trained and culturally aware (cultural background was less important than cultural knowledge) especially regarding dietary practices, flexible scheduling for appointments, a preference for verbal and visual

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					communication, and the avoidance of complex medical jargon. Phase 3: During the materials developmental phase, key design aspects included group-based delivery to foster social connectedness, practical cooking demonstrations, culturally tailored resources, such as educational booklets, short films, and exercise videos to motivate behaviour change related to diabetes management.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Hawthorne et al. (2001) United Kingdom	A secondary analysis was conducted on data from a randomized controlled trial on the impact of culturally appropriate health education on glycemic control and diabetes knowledge among British Pakistani women with type 2 diabetes mellitus. The original study aimed to compare the effects of a structured, health education program using pictorial flashcards, which depicted culturally tailored images such as traditional Pakistani foods and	**Diabetes management and complications.** Outcomes were measured at baseline and 6 months. Clinical outcomes: - HbA1c Patient-reported outcomes: - Questionnaire measuring diet management, diabetic complications, diabetes management, and glucose monitoring	Access to services	N=200 - 53% women - 100% British Pakistani - Mean age women: 51.5 years (46 in the control group, 59 in the intervention group) - Mean age men: 54.8 years (44 in control group, 50 in intervention group) - 58% of women were illiterate - 91% of illiterate women spoke only Punjabi (not English or Urdu) - 43% of literate women were fluent in English compared to only 6% of illiterate women	The intervention group had improved knowledge in various aspects of diabetes management. Among literate women, 88% knew what to do if their blood sugar was high, compared to 75% of illiterate women. In the intervention group, both men and women had knowledge scores that were alike at the 6-month mark, whereas in the control group, women had lower knowledge scores than men. Women who participated in the health education program had significant improvement in glycemic control, with an average HbA1c reduction of -0.58 (p=.03) after 6 months. Literacy levels and health

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	utensils, against a control group receiving usual care. Secondary analysis examined the effects of gender and literacy levels on outcomes.				education played a role in improving knowledge and glycemic control, highlighting a positive relationship between receiving health education, literacy, and improvements in both knowledge and glycemic control.
Kousar et al. (2008) Australia	A single arm, pre-post-test design with a control period to test the effectiveness of a culturally appropriate diet and lifestyle intervention for treating metabolic syndrome in Pakistani female immigrants (diagnosed with at least one	**Diabetes management and complications.** Outcomes measured at baseline, 12 weeks (control period), 24 weeks (post-intervention) Clinical outcomes: - Weight - BMI - Waist circumference	Access to services Immigrant status	N=40 Pakistani born women - Mean age 37.6 years - 50% had completed tertiary education - All married with children - 25% had poor English skills	Culturally relevant diet and physical activity effectively improved health outcomes related to the metabolic syndrome at 24 weeks: - Physical activity: Significant increase in daily steps from 4000 to 8617 ($p<.001$) - BMI: Decreased from 29.2 kg/m² (obese) to 27.8 kg/m² ($p=.043$) - Blood pressure: Significant reductions in both systolic and diastolic

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
	component of metabolic syndrome such as elevated blood pressure, obesity, elevated blood glucose, or dyslipidemia). The program used a bilingual, female facilitator from the same cultural background. Written materials were provided in Urdu. The curriculum comprised 12 weekly sessions, each concentrating on various aspects of diet, exercise, and behaviour modification.	- Blood pressure - Biochemical measures (cholesterol, HDL/LDL, triglycerides, glucose, insulin) Patient-reported outcomes: - Physical activity levels (daily steps measured via pedometer)			values (systolic from 135 mm Hg to 125 mm Hg; *p*<.001). - Cholesterol: Significant reductions from 6.8 mmol/L to 5.5 mmol/L (*p*<.001) - Triglycerides: Significant reductions from 2.9 mmol/L to 1.97 mmol/L (*p*<.001) - Blood glucose: Significant reductions from 6.4 mmol/L to 5.9 mmol/L (*p*<.001). - Blood insulin: Significant reductions from 45 µU/mL to 24.14 µU/mL (*p*<.001).

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Low et al. (2024) United Kingdom	This was a mixed-methods study evaluating the feasibility and acceptability of the HEAL-D Online service. The study focused on the acceptability of the service to users, the feasibility for staff to deliver the program, the feasibility of digital participation, the potential benefits for service users, and suggested future improvements to the service.	**Diabetes management and complications.** Process measures: - Attendance rates - Completion rates - Satisfaction Patient-reported outcomes: - Perceived weight loss - Problem Areas in Diabetes Scale (PAID-5) Qualitative feedback: - Interviews on experiences with the program, perceived benefits, and suggestions for improvement.	Access to services	Quantitative evaluation (n=53): - All participants of African or Caribbean heritage. - No other characteristics reported Qualitative Service users (n=14): - 57% African - 43% Caribbean - 57% female - Median age: 51 years - Time since diabetes diagnosis: 2 years - Previous diabetes self-management interventions: dietary advice/ exercise (64%), blood monitoring (21%), DESMOND (7%) Qualitative Service delivery staff (n=7):	Participation rates: 135 places were booked, with 84 participants attending the first session. 77% of attendees (65 out of 84) completed the course (attended at least 4 out of 7 sessions). 62% attendance rate among all booked participants. Satisfaction with course: 91% rated key components (facilitator delivery, initial contact, cooking sessions, etc.) as excellent or good, and 100% recommended HEAL-D Online. Usability: 83% found the digital platform easy to use. The online format provided flexibility and convenience, with some participants attending from other countries or during holidays.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
				- All female - 71% Black heritage - 29% dietitian, 29% lay educator, 14% physiotherapist, 14% cooking session facilitator, 14% service manager	Feasibility for service delivery staff to deliver HEAL-D: Challenges in assessing participant engagement and exercise safety via virtual format. There were also issues with navigating the online platform, although familiarity improved over time. Outcomes: 78% self-reported weight loss, and 72% reported reduced waist measurement. There was decreased emotional distress, (median PAID-5 score dropped from 7 to 4). Participants appreciated the peer support and cultural relevance of the program, which motivated them to create a space for sharing personal stories and experiences. This

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					forum allowed service users to connect with others from similar cultural backgrounds, offering reassurance that their challenges were not unique and that others had faced similar circumstances.
Moore et al. (2019) United Kingdom	An intervention development study aimed at creating a culturally tailored self-management support program for type 2 diabetes within African and Caribbean communities. Using a co-design approach, the project involved collaboration among patients, community leaders,	**Diabetes management and complications.** Primary outcomes focused on identifying barriers and facilitators to healthy behaviours for managing type 2 diabetes.	Access to services Social support	N=41 - 56% African - 44% Caribbean - 66% female - Mean age: 62.4 years - 88% were born outside of the U.K. - 44% had basic education - 10% unemployed	Cultural preferences had a significant influence on participants' dietary habits, with traditional foods being a central part of their diets. There were gaps in knowledge about how certain foods, such as natural sugars and starches, affect blood glucose levels, and many participants struggled with portion control. Physical and psychological barriers related to physical

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	and healthcare professionals. The goal was to identify barriers to adopting healthy behaviours and develop an intervention that directly addressed these challenges.				activity were discussed, shaped by cultural attitudes toward exercise. Walking and dancing were discussed as culturally familiar activities that provided opportunities for increasing physical activity. Motivation to adopt healthier behaviours was driven by concerns about health risks and the support of family. Social norms and family dynamics played a key role in shaping dietary choices, particularly with family members, especially wives, having a strong influence on food preparation and portion sizes. Peer support and group interactions were seen as essential for maintaining long-term behaviour changes.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Morrison et al. (2014) United Kingdom	A qualitative study utilizing narrative interviews with participants in a family-based, cluster-randomized control trial of a dietitian-led intervention to reduce obesity in people of South Asian origin at high risk for diabetes.	**Progression from prediabetes to diabetes.** Interviews examined experiences related to motivations for participation, adherence to the intervention, challenges faced in meeting dietary and physical activity goals.	Access to services Social support	N= 24 - 63% Indian - 37% Pakistani - 50% female - 20 trial participants and 4 family members	Participants joined the trial due to family diabetes history and a desire to lose weight. Some also wanted to acquire health information and personalized monitoring. Trial had a 97.7% retention rate, supported by personalized language choices, home-based consultations, and strong participant-dietitian relationships. While some saw benefits like weight loss (up to 8 kg) and increased activity, adherence was difficult due to time constraints, cultural food preferences, social (e.g., Ramadan) and work-related factors, and challenging weather conditions. Family responsibilities and sense

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					of obligation played a key role in encouraging some participants to stick with the intervention.
Pludwinski et al. (2016) Canada	A qualitative inquiry of participants from a randomized controlled trial that assessed the effectiveness of a smartphone-based health coaching intervention for individuals with type 2 diabetes.	**Diabetes management and complications.** Interviews focused on understanding participants' experiences with the smartphone-based health coaching intervention (e.g., smartphone use, interaction with health coach).	Access to services	N=11 - 82% females - Mean age: 60.6 years - Participants came from a range of socioeconomic backgrounds (details were not provided)	Smartphone and software: Participants valued the smartphone's utility for tracking diet, exercise, and blood glucose, with some reporting increased self-awareness of their health behaviours. Meal photo journaling and feedback from health coaches helped improve dietary choices and portion control. Health coach: Participants found the health coaches to be supportive, trustworthy, and encouraging, which helped them manage their diabetes.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					Overall experience: Participants felt more confident in managing their condition, reporting increased control over their diabetes. They found the program motivating and appreciated the knowledge gained about diabetes management. Many expressed interest in participating in similar programs in the future. Frustrations with chronic condition management: Despite positive experiences, participants faced challenges in managing medications, blood glucose levels, diet restrictions, and comorbidities like chronic pain and mental health issues, which made diabetes management more difficult.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
Prinjha et al. (2020) United Kingdom	A qualitative study investigating the perceptions of British South Asian-origin patients with type 2 diabetes on mobile health SMS text messaging to support medication adherence.	**Diabetes management and complications.** Focus groups examined views on diabetes management, use of digital devices, the type of support required, and the potential effectiveness of SMS in managing diabetes.	Access to services Social support	N=67 - 57% women - Age range: 18-81 - 16% Punjabi Sikh - 27% Bangladeshi Muslim - 10% Pakistani Muslim - 12% Gujarati Hindu - 18% South Asian - 7% Gujarati Muslim - 10% Bangladeshi	Participants valued SMS messages for supporting medication adherence but also wanted messages addressing other self-management needs, including diet, exercise, stress management, and information specific to South Asian diets and fasting practices. Short messages in English were seen as useful, primarily because family members could translate them for those who had difficulty reading or understanding the content. Family participation was essential, particularly for individuals with limited English proficiency. Participants recommended using various formats,

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					such as audio and images, along with in-person group sessions for those without digital devices, to enhance accessibility and support.
Tang et al. (2021) Canada	A single-arm cohort study with a pre-post-test design to evaluate the impact of a 3-month diabetes self-management education and support (DSME/DSMS) intervention led by a peer leader and diabetes educator, on South Asian-origin adults with type 2 diabetes.	**Diabetes management and complications.** Outcomes measured at baseline and 3 months. Clinical outcomes: - HbA1C - Apolipoprotein B - Blood pressure - BMI - Waist circumference Patient-reported outcomes: - Diabetes Distress Scale	Access to services	N=114 - 78% born in India - 52% women - Mean age: 64 years - 39% had postsecondary education - 33% had household income <$20,000	There were significant improvements in HbA1C levels, from 8.2% (66 mmol/mol) to 7.8% (62 mmol/mol), a slight decrease in BMI from 30.02 to 29.7 kg/m², and a reduction in blood pressure from 75.86 to 70.78 mmHg. However, other factors, including systolic blood pressure, ApoB levels and psychosocial measures (diabetes-related distress and depressive symptoms), showed no significant changes between baseline and the 3-month follow-up.

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
		- Patient Health Questionnaire			
Umaefulam et al. (2023) Canada	Environmental scan and co-development approach to create a culturally and linguistically tailored intervention designed to enhance diabetic retinopathy screening participation among French-speaking individuals from African and Caribbean backgrounds.	**Diabetes management and complications.** Workshop survey assessing feasibility, cultural appropriateness and effectiveness of the intervention in overcoming barriers to diabetic retinopathy screening within immigrant communities.	Access to services Social support Immigrant status	N=13 - 46% spoke French - 62% were male - 54% were in the 50-69 age group - 54% were only in Canada for 0-4 years	Environmental scan: Gap was identified for specific groups, which included French-speaking individuals from African and Caribbean countries. Co-development workshops: Participants in community workshops (individuals with diabetes, as well as family members) identified key barriers to screening and co-developed solutions such as language barriers, cultural factors and logistical challenges, such as transportation and wait times. Health system partners (such as diabetes educators, social support workers and clinical managers) also contributed,

Author and location	Study design and intervention characteristics	Diabetes outcome	Social determinants of health	Sample characteristics	Key findings
					ensuring that the solutions were feasible and culturally appropriate.
Wayne et al. (2014) Canada	Single-arm, longitudinal feasibility study with a pre-post-test design evaluating the feasibility of a smartphone-based health coaching intervention for managing type 2 diabetes among participants from a lower socioeconomic, ethnically diverse community.	**Diabetes management and complications.** Outcomes measured at baseline and 24 weeks. Clinical outcomes: - HbA1c - Weight - BMI - Waist circumference	Access to services	N= 21 - 14% African - 14% Caribbean - 14% South Asian - 57% female - Mean age: 55.6 years - 86% had children - 14% had less than high school education - 57% employed full-time, 33% unemployed	HbA1c Reduction: The entire sample showed a significant mean reduction of 0.28% in HbA1c and participants with sub-optimal baseline HbA1c (≥7.0%) (n=12) experienced a significantly greater reduction of 0.43%. Weight changes: The entire sample had a mean weight reduction of −1.3 kg while sub-optimal HbA1c group (n=9) had a significant weight reduction of −1.9 kg. BMI: The entire sample showed a mean reduction in BMI of −0.4. Waist circumference: The entire sample showed a mean increase in waist circumference of +2.7 cm.

Table 3. Downs and Black quality assessment results

Study	Reporting (/11)	External validity (/3)	Internal validity (/7)	Selection bias (/6)	Power (/1)	Total score (/28)
Banerjee et al. (2022)	9	1	4	2	0	16
Bhopal et al. (2014)	10	1	5	6	1	23
Chatterjee et al. (2018)	7	2	4	1	0	14
Choudhury et al. (2008)	6	1	4	0	0	11
Dallosso et al. (2022)	9	2	4	4	1	20
Gill et al. (2010)	6	1	4	0	0	11
Goff et al. (2021a)	7	1	5	5	0	18
Hawthorne et al. (2001)	9	1	4	3	0	17
Kousar et al. (2008)	9	1	4	1	1	16
Low et al. (2024)	4	1	4	2	0	11
Tang et al. (2021)	9	1	4	1	0	15
Wayne et al. (2014)	8	1	4	1	0	14

Table 4. CASP Tool quality assessment results

Study	Are the results valid? (/6)	What are the results? (/3)	Will the results help locally? (/1)	Total score (/10)
Choudhury et al. (2018)	5	1	0	6
Goff et al. (2021a)	5	1	1	7
Goff et al. (2021b)	5	3	1	9
Low et al.	6	3	1	10
Moore et al. (2019)	5	3	1	9
Morrison et al. (2014)	5	3	1	9
Pludwinski et al. (2016)	4	3	1	8
Prinjha et al. (2020)	5	3	1	9
Umaefulam et al. (2023)	5	3	1	9

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