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Healthy Outcomes through Peer Educators: Feasibility of a peer support diabetes prevention programme for African-American grandmother caregivers

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Abstract

Aim: To assess the protocol feasibility and intervention acceptability of a community-based, peer support diabetes prevention programme (DPP) for African-American (AA) grandmother caregivers at risk for diabetes.

Materials and Methods: Grandmother caregivers were randomized in a 2:1 ratio to DPP (active comparator) or DPP plus HOPE (Healthy Outcomes through Peer Educators; intervention). DPP + HOPE incorporated support from a peer educator who met with participants in person or by telephone every week during the 1-year intervention. Outcomes included: (1) recruitment rates, outcome assessment, and participation adherence rates assessed quantitatively; and (2) acceptability of the programme assessed through end-of-programme focus groups.

Results: We successfully consented and enrolled 78% ($n = 35$) of the 45 AA grandmothers screened for eligibility. Eighty percent of participants (aged 64.4 ± 5.7 years) were retained up to Week 48 (74% for DPP [$n = 17$] and 92% for DPP + HOPE [$n = 11$]). All grandmothers identified social support, neighbourhood safety, and access to grocery stores as influences on their health behaviours. At Month 12, the active comparator (DPP) group and the intervention group (DPP + HOPE) had a mean change in body weight from baseline of −3.5 ± 5.5 (−0.68, −6.29) kg and − 4.4 ± 5.7 (−0.59, −8.2) kg, respectively.

Conclusions: This viable study met the aim of educating and equipping AA grandmothers with the practical and sustained support needed to work toward better health for themselves and their grandchildren, who may be at risk for diabetes. The intervention was both feasible and acceptable to participating grandmothers and their organizations.

KEYWORDS
African-American grandmother caregivers, diabetes prevention, diabetes prevention programme, peer educators, prediabetes

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1 | INTRODUCTION

African-American (AA) individuals are disproportionately represented as grandparent caregivers, with 31% of AA grandparents, mostly AA grandmothers who live with grandchildren, serving as a primary caregiver compared to 5% of the general population.[1] This figure may underestimate the AA grandparent caregiver population because it may not capture informal kinship care, which is the most common care arrangement in AA grandparent-headed households. Some grandmothers may assume primary responsibility for their grandchildren without legal custodial rights as the legal process is complicated, overwhelming, and expensive.[2] AA grandmother caregivers represent a highly vulnerable population, both financially and physically.[3] They are more likely to live in poverty and have more functional limitations than other AA women aged 45 years and over.[4,5] When compared with women from other racial/ethnic groups across all age groups, AA grandmothers are most likely to live in poverty.[6]

African-American grandmother caregivers experience increased stress and numerous health challenges directly related to their caregiving roles.[7,8] The prevalence of obesity, depression, diabetes, hypertension, and insomnia is high among AA grandmother caregivers.[9] Compared to non-Hispanic White grandmothers, AA grandmothers are more likely to have obesity and poor health prior to taking the responsibility of caring for a grandchild.[10] The psychological stress associated with raising a grandchild and maintaining a household may trigger pre-existing health problems or induce health behaviour changes which exacerbate health conditions in later life.[11–14] Because most AA grandmother caregivers provide care to grandchildren in the absence of alternative caregivers, a grandmother who becomes unable to care for a grandchild due to health problems may be forced to leave the grandchild in the care of an unreliable parent or place the child in foster care (either temporarily or permanently). Such placements have adverse effects on the well-being of children and impose financial costs on the public sector.[14]

Grandmother caregivers play an important role in the formation of food habits and preferences of their grandchildren by modelling their own eating behaviours and food preferences.[15–17] AA grandmothers with excess weight who are caregivers for their grandchildren may benefit from interventions to reduce weight and prevent diabetes. In turn, improvements in their lifestyles may translate to benefits in reducing the alarming obesity trend among AA grandchildren.[17]

The Diabetes Prevention Programme (DPP)[18] is an evidence-based, lifestyle change programme that has been shown to decrease the risk of diabetes through weight loss among all participants, including AA people. However, suboptimal weight loss outcomes have been reported among AA people, particularly older women who participated in DPP translations in 'real-world' settings. All translational studies combined led to an average weight loss for AA participants of approximately half the weight loss for AA participants in the original DPP (−2.8 vs. −5.8 kg, respectively). Low participation adherence in translated DPP interventions may partly explain the suboptimal weight loss outcomes in AA participants.[19] The suboptimal effectiveness of DPP translations among AA participants signals the need for enhancements to existing evidence-based interventions, particularly for other at-risk AA groups, such as AA grandmothers of lower socioeconomic status.

Support from community members and professional care providers can enhance personal resilience in grandparent caregivers.[20–23] Social support is viewed as a protective factor that promotes positive outcomes, and is most beneficial to grandparents with higher levels of stress.[24] Healthy Outcomes through Peer Educators (HOPE) is a community-based, peer support DPP intervention that allows grandmothers who reside in the same community an opportunity to provide each other with knowledge, experience, emotional, social and practical help. The primary aim of this feasibility study was to assess whether HOPE was feasible to deliver and acceptable to AA grandmother caregivers residing in a low-income urban community.

2 | MATERIALS AND METHODS

This was a prospective randomized study to assess the feasibility and acceptability of DPP + HOPE relative to the active comparator (DPP only). Community-based participatory research was used to design, implement, and evaluate the study in partnership with a community advisory board of pastors and leaders from a senior community centre and a local church in a Midwest urban city. The HOPE Community Advisory Board developed the intervention with feedback from local community members. The study was approved by the University Social Sciences Human Subjects Protection Committee. Participants provided written informed consent prior to enrolment in the study. The leadership team from the community centres identified four women who would serve as peer educators in Spring 2022. These women were well-respected members of the community who were actively engaged in community events.

The peer educators participated in a 16-h training programme offered over a 2-month period. This was guided by the DPP training manual and a toolkit from our prior work focusing on supportive, non-judgemental communication, goal setting, motivational interviewing, and providing peer support.[24] A community-based ethics training module utilized in prior work was completed prior to training for HOPE. Trainees were required to attend all training sessions and received $20 per hour as compensation for training and participation in the study.

The study is registered at https://www.isrctn.com (ISRCTN 16613921).

2.1 | Inclusion/exclusion criteria for HOPE study

Community partners recruited participants for the study between June 2022 and August 2022. Recruitment of participants included announcements during church services and events, flyers, pastor communications, or in-person recruitment at community events. The inclusion criteria for participation in the HOPE study included being 40 years of age or older and the primary caregiver of one or more grandchildren. A primary caregiver was defined as 'one who provides instrumental and expressive care to a grandchild on a daily basis for an indefinite period

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of time'.[25] Grandmothers were also required to meet the DPP eligibility requirements at the time of enrolment in the study, which include: (1) having overweight or obesity (body mass index ≥25 kg/m^2); (2) no previous diagnosis of diabetes; and (3) a glycated haemoglobin (HbA1c) level between 39 and 46 mmol/mol (5.7%–6.4%) measured using a finger stick test at the time of enrolment.[18,26] Grandmothers were excluded if they were pregnant or had diseases that would limit their lifespan and ability to participate in the study.

The DPP sessions began in September 2022. Grandmothers were allocated in a 2:1 ratio to DPP or DPP + HOPE to account for anticipated attrition in the DPP arm. All grandmothers participated in 16 DPP group sessions over the first 6 months (once a week for Months 1–2, then every other month for Months 3–6, and once a month for Months 7–12). The sessions were offered virtually to increase accessibility and address participant safety concerns about travelling alone in the evenings. Grandmothers assigned to the DPP + HOPE intervention also met with a peer educator in person or by telephone weekly during the 1-year study.

2.2 | Measures

We evaluated the feasibility of HOPE by assessing the number of potential versus recruited participants, participant adherence, attrition for outcome assessments, and missing data of the DPP + HOPE intervention. We collected preliminary data to measure the impact of DPP + HOPE by comparing the active comparator (DPP alone) and intervention groups (DPP + HOPE) with regard to: (1) weight loss; (2) physical activity (assessed with a Fitbit® device); and (3) HbA1c level, measured at baseline and Month 12.

Body weight was measured without shoes and in light clothing to the nearest 0.1 kg. Each measurement was done twice, and the mean of the two measurements was used.

All grandmother participants received a Fitbit Charge 5® physical activity tracker at the time of enrolment.[27] The research team assisted participants with navigating the features of the tracker and installation of the Fitbit app on their smartphone. A triaxial accelerometer measures motion, which is then aggregated into physical activity data. Summary information (e.g., steps) is available on the tracker, and data are wirelessly uploaded to a study team's website that displays daily steps, min/day activity, and a graph showing the temporal pattern of physical activity during the day and over time (e.g., weeks or months).

During the enrollment screening, HbA1c was measured to determine eligibility to participate in the study and at the end of the study it was measured again to assess if participants had progressed to diabetes. We used the A1cNow + system, the National Glycohemoglobin Standardization Program Certified, Clinical Laboratory Improvement Amendment waived, system that provides results using a finger stick test.

2.3 | Focus groups

A random 50% ($n = 14$) of study participants were invited to participate in the focus group discussions to assess the acceptability of the programme and learn about the factors that contributed to their success and the difficulties they faced while attempting to implement healthy strategies recommended by the DPP. The grandmothers were telephoned, provided information regarding the focus group interviews, and asked about their interest in participating in the focus group discussion. The grandmothers received $50 after completing a 1-h focus group session to compensate for their time. The focus group discussions were conducted virtually via an approved video conferencing platform.

The interviews explored the context in which the participants attempted to adhere to the lifestyle change recommendations stipulated in the DPP. The following questions were asked: (1) What did you like most about the HOPE programme? (2) What challenges did you face when trying to be healthier? (3) What changes (if any) should be made to help you and other women be successful in the programme? Probes were used to assist the grandmother in elaborating and clarifying statements.

A graduate student conducted each interview, which was digitally recorded and lasted 1 h. Contextual information and details about the interview experience were documented in field notes. The principal investigator (PI) and graduate students listened to recordings of the interviews and, together, adjusted the interview approaches and refined questions to ensure that research questions were addressed in a subsequent focus group interview. The focus group recordings were transcribed and de-identified prior to data analysis.

2.4 | Statistical methods

For the focus groups, deductive content analysis was guided by social learning theory, which assumes that people are shaped by their environment and learn by observing others.[14,15] The preliminary coding scheme consisted of three categories (neighbourhood, support, and education). New categories were inductively created for coded text that did not fit the coding scheme. Once all transcripts were coded, the PI and graduate student examined the data within each code again. Codes with similar content or context were collated into unifying themes.

Descriptive statistics were examined for the secondary feasibility outcomes (change in weight, HbA1c%, and steps per day). The mean and standard deviation were used for continuous measures, and frequency and percentage for categorical measures were calculated for the intervention and comparator group. CIs were provided to reflect the uncertainty of the secondary feasibility outcomes.

3 | RESULTS

Two community organizations were approached, and both agreed to participate. We screened 45 women who indicated they were grandmothers who cared for one or more grandchildren. Eight women were ineligible due to undiagnosed diabetes (HbA1c above 48 mmol/mol [6.5%]) and were referred to their primary care provider. Two women did not meet the inclusion criteria because they did not care for a grandchild on a regular basis. All women who were eligible to participate consented and enrolled in the study (78%, $n = 35$; Figure 1).

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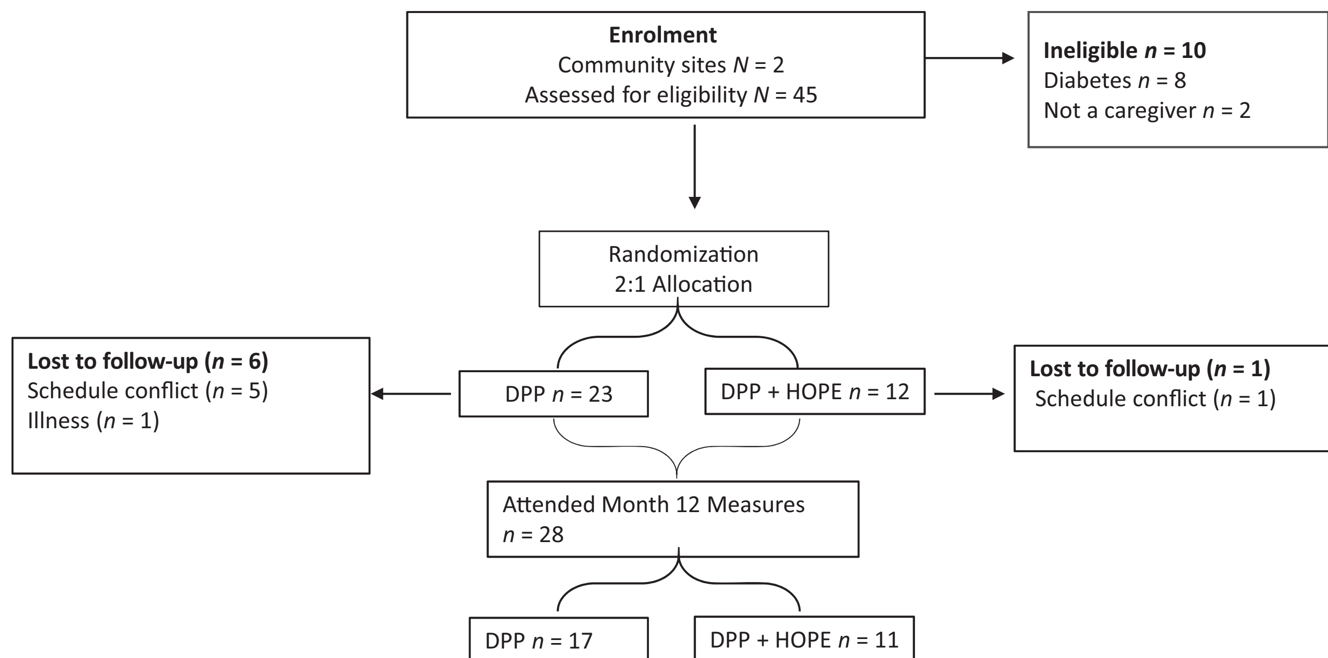

FIGURE 1 HOPE (Healthy Outcomes through Peer Educators) consort diagram.

TABLE 1 Baseline demographics.

	All (n = 28)	DPP (n = 17)	DPP + HOPE (n = 11)
Age			
mean ± SD	64.4 ± 5.7	61.9 ± 7.01	64.6 ± 5.92
40–59 years	8	5	3
60–79 years	19	11	8
>80 years	1	1	0
Education			
High school or less	8	5	3
Some college	12	5	7
College+	5	4	1
Missing	3	3	0

Note: + or higher.
Abbreviations: DPP, Diabetes Prevention Programme; HOPE, Healthy Outcomes through Peer Educators.

The grandmother caregivers were allocated to receive DPP (n = 23), or DPP + HOPE (n = 12). One participant withdrew from the intervention group (DPP + HOPE) during Week 1 and six participants withdrew from the comparator group (DPP) between Weeks 2 and 3. The seven women withdrew within the first month of the study due to employment or caregiving responsibilities.

Table 1 summarizes the baseline demographic characteristics for the entire sample and by groups. On average, participants (n = 28) were aged 64.4 ± 5.7 years and 18% had a college degree or more. All the participants had prediabetes (HbA1c 39 –46 mmol/mol [5.7–6.4%]) at baseline[26] and the mean HbA1c was slightly higher among the DPP + HOPE participants than the DPP participants (Table 2).

Eighty percent of the women stayed in the study through to Week 48 (Figure 1). Fifty-nine percent (n = 10) of women in the DPP participated in 50% (13 sessions) or more of the sessions offered during the year compared to 82% (n = 9) of women in the DPP + HOPE intervention group.

The active comparator (DPP) and intervention group (DPP + HOPE) had a mean change in body weight from baseline of −3.5 ± 5.5 (−0.7, −6.3) kg and −4.4 ± 5.7 (−0.6, −8.2) kg, respectively. DPP participants and DPP + HOPE participants successfully lost an average of 4% and 5% of their baseline body weight, respectively. The DPP participants' mean change in steps per day from baseline was 1157.6 ± 3618 (−711, 3026). Despite three participants with limited mobility, the DPP + HOPE participants' mean change in added steps per day from baseline was 500.72 ± 4192 (−2137, 3138). HbA1c improved or remained unchanged in 53% and 64% of the DPP participants and DPP + HOPE participants, respectively, at Month 12 (Table 2).

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TABLE 2 Physical activity and biometric characteristics (secondary outcomes).

	DPP (*n* = 17)			DPP + HOPE (*n* = 11)		
	Baseline	**12 months**	**Difference**	**Baseline**	**12 months**	**Difference**
Weight, kg mean ± SD (95% CI)	91.9 ± 17.1 (83, 100)	88.4 ± 13.8 (81.4, 95)	−3.5 ± 5.5 (−0.7, −6.3)	91.3 ± 13.7 (82, 100)	86.9 ± 13.9 (78.6, 95)	−4.4 ± 5.7 (−0.6, −8.2)
HbA1c, mmol/mol HbA1c, %, mean ± SD, (95% CI)	39.7 ± 1.9 (38.6, 40.7) 5.78 ± 0.18 (5.68, 5.87)	38.9 ± 3.2 (37, 41) 5.71 ± 0.33 (5.54, 5.88)		41 ± 1.5 (39.42) 5.92 ± 0.23 (5.76, 6.07)	40.9±3.1 (38, 44) 5.89 ± 0.40 (5.62, 6.16)	
HbA1c ↓ ↔ (*n*, %)		*N* = 9, 53%			*N* = 7, 64%	
HbA1c >48 mmol/mol		*N* = 0			*N* = 1, 9%	
Steps per day mean ± SD, (95% CI)	5396.6 ± 2816.2 (3948, 6844)	6554.2 ± 2271.7 (5242, 7865) Missing (n = 3)	1157.6 ± 3618 (−711, 3026)	5038.8 ± 2838.5 (3131, 6945)	5539.5 ± 3086.0 (3466, 7612)	500.72 ± 4192 (−2137, 3138)

Abbreviations: ↓, decrease; ↔, same; HbA1c, glycated haemoglobin; CI, confidence interval; DPP, Diabetes Prevention Programme; HOPE, Healthy Outcomes through Peer Educators SD, standard deviation.

3.1 | Focus group discussions

The categories identified in the analysis were predominately descriptive, that is, they described patterns in the data relevant to the research question. Two new categories (motivation and challenges) were inductively created for coded text that did not fit the original coding scheme. The following categories were generated in the interviews: motivation, challenges, neighbourhood, support, and education (Figure 2). Sample excerpts are provided.

3.1.1 | Challenges

Physical limitations impacted some participants' ability to be physically active. Two women indicated they were planning knee surgery, and one participant was scheduled for total hip replacement a week after the interview.

The work environment was also identified as a challenge by participants who were still employed. Social pressure at family or church celebrations, meetings with catered food, or communal gatherings where eating was encouraged often led to overeating or consuming more food than intended. Some workplaces provided easy access to food, such as a vending machine, communal snack area, or office treats, making it tempting to consume it, irrespective of hunger. Some participants engaged in work activities that involve food. For example, ID 9 stated '*I'm a demo person at supermarket. If we are giving out samples of cake or ice cream, we have to taste it and tell the customers what is like, and it's very, very tempting to eat more than just a sample. And then we must stand there for 5 and a half hours in one place, and you can't move around at all or away from your cart*.'

3.1.2 | Education

All the women felt that HOPE promoted skills such as problem-solving, decision-making, communication, and self-advocacy, allowing them to tackle health behaviour challenges. They indicated that learning about the relationship between physical activity, nutrition, and diabetes helped them understand the importance of modifying their health behaviours to prevent diabetes and other chronic diseases. ID 20 stated, '*I feel informed after reading the manual and listening to the DPP speakers. I didn't know what an A1C number was or what was normal blood pressure. Now I know what my doctor is talking about, and I can ask him how I am doing at my next appointment*.'

3.1.3 | Neighbourhood

The grandmothers reported a lack of grocers with fresh produce in their neighbourhood as contributing to their diet-related health problems. Participants travelled two to three miles from their home to a grocer in a 'White neighbourhood' who carried a variety of fresh produce. ID1, a 60-year-old grandmother stated, **'***Well, I don't shop in my neighborhood. I only go to my neighborhood grocery store if*

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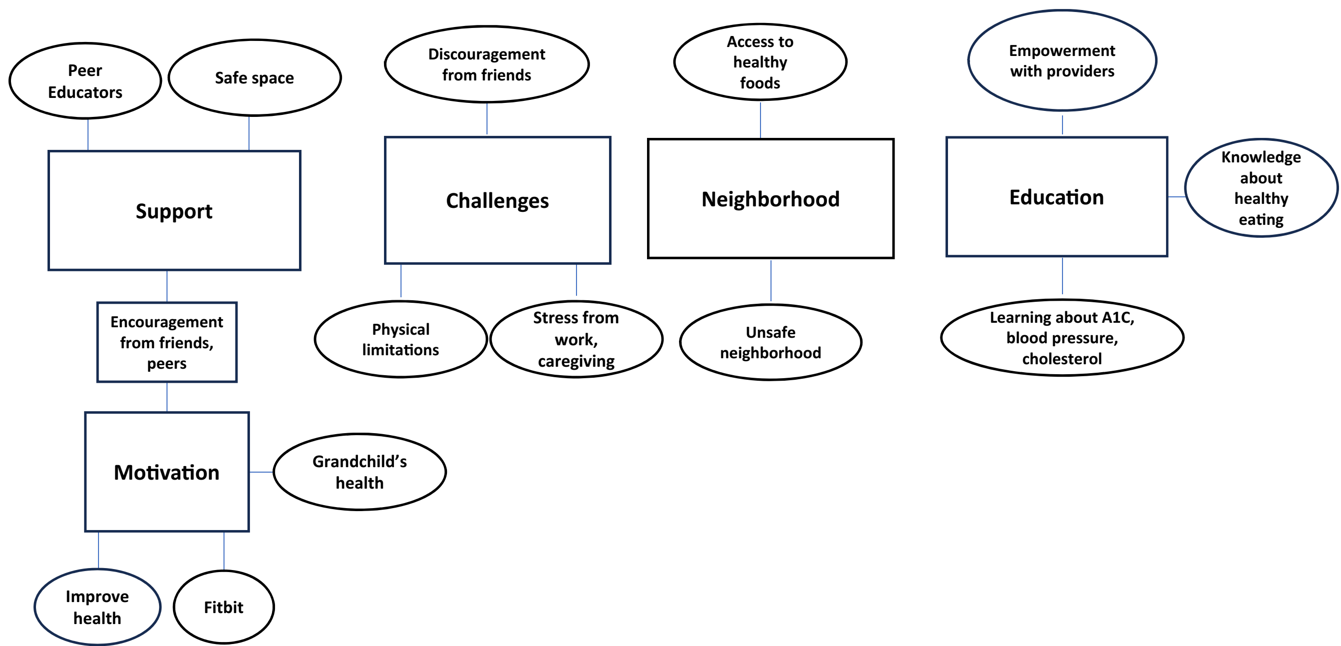

FIGURE 2 Social and environmental factors influencing health.

I must get something quick because I feel like the food is pretty picked over, or they don't have what I'm looking for, or the food that they have does not look as fresh.' Participants without cars or access to public transportation were limited to walking to convenience stores and petrol stations to purchase food.

Participants indicated that they did not feel comfortable walking alone in their neighbourhood during the day because of personal safety concerns (crime, loose dogs, traffic, etc.). ID2, a 72-year-old grandmother, stated, '*I'm glad the program was virtual. I don't like driving in the dark. There's been a lot of car jackings around here. I would never walk alone, even in the summer. People take advantage of older people. It's a shame*.' Several of the grandmothers started a walking group during the study so women felt safe while engaging in physical activity in their neighbourhood.

3.1.4 | Social support

All women described HOPE as a source of support that helped them to stay on track with their health goals. The women enjoyed spending time with their neighbours and peer educators and validating each other when they talked about their challenges and accomplishments. The women embraced the opportunity to share experiences and offer informational support. The women appreciated the virtual aspect of the programme, which allowed them to interact with their peers in the convenience of their home. The peer educators indicated that 'helping others helped them' maintain healthy behaviours so they could set a good example for their peers. ID 22, a 65-year-old grandmother, praised her peer educator by stating the following: '*One of the powerful things that this program offers that others may not offer would be our (peer) coaches, and so I wanted to say thank you to ID27. She always seems to call me when I need to talk to somebody*.'

3.1.5 | Motivation

Grandmothers expressed the importance of remaining healthy to provide support for their family. Because most of the AA grandmother caregivers provided care to grandchildren in the absence of alternative caregivers, a grandmother who becomes unable to care for a grandchild due to health problems may be forced to leave the grandchild in the care of an unreliable parent or place the child in foster care (either temporarily or permanently).

Many grandmothers described themselves as a 'change agent' for their family, particularly their grandchildren. These grandmothers indicated that they wanted to be healthier for the sake of their grandchild. ID 25 stated, '*My daughter can't afford childcare, so my grandsons need me. I got to be healthy so I can help my family*.'

4 | DISCUSSION

The main findings of this study were as follows: (1) Our community-engaged approach to recruiting resulted in the successful consent and enrolment of 78% ($n = 35$) of the 45 AA grandmothers screened; (2) peer support through weekly contact with a peer educator resulted in greater retention through to Week 48 (74% for DPP [$n = 17$] and 92% for DPP + HOPE [$n = 11$]); (3) 59% of DPP participants attended at least 13 of the 26 DPP sessions compared to 82% percent of DPP + HOPE participants; and (4) social and environmental factors play a

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significant role in the health behaviours of AA grandmother caregivers.

Our retention rate at Week 48 of the study was higher than the national diabetes prevention programmes offered between 2012 and 2017 that retained 60.5% of Black participants up to Week 18.[28] The DPP + HOPE intervention group had an average of 5% weight loss at Month 12, which was comparable to results found in AA women enrolled in the original DPP efficacy trial,[29] and a faith-based DPP study.[30] As with other DPP translations,[31–33] HbA1c levels improved or remained unchanged in 53% and 64% of the DPP participants and DPP + HOPE participants, respectively, at Month 12.

This study is strengthened by our partnership with community organizations that facilitate social capital by engaging their members in activities that build social relations and provide a sense of belonging. The preexisting social connection between participants within the intervention and comparator groups likely contributed to the retention and participation observed in this study. HOPE was an accessible diabetes prevention programme that was described by some participants as a 'safe' space where they felt comfortable and at ease. The study reinforced social capital among the participants, allowing them to develop strategies to overcome existing barriers within their environment (e.g., walking groups). A limitation of our study was our inability to reach socially isolated women with weak community connections who might be adversely impacted by the limited resources within their community.

Many of the challenges cited by the participants (e.g., lack of safe walking areas and local grocers with fresh produce) are the result of structural racism's influence on policies impacting social and environmental factors that adversely affect the health of AA people residing in low-income, marginalized communities.[34] While individual and community-level interventions assist with circumventing these barriers, the responsibility of mitigating the damaging effects of structural racism should not be placed solely on the shoulders of those adversely impacted.[35,36] New policies informed by evidence on social and health risk are needed in urban areas to reverse the residual effects of historical discriminatory policies (e.g., redlining) that sustain impoverished neighbourhoods with scarce access to health-promoting activities.[37] Housing and development policies that mitigate problems created by concentrated poverty (e.g., lack of access to reasonably priced fruits and vegetables, recreational facilities and healthcare services, and walkable neighbourhoods) are necessary to address disparities in diabetes, hypertension, and other chronic diseases. Policy-level changes can strengthen interventions that incorporate multiple levels of influence (e.g., interpersonal, organizational, community, educational, occupational, and environmental) to diminish health disparities.[38]

HOPE proved to be an acceptable refinement to a powerful intervention (namely, the DPP). This feasibility study suggests the efficacy of HOPE should be evaluated in an adequately powered randomized trial to determine if clinically meaningful improvements in grandmothers' health behaviours influence the health behaviours (e.g., fruit and vegetable intake, physical activity) of their grandchild(ren) and other members of the family.

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CONFLICT OF INTEREST STATEMENT

No potential conflicts of interest relevant to this article were reported.

PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/dom.15574.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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