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Factors related to recruitment and retention of patients into diabetes group visits in Federally Qualified Health Centers

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Abstract

Rationale, Aims and Objectives: To examine factors related to recruitment of eligible patients and retention of enrolled patients in diabetes group visits (GVs).

Method: As part of a cluster randomized trial, 272 eligible patients were contacted and 75 patients were eventually enrolled in GVs at six community health centers (CHC). Fisher's exact tests and χ^2 tests were used to compare enrolled and nonenrolled patients by patient recruitment method, gender and preferred language. Linear mixed models were used to evaluate characteristics associated with GV attendance such as diabetes self-empowerment and diabetes-associated distress. Content analysis was used to analyse patients' open-ended survey responses, and template analysis was used to analyse CHC staff interviews.

Results: In terms of recruitment and enrollment analysis, patients who received in-person contact only and both phone and in-person contact comprised a greater fraction of the enrolled than unenrolled group, while those who received phone only and both phone and mail comprised a smaller fraction of the enrolled than unenrolled group ($p = 0.004$). In terms of retention analysis, 70 of the 75 enrolled patients attended at least one GV (93%). The average number of GVs was 3.2 out of 6 visits. Higher GV attendance was associated with lower baseline diabetes empowerment ($p = 0.03$). Patients' most common self-reported motivating factors to attend GVs were to learn more about diabetes, gain improved blood glucose control and find support from peers.

Conclusion: In-person recruitment for GVs at CHCs was more effective than recruitment by telephone/mail. Patients who felt less empowered to manage their diabetes were most motivated to attend GVs. These findings could help clinicians implement targeted recruitment of patient populations who are more likely to attend diabetes GVs and tailor self-management education interventions to their patient populations, particularly for underserved patients who face disparate clinical outcomes.

KEYWORDS
barriers to attendance, community health centers, group visits, patient recruitment, self-management education, type 2 diabetes mellitus

1 | INTRODUCTION

About 30.3 million people (9.4%) in the United States have diabetes.[1] Diabetes is a complex chronic disease requiring lifetime self-management, such as checking blood glucose levels at home and taking prescribed medications, to control blood glucose levels. Yet many barriers exist to effective self-management, especially for patients from underserved populations, including the cost of medications[2] and lack of social support.[2] To facilitate effective self-management, the American Diabetes Association recommends participation in diabetes self-management education for all people with diabetes at diagnosis and as needed thereafter.[3,4]

Diabetes group visits (GVs) are one such self-management education intervention which has been shown to improve control of blood glucose levels[5] and quality of life[6] as well as decrease emergency room utilization.[6,7] A GV is a shared appointment in which patients receive self-management education in a group setting and have a medical visit. While several studies have examined the impact of diabetes GVs on diabetes self-management,[8,9] no study to date has examined factors related to recruitment and/or retention of patients in diabetes GVs, let alone recruitment and retention of minority persons with diabetes.

Studies report that persons with type 2 diabetes from underserved communities are less likely to meet HbA1c goals[10] and receive annual eye and foot exams, and are more likely to have diabetic retinopathy.[11,12] They are also less likely to receive diabetes self-management education due to a lack of resources to launch education programs in their communities,[13] a shortage of physicians,[12] lack of time during clinic visits with providers[5] and linguistic barriers.[2] Therefore, it is vital to study how to more effectively recruit and retain underserved populations in diabetes self-management education interventions so they can overcome these barriers and benefit from improved clinical outcomes. This paper reports on patient recruitment and retention in a cluster-randomized trial of community health centres (CHCs) in the Midwest Clinicians' Network (MWCN). Seventy percent of the CHCs' patients have incomes below the federal poverty level and 57% are people of colour.[14]

By examining factors related to recruitment and/or retention of this population in diabetes GVs, we sought to understand how to most effectively recruit patients into diabetes GVs and which patient and cohort characteristics impact GV attendance. We constructed a conceptual model of factors affecting GV attendance and patient outcomes related to more frequent attendance (Supporting Information: Appendix Figure S1). Previous studies have shown that patients with a shorter duration of type 2 diabetes,[15,16] increased comorbidities burden,[15] high baseline diabetes-associated distress[15] and low baseline self-empowerment[17] exhibit more frequent attendance at primary care visits. Studies of diabetes GVs also show that more frequent GV attendance leads to increased self-empowerment,[17] increased patient activation,[16] increased self-management,[6,18] and decreased healthcare utilization (decreased ED visits, visits to specialists and hospitalization rates).[19] For recruitment in our study, we hypothesized that patients contacted in person would be more likely to enroll than patients contacted by telephone and/or mail. For retention, we hypothesized that persons with uncontrolled type 2 diabetes who attend more GV sessions would have a lower duration of diabetes diagnosis, higher comorbidity burden, higher diabetes-associated distress and lower self-empowerment at baseline than those who attend fewer GV sessions. Understanding the factors that affect recruitment and retention of underserved persons with diabetes in diabetes GVs would allow healthcare providers at CHCs to most effectively provide these services.

2 | METHODS

2.1 | Health center recruitment

This study explored potential factors affecting the retention of adult patients with uncontrolled type 2 diabetes (HbA1c ≥ 8.0%) in GVs with a concurrent text messaging programme at CHCs. Sixteen CHCs were recruited from MWCN, a member agency of CHCs from 10 Midwestern states, and 8 were randomly assigned to the group visit and text messaging intervention arm (2018 Training Cohort). Inclusion criteria specified that the CHCs should offer primary care services and have at least three staff members who could attend training sessions and have protected time to implement GVs, collect patient data, and facilitate patient enrollment in a text-messaging programme for diabetes education, support and self-management in English or Spanish. Exclusion criteria included that the CHC must not have been part of our prior pilot study. One CHC in the intervention arm had two clinic locations and hosted a cohort at each location. Two CHCs in the intervention arm withdrew before training. This resulted in a final enrollment of seven cohorts at six CHCs in the intervention arm.

2.2 | Patient screening and recruitment

Each CHC in the intervention arm recruited up to 15 patients with type 2 diabetes using a randomly ordered list of patients who met inclusion criteria. Patients were eligible if their last documented HbA1c was 8.0% or greater and they had attended at least two visits at the CHC in the past year, with at least one during the past 6

months. This ensured that data was collected from patients who were actively engaged in seeking care at their CHC. Other inclusion criteria included that subjects must own a cell phone with text-messaging capabilities, must be at least 18 years of age, and must speak English or Spanish. Patients who were pregnant or planning to become pregnant or who had an uncontrolled psychiatric problem, dementia, another cognitive impairment, hearing difficulties or a severe physical disability that would prevent them from participation in a GV (e.g., homebound) were excluded. Patients who expected to relocate in the next year were also excluded.

Intervention CHC staff identified all patients who met the eligibility criteria and contacted the patients' primary care provider(s) (PCP) to exclude patients whom the PCP suggested would not benefit from GVs. Using a randomly ordered list, the remaining patients were contacted by telephone, letter, and/or in person at their clinic appointments and invited to participate in GVs. For non-English speakers, bilingual CHC staff called and recruited patients; mailed letters were professionally translated. Our hypothesis was that face-to-face contact would deliver higher enrollment rates than telephone and/or mail.[20] Therefore, patients who received in-person contact and phone calls/mail were grouped into a single 'in person' group.

2.3 | Data collection

CHC staff were trained by University of Chicago staff and MWCN in implementing diabetes GVs and in human subjects research and data collection. All patients completed a baseline survey before the first GV. CHC staff also conducted chart abstractions at baseline and after the sixth GV. CHC staff implemented six monthly GVs for recruited subjects and recorded each subject's attendance. During GV implementation, the study team conducted semistructured interviews with 15 CHC staff about the challenges they faced and strategies for improving group visit programs. CHC staff were also surveyed about their experiences about 1 year after the first GV.

2.4 | Outcome and covariate measures

This study focuses on two key outcomes: recruitment and retention. Recruitment was a binary variable (enrolled or not enrolled). The study population for recruitment was composed of all patients who were contacted and invited to enroll in the intervention group. CHC staff recorded method of contact (mail, phone and/or in-person) and recruitment outcome as well as age, gender and preferred language for all eligible patients who were contacted. Retention was measured by GV attendance, a continuous variable, which was recorded by CHC staff in session logs. Session logs were forms where CHC staff recorded patient attendance, activities and topics covered, materials used, and staff present at each GV. The study population for retention was composed of patients enrolled in the intervention group.

Data for patient-level covariates were collected through subjects' baseline surveys and baseline chart abstractions. The baseline survey collected data on demographic information; medical history; diabetes self-care knowledge, attitudes and behaviors[21,22]; quality of life[23]; health care utilization (PCP visits, ED visits and hospitalizations)[24]; and reasons cited by patients for their participation in the group visit program. Baseline surveys included the Diabetes Distress Scale-2,[25] Diabetes Support Scale[26] and Diabetes Empowerment Scale Short Form[27] to assess diabetes self-care knowledge, attitudes and behaviours. Since one CHC held two patient cohorts, data were analysed at the cohort level rather than the CHC level. Patients' gender, cohort and insurance status were recorded by CHC staff in the baseline chart abstractions. Race, ethnicity and preferred language were taken from subjects' baseline surveys. Duration of diabetes diagnosis was calculated as the difference between the patient's current age and self-reported age of diabetes diagnosis. Data for comorbidities burden was obtained from the baseline chart abstraction. Comorbidities burden was calculated as the total number of diabetes-associated complications experienced before the first GV, with more severe complications (amputation due to diabetes, cerebrovascular disease [stroke] and heart failure) weighted as twice the value of other complications, as has been done in other validated scales assessing diabetes-associated complications.[28]

Cohort-level covariates included mean length of GV session; mean length of medical visit; the number of staff involved across the six sessions; whether transportation services were offered; whether childcare services were offered; whether waiving the fee/copay was offered; and whether each of the following activities was done in at least one session: medications refills, foot exams, flu vaccinations, referrals, educational overview of diabetes, education on checking blood glucose, education on medications/insulin, education on dental care, education on eye care, or education on foot care. All cohort-level covariate data were taken from session logs.

2.5 | Analysis

Demographic, recruitment and attendance data for the intervention arm were summarized using basic descriptive statistics. χ^2 analysis was performed to compare enrolled and nonenrolled patients and test for association with gender and preferred language. A Fisher's exact test and χ^2 test were performed to test an association between enrollment and contact methods. Among the participants who attended at least one GV, a linear mixed model (LMM) was used to test the association between GV attendance and covariates. Within-cohort/CHC association was taken into account. Univariate and multivariate analyses were performed on all patient-level covariates. Covariates with $p < 0.15$ in the univariate analyses were included in a full LMM. The backward model selection procedure was used to find the final reduced LMM until the model fit achieved the smallest Akaike information criterion and Bayesian Information Criterion. The same methodology was used to examine the effect of cohort-level covariates on GV attendance, except cohort was considered a

random effect in this model. Patient-level and cohort-level analyses were not combined in an LMM due to the exploratory nature of the study and small sample size. All analyses were performed using SAS software, Version 9.4 of the SAS System (Copyright © 2016 SAS Institute Inc.).

For staff interview transcripts data, we conducted template analysis[29] to identify challenges faced during GVs and potential strategies to address these challenges. Two reviewers (A. N, S. S) independently analysed the transcripts to identify themes and organize them into a codebook. This initial codebook was discussed to a consensus to create a final codebook, which was then used to analyse all the transcripts. In addition, content analysis was conducted of an open-ended question from the baseline patient survey about their motivations for joining GVs. A codebook was generated based on an initial review of responses. Four reviewers (A. N, S. S, A. V, C. S) independently coded responses and discussed to consensus. Similar codes were combined into overarching themes. Content analysis was used because it allowed us to compare the frequency of patients' mentions in the baseline patient survey of particular themes, which served as a metric of theme salience.

3 | RESULTS

3.1 | Screening and recruitment

Staff at six CHCs screened 13,837 adults with type 2 diabetes and identified 8112 (59%) active patients (patients with ≥2 visits in the last year and ≥1 in the last 6 months). Of the active patients, 2459 (30%) had HbA1c ≥8%. After removing patients who did not meet the inclusion criteria, 474 patients were eligible for recruitment. The most common reasons for exclusion at screening were not speaking English or Spanish (54%, 139/258), no longer being a patient at the CHC (4%, 10/258), dementia or cognitive impairment (3%, 9/258), or other reasons that would preclude a patient from participating in GVs such as being incarcerated, terminally ill, and so forth (29%, 75/258).

Of the 474 eligible patients, CHC staff attempted to contact 452 patients (Figure 1) but were unable to reach 180 patients due to incorrect phone numbers, full voicemail boxes and so forth. Of the 272 patients whom CHC staff were able to reach, 58% (156/272) were contacted only by phone; 23% (61/272) by phone and mail; 7% (19/272) by phone and in person; 6% (17/272) only in person; 4% (11/272) by phone, mail and in-person; 2% (6/272) by mail and in person; 0.4% (1/272) only by mail; and 0.4% (1/272) had an unknown method of contact.

Twenty-six per cent (72/272) of patients reached by CHC staff consented and enrolled in the intervention. Enrollment was significantly related to the method of contact, with the following groups comprising a larger fraction of the enrolled than unenrolled group ($p = 0.004$): patients contacted in-person only (8.33% of enrolled vs. 5.53% of unenrolled); patients contacted by both phone and in-person (15.28% vs. 4.02%); by mail and in-person (2.78% vs. 2.01%); and by phone, mail and in-person (5.56% vs. 3.52%). Those contacted by phone only (54.17% vs. 58.79%) and by phone and mail (12.5% vs. 26.13%) comprised a smaller fraction of the enrolled than unenrolled group (Supporting Information: Appendix Table S1). In other words, 43% (23/53) of patients contacted in person were successfully recruited, compared to 22% (49/218) of patients contacted by telephone and/or mail only ($p = 0.01$). The remaining 200 patients reached by CHC staff did not enroll: 85 (31%) reported barriers to participation in GVs, 68 (25%) said they were not interested in GVs, and 47 (17%) verbally agreed to participate but did not show up to sign an informed consent form. Three patients were added to the study after screening and recruitment data were collected, for a total of 75 patients enrolled in the intervention arm.

3.2 | Staff-reported challenges with recruitment and retention

Of the 23 staff members surveyed, 74% (17/23) agreed or strongly agreed that recruiting a sufficient number of patients for GV was a barrier to implementing diabetes GVs at their CHC. In interviews, five staff members from three CHCs suggested that recruitment would have been easier if they were able to recruit more widely than the study's inclusion criteria allowed. One staff member said, '…we had patients that we thought would be really engaged and really great for it [the study] but… they didn't meet the criteria'.

Eighty-three per cent (19/23) of staff surveyed agreed or strongly agreed that retaining enough patients for GVs was a barrier to implementing diabetes GVs at their CHC. Five staff members from three CHCs said that the lack of consistency in which patients came to each visit was a challenge, saying, for example, 'I think there's only been three people make it to … our visits consistently. So, it's not like we're really building that sense of you're seeing the same people every time'. They also expressed that barriers to access were a major factor contributing to patients being unable to come to visits, mentioning the cost of copay, transportation, weather and work schedules as barriers that affected their patients' abilities to come to GVs.

3.3 | Patient-reported barriers to participation

Of the 85 patients who reported barriers to participation in GVs (Figure 1), 47% reported work (40/85) as a barrier. Some patients suggested that they would have enrolled if GVs were offered during evenings or weekends when they were not working. Eighteen per cent (15/85) reported other scheduling conflicts, such as conflicts with other doctors' appointments. Sixteen per cent (14/85) declined attending due to lack of transportation, 4% (3/85) due to lack of childcare, 2% (2/85) due to living in a nursing home, 2% (2/85) due to feeling like they had too many appointments already and 1% (1/85)

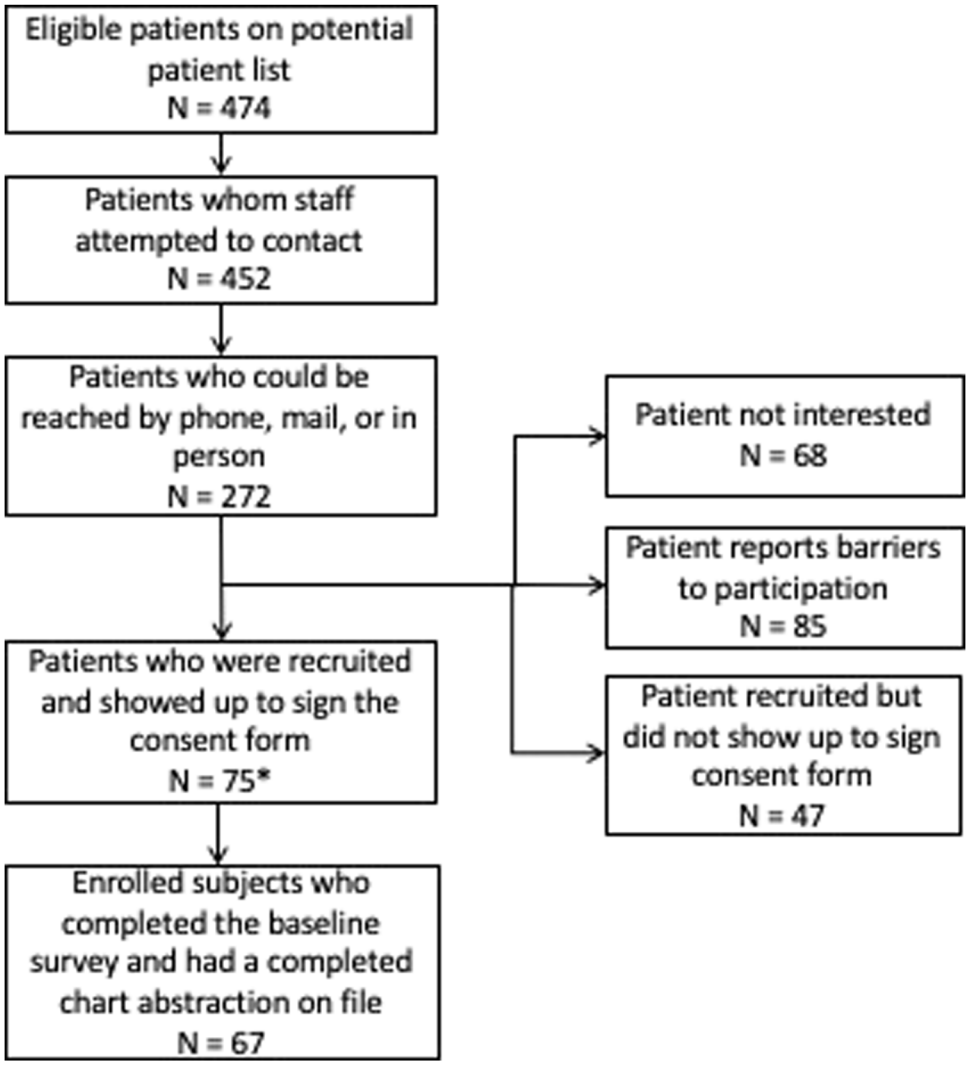

FIGURE 1 Recruitment flowchart. Of the 474 eligible patients on the potential patient list, only 272 were able to be reached by phone, mail or in person. Seventy-two of the 272 reached were initially enrolled, with three subjects added later.

due to cost of the copay. Nine per cent (8/85) cited various other barriers to participation.

3.4 | Patient-reported reasons for disinterest in diabetes GVs

Of the 68 patients who were not interested in GVs (Figure 1), 16% (11/68) said they preferred an individual setting over a group setting for diabetes care. Seven per cent (5/68) felt they were doing well and did not need diabetes self-management education, 1% (1/68) did not want a different provider, and 1% (1/68) did not think diabetes GVs sounded like an intervention which would work for them. There were no data available to explain the lack of interest in GVs among the remaining 74% (50/68) of patients; this gap could be due to patients not being posed the question of why they declined to enroll or not providing an answer to the question.

3.5 | Patient-reported reasons for enrollment in diabetes GVs

Of the 75 enrolled patients, only 55 answered the baseline survey question about why they wanted to participate in diabetes GVs. The most cited reason (29/55, 53%) was a desire to learn more about diabetes. One respondent wrote that they joined the GVs because '…I need to learn a lot more about how to take care of myself and to have them explain it to me more slowly and with more time so I can understand better'. Twenty-seven per cent (15/55) said they wanted improved control of their blood glucose levels and diabetes. Some participants expressed a feeling of loss of control or frustration related to the control of their blood glucose. For instance, one participant wrote, '…I am struggling with managing my diabetes even after adding an insulin injection at night. I am frustrated and am wanting to … find ways to get my sugars under better control….'

TABLE 1 Themes and subthemes identified from content analysis of patient-reported reasons for enrollment in diabetes GVs

Themes in reasons for enrollment	Representative quotes from survey responses
Desire to learn more about diabetes	'Because I need to learn a lot more about how to take care of myself and to have them explain it to me more slowly and with more time so I can understand better'.
	'Because I need know all that I can about my diabetes so I can help myself and other'.
	'I would be informed and willing to participate in my diabetes health'.
Want improved control of their blood glucose levels and diabetes	'I would love to have at least part of my life back before the diabetes and learn how to control it better and reduce how much insulin I will have to take. I take 5 shots a day would love it to be none or 1'.
	'Because I would like to learn more about how to manage my glucose levels'.
	'Because I am struggling with managing my diabetes even after adding an insulin injection at night. I am frustrated and am wanting to try and find ways to get my sugars under better control on a regular basis'.
Want support and accountability from other patients with diabetes	'At times I struggle with my diabetes. I believe that getting support and ideas from other with the same problem will benefit me and them'.
	'I like to talk to people who have the same problems'.
	'Because I need the accountability. I appreciate all information'.
Doctor and/or care team recommended the programme	'Because I trust my care provider in recommending the programme. [She] has been a great help since after being barely at risk to a spike of over 450 percent 14.5. She had made my transition bareable'.
	'My diabetes caregiver said it would make a difference for me'.
	'My doctor said it would help'!
Want improved quality of life	'I would love to have at least part of my life back before the diabetes and learn how to control it better and reduce how much insulin I will have to take. I take 5 shots a day would love it to be none or 1'.
	'Because I want to improve my quality of life'.
Want more education about a healthy diet	'To learn more about diabetes, how to eat much healthier, cook better and most of all feel better'.
	'To learn more about diabetes and healthy eating'
Want to improve overall health	'Better my health'
	'I'm really sick and managing my diabetes is hard'.

Abbreviation: GV, group visits.

Sixteen per cent (9/55) wanted support and accountability from other patients with diabetes, recognizing that '… getting support and ideas from other[s] with the same problem will benefit me and them'. Eleven per cent (6/55) said they joined because their doctor and/or care team recommended the programme. These patients wrote about their pre-existing relationship with the provider who recommended the GVs, such as 'I trust my care provider in recommending the programme. [Provider] has been a great help…She had made my transition bearable'. Nine per cent (5/55) wanted to improve their quality of life, with one patient writing, 'I would love to have at least part of my life back before the diabetes'. Finally, 7% (4/55) wanted more education about a healthy diet and 5% (3/55) wanted to improve their overall health. Table 1 contains additional patient quotes supporting each theme.

3.6 | Intervention patient characteristics

The mean age of the 75 enrolled patients was 53.5 ± 12.2 years. Fifty-one patients (68%) identified as female. Table 2 contains descriptive statistics of all baseline patient characteristics of patients who enrolled and those who did not. There were no significant differences in age ($p = 0.90$), gender ($p = 0.31$), or preferred language ($p = 0.48$) between eligible patients who enrolled and those who did not.

3.7 | Patient characteristics associated with GV attendance

Seventy of the 75 enrolled patients received at least one GV, however, only 67 patients completed the baseline survey and had a

TABLE 2 Baseline characteristics of patients who enrolled versus those who did not

Characteristic	Enrolled (n = 75)	Eligible but did not enroll (n = 200)	p Value
Age, mean (SD)[a]	53.5 (12.2)	53.3 (10.6)	0.90
Women, n (%)[a]	51 (68)	122 (61.3)	0.31
Self-reported race and ethnicity[b]			
Non-Hispanic American Indian, Native American or Alaska Native, n (%)	9 (12)	-	-
Non-Hispanic Asian or Pacific Islander, n (%)	1 (1.3)	-	-
Non-Hispanic Black or African American, n (%)	14 (18.7)	-	-
Non-Hispanic White or Caucasian, n (%)	32 (42.7)	-	-
Non-Hispanic other or multiple races, n (%)	1 (1.3)		
Hispanic, n (%)	18 (24)	-	-
Preferred language[a]			0.48
Spanish, n (%)	12 (16)	34 (19.8)	
English, n (%)	63 (84)	138 (80.2)	
Insurance status		-	-
Public insurance, n (%)	51 (68)	-	-
Private insurance, n (%)	9 (12)	-	-
Self-pay/no insurance, n (%)	15 (20)	-	-
Duration of diabetes diagnosis, mean (SD)[a]	14.1 (10.5)	-	-
Diabetes distress, mean (SD)[a]	3.0 (1.3)	-	-
Diabetes empowerment, mean (SD)	3.7 (0.6)	-	-
Diabetes social support, mean (SD)	3.5 (0.7)	-	-
Group visit attendance, mean (SD)	3.2 (1.9)	-	-
Comorbidities burden, mean (SD)	1.6 (1.7)	-	-

Abbreviation: SD, standard deviation.

[a]Values were missing for age (eligible but not enrolled n = 28); women (eligible but not enrolled n = 1); preferred language (eligible but not enrolled n = 28); duration of diabetes diagnosis (n = 11); diabetes distress (n = 11); diabetes empowerment (n = 8); and diabetes social support (n = 8).

[b]Race and ethnicity data were not recorded for eligible patients who did not enroll.

baseline chart abstraction on file. Univariate analyses were performed on these 67 patients (Table 3). Univariate analyses showed that ethnicity, preferred language, self-reported race, diabetes empowerment score (DES), and comorbidities burden were likely associated with GV attendance ($p < 0.15$). In the final reduced LMM (Table 3), low baseline DES ($p = 0.03$) was associated with GV attendance, but not enough evidence was found to support the association of GV attendance with higher baseline comorbidities ($p = 0.12$).

3.8 | Cohort characteristics associated with GV attendance

In the univariate analyses (Table 4), mean length of a medical visit, the number of staff involved across the six sessions, whether childcare services were offered, whether medication refills were done in at least one session, whether education on checking blood glucose was done in at least one session, whether education on medications/insulin was done in at least one session, whether education on eye care was done in at least one session, and whether education on foot care was done in at least one session were likely associated with GV attendance ($p < 0.15$). In the multivariate analysis (Table 4), no variables were significantly associated with GV attendance.

4 | DISCUSSION AND CONCLUSION

4.1 | Discussion

This is the first study to examine factors related to recruitment and retention in diabetes GVs in a multisite study with CHCs which

TABLE 3 Analyses of associations between patients' attendance and patient-level covariates

Covariate	Univariate analysis		Multivariate analysis[a]	
	Effect	*p* Value	Effect	*p* Value
Gender[b]				
Female[c]	−0.385	0.45	-	-
Ethnicity				
Hispanic[d]	−0.996	0.05	-	-
Self-reported race[b]				
Non-Hispanic American Indian, Native American or Alaska Native[e]	−0.467	0.57	-	-
Non-Hispanic Asian/Pacific Islander[e]	2.200	0.24	-	-
Non-Hispanic Black/African American[e]	−1.100	0.10	-	-
Hispanic[e]	−1.244	0.02	-	-
Preferred language				
English[f]	1.211	0.03	-	-
Insurance status				
Medicaid[g]	0.312	0.62	-	-
Medicare[g]	1.029	0.11	-	-
Private[g]	0.933	0.24	-	-
Duration of diabetes diagnosis[b]	0.020	0.36	-	-
Diabetes distress score[b]	0.044	0.81	-	-
Diabetes empowerment score	−0.767	0.03	−0.833	0.03
Diabetes social support	0.131	0.71	-	-
Comorbidities burden	0.208	0.12	0.246	0.12

Abbreviation: LMM, linear mixed model.

[a]Multivariate analysis results of the final reduced LMM are reported.

[b]Values were missing for women ($n = 3$); self-reported race and ethnicity ($n = 2$); duration of diabetes diagnosis ($n = 3$); and diabetes distress ($n = 3$).

[c]Effect and *p* value calculated in reference to male subgroup.

[d]Effect and *p* value calculated in reference to Non-Hispanic subgroup.

[e]Effect and *p* value calculated in reference to Non-Hispanic White/Caucasian subgroup.

[f]Effect and *p* value calculated in reference to Spanish subgroup.

[g]Effect and *p* value calculated in reference to self-pay/no insurance subgroup.

provide the majority of their services to under-served populations. Patients contacted in person had a significantly higher enrollment rate than patients contacted by mail or phone. A lower diabetes empowerment score was significantly associated with GV attendance. However, baseline comorbidities, duration of diabetes diagnosis and diabetes distress score were not associated with attendance.

4.1.1 | Recruitment

Findings from the recruitment data suggest in-person recruitment for diabetes GVs was more successful than recruitment by mail and/or phone. Previous studies on recruitment for cancer, asthma or mental health clinical trials have also found that in-person recruitment by a patient's physician yields higher enrollment rates for minority patients.[30] A patient is more likely to react positively to an in-person interaction with a provider whom they trust rather than to a phone call from an unknown staff person. This finding underscores the importance of in-person recruitment for diabetes GVs, which may require the education of staff and providers on diabetes self-management options for their patients. In reality, recruitment via phone call might be even less efficient than found in our study, since we excluded patients who were not successfully reached by phone (due to incorrect phone numbers, full voicemail boxes, etc.) from the recruitment analysis. Other studies have noted that recruitment via phone call is particularly difficult for patients living in poverty, as they have frequent changes of addresses and phone numbers.[31]

TABLE 4 Analyses of associations between patients' attendance and cohort-level covariates

Covariate	Univariate analysis		Multivariate analysis[a]	
	Effect	*p* Value	Effect	*p* Value
Mean length of GV session	−0.005	0.83	-	-
Mean length of medical visit	−0.082	0.05	-	-
Number of staff involved across six GV sessions	−0.145	0.12	-	-
Whether transportation services were offered	−0.388	0.54	-	-
Whether childcare services were offered	1.079	0.07	-	-
Whether fee waiver services were offered	−0.144	0.80	-	-
Whether medication refills were done in at least one session	−1.079	0.07	-	-
Whether foot exams were done in at least one session	−0.039	0.94	−0.833	0.17
Whether flu vaccination was done in at least one session	0.283	0.56	-	-
Whether referrals were made in at least one session	−0.560	0.22	-	-
Whether education on an overview of diabetes was done in at least one session	0.204	0.66	-	-
Whether education on checking blood glucose was done in at least one session	−0.729	0.11	-	-
Whether education on medications and insulin was done in at least one session	1.200	0.03	1.033	0.06
Whether education on dental care was done in at least one session	−0.911	0.06	-	-
Whether education on eye care was done in at least one session	−0.816	0.07	-	-
Whether education on foot care was done in at least one session	−1.079	0.07	-	-

Abbreviation: GV, group visits; LMM, linear mixed model.

[a]Multivariate analysis results of the final reduced LMM are reported.

When asked why patients wanted to participate in diabetes GVs (Table 1), the most commonly reported reason was a desire to learn more about diabetes. This is despite the fact that the mean duration of diabetes diagnosis in these patients was 14 years, suggesting that even patients who have lived for many years with diabetes may perceive their knowledge as inadequate. One participant wrote about how they knew that GVs would provide an opportunity to learn about diabetes more slowly and therefore have an improved understanding of it. Another commonly cited reason was a desire for support and accountability from other patients with diabetes, highlighting that community building may be as important as providing education when organizing group visits. However, in this study, staff members found building community within the group to be a challenge due to the lack of consistency in which patients came to each visit.

Patients reported work, scheduling conflicts, transportation, and childcare as barriers to enrolling in diabetes GVs. Staff members also observed these barriers to access to be a challenge in recruiting and retaining patients in GVs. Offering weekend GVs or vouchers for public transportation might improve access to diabetes GV programmes.[32,33] Furthermore, some patients who were not interested in GVs reported that they were doing well with their diabetes and did not need GVs, despite having an HbA1c higher than 8%. This indicates a gap in understanding between the provider and the patient on optimal diabetes control and risks of uncontrolled diabetes. Emphasizing the benefits of GVs such as peer support and more time with the healthcare team while recruiting these patients could lead to more effective recruitment of patients with this gap in understanding.

4.1.2 | Retention

There was a significant association between patients with higher baseline diabetes self-empowerment and attendance of fewer group visits. This finding is consistent with prior studies that report patients with increased self-empowerment have greater ability and motivation to acquire the skills and knowledge necessary to self-manage their condition or be more activated in their care.[15,17] An activated and empowered patient might need fewer GV sessions to feel confident in managing their condition. In place of a one-size-fits-all diabetes GV program, future studies may consider tailoring programming for more knowledgeable and empowered patients, for example by offering an abbreviated refresher programme or more in-depth sessions for those who have completed introductory education. Alternatively, CHC staff could highlight to patients the importance of their role as peer experts who can help less empowered patients in the group.[34,35]

Several CHCs reported unique activities aimed at improving retention. Some CHCs did check-in phone calls to patients who did not show up to GVs to better understand why they could not attend. Multiple CHCs made an effort to provide information from the GVs

to patients who missed GVs by having a care coordination team send information or by doing one-on-one education for these patients. CHCs also recognized that culturally tailoring GVs improved patient engagement and retention. For example, a CHC serving a primarily Native American population included spiritual care and talked about indigenous foods in their GV curriculum. Another CHC serving a primarily Spanish-speaking population noted that having Spanish-speaking providers and staff running the sessions was beneficial. Many CHCs noted that patient retention was tied to social determinants of health that prevented patients from attending visits. Addressing these barriers to care in advance (such as by having staff call and make transportation arrangements for patients with transportation issues) improved retention. Another CHC noted that weather was a barrier to attendance and having a spring or summer start time for group visits might improve attendance. Finally, many CHCs provided food during GVs, whether in the form of a meal from a local restaurant or snacks.

4.1.3 | Limitations

There are several limitations of this study. A major limitation is that this is an observational study that aims to evaluate recruitment methods. Thus we were unable to control for confounding variables associated with the effects of the recruitment methods, such as patients' varying amounts of interaction with the healthcare system and the timing of their next clinical visits. CHC staff also did not record why they decided to contact some patients by phone or mail while others were contacted in person. Our recruitment analysis of patients contacted via phone call likely overestimated the enrollment rate since we only analysed patients who were successfully contacted via phone (excluding patients who were unable to be contacted). Due to this study being a clinical trial, staff had to complete additional paperwork, including following a recruitment protocol, receiving patient informed consent and abstracting data, which would not be barriers in routine clinical practice. In addition, our study had a limited sample size, particularly for the subgroup of patients recruited in person. Therefore, all analyses were considered to be exploratory. Future studies are recommended that would assess various recruitment methods via random assignment. Finally, this study assumes that more GV attendance is better for the patient's clinical outcomes. However, there is no data on whether the clinical benefit of GVs continuously increases with a number of visits attended.

4.2 | Conclusions

This study analysed recruitment and retention data from a cluster-randomized trial in which six CHCs led seven diabetes GV cohorts with the aim of improving outcomes among adults with type 2 diabetes. In-person recruitment for GVs was associated with a higher recruitment rate than recruitment by telephone or mail. Patients with lower diabetes empowerment scores were likely to have higher GV attendance. The most common motivating factors for patients to attend GVs were to learn more about diabetes, gain improved control of their blood glucose levels, and find support and accountability from peers with diabetes.

Future studies should examine whether in-person recruitment is more successful than that by phone and/or mail when the method of contact is randomly assigned and should explore the effectiveness of recruitment methods not used in our studies such as via social media, posters, and billboards or TV advertisements. Future studies should also examine whether clinical benefit increases continuously or whether the clinical benefit to the patient is contingent on specific attendance cutoffs.

AUTHOR CONTRIBUTIONS

Cynthia T. Schaefer, Amanda Campbell, Michael Quinn and Arshiya A. Baig have substantially contributed to the conception and design of the work. Erin Staab and Jefferine Li have substantially contributed to the acquisition of data for the work. Aaditi G. Naik, Erin Staab, Jefferine Li, Sara Siddiqui and Wen Wan have substantially contributed to the analysis and interpretation of data for the work. Aaditi G. Naik has substantially contributed to the drafting of the work. Erin Staab, Jefferine Li, Sara Siddiqui, Wen Wan, Cynthia T. Schaefer, Amanda Campbell, Michael Quinn and Arshiya A. Baig have substantially contributed to the critical revision of the work for important intellectual content. All authors have contributed to the final approval of the version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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CONFLICT OF INTEREST

Wen Wan, PhD receives funding support from OMH (CPIMP171145-01-00). She has no other conflicts of interest to disclose. The remaining authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

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

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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