



Do community health workers affect non-urgent, ambulatory healthcare utilization among low-income, minority patients with diabetes?



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ABSTRACT

Community health workers (CHWs) can reduce emergent care among low-income, ethnic minority patients with type 2 diabetes. A secondary analysis of a randomized controlled trial evaluated the effect of CHWs on non-urgent, ambulatory healthcare utilization. Within this trial, no effect on ambulatory care was found.

Introduction

Within low-income, ethnic minority neighborhoods, community health workers (CHWs) address various social determinants of health that may complicate diabetes self-management. CHWs are well positioned to address many issues such as language barriers, limited transportation options, poor health literacy, and lack of social support that adversely affect health [1]. CHWs assist patients in understanding medication instructions, arranging transportation to and from appointments, and promoting patient self-efficacy and confidence [2,3]. Available evidence suggests that CHWs reduce hospitalizations, emergency department visits, and urgent care visits [4,5]. However, the effect of CHWs on the frequency of routine, ambulatory healthcare utilization remains poorly characterized. We conducted a secondary analysis of a randomized, controlled trial involving CHWs [6] to determine whether CHW support affects ambulatory healthcare utilization among Hispanic and African-American patients with uncontrolled type 2 diabetes, as well as identify predictors of utilization among patients receiving CHW support.

Material and methods

A randomized, controlled trial evaluated the impact of CHWs supporting clinical pharmacists in diabetes management [6]. Patients at an urban academic medical center received either clinical pharmacist support alone or both clinical pharmacist and CHW. CHWs conducted home visits and telephone calls with patients, based on patient availability, willingness, and needs. With permission, CHWs also accompanied patients to primary care provider (PCP) and pharmacist visits, reinforcing clinician instructions and creating plans for adherence.

CHWs provided social support, diabetes education, assistance with problem-solving, health care navigation, translation (English/Spanish), and referrals to community resources. Additionally, CHWs communicated with pharmacists in person, by telephone, and through secure e-mail to coordinate patient management.

Randomization to these two groups was blocked by sex, ethnicity, and clinic site using a computer-generated random number generator by a research assistant. Eligibility criteria included: (1) self-identified African-American or Hispanic adult (≥ 21 years of age); (2) history of type 2 diabetes; (3) hemoglobin A1c (HbA1c) $\geq 8\%$ in the past year; and (4) having received primary care at our institution for at least one year.

We conducted an electronic chart review and abstracted encounter data during the initial 12 months of the study, including non-urgent visits to PCPs, specialists (endocrinology, cardiology, nephrology, transplant surgery), diabetes educators, and clinical pharmacists. While patients in both groups were offered clinical pharmacist support, patient utilization of their services varied. Consequently, we assessed the number of pharmacist encounters, as CHWs may have influenced this by providing assistance with health system navigation or encouragement in attending provider appointments. To test the difference between CHW plus pharmacist and pharmacist-only groups, two-sample *t*-test or nonparametric Wilcoxon rank-sum tests for continuous variables, as well as Chi-square or Fisher exact tests for categorical variables were utilized as appropriate, respectively. Multivariate modelling with negative binomial regression were used to identify the predictors of healthcare utilization from group assignment as well as baseline demographic (age, sex, preferred language, highest education level, health insurance, employment) and comorbidity data (diabetes duration, diabetes knowledge, social support, depression, HbA1c, blood

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Table 1
Patient demographics and characteristics.

	CHW + Pharmacist (N = 120)	Pharmacist Alone (N = 124)	p-value
Age, mean years ± SD	53.8 ± 10.5	54.6 ± 11.7	0.61
Sex (male), N (%)	37 (30.8%)	43 (34.7%)	0.52
English as primary language, N (%)	105 (87.5%)	103 (83.1%)	0.28
Education level, N (%)			0.24
Less than high school	33 (27.5%)	39 (31.5%)	
High school/GED	58 (48.3%)	59 (47.6%)	
2-year certificate/associate	17 (14.2%)	19 (15.3%)	
College graduate	12 (10.0%)	5 (4.0%)	
Graduate degree	0 (0.0%)	2 (1.6%)	
Insurance coverage, N (%) ^a			0.03
Uninsured	4 (3.3%)	9 (7.3%)	
Public aid/Medicaid	79 (65.8%)	58 (46.8%)	
Medicare	17 (14.2%)	31 (25.0%)	
Private insurance	20 (16.7%)	23 (18.5%)	
Unemployed, N (%)	18 (15.0%)	13 (10.5%)	0.52
Diabetes duration, mean years ± SD	13.2 ± 8.7	13.7 ± 8.9	0.71
Medication History, N (%)			
Insulin	79 (65.8%)	83 (66.9%)	0.89
Oral diabetes medication	87 (72.5%)	92 (74.2%)	0.77
Oral hypertension medication	103 (85.8%)	108 (87.1%)	0.85
Comorbidities, N (%)			
Current smoker	26 (21.7%)	25 (20.2%)	0.07
History of myocardial infarction	7 (5.8%)	10 (8.1%)	0.62
History of stroke	8 (6.7%)	10 (8.1%)	0.81
History of end-stage renal disease	14 (11.7%)	17 (13.7%)	0.70
History of amputation	3 (2.5%)	6 (4.8%)	0.50
History of peripheral vascular disease	8 (6.7%)	8 (6.5%)	1.00

SD = Standard Deviation; CHW = Community Health Worker.

^a Three patients in the control group had unknown insurance status.

pressure, body mass index, cholesterol, insulin use, oral diabetes medication use, smoking, as well as history of myocardial infarction, stroke, end-stage renal disease, amputation, and peripheral vascular disease). All statistical tests were two-sided.

Results

A total of 244 patients met inclusion and exclusion criteria, 120 in the CHW group and 124 in the control group (Table 1). Together, the patients had a mean (standard deviation [SD]) age of 54 (11) years, 22% were employed, 23% had a college education, and 5.4% were uninsured [6]. Of the 120 patients assigned to CHW support, 92% completed at least one CHW encounter, with an overall mean (SD) of 6.5 (5.3) CHW encounters. Aside from insurance coverage, there were no baseline differences between CHW plus pharmacist and pharmacist-only groups with regard to demographic factors or comorbidities [6]. Mean (SD) diabetes duration and HbA1c were 14 (8.8) years and 9.5%

Table 2
Number of healthcare provider visits by group.

	CHW + Pharmacist (N = 120)	Pharmacist Alone (N = 124)	p-value
Primary care physician, mean (SD)	3.9 (2.5)	3.8 (2.5)	0.64
Specialist physician, mean (SD)	1.9 (4.0)	1.8 (3.0)	0.79
Pharmacist, mean (SD)	4.6 (4.9)	4.9 (5.2)	0.58
Diabetes educator, mean (SD)	0.3 (0.8)	0.5 (1.3)	0.20

SD = Standard Deviation; CHW = Community Health Worker.

(1.9) respectively [6]. No differences were found in mean number of PCP (3.9 vs. 3.8, $p = 0.64$), specialist (1.9 vs. 1.8, $p = 0.79$), clinical pharmacist (4.6 vs. 4.9, $p = 0.58$), or diabetes educator (0.3 vs 0.5, $p = 0.20$) visits between CHW and pharmacist-only groups, respectively (Table 2). Among patients receiving CHW support, multivariate modeling revealed that PCP visits were predicted by insulin use (incident rate [IR] 1.31, 95% CI 1.09–1.57), and clinical pharmacist visits by age (IR 1.02, 95% CI 1.01–1.03). Specialist visits were predicted by oral diabetes medication use (IR 0.47, 95% CI 0.28–0.77), diabetes duration (IR 1.03, 95% CI 1.01–1.06), and end-stage renal disease (IR 2.91, 95% CI 1.55–5.45).

Discussion

There were no differences in non-urgent ambulatory healthcare utilization between African-American and Hispanic patients receiving versus not receiving CHW support. This finding is interesting given other evidence demonstrating that CHWs reduce healthcare costs and *preventable*, urgent health services utilization (e.g., emergency department visits and hospitalizations) [4,5,7,8]. While CHWs may conceivably increase access and use of non-urgent healthcare services by encouraging medical visit attendance and addressing transportation barriers, this was not observed in the trial.

We are unaware of clinical trials designed to specifically assess ambulatory utilization in persons with diabetes receiving CHW support. However, studies assessing similar endpoints in the use of preventive services and chronic disease care have reported mixed results [4]. For example, in patients with asthma, greater follow-up primary care appointments was observed with the addition of CHW support [9], while other studies showed no such effect [10,11]. In addition, a trial limited to uninsured Hispanic women aged 40 and older showed that CHWs increased follow-up for routine preventative exams [12]. Similarly, CHW support increased both access to and usage of primary care services among patients recently discharged from the hospital setting [8]. Some of the variability in evidence may relate to variation in the population studied as well as CHW training, roles, and activities [13].

This study is unique in investigating non-urgent healthcare utilization in the context of CHW support. However, several limitations are present in this study. Firstly, because endpoints were limited to one year, long-term effects of CHW support may not have been captured. In addition, our patient population was limited to that of our own academic institution, which may potentially affect external validity and generalizability. Furthermore, because specialist visits were not analyzed by specific medical specialty (e.g., cardiologist vs. nephrologist), we were unable to consider potential variability in different specialist contributions and responsibilities. Moreover, we did not examine details of the nature of the outpatient encounters; thus, some encounters may have included urgent situations in addition to routine chronic disease care. Finally, because this study was a secondary analysis of a previous trial, the sample size may not be adequate to assess differences in outcomes.

In conclusion, we found no effect of CHW support on non-urgent, ambulatory healthcare utilization in low-income, minority patients with diabetes.

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Trial registration

ClinicalTrials.gov, Identifier: NCT01498159.

Conflicts of interest statement

Ryan G. Chiu, B.S. – no conflicts to disclose.

Yinglin Xia, Ph.D. – no conflicts to disclose.

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