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# A clinic-based pilot intervention to enhance diabetes management for elderly Hispanic patients

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## ABSTRACT

*Background and objectives: Successful diabetes self-management requires behavioral and lifestyle changes. However, low-income patients may face challenges related to poverty that make it difficult to engage in lifestyle changes. We piloted an intervention designed to help older, low-income, Hispanic, patients with diabetes access free or low-cost community resources to enhance diabetes self-management. Results from this pilot intervention are reported. Design and Methods: Patients were recruited at baseline to complete surveys assessing diabetes self-care activities, diabetes self-efficacy, and general self-efficacy. Volunteers were trained by a clinic social worker to help patients identify needs and make referrals to local community resources (e.g., housing, transportation, food, clothing, dental and prescription services, employment, or family social services). Identical surveys were administered at 3-month follow-up. Results: 28 patients were recruited at baseline and 18 patients completed the follow-up assessment. No significant changes in diabetes care and self-efficacy were detected. All patients requested at least one referral to a community resource. The most common requests were for low-cost dental clinics, food assistance, and housing support. At follow-up, nine (50%) patients contacted their given referrals. Conclusions: The need for assistance with basic social services is high in this population. The rate of referral uptake (50%) is high for a relatively low intensity intervention. Since the completion of the pilot, the program has trained 21 volunteers and helped over 220 patients in a primary care clinic. Using a volunteer model and creating connections to existing community resources is a cost-conscious way to deliver needed services to patients.*

*The Journal of Health, Environment, & Education, 2016; 8, 1-6. doi: 10.18455/08001*

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## Introduction

Diabetes affects 29.1 million people in the United States. It is the leading cause of cardiovascular disease, stroke, blindness, end-stage renal disease, lower limb amputations, and is more prevalent among older adults than those in younger age ranges [1]. It is also the leading cause of death among Hispanic communities [2; 3]. Hispanics are disproportionately affected by diabetes. Approximately 13% of Hispanics have diabetes compared to 9.3% of the general American population [2].

Self-management is a critical and necessary aspect of diabetes care and plays an important role in controlling glucose levels and delaying the onset of related complications [4]. Self-management behaviors include a range of activities such as monitoring diet, engaging in physical activity, checking blood sugar levels, and practicing foot care. Lower socioeconomic status is associated with poorer self-management and Hispanics are less likely than Whites to engage in some self-

management behaviors such as glucose testing and foot care [5; 6]. Educational interventions such as diabetes education classes can improve self-management behaviors in the short-term [7]. However, the ability to maintain self-management behaviors in daily life and engage in lifestyle changes may be constrained by one's social environment and access to resources such as healthy foods and safe spaces for exercise [8]. Thus, the goal of this pilot study was to test the implementation of a volunteer-driven, primary care-based intervention designed to help older Hispanic patients with diabetes identify and access community resources for help with daily needs.

## Theoretical framework

According to the social cognitive theory (SCT) of health behavior change [9], health outcomes are influenced by positive and negative reinforcements from the environment and health behavior change is dependent on both individual and social factors.

Altering an individual's social environment by introducing new resources can play an important role in changing health behaviors related to diabetes self-care by linking patients to new environments and opportunities that support positive behaviors. By accessing those opportunities, individuals may master new skills and develop internal resources, such as self-efficacy, to support behavior change. Self-efficacy is an important concept in SCT and refers to the perceived ability to engage in specific tasks [10]. Perceiving the ability to successfully engage in a task and subsequently doing so may produce positive responses to those behaviors that can reinforce the likelihood of reoccurrence.

## Methods

### The Intervention: Health Connectors

The Health Connectors program was delivered in a university-affiliated, Federally Qualified Health Center where Hispanic patients make up more than 70% of the clinic population and 90% of patients fall below 200% of the Federal Poverty Level. Volunteers were recruited to participate in the Health Connectors program through outreach to student-led pre-medical and medical interest groups at local universities. All Health Connectors volunteers were pre-medical undergraduate students or college graduates with interest in pursuing a career in medicine and in working with underserved, Hispanic populations. Recruited volunteers were trained by clinic personnel, including a clinic social worker and physician, to work with patients to identify needs and locate resources to meet those needs. To help retain volunteer interest and attract dedicated volunteers, university faculty provided pre-medical career and academic guidance as a benefit of volunteering in the program.

During continuity clinic hours, volunteers worked in coordination with medical assistants who identified diabetic patients from the medical charts of patients who were scheduled for an appointment that day. Medical assistants communicated this identification by placing an orange, laminated, "HC" sign on the exam room door, which indicated to volunteers that the patient was in the room and waiting for a provider. Volunteers used this waiting time to administer a brief interview using a checklist to ask if patients required any assistance locating or accessing local resources for: 1) housing, 2) transportation, 3) food, 4) clothing, 5) dental and prescription services, 6) employment, or 7) family and social services. For each patient-identified need, volunteers used a public, online database of local non-profit organizations ([www.211oc.org](http://www.211oc.org)) to search for relevant referrals to free or low-cost community programs. Resource information including addresses, phone numbers, and maps were printed out and handed to patients

before they left the clinic. Volunteers called patients on the phone after three weeks to check on the status of the referral, encourage patients to access resources, and make inquiries to resources on behalf of the patient if requested. All volunteers met once a month as a group with the lead physician to discuss cases, share challenges, and solutions.

For this specific study, not all patients who were screened by the Health Connectors were included in the sample. Patients who were ages 60 and over were told about the study and screened for eligibility. Those who did not meet the inclusion criteria or declined to participate in the study were still helped by the Health Connectors. However, only those who consented to the study were included as part of this evaluation.

### Participants

This study was approved by the University of California, Irvine IRB. We evaluated the Health Connectors program using a pre and post survey design. English-Spanish bilingual, research assistants approached patients to explain the study and assess them for the inclusion criteria (i.e. have diabetes, self-identify as Hispanic, ages 60 or older, and speak English and/or Spanish). Patients who were interested in being in the study were enrolled in the study and signed a consent form. Those who were not interested in being in the study were still offered assistance from a Health Connector volunteer but were not assessed in this evaluation. Twenty-eight patients enrolled in the study at baseline.

### Data collection

The baseline survey was administered orally and in-person by research assistants and participants were given a \$5 gift card for completing the baseline survey. Identical surveys were administered over the phone at three-month follow-up and \$15 gift cards were mailed to participants after completing the follow-up survey. At follow-up we reached 18 patients for a follow-up success rate of 64.3%.

### Measures

Validated Spanish versions of survey instruments were used and when not available, instruments were translated into Spanish by a certified Spanish translator. The survey included:

Demographic questionnaire: Questions assessed the participant's age, sex, marital status, highest level of education completed, employment status, health insurance status, number of people living in the household including self, number of years living in the U.S., country of birth, primary language spoken at home, primary language spoken at work,

**Table 1.** Participant characteristics (N=18)

	Mean [(SD) range]	n (%)
Age (years)	66.2 [(5.80) 60-83]	--
Sex		
Male	--	2 (11.1)
Female	--	16 (88.9)
Marital status		
Single	--	8 (44.4)
Married/domestic partnership	--	6 (33.3)
Divorced/widowed	--	4 (22.2)
Highest level of education completed		
Less than high school	--	13 (72.2)
High school	--	2 (11.1)
Some college or more	--	3 (16.7)
Employment status		
Full-time/part-time	--	5 (27.8)
Not employed/Disability /Retired	--	11 (61.2)
Not employed but looking	--	2 (11.1)
Has health insurance (yes)	--	13 (72.2)
Number of people in household including self	3.61 [(1.58) 1-6]	--
Years living in the US	26.56 [(10.67) 3-54]	--
Born outside the U.S.	--	17 (94.4)
Spanish as primary language spoken at home	--	18 (100.0)
How often language difficulties prevent completion of day-to-day activities		
Never	--	5 (27.8)
Some of the time	--	9 (50.0)
Most of the time/Always	--	4 (22.2)

and level of language difficulty encountered in performing day to day activities.

Summary of Diabetes Self-Care Activities (11-items;  $\alpha=0.68$ ) [11; 12]: Participants were asked to recall the number of days over the past seven days in which they engaged in self-care activities related to diet, exercise, blood sugar testing, and foot care. Items included questions like, "On how many of the last seven days did you space carbohydrates evenly through the day?" and "On how many of the last seven days did you check your feet?". Scores were calculated as an average within each domain with

separate scores for diet, exercise, blood sugar testing, and foot care.

Stanford Diabetes Self-efficacy Scale (8-items;  $\alpha=0.85$ ) [13; 14]: Eight questions assessed level of confidence on a 10-point scale ("not at all" to "totally confident") in performing certain activities related to diabetes management. For example, "How confident do you feel that you can exercise 15 to 30 minutes, 4 to 5 times a week?", "How confident do you feel that you know what to do when your blood sugar level goes higher or lower than it should be?", "How confident do you feel that you can judge when the changes in your illness mean you should visit the doctor?", etc. Scores were averaged across all questions with 10 being the highest score possible. Higher scores indicate higher levels of diabetes self-efficacy.

General self-efficacy (10-items;  $\alpha=0.75-0.91$ ) [15; 16]: Participants choose their level of agreement on a four-point scale ("not at all true" to "exactly true") on ten statements about confidence in problem-solving, dealing with unexpected events, getting out of trouble, etc. These included statements such as, "I can solve most problems if I invest the necessary effort", "If I am in trouble, I can usually think of a solution", and "I can always manage to solve difficult problems if I try hard enough." The final score was a sum of the responses with a range of 1-40.

### Analysis

We report findings for the 18 participants who completed the study. Descriptive analyses of the data were performed. Follow-up data were compared to baseline using paired t-tests.

### Results

Participant demographics are summarized in Table 1. At baseline, all patients requested at least one referral and 23 referrals were given out amongst the 18 participants (mean=1.28 referrals per patient). Resources requested were for low-cost dental care (n=7), food (n=6), housing (n=4), clothing (n=3), transportation (n=2), and employment assistance (n=1).

Overall, no statistically significant differences were detected at follow-up from baseline for self-management activities, self-efficacy, and general self-efficacy (Table 2). However, nine patients (50%) reported at follow-up that they had contacted the resources that were suggested to them. Resources contacted were for food assistance (n=4), dental clinics (n=3), housing (n=2), and clothing (n=1). Two people were told they did not qualify for services or that the waitlist was not open. Two had pending appointments and five had successfully accessed the resources.

**Table 2.** Overall change in mean scores on the Summary of Diabetes Self-Care Activities, Self-Efficacy, and General Self-Efficacy (n=18)

	Baseline	Follow-up	<i>p</i>
	Mean (SD)	Mean (SD)	
Diet/healthful eating plan	4.66 (0.82)	4.52 (1.15)	0.63
Physical activity	3.11 (2.43)	2.94 (2.20)	0.80
Test blood sugar	4.14 (2.91)	4.83 (2.40)	0.38
Inspect feet/shoes	5.72 (1.72)	5.92 (1.75)	0.61
Diabetes self-efficacy	8.00 (1.90)	8.51 (1.42)	0.25
General self-efficacy	31.89 (7.83)	32.89 (7.10)	0.64

*Higher scores indicate greater efficacy*

Since the initial pilot study, the Health Connectors program has gained popularity with student volunteers for the meaningful primary care experiences that it offers. Over the course of one year, the program has trained 21 volunteers and expanded the reach to patients of all ages, including non-diabetic patients. The 21 volunteers served 224 patients and among these patients, the top four patient-identified needs were dental services (29% of patients), low-cost or free food resources (27%), housing (12.5%), and transportation (12.5%). Eighty-six cases (72.9%) were considered closed within a year. Among all closed cases, at final contact, 38% of patients reported that they successfully accessed the referrals that were suggested to them.

## Discussion

These findings demonstrate that patients in need of assistance will utilize suggested referrals to local resources. Findings also demonstrate that such a program can be integrated into regular clinical practice for a Spanish-speaking patient population by using a sustainable volunteer model that gives pre-medical students exposure to primary care practice for underserved patients. Start-up costs for a volunteer-based model are minimal and may be a cost-efficient way to ease the workload of clinic social workers so that they can spend more time with patients with complex cases. Using the volunteer model and creating connections to existing community resources is a feasible way to implement this type of program in a low-resource clinic environment.

Although patient clinical outcomes did not change significantly from baseline, the project period of 3-months was short and the intensity of contact was low. All patient participants were Spanish-speaking and almost 75% reported that language difficulties prevented them from completing daily activities. This indicates that patients face potential language

barriers to seeking resources and that Health Connector volunteers may need to serve a more direct role in helping patients to contact referrals. Nonetheless, continued intervention contact over time may lead to behavioral changes given that half of participants reported that they accessed resources. This pilot data demonstrates the potential for success and a study with greater sample size is needed.

This study was limited in that we did not measure clinical indicators of diabetes control such as blood glucose and HbA1C so the clinical impact of the intervention is unknown and further study is needed. In addition, the loss to follow-up rate of 36% reduced our sample at follow-up. However, the difficulty of recruiting Hispanic populations to participate in research studies is well documented recruit [17-19]. Non-English speaking populations are likely to perceive research as a burden or experience distrust for researchers. This study sheds information on a specific segment of the underserved population, specifically elderly Hispanics, and provides valuable pilot data from which to build larger studies.

Given the impact of diabetes on health disparities in the Hispanic population, it is important to explore and evaluate the feasibility of new and innovative models for improving diabetes self-management. The results from this initial pilot study demonstrate that an intervention which provides referrals to community resources has the potential to positively impact patients' lives. Particularly for low-income populations with limited English proficiency, the day to day barriers of navigating access to basic needs such as food, transportation, and housing can create significant challenges to health. Taking care of those basic needs may be the first step toward improving diabetes care.

An indirect but related outcome of this intervention is the impact of volunteering on the Health Connectors. Volunteers expressed enthusiasm for the program and many appreciated the opportunity to make meaningful contributions to the lives of patients as well as the opportunity to work in a health setting. The popularity of this program is evidenced with the growth of number of Health Connector volunteers from four to 21 within the course of one year. For many who strived to pursue a healthcare career, the experience offered valuable hands-on experience working with patients. The professional and personal benefits of such a program may encourage volunteers to go on to pursue careers caring for underserved populations. Indeed, the exposure of young health professionals to underserved areas has been shown to increase desire and intention to practice in those areas [20; 21]. The impact of such a volunteer program on the health of underserved communities

may be far-reaching and extend beyond the evaluation period.

### Acknowledgments

Dr. Nguyen received support from the University of California, Los Angeles, Resource Centers for Minority Aging Research Center for Health Improvement of Minority Elderly (RCMAR/CHIME) under NIH/NIA Grant Number P30-AG021684. This publication was also supported by the UCLA CTSI under NIH/NCRR/NCATS Grant Number UL1TR000124. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

### References

- [1] CDC. (2011). *National Diabetes Fact Sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011*. Atlanta, GA.
- [2] National Center for Chronic Disease Prevention and Health Promotion Division of Diabetes Translation. (2014). *National Diabetes Statistics Report*. Atlanta, CA.
- [3] Umpierrez, G. E., Gonzalez, A., Umpierrez, D., & Pimentel, D. (2007). Diabetes mellitus in the Hispanic/Latino population: an increasing health care challenge in the United States. *Am J Med Sci*, 334(4), 274-282. doi: 10.1097/MAJ.0b013e3180a6efe3
- [4] American Diabetes Association. (2013). Standards of medical care in diabetes-2013. *Diabetes Care*, 36 Suppl 1, S11-S66. doi: 10.2337/dc13-S011
- [5] Piper, C. N., Polite-Middleton, T., Warren-Findlow, J., et al. (2013). Racial influences on diabetes management among adults in North Carolina. *Ethn Dis*, 23(3), 316-321.
- [6] Pu, J., & Chewning, B. (2013). Racial difference in diabetes preventive care. *Res Social Adm Pharm*, 9(6), 790-796. doi: 10.1016/j.sapharm.2012.11.005
- [7] Norris, S. L., Engelgau, M. M., & Narayan, K. M. (2001). Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care*, 24(3), 561-587.
- [8] Sorensen, G., Emmons, K., Hunt, M. K., et al. (2003). Model for incorporating social context in health behavior interventions: applications for cancer prevention for working-class, multiethnic populations. *Prev Med*, 37(3), 188-197.
- [9] Baranowski, T., Perry, C. L., & Parcel, G. S. (2002). How individuals, environments, and health behavior interact: Social Cognitive Theory. In K. Glanz, B. K. Rimer & F. M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice*. San Francisco, CA Jossey-Bass.
- [10] Anderson, R. M., Funnell, M. M., Fitzgerald, J. T., & Marrero, D. G. (2000). The Diabetes Empowerment Scale: a measure of psychosocial self-efficacy. *Diabetes Care*, 23(6), 739-743.
- [11] Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care*, 23(7), 943-950.
- [12] Hernandez, R., Ruggiero, L., Riley, B. B., et al. (2014). Correlates of self-care in low-income African American and Latino patients with diabetes. *Health Psychol*, 33(7), 597-607. doi: 10.1037/hea0000043
- [13] Stanford Patient Education Research Center. *Self-efficacy for diabetes scale*. Retrieved January 7, 2015, from <http://patienteducation.stanford.edu/research/sediabetes.html>
- [14] Lorig, K. R., Ritter, P. L., & Gonzalez, V. M. (2003). Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nurs Res*, 52(6), 361-369.
- [15] Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright & M. L. Johnson (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 33-37). Windsor, UK: NFER-Nelson.
- [16] Scholz, U., Gutierrez-Dona, B., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment*, 18(3), 242-251.
- [17] Ford, J. G., Howerton, M. W., Lai, G. Y., et al. (2008). Barriers to recruiting underrepresented populations to cancer clinical trials: a systematic review. *Cancer*, 112(2), 228-242. doi: 10.1002/cncr.23157
- [18] De La Rosa, M., Babino, R., Rosario, A., et al. (2012). Challenges and strategies in recruiting, interviewing, and retaining recent Latino immigrants in substance abuse and HIV epidemiologic studies. *Am J Addict*, 21(1), 11-22. doi: 10.1111/j.1521-0391.2011.00193.x
- [19] Martin, M. A., Swider, S. M., Olinger, T., et al. (2011). Recruitment of Mexican American adults for an intensive diabetes intervention trial. *Ethn Dis*, 21(1), 7-12.
- [20] Tavernier, L. A., Connor, P. D., Gates, D., & Wan, J. Y. (2003). Does exposure to medically underserved areas during training influence eventual choice of practice location? *Med Educ*, 37(4), 299-304.

- [21] Ko, M., Edelstein, R. A., Heslin, K. C., et al. (2005). Impact of the University of California, Los Angeles/Charles R. Drew University Medical Education Program on medical students' intentions to practice in underserved areas. *Acad Med*, 80(9), 803-808.

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