

Diabetes Training for Community Health Workers

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Received date: Oct 12, 2015; Accepted date: Nov 26, 2015; Published date: Nov 29, 2015

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Abstract

Background: A 2.5-month diabetes education training for community health workers (CHWs) was developed, implemented, and evaluated.

Methods: Training methods used included case studies, role-playing, and lectures. Exams were used throughout the training for its evaluation. Teaching was delivered by different ways: a one day American Diabetes Association (ADA) course; a five day Diabetes Self-Management Program (DSMP); Conversation Maps; and a series of seven National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) diabetes education booklets.

Results: Qualitative and quantitative evaluative methods were used during and after the training. The CHWs' diabetes knowledge was evaluated by a pre- and post-test Diabetes Knowledge Questionnaire (DKQ). The post-test was conducted one week after completing the training. The findings showed that the diabetes knowledge of the CHWs increased.

Conclusions: Diabetes competencies and evaluative tools need to be developed specific for CHWs as a way to standardize all CHW diabetes trainings.

Keywords: Diabetes; Community health workers

Introduction

Community Health Workers (CHWs) – also known as promotoras, lay health educators, peer educators and community health outreach workers, among other names – are “lay members of communities who work either for pay or as volunteers... usually sharing ethnicity, language, socioeconomic status and life experiences with the community members they serve” [1- 4]. The profile of CHWs is very diverse, and in some instances, they are also known as patient navigators [2]. CHWs are public health workers who conduct many different activities, including outreach, community education, and social support [3].

Utilizing CHWs over professional health care providers has many advantages in delivering effective health education, including shared religious beliefs, and social characteristics [4]. Given that they often share the cultural values and characteristics of the population they serve, CHWs have shown to develop and strengthen connections between the health care system and their own community through health-related awareness and education [5]. For example, CHWs can deliver translation services; culturally and linguistically appropriate diabetes health education; informal counseling and guidance on positive healthier behavior changes (e.g., making healthier food choices and exercise); methods to maintain self-management skills; and some direct services, such as teaching the importance of maintaining blood glucose [1]. Although, CHWs have shown to be effective in ethnic minority communities because they speak the same language and understand the culture, especially in terms of health-related beliefs and practices [4], some disadvantages in utilizing CHWs

include lack of preparation and knowledge in the specific health issue (e.g., diabetes); and the need of support from other health professionals (e.g., nurses).

The purpose of this article is twofold: 1) evaluate the diabetes education training and preparation provided to three new graduates of an urban community college CHW certificate program (post-CHW certification); and 2) evaluate the strategies used to assist the CHWs deliver engaging diabetes education classes. The overall aim is to describe a diabetes educational training for CHWs and the evaluation of the training.

Literature Review

In the US, literature references about CHWs are found primarily after the mid-1960s [1]. Studies have shown CHWs address the health and linguistic needs of different ethnic groups and vulnerable populations (e.g., low-income) with chronic diseases (e.g., diabetes), and improve health outcomes [6-8]. In addition, CHWs have been successful in promoting health education to Hispanic communities [2], and have shown to be an effective bridge between community members and health care providers [9].

Three different PUBMED database searches of articles published from January 2000 to October 1, 2014 were conducted. One search using the keywords “community health worker” and “diabetes training” produced only two articles. In the first article, the diabetes training was hybrid (three days hands-on, followed by six months of weekly tele/video conference sessions) [10]. It was developed for 23 CHWs in New Mexico. Upon completion of the training, the CHWs had significant improvements in diabetes knowledge, attitudes, and confidence [10]. Competencies were not used in evaluating the CHWs. In the second

article, the diabetes training was a 48-hour teaching for 10 CHWs in Massachusetts. It showed significant increases in CHWs' diabetes knowledge [11]. Competencies were used to evaluate the CHWs in the training program. Overall, there is a lack of studies on CHWs and no published articles outlining the methodology used for training CHWs and none on diabetes training programs provided to New York City (NYC) CHWs post- CHW certification.

A second search using keywords, "lay educators" and "diabetes training" showed zero articles. A third search using keywords, "peer educator" and "diabetes training" produced 30 articles. Of those 30, only three were on training programs for peer educators. One article focused on the process used to develop a 46-hour long peer-lead diabetes training, but lacked reporting on the evaluation of the program or of the peer educators [12]. A second article was a literature review of peer educators training programs that noted the variation in length of trainings among the programs [13]. For example, of the seven peer educator diabetes programs mentioned the length of the training sessions ranged from 4 hours to 1620 hours long; while some did not address the methods used to train the peer educators or materials used to deliver the training [14-16] and did not evaluate the educators diabetes knowledge, only that of the patients they served [14,15]. Most of the literature on CHWs, peer educators and lay educators have focused on the implementation and evaluation of the individual role as an intervention, rather than on the training they undergo to perform support-related functions, of their changes in diabetes knowledge post-training, or of competencies mastered in the training [12,13].

The American Association of Diabetes Educators (AADE) [17] recognizes that in order for CHWs to deliver diabetes education, they need specialized training. The AADE white paper [18] recommends that CHWs have 20 hours of diabetes self-management education/training-related work experience, and, within a two year period, complete 10 hours of diabetes-related continuing education. They also strongly recommend that a diabetes educator directly supervise CHWs [19]. Although the AADE [19] provides recommended educational and professional requirements for educators of all levels (i.e., non-professional healthcare provider to expert diabetes healthcare provider), there are no training competencies and standards for CHWs.

Methods

Recruitment of CHWs

The principal investigator (PI), a registered nurse (RN), a certified diabetes educator (CDE), and a college professor recruited and hired CHWs to deliver diabetes education to Hispanics with Type 2 diabetes (T2D). Because the PI wanted to ensure that those newly hired CHWs had a foundation and understanding of their role and responsibilities, recruitment occurred at an accredited NYC public college with a CHW certificate program. The director of the program notified the graduating CHWs of this job opportunity and forwarded interested candidates' resumes to the PI.

The PI reviewed the resumes, and eligible CHWs were contacted for an interview. The inclusion criteria of the CHWs were: 1) graduate of

an accredited NYC public college CHW certificate program; 2) fluent in reading, writing and speaking in English and Spanish; 3) understood the Hispanic culture. There were five interested certified CHW applicants who met those criteria. All five were interviewed, and three were hired part-time (21 hours/week) to deliver in-person diabetes education classes to Hispanics with T2D. Although they would deliver diabetes education classes, it was not required for the three CHWs to have diabetes [3]. Internal Review Board approval was obtained by the City University of New York.

Sample

Of the three CHWs hired, none had diabetes; two were female and one was male. All three had a minimum of a high school diploma/general educational development and had at least three college credits, as one course in the CHW certificate program granted college credits. The CHW certificate program had a total of 198 hours of course content and lessons on teaching presentation skills (e.g., projecting the voice), on teaching strategies (e.g., ways to create discussion), on health-related disease (e.g., diabetes), and 100 internship hours. However, they had limited knowledge of diabetes and its complications, and of delivering educational classes. The PI felt it was necessary to give the CHWs a comprehensive training that provided them with thorough knowledge to deliver diabetes education and allow them time to practice their presentation skills and teaching strategies.

Upon being hired, the CHWs received a total of 2.5 months of diabetes training from an American Diabetes Association (ADA) educator, a Stanford University Diabetes Self- Management Program (DSMP) Master trainer educator, and the PI. All three trainers were Hispanic and fluent in English and Spanish.

Diabetes training

Initially, the CHWs were to be trained using the English and Spanish versions of the National Diabetes Education Program (NDEP): The Road to Health Toolkit [20]. While preparing the training, the PI identified that the toolkit did not include a curriculum, teaching tools (e.g., PowerPoint [PP] slides in English and Spanish), or ways to evaluate their learning. Although the toolkit was aimed for CHWs, it was geared towards those who already had an understanding of diabetes. The activities within the toolkit focused on nutrition, making healthy food choices, and physical activity.

Given that there is no published diabetes curriculum specifically for CHWs, and because of the need to begin training, different methods and tools were used to teach the three hired CHWs about diabetes, its complications and self-management. Because the CHWs were part-time, the 2.5 months of diabetes training was conducted three full days a week. All of the classes were in person, and the teaching methods and tools used were: two different courses (i.e., one day ADA, five day DSMP); the use of Conversation Maps; and a series of seven National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) diabetes education booklets. See Table 1 for a list of topics covered during the 2.5 months of diabetes training.

	Topics
1	Statistics of diabetes among Hispanics

2	Information about Type 1 and Type 2 diabetes
3	Review of cultural foods (e.g., vegetables, fruits)
4	Impact and importance of portion control with diabetes
5	Review of reading a label
6	Review of carbohydrate counting
7	Heart and vascular disease, hypertension and hypercholesterolemia and diabetes
8	Physical activity and diabetes
9	Neuropathy
10	Gum disease and diabetes
11	Retinopathy
12	Nephropathy
13	Diabetes and the skin
14	Importance of foot care
15	Importance of diabetes services, follow-up, and supportive care in diabetes management
16	Setting realistic self-management goals for medication adherence, follow-up care, nutrition, diet, and physical activity
17	Engaging participation among individuals in a group setting
18	Discussion of different ways to present educational information

Table 1: Community health worker training topics.

ADA course: The ADA developed a training course for non-professional health care providers. This one-day class provides an overview of the different types of diabetes, of acute (e.g., high and low blood glucose) and chronic (e.g., kidney disease) complications, and of important physiological measures people with diabetes need to know and monitor (e.g., glycosylated hemoglobin [A1c], blood pressure). Pre- and post-questionnaires were provided on each topic with the purpose for self-reflection and self-evaluation. In addition, the CHWs participated in role-playing activities, allowing them to reflect on and apply concepts and diabetes-related information discussed in class.

Conversation maps: Conversation Maps were used to continue educating the CHWs about diabetes and its complications. Conversation Maps, an interactive tool, contain pictures and metaphors that promote and engage participants in discussion, while exploring and learning diabetes-related information. For a total of four weeks following the one-day ADA class, the PI used four of the five Conversation Maps that focused on T2D (i.e., natural course of diabetes, monitoring and using your results, healthy eating, overview of diabetes) [21,22]. Each CHW had access to a computer and was given a list of links to access professional diabetes websites (e.g., ADA) to learn more about diabetes and its complication. In addition, the CHWs received hard copies of the English and Spanish version of the seven NIDDK diabetes education booklets and of the NIDDK diabetes dictionary [23,24]. These websites and booklets were provided to them to be used as resources and in preparation for use later in the training.

A different Conversation Map, along with other tools (e.g., NDEP toolkit flipchart, available in English and Spanish), was used during each of the four weeks. Teaching methodologies included: case-based

learning to promote critical thinking and problem solving; participatory education to create an engaging and interactive learning environment; and discussions that allowed the PI to assess the learning and application of knowledge and skills. In addition, during this month, different nutritional topics [i.e., reading a label, portion size (e.g., the plate) and carbohydrate counting] were taught to the CHWs. Before and after completing each Conversation Map and new topic, the CHWs took an exam on that specific topic.

The PI developed the exam questions, which varied in type: short answers (e.g., “What is neuropathy?”), math calculations (e.g., calculating carbohydrates based on serving size), multiple choice (e.g., “Which health care provider should a person with uncontrolled diabetes see every 3- 4 months?”), and true/false (e.g., “Even though I have diabetes, as long as my eyes don’t bother me, I don’t need to get a yearly dilated eye exam.”). At the beginning of the week, the CHWs took a pre-test exam for the PI to evaluate their knowledge and plan the focus for that week. At the end of each week, the CHWs retook the same exam they had taken in the beginning of the week. This provided each CHW with individual feedback, allowing them to reflect on their responses and to identify their weaknesses, strengths, and areas to focus on and review. At the end of these four weeks, the CHWs had taken a total of eight exams (four pre- and four post- tests). Each post-test showed improvement when compared to the pre-test. These eight exams had not been previously pre-tested. After gaining this foundation, the CHWs were prepared to learn more about diabetes self-management behaviors and began the DSMP training.

DSMP training: The DSMP courses, developed by Stanford University’s Patient Education Research Center, covered topics on self-

managed behavior modification and coping strategies to enable participants to self-manage their diabetes. The English and Spanish version of the DSMP is a five-day course (four days in English and one day in Spanish). It is aimed to train people who either have diabetes or those with a diabetes foundation. For this reason, the DSMP course was provided to the CHWs after the ADA class and Conversation Maps sessions. The DSMP course uses a manual and the book entitled *Living a Healthy Life with Chronic Conditions*, 4th Edition [25], which was provided to each CHW. During the DSMP training, each CHW participated in and was evaluated based on role-playing activities. The activities always had one person portraying a diabetes patient and the other a diabetes trainer. After completing the five-day DSMP course, in addition to the other diabetes lessons (i.e. ADA course and Conversation Map), the CHWs were prepared to start their teaching exercises with the NIDDK diabetes education booklets they would use in educating the Hispanic patients with T2D.

Diabetes education booklets: For the last four weeks of the CHWs diabetes training, there was an intense review of the series of seven NIDDK [26] diabetes education booklets (in English and Spanish). This review was essential, since these booklets would be given to, read to, and used to teach each Hispanic patient with T2D about diabetes and its complications. Each different booklet discussed specific diabetes-related topics and complications (e.g., nerve damage).

During these four weeks, in preparation to deliver diabetes education classes, each CHW presented to each other and to the PI, a NIDDK booklet in English and in Spanish. During the first few days of the presentations, the PI realized the CHWs needed structure and direction when presenting the information. For example, the presenting CHW had difficulty with time management, would deviate from the content, and could not respond to questions the CHWs and PI posed; they read the booklet and did not pause to check the participants knowledge of key information (e.g., what normal blood glucose levels are). Hence, the PI developed seven sets of

PP slides in English and in Spanish corresponding to each booklet.

These PP slides were used as a teaching aid to assist and guide the CHWs with the flow of information and content of the booklet while they read the information. Each CHW presented the English and Spanish versions of the seven NIDDK diabetes education booklets using the corresponding slides. The purpose of this was for the CHWs to familiarize themselves with the booklets, reinforce knowledge of diabetes and its complications, build their confidence and comfort level in presenting the information, and allow them to practice navigating the use of the slides while reading the booklets and providing education. The PP slides allowed for the information to be focused and reinforced (e.g., normal A1c), since some slides were repeated throughout the session. The slides also provided a visual aid to enhance discussions between the CHWs and patients. Each set of slides had three key objectives that were repeated again at the end of the lesson, but posed as questions. The goal of posing the objectives as questions was to reinforce the content and briefly review that lesson. After the CHWs presented each NIDDK booklet with the corresponding PP slides, they received a hard copy of the slides to use for practice and review. At the end of each presentation, the PI discussed it and provided feedback.

Upon completing the 2.5 months of diabetes education training, the three CHWs were scheduled to begin the delivery of 15 weekly diabetes education classes to a total of 60 Hispanics with T2D. Each CHW would deliver two diabetes classes per week to a group of 10,

totaling a caseload of 20 people. Even though the average CHW's caseload is approximately 30 clients [27], each had a smaller than average caseload because this was their first position as a CHW. The CHWs were partnered with each other (peer-CHW) to support and assist one another in tasks, such as calling patients to remind them of the education classes, organizing and distributing the supplies for the class (e.g., water, educational materials), and meeting the patients at the main lobby to ensure they arrived to the correct class location.

Once the CHWs completed the diabetes education class training, the PI hired three Hispanic, bilingual (English/Spanish) RNs who were graduate nursing students with at least two years of nursing experience and fluent (reading/writing) in Spanish. These RNs were hired as research assistants (RAs) to supervise and evaluate the CHWs. Both RAs were female and had experience in teaching Hispanics with T2D. The RAs were asked to keep reflection journals. Quotes shared from these journals discuss how they applied these guiding principles while participating in these research studies. The PI supervised the CHWs and RAs.

Evaluation

Pre- and post-test

On the first day, before starting the diabetes training, each CHW completed the Diabetes Knowledge Questionnaire (DKQ) as a pre-test. One week after completing the 2.5 months of diabetes training, the three CHWs retook the DKQ as a post-test to assess their knowledge. The DKQ, available in English and in Spanish, is comprised of 24 questions. It is a valid and reliable tool that assesses overall diabetes knowledge as recommended by the National Standards for Diabetes Patient Education Programs [28,29]. The statistical software, Statistical Package for the Social Sciences (SPSS), was used to analyze the data of the pre- and post-test DKQ. Incorrect responses to the pre- and post-test were coded as "0," correct answers as "1," and I don't know as "2."

During each diabetes education class the CHWs delivered during the 15 weeks, a peer-CHW, one of the two RAs, and the PI were always present. Initially, the role of the RAs was to supervise and evaluate the CHWs, but during the first class, their role evolved to include addressing the skill level needs of the patients. For example, there were patients who were fearful of using the glucometer and needed to be taught how to use it; they asked the RAs to teach them. Another patient, who was prescribed an insulin pen to replace an insulin vial needed assistance to read the instructions and verbal guidance to administer their insulin pen. The PI immediately realized that the RAs could meet these patient needs.

Results

Pre- and post-test

Descriptive statistics was conducted analyzing the pre-and post-test data of the DKQ to determine if there was a change in the CHWs' diabetes knowledge.

Because the CHW sample was small (n=3) and the limited power, there was no statistical significance nor was it expected. Of the 24 questions in the DKQ, the pre-test scores of the CHWs varied: 70.8%, 79% and 50%; and post-test scores were: 95.8%, 87.5% and 91.7% (Table 2). The pre-test mean was 16 (SD=4.9) and the post-test mean was 22 (SD=1.29).

CHWs	Pre-Test	N=24	Post-test	N=24
	SD n (%)		SD n (%)	
1	17 (70.8)		23 (95.8)	
2	19 (79)		21 (87.5)	
3	12 (50)		22 (91.7)	
	Mean=16	SD=4.9	Mean=22	SD=1.29

Table 2: DKQ pre- and post-test community health worker (CHW) results.

Each CHW and RA was given a journal. The CHWs were asked to keep reflection journals of their 2.5 months of diabetes education training and on delivering the educational classes to the patients. The RAs were asked to journal their evaluations of the CHWs delivering the educational classes. Quotes from these journals are shared.

CHWs feedback on diabetes educational training

At the end of the 2.5 months of diabetes training, the CHWs completed an evaluation form providing feedback about each of the different diabetes training segments and about the overall training. Seven different quotes from the CHWs' reflection journals highlight their diabetes educational training:

"I feel all of the classes were very good and build on one another;" "I have learned so much about diabetes;" "I have made behavioral changes to my own life;" "I never knew some vegetables were high in carbohydrates;" "I never knew how to properly read a label and what the numbers meant;" "I enjoyed the role-playing activities and the Conversation Maps since they were interactive and allowed us to show what we knew and learned;" "One of the things I found very useful were the PP slides, they helped up keep on track with the information and reminded us to reinforce important information."

RAs evaluation of CHWs

When the CHWs delivered the diabetes education class, the RA and PI sat in the back of the class. The RA answered the patients' clinical questions and evaluated the CHWs' presentation skills and teaching strategies. At the end of each class, both CHWs, the RA and the PI had a debriefing session to review and discuss the class (e.g., positive aspects, and shortcomings of the class). Examples of feedback provided by the RAs to the CHWs included to: make eye contact with the patients in between reading the NIDDK education booklets; engage them and encourage participation; and have the peer-CHW navigate the slides for the CHW delivering the lesson, since at times the CHW would forget to change the slides.

CHWs feedback of delivering the educational classes

Overall, the CHWs felt that the classes they delivered went well. They felt that more experience in their CHW certificate training during internships would have better prepared them for the role of educating the Hispanic patients with T2D. Three different quotes from the CHWs' reflection journals highlight their experience in delivering the educational classes:

"...having a peer-CHW was helpful since it relieved some of the pressures in organizing the class;" "Having a RN in the class was a

great resource for me and the patients;" "The RN did not make me feel alone, I knew there was someone there to help me address difficult questions and answer clinical questions the patients had."

There are two quotes of the primary challenges the CHWs identified when delivering the education classes:

"...patients arriving late to class;" "...last minute changes in classrooms and technical issues such as needing computer passwords."

Four quotes from the CHWs' perspective highlight the patients and the education classes:

"...they are very interested in the classes;" "...they are eager to learn;" "...had many questions about diabetes;" "...they need reminders of what the normal levels are."

Patient's feedback of the CHWs and the educational classes

In general, the patients felt the CHWs were: "very nice," "helpful," "professional," "knowledgeable," "resourceful." They mentioned: "The classes allow me to meet other people who were dealing with many of the same issues I am facing." They were sad when the classes were ending, and said: "I looked forward to coming to class since it was like a support group." One of the key comments they had was: "At these classes I am able to speak to someone who speaks my language and allows me to express myself without an interpreter; in speaking to the CHW and nurse in Spanish, it makes me feel heard and that I am being understood." Although approximately 25% had attended diabetes classes in the past, they mentioned this was the first they attended that was available in Spanish.

Discussion

More and more CHWs are viewed as an integral and formal part of the healthcare team [30]. In addition, the Centers for Disease Control and Prevention [31] recognizes the unique role CHWs play in the activities they deliver to close the gap in diabetes-related health disparities. Although the sample size was small, a potential of a Type II error and no statistical significance, all three CHWs' DKQ pre-to post-test had between an 8.3% and 41.7% increase, indicating that during training they learned more about diabetes. One CHW in particular (CHW #3) had the largest gain in diabetes knowledge from the diabetes training, a 41.7% increase. This study shows that all CHWs hired to deliver diabetes education require additional training to assist them.

The findings of this study support those two published studies on CHWs diabetes training classes, showing a significant improvement in CHWs diabetes knowledge [10,11]. Although the findings of these CHWs studies (i.e., this study and the two additional CHWs studies) were the same, the length of training (i.e., 48 hours, 2.5 months and 6 months), methods (e.g., in-person, online and tele/video conference) and teaching tools (e.g., Conversation Maps) were different. The peer educator studies did not evaluate the educators diabetes knowledge post- training.

Lessons Learned. One of the lessons learned from this CHW diabetes education training was the importance of integrating and involving the RAs at the beginning of the four-week training of the NIDDK diabetes education booklets, instead of at the end of the 2.5 months of diabetes training. By involving them sooner, the RAs could have provided feedback to the CHWs on their presentation skills and

teaching strategies, which would have allowed the CHWs to refine their skills and strategies before delivering the classes to the patients.

Another lesson learned was based on the development of the PP slides, corresponding to the NIDDK diabetes education booklets. Given that the CHWs had not delivered education classes during their CHW certificate internship, and the only experience they had was during their course work, the PP slides were a useful teaching tool that helped them stay focused. For the patients, the PP slides allowed them to listen and concentrate on key concepts. Development of these PP slides in English and Spanish addressed the needs of the CHWs and of the patients. The need to develop and use additional tools, such as PP slides, to enhance the delivery of the content is important and essential in order to be effective.

Finally, ensuring that a designated person from the institution is available before and during the delivery of the educational classes is essential. In order to reduce some of the challenges the CHWs encountered (e.g., last minute room changes and updated computer passwords), a designated person from the institution would have been able to troubleshoot any technical issues without delays, and ensure that room changes be posted in a timely fashion, allowing patients to know the correct room where the education classes were taking place.

Conclusion

The AADE [18] supports CHWs as a non-clinical healthcare provider of a diabetes team who can improve the quality of diabetes education, as long as they receive specialized diabetes training and are directly supervised by a diabetes educator. Based on these recommendations, and as CHWs are used, the need to develop diabetes competencies is vital. These competencies would provide consistent standards for all CHW diabetes trainings and ensure that the appropriate content is delivered and taught, allowing for the development of a sustainable workforce.

Besides the need for the development of diabetes competencies, a tool to evaluate those competencies for CHWs is also urgently needed. The tool could be a checklist of the specific competencies CHWs need to master before delivering diabetes education. This tool could be used by researchers who hire CHWs to deliver diabetes education, or by people who train CHWs in diabetes education to ensure they have the appropriate knowledge.

It is important, now more than ever, the need to develop a diabetes training program for CHWs, develop standardized diabetes competencies, and tools to evaluate those competencies, making CHW graduates sustainable and marketable.

Acknowledgments

This study was funded by a Clinical Translation Science Center award from Weill Cornell Medical College, funded through grant ULI TR000457-06 from the National Center for Advancing Translational Sciences, National Institutes of Health.

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