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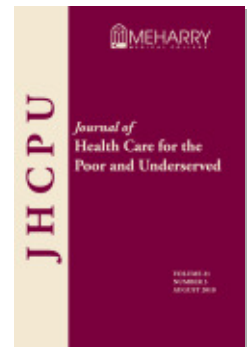
## **Applying the Community Health Worker Model to Diabetes Management: Using Mixed Methods to Assess Implementation and Effectiveness**

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# Applying the Community Health Worker Model to Diabetes Management: Using Mixed Methods to Assess Implementation and Effectiveness

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**Abstract: Introduction.** The community health worker (CHW) model is a popular method for reaching vulnerable populations with diabetes. This study assessed implementation and effectiveness of the model within diabetes programs. **Methods.** Four databases were searched to identify diabetes programs implementing the CHW model. Corresponding articles were reviewed and semi-structured interviews were conducted with directors of each program. **Results.** Eight studies met inclusion criteria for review and their program managers were interviewed. Five CHW roles were identified: educator, case manager, role model, program facilitator, and advocate. Roles, responsibilities and training varied greatly across programs. Selected outcomes also varied, ranging from physiologic measures, to health behaviors, to measures of health care utilization and cost. **Conclusions.** Research regarding application of the community health worker model in diabetes management is limited and consensus regarding the scope of the CHW's role is lacking. Future studies should rigorously examine how best to integrate this promising model into chronic disease management.

**Key words:** Diabetes, community health worker, systematic review, qualitative methods, community health.

While effective disease management and glycemic control can prevent or delay much of the morbidity associated with type 2 diabetes,<sup>1,2</sup> few patients with diabetes achieve the control needed to avoid these complications.<sup>3</sup> Further, minority populations and individuals of lower socioeconomic status are at disproportionately high risk for diabetes complications.<sup>4,5</sup> Thus, translating management strategies proven

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in controlled trials for effective use in diverse community settings represents a current challenge for the scientific and public health sectors.<sup>6</sup> In the United States, the community health worker (CHW) model has been used to engage medically underserved communities on a number of different health issues to help individuals overcome financial, social, political, and cultural barriers to health care.<sup>7-9</sup> Increasingly, CHWs are being employed within diabetes management programs in efforts to bridge communities and health services ultimately to improve health outcomes and decrease disparities.<sup>10</sup>

Disparities in diabetes prevalence and severity are most striking between communities traditionally disenfranchised from the health care system.<sup>4,5</sup> Consequently, the CHW model may be particularly well-suited for interventions aimed at reducing diabetes-related disparities since it is based on community empowerment. Community health workers, referred to by various names (including *promotoras* and *community health advisors*), are natural helpers with expertise and knowledge that enhance the health and competence of their community through information distribution, assistance, and organization of community-building activities within social networks.<sup>11-13</sup> The CHW model assumes that, for health conditions of communities to change, interventions should include individual, social network, and organization-related components.<sup>11,14</sup> Within diabetes interventions, CHWs have the potential to bring about far-reaching effects, beyond individual improvements towards healthier communities.<sup>15</sup>

Many community diabetes interventions currently incorporate some characteristics of the CHW model.<sup>16</sup> Through a nationwide diabetes initiative, the Robert Wood Johnson Foundation recently identified CHWs as a key component of many successful diabetes self-management programs.<sup>16</sup> Several other large organizations have also given the CHW model recognition and support, including the American Association of Diabetes Educators,<sup>10</sup> the American Public Health Association,<sup>17</sup> and the Centers for Disease Control and Prevention, Division of Diabetes Translation.<sup>18</sup> However, despite the broad support for this model and its widespread use in diabetes programs, consensus regarding the scope of the diabetes CHW's role is lacking and data regarding the effectiveness of this model in terms of health outcomes is limited.<sup>19</sup> In previous studies, the CHW model has proven to be effective in increasing access to care; some evidence suggests the model can promote behavior change and improve health outcomes, though this body of evidence is less conclusive.<sup>13,19,20</sup> In a review of the effectiveness of CHWs in diabetes care specifically, Norris and colleagues found preliminary data demonstrating improved knowledge and behavior for participants interacting with CHWs; however, details regarding implementation of the CHW interventions were limited due to lack of reporting.<sup>21</sup>

Systematic literature reviews are frequently limited by the extent of the data available in published studies.<sup>22</sup> In this study, we sought to expand what is known regarding implementation and effectiveness of the CHW model within diabetes programs by combining literature review methods with qualitative, in-depth interviews. This seldom-used approach allowed us to capture details often left out of the published literature, including information on specific CHW responsibilities and methods used to recruit and train CHWs. Here, we report our results regarding methods of implementation and evidence for effectiveness of the CHW model when applied to diabetes management.

## Methods

**Study design.** Programs employing a CHW model were identified through a systematic, comprehensive literature review. Manuscripts were abstracted and in-depth interviews were conducted with representatives from each program to gather information on multiple dimensions of program design and implementation. All study protocols were approved by the University of North Carolina–Chapel Hill Institutional Review Board.

**Literature review.** Four literature databases (PubMed, CINAHL, ISI Web of Knowledge, and PsycInfo) were searched through May of 2005 by combining the term *diabetes* with a list of over 55 terms used for CHWs to identify articles about diabetes programs using the CHW model. Additional articles were identified by backward-searching references contained in articles found through the databases.<sup>22</sup> Inclusion criteria required that the programs focus on diabetes mellitus, implement a CHW intervention, and be conducted within the United States. Studies were excluded if they did not assess outcomes using a rigorous study design (e.g., randomized controlled trials (RCT) or pre-post test methodology). In order to be as inclusive as possible, community health workers were defined very broadly as lay people involved in care identified from the target community and/or committed to serving the needs of the community.<sup>7</sup> Two independent reviewers used the title and abstract of each reference to assess it for inclusion criteria. When discrepancies arose or there were insufficient data to determine if a reference should be included, the entire article was reviewed. One of the authors abstracted data for each study and entered it onto a structured form based on topics included in the National Community Health Advisor Study, a survey conducted by Rosenthal and colleagues to explore how community health workers define and describe their work.<sup>9</sup> A second author then reviewed each article and its tables for abstraction accuracy.

**Key informant interviews and analysis.** Interviews were conducted through June 2005. After programs were identified for review using inclusion and exclusion criteria described above, at least five attempts were made to reach the program staff. Once contact was established, a research assistant trained in qualitative methods asked to speak with either the principal investigator or the program manager, and described the study objectives. Informed consent was obtained to conduct an in-depth telephone interview; interviewees were assured that names would not be used and that all quotations would be anonymous. Interviews, which were scheduled for a time after the initial call, were completed in approximately 60 minutes. Each interview was audio-recorded and transcribed *verbatim*. Like the data collection form used for manuscript abstraction, the interview guide paralleled that of the National Community Health Advisor Study in content and structure.<sup>9</sup> The interview included questions regarding CHW roles and responsibilities, CHW recruitment and training, and program evaluation efforts.

The authors used specific questions from the interview guide to drive a combined inductive and deductive analysis. To develop a thematic codebook, two authors read a representative interview transcript, independently developed a set of representative themes within each of the topics, and met for consensus on the themes. They used an iterative process to refine the thematic code book as new transcripts were reviewed. Coding disagreements were examined by a third author and then consensus was reached

across all authors. Using the final codebook, all transcripts were coded independently by both authors and then compared to reach 100% consensus. The transcripts and codes were imported into Atlas TI (ATLAS.ti 5.0, ATLAS.ti Scientific Software Development GmbH, Berlin) to facilitate analysis.

## Results

The literature search identified 244 published articles (Figure 1). After review, 19 references (13 programs) met inclusion criteria. Of those, three programs did not use RCT or pre-post test methodology,<sup>23-25</sup> one was ongoing,<sup>26</sup> and one could not be reached for

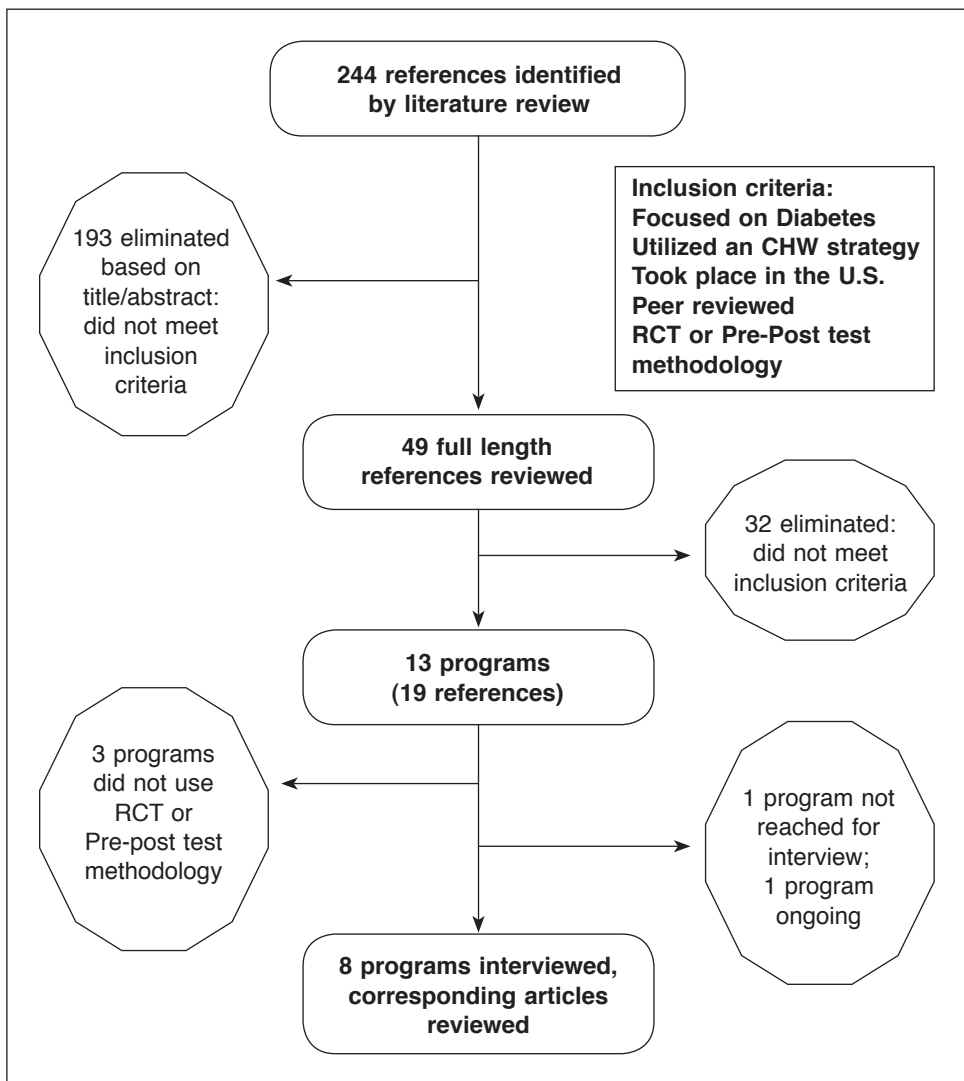


Figure 1. Search strategy.

the interview despite multiple contact attempts.<sup>27</sup> The reported results reflect the eight programs for which articles were reviewed and managers were interviewed.<sup>28-39</sup>

**Published vs. unpublished data.** Data from the published articles and interviews were compared and integrated for each program. No inconsistencies were found between the literature and interview data; however, the interview data were more detailed. Data regarding outcomes came entirely from the published articles, while in-depth interviews elicited details regarding roles, responsibilities, and other areas of program implementation that were not available in the published literature. For example, although seven of eight programs published recruitment criteria to varying degrees, only three articles reported methods used to recruit. The same was true for training topics, teaching methods, and intensity of training, respectively. Only one of eight programs reported on how or whether CHWs were paid—an important feature when considering the cost effectiveness of such a model.<sup>7</sup> Thus, results presented on these topics come primarily from interview data.

**Recruitment.** Program coordinators described a number of recruitment criteria for the position of CHW (Table 1). The most commonly identified criteria were that the CHW voice a strong community connection/commitment or reside in the target community. For example, one program coordinator said, “So it’s a very old community and one that, they just have a lot of history. So getting, having a ‘stranger’ to come in is not the best thing in a community like this. It’s just that they’re very close knit and they know what works in their homes. So we really try to find a lay health advisor that lives there . . .”

Half of programs required that the CHWs themselves be diabetes patients. One program coordinator said, “And folks would, the patients with diabetes were saying that folks just don’t understand what they have to go through. So, I felt like the idea of a peer, somebody who lived with the disease who knows what it means to live with diabetes and could really function as a good role model. We figured that person would be a good messenger.” Programs also emphasized criteria such as good interpersonal skills (3/8) and a willingness to learn (1/8); two programs required a certain level of education or literacy skills; some recruited CHWs of a specific race/ethnicity or gender (3/8).

Programs used several methods to recruit CHWs including personal community contacts (3/8) and clinic contacts (3/8). One program coordinator said, “You kind of look at where you want to give classes, where you need leaders, and you kind of concentrate your recruiting in that area. But, so much of it has to do with trust and people knowing people. And people knowing you.” Media ads and clinic ads were also sometimes used; one program contacted CHWs from another program. Two programs recruited CHWs from existing diabetes classes. Among other reasons, one program coordinator explained, “I’d really think about where I was recruiting from. You know, if you have a clinic or a place where you have a group of patients with diabetes, that are really there, and are constantly being seen, that’s very helpful, because it’s much harder to go out willy nilly and look all over the place for people.”

**Roles and responsibilities.** Five primary CHW roles within diabetes management programs emerged through the coding process: educator, case manager, role model/mentor, program facilitator, and advocate (Table 1). *Educator* was the most commonly

**Table 1.****DIABETES COMMUNITY HEALTH WORKERS'  
RECRUITMENT, ROLES AND TRAINING**

<b>Pro-gram</b>	<b># of CHWs</b>	<b>Recruitment criteria</b>	<b>Main LHA roles<sup>a</sup></b>	<b>Training topics<sup>b</sup></b>	<b>Payment</b>
A <sup>28</sup>	1	Resides in target community Has DM Bilingual/bicultural Previous clinic volunteer	CM, AV	DMSM	Part time (hourly)
B <sup>29,30</sup>	7	Has DM African American women Good interpersonal skills Good role model, Physician referred	RM	DMSM, BS, RI	Full time (hourly)
C <sup>31,32</sup>	1	Resides in target community Local HS graduate, part time college student	ED, CM	DMSM RS	Full time
D <sup>33,34</sup>	8	Resides in target community Has DM Mexican American women Good interpersonal skills HS graduate, driver's license	CM, PF	DMSM	Full time (hourly)
E <sup>35</sup>	n/a	Resides in target community Existing "paraprofessionals" in the area	ED, RM, PF	DMSM, BS	Employed full time, CHW responsibilities only part of their job
F <sup>36</sup>	19	Resides in target community Spanish speaking Good teachers	ED	DMSM, BS, IS	\$150 per course taught, Not paid for training
G <sup>37</sup>	38	Resides in target community Existing CHWs in the area Wants to learn	ED, CM RM, AV	DMSM, BS, RI, RS, IS, TS	Monthly stipend Bus pass
H <sup>38,39</sup>	5	Has DM Good interpersonal skills "Natural leaders" from within the DM clinic	ED, RM, PF	DMSM, BS, RI, RS,TS	Stipend per training session x 4 Then full time position

<sup>a</sup>Roles: ED: Educator; CM: Case Manager/Liaison; RM: Role model; PF: Program facilitator; AV: Advocate

<sup>b</sup>Training topics: DMSM: Diabetes & self management skills; BS: Behavioral skills; RI: Resource identification; RS: Research/administrative skills; IS: Interpersonal skills; TS: Technical health skills

reported role, identified by over half the programs. Half of the programs identified *case manager* as one of the CHWs' primary roles. For example, "Their primary role is they're case managers. They build up a caseload of clients, it could be anywhere from 20 to 30 to 40 to 50, depending upon the complexity of the client." Similarly, half of the programs identified *role model/mentor* as one of the CHWs' primary roles. For example, "Because our leaders have diabetes, they act as role models. So the modeling piece is just absolutely key, as far as I'm concerned at least."

Primary responsibilities varied across programs. Community health workers in over half of the programs were engaged in teaching; content and teaching methods used by CHWs varied, ranging from such activities as scripted group education sessions to working on problem-solving skills one-on-one. Some programs asked CHWs to provide self-management guidance, to provide social support, and/or to facilitate follow-up and to help identify resources. Two programs had CHWs engaged in some sort of medical management, including reviewing medications and monitoring for diabetes complications.

**Training topics.** Six categories of training topics were identified during coding, including diabetes/diabetes management, behavioral skills, interpersonal skills, research and administrative skills, resources and referrals, and technical health skills (Table 1). All programs provided CHWs with training on diabetes and diabetes management. Five provided behavior change skill training, including problem solving and goal setting. Two programs reported providing CHWs with training on interpersonal skills such as communication skills and conflict resolution and two programs reported providing CHWs health-related technical skills training, ranging from monitoring blood glucose levels and blood pressure checks to dealing with diabetic emergencies and retinal imaging.

Methods of CHW training varied widely across programs, ranging from hands-on exercises and interactive discussion to didactic lectures. Similarly, duration and intensity of training varied widely between programs, ranging from weekly four-hour training sessions over one month, to 24 hours of training spaced over four days, to 60 hours spaced over six months. Some programs relied on one-on-one and on-the-job training, often led by other CHWs. For example, one program coordinator said, "I think some of it was learning on the job, but I would guess that she probably had somewhere between, I'd say 30–40 hours of training." Other programs had highly structured training and followed a set curriculum. For example, one program coordinator said, "What we do in the training is we go through the entire course. Then they actually have two sessions of practice teaching."

**Payment.** The majority of CHWs worked full-time for their program (5/8); the rest worked part-time (1/8) or received a stipend (2/8) (Table 1). Some paid CHWs for training, others did not.

**Program design and outcomes.** Of the eight programs, five were designed as randomized controlled trials (RCTs); only three programs (A, B, C) randomized participants in such a way as to measure the independent effect of CHW involvement (Table 2). Of the non-RCT studies, one used a pre-post intervention evaluation, one conducted a retrospective comparison, and one used a case-control design. Three programs focused their efforts on urban populations, one focused on rural participants, one focused efforts

in a county on the U.S.-Mexican border, and three did not specify whether the priority population was urban or rural. Four programs focused primarily on Latinos, and three focused on African Americans. All but one of the programs was affiliated with a university. Outcomes of interest varied greatly across programs. During interviews, the majority of program managers informally reported positive results associated with implementation of their CHW strategy.

**Health indicators.** Six programs assessed change in HbA1c. Of the three designed to examine the unique contributions of the CHW (A, B, C), none demonstrated significant between group differences in HbA1c. Of the remaining three studies, two showed an improvement (D, H) and one showed no change (E).

Three programs measured lipid profiles in addition to HbA1c. One demonstrated improved lipid profiles post-intervention (H), one demonstrated no difference between the intervention group and the control (B), and the other yielded mixed results (C). Two programs measured blood pressure; a statistically significant improvement was noted in one (H) and a trend towards improvement in the other (C).

**Diabetes knowledge and self-efficacy.** Three programs measured changes in diabetes knowledge. Three distinct instruments (two validated) were used to measure knowledge, one by each program. Two studies demonstrated improved diabetes knowledge for the intervention group (B, D); one reported no effect (A). Only one program measured changes in self-efficacy post-intervention (measure used was not described). This study demonstrated improved self-efficacy (F).

**Health behavior.** Five programs measured changes in behavior. One study demonstrated improved health behaviors after intervention (F), another reported improved physical activity levels among all three intervention groups (CHW and non-CHW) but did not find significant between-groups differences (C), and another reported no change in dietary practice but, again, demonstrated increased physical activity for both CHW and non-CHW groups with no significant between-group differences (B). The fourth study demonstrated no change in behaviors (A). The fifth study measured intent to change health behaviors, reporting progression to later stages of change for selected behaviors (E).

**Health care access, utilization, and cost.** Four programs measured some form of health care access, utilization, and cost. One RCT demonstrated significant improvement in diabetes program attendance and completion among those exposed to the CHW intervention (A). Another study reported decreased emergency room visits and hospital and Medicaid reimbursements/costs (G). The third study showed increased pharmacy and disease management costs, but a trend towards decreased hospital expenditures (H). Finally, one study demonstrated a trend towards decreased health care utilization (as measured by outpatient visits, emergency room visits, hospitalizations, and hospital days) (F).

## Discussion

Despite growing support for and increasing utilization of the community health worker model for diabetes management, evidence for the model's effectiveness remains limited, judging by the small number of studies using rigorous study design identified in this

**Table 2.**

**STUDY DESIGN AND OUTCOMES**

Program	Study design	Intervention	Sample	Follow up	Measurement and results							Results
					Hgb-A1C	Lipid	BP	DM Knowledge	Self-efficacy	Behavior change	Health care use or cost	
A <sup>28</sup>	RCT N=64	DE <sup>a</sup> vs DE + CHW <sup>b</sup>	Urban Latinos	3.4, and 7.7 months	X			X		X	X	No effect on A1C, knowledge or self-care behaviors More likely to complete DM program: (CHW: 80% versus non-CHW 42%; p≤.01) Improved A1C, knowledge and self-care for DM program completers
B <sup>29,30</sup>	RCT N=200	Control vs DE vs DE + CHW	African American women age ≥ 40	6, 12, 18 months	X	X		X		X		No CHW effect (between intervention groups differences) on A1C, lipids, dietary behaviors or physical activity Modest improvement in physical activity (p≤.02) and DM knowledge (p=.037) for both intervention groups compared to controls

*(Continued on p. 1053)*

**Table 2. (continued)**

Program	Study design	Intervention	Sample	Follow up	Measurement and results							Results	
					Hgb-A1C	Lipid	BP	DM Knowledge	Self-efficacy	Behavior change	Health care use or cost		
C <sup>31,32</sup>	RCT N=186	Control vs NCM <sup>c</sup> vs CHW vs NCM + CHW	Urban African American	2 years	X	X	X				X		No between group differences for A1C, Lipids BP (NCM+CHW had significant within group change in triglycerides and diastolic BP p=.04 after adjustment) No between group differences for diet, physical activity (all three intervention groups had within group change in physical activity levels p=.05)
D <sup>33,34</sup>	RCT N=256	Control vs DE+ CHW	Mexican American	3, 6, 12 months	X			X					HbA1C (p=.016) and DM knowledge (p<.001) improved at one year
E <sup>35</sup>	RCT N=132	Control vs DE + CHW	Rural women age ≥ 40	6 months	X						X		No change in HgbA1C Improved dietary behaviors (p≤.05) Significant movement (p<.01) in stage of change for 4 of 5 diet/ activity behaviors

(Continued on p. 1054)

**Table 2. (continued)**

Pro-gram	Study design	Inter-vention	Sample	Follow up	Measurement and results							Results
					Hgb-A1C	Lipid	BP	DM Knowl- edge	Self- efficacy	Behavior change	Health care use or cost	
F <sup>36</sup>	Pre-post Evaluation N=149	DE + CHW	Mostly Latino	3 months					X	X	X	Improved health behavior ( $p \leq .05$ ), improved self-efficacy ( $p \leq .001$ ), trend toward decreased health care utilization
G <sup>37</sup>	Retrospect Comparison N=117	CHW	Urban African American	1 year							X	Decreased ER visits, hospital and Medicaid reimbursements/costs
H <sup>38,39</sup>	Case control N=188 (cases)	Control vs NCM + CHW <sup>d</sup>	Low-income Mostly Latino	1 year	X	X	X				X	Improved HgbA1C, Blood pressure, total Cholesterol and LDL ( $p \leq .001$ ) Increased pharmacy ( $p < .001$ ) and disease mgmt costs, trend towards decreased hospital expenditures ( $p = .06$ )

<sup>a</sup>DE: Diabetes education

<sup>b</sup>CHW: Community health worker

<sup>c</sup>NCM: Nurse case manager

<sup>d</sup>Participants in this study were encouraged to attend CHW led groups but were not required to do so, approximately 50% of participants attended at least one group, average attendance was 4 of 8 sessions.

review. Among the eight studies that scientifically evaluated health-related outcomes and were available for interview, there was great variation in selected outcomes of interest. Similarly, there was variability across programs regarding the CHWs' roles, the scope of their responsibilities, and their training. Community health worker roles and targeted outcomes were not explicitly linked, making it difficult to assess which CHW roles were the most effective at achieving specific outcomes within diabetes management. For example, of the three studies measuring changes in DM knowledge, none identified *educator* as one of the CHWs' primary roles. Finally, published reporting regarding implementation of the CHW model (recruiting, roles, training, and process evaluation) was limited.

Targeted outcomes varied greatly across the eight programs, including physiologic measures (glycosylated hemoglobin (HbA1c), blood pressure (BP), and lipids), knowledge, self-efficacy, health behaviors (diet, physical activity), and health care utilization and cost. The differing endpoints of interest and varied measures used make drawing conclusions across studies difficult. Further, only three programs were designed to test for the independent effects of the CHW. Among the different studies and outcomes, CHWs had the largest effect on program completion; individuals who had CHW contacts were more likely to complete their diabetes program. The finding that CHWs may be most effective in ensuring follow-up has been demonstrated in studies related to other disease conditions.<sup>40</sup> Of six programs measuring HbA1c levels, one third demonstrated an improvement and two thirds reported no change. Based on study design, neither study demonstrating change could attribute the effect to an independent CHW effect. Three studies assessed change in knowledge; among the two that tested for independent effects of the CHW, neither demonstrated significant change in knowledge for the CHW intervention group vs. the non-CHW intervention group. These differences in outcomes across studies may be explained by factors such as differences in selected CHW roles and/or training or by differences in the intensity of the overall intervention; however, data are not available to draw conclusions definitively. In fact, the results of the National Study of Community Health Advisors also demonstrated that CHW programs often lack effectiveness data needed to determine which CHW activities should be continued, refined, expanded, downsized, or discontinued.<sup>9</sup>

Community health worker roles and responsibilities also varied across programs. No one role was selected by all eight programs. Further, no two programs assigned CHWs to the same set of roles. This finding is not surprising, given that CHWs are being employed in community-based interventions; communities' differing needs shape the programs in differing ways. At the same time, the lack of uniformity prohibits comparison across studies, making it difficult to assess which roles are appropriate and effective in the context of managing a chronic illness such as diabetes. In a review of published literature, Norris et al. were unable to draw conclusions about the most effective role of community health workers within diabetes management teams.<sup>21</sup> In the current study, despite additional detail regarding specific CHW responsibilities, recruitment, and training, it remains difficult to provide a definitive statement regarding effective CHW roles because significant findings among studies assessing incremental benefit of CHWs were limited. In the study by Corkery et al., CHWs had a positive effect on individuals' likelihood of completing their diabetes programs, which in turn improved outcomes.<sup>28</sup>

Thus, serving as a bridge between the health system and the community may represent a critical role for CHWs in the context of diabetes management. It may also be that data related to important CHW roles has not been adequately measured to date. The CHW model is meant to engender change at both the individual and community level and so outcomes related to both must be assessed in order to capture the true CHW effect. Community health workers may have the biggest impact on increasing social support, community capacity, and health care access. The consequent impact on an individual's HbA1c may not be directly measurable in the short term and therefore lack of change in HbA1c should not necessarily be interpreted as a lack of effect.

This study has limitations. First, in order to allow for a richer response, the interview guide mostly consisted of open-ended questions. As a result, if program managers did not say something was done or included, it was assumed not to have been done or included. It is likely, however, that the content described represented the most prominent program features. Second, we did not interview CHWs themselves in this study. Inclusion of the CHW perspective will be essential for future discourse aimed at further defining CHW roles and responsibilities within diabetes management.

Finally, the potential for publication bias is present in this study. This review does not include programs employing CHWs in demonstration projects, some of which report positive changes in health outcomes and have even won awards.<sup>23-25</sup> Furthermore, although every attempt was made to be inclusive, it is possible that studies were missed, particularly those with negative results. While inclusion of interviews and qualitative analysis allowed for an in-depth examination of program implementation, use of this methodology required additional time; articles describing CHW interventions for diabetes have been published subsequent to this review.<sup>41,42</sup> Nevertheless, the key issues identified in this study, the need for additional evidence and consensus regarding CHW roles, remain pertinent. Proceedings from a recent conference focused on building a national research agenda for the community health worker field pointed out that "much is still not clearly known about CHW's potential to improve the lives' of underserved communities" and "the processes by which CHWs engage community members and produce positive change are still not completely understood."<sup>43, p. 1</sup> The conference's executive summary outlines a number of research themes that could be applied within the framework of diabetes management to guide future research efforts aimed at maximizing CHW potential and effectively integrating CHWs into the diabetes management team.

## Conclusions

As respected and trusted members of their communities, CHWs may be uniquely positioned to facilitate the translation of proven diabetes management strategies for communities; however evidence for the model's effectiveness with respect to health outcomes is still in the beginning stages. A previous review of general CHW programs noted that "the [CHW] role can be doomed by overly high expectations, lack of clear focus and lack of documentation."<sup>19, p. 11</sup> This may be particularly true in the context of chronic disease management, where complex and demanding regimens add a layer of complexity not found in disease prevention. Future studies must employ rigorous

experimental methods, report relevant outcomes, and examine the association between specific configurations of CHW interventions with outcomes. More specifically, they should seek to evaluate specific CHW responsibilities within the context of chronic diseases such as diabetes. Ideally, studies should incorporate feedback from providers, community health workers, and the community members they serve. Journal editors should require authors to include information regarding key variables, such as CHW roles and specific responsibilities, and should encourage the inclusion of more details regarding program implementation, such as CHW recruitment strategies and intensity of training, to allow for program replication and evaluation of effectiveness.

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