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ORIGINAL PAPER

Risk Screening for Cardiovascular Disease and Diabetes in Latino Migrant Farmworkers: A Role for the Community Health Worker

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Abstract Diabetes and heart disease are two of the leading causes of death for Hispanics living in the United States (American Heart Association [AHA] in Circulation 123: e18–e209. doi:10.1161/CIR.0b013e3182009701, 2010). As the Hispanic population continues to grow, the need for low-cost, non-invasive methods to detect at risk populations for such diseases becomes more important. Once at risk individuals are detected, prevention strategies can be implemented. Studies have shown that Latino community health workers (CHWs) are effective educators, patient advocates and health promotion motivators for patients with known heart disease or diabetes. This pilot study examined the accuracy with which Latino CHWs could determine migrant farmworkers at risk for diabetes or cardiovascular disease (CVD) in rural Virginia. This quasi-experimental study supports the hypothesis that Latino CHWs can use non-invasive diabetes and CVD screening tools with similar accuracy as a registered nurse. The screening tools used were the American Diabetes Association's diabetes risk calculator and a non-laboratory screening tool for CVD risk designed by Gaziano et al. (Lancet 371:923–931, 2008). The terms Latino and Hispanic will be used interchangeably.

Keywords Community health worker · Hispanic · Migrant · Diabetes · Cardiovascular disease

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Introduction

Rates of diabetes and cardiovascular disease (CVD) amongst Latinos residing in the United States (US) are alarming. The risk of diabetes diagnosis as an adult is 66 % higher in Latinos than in non-Hispanic, White Americans [3]. The prevalence in the Mexican-American population is startling. According to the 2013 heart disease and stroke statistic update, the prevalence of pre-diabetes was 47 % in Mexican-American, adult men while 11.4 % of this population had been diagnosed with diabetes [3]. In 2009, diabetes was the fifth leading cause of death for people of Hispanic origin in the US [4]. Cancer, heart disease, unintentional accidents and stroke ranked higher, respectively. The San Antonio heart study found that Mexican-Americans with diabetes have a twofold risk of cardiovascular mortality and a threefold risk of coronary artery disease mortality compared to non-Hispanic whites [5]. The National Center for Health Statistics 2013 update reported that 33.4 % of Mexican-American men over the age of 20 have CVD [3]. Latinos, especially Mexican-Americans, have a higher prevalence of risk factors which lead to CVD. These include obesity, diabetes, and lack of physical activity [6]. The rates of CVD have been shown to increase with US acculturation

[7]. It is necessary for health care systems to adopt easy risk identification methods for DM and CVD in Hispanics so that the rates do not continue to climb as the population grows and acculturates.

The nearly three million Latino migrant farmworkers who are living in the US are likely at an even higher risk for developing complications related to diabetes or CVD. Not only does this population rank amongst the most economically disadvantaged, but they are also poorly educated, exhibit poor dietary behaviors and are socially isolated [7, 9, 10]. The transient nature of their jobs coupled with a low literacy rate, language barrier, and lack of transportation make it difficult for Latino migrant farmworkers to obtain primary healthcare. There is also an uncertainty regarding the process of receiving healthcare in the US which poses a barrier to access [11].

Hu et al. [12] showed that lack of access to prevention and management programs is a factor which increases the burden of disease on minorities. There are migrant health centers scattered throughout the US, however, these centers are only equipped to serve <20 % of the nation's migrant farmworkers [8]. Current research lacks information regarding cost effective methods for providing health screenings, disease prevention education and primary health care in Latino migrant farmworker communities. Innovative techniques must be used to reach this population in order to prevent the serious consequences that undiagnosed or uncontrolled diabetes or CVD can have on an individual, a community and the national economy.

Background

The Community Health Worker

A CHW is traditionally a member of the community in which they serve. The purpose of the CHW role is to educate others within the community on health risks, disease prevention and healthy behaviors [13]. Various models have emerged which incorporate the CHW in different steps of the health care process. Literature supports the utilization of CHWs as patient educators, motivators and advocates in the Latino community. The CHW has been shown to have positive influence upon knowledge scores, clinical outcomes and healthy behaviors in Latinos with diabetes and/or CVD risk factors.

Value of Absolute Diabetes and Cardiovascular Disease Risk Assessment

Frequently individuals are treated for CVD independent of their absolute risk. They are often treated based on a single risk factor, such as high blood pressure, diabetes, or high blood lipids [14]. Strategies for treatment often include pharmacological therapy along with lifestyle changes. These treatments may be out of proportion to a person's absolute risk for disease and are often not cost effective. Cost effective treatment is vitally important in resource limited environments such as Latino migrant farmworker communities.

Risk assessment tools are used in clinical settings to identify the presence and level of abnormality of CVD risk. This allows clinicians to categorize individuals into low, moderate and high risk groups which will ultimately impact the treatment chosen. The obvious priority for clinicians is to identify individuals with high cardiovascular risk as well as those with atherosclerotic disease and diabetes risk factors. Individuals who lack easy access to care are often inaccessible to clinicians and go unevaluated for these risks. Risk scoring tools exist which are readily available and could potentially be used by non-clinicians to identify high risk individuals in rural communities. Several of these tools do not require the use of serum testing. This is ideal in resource limited environments such as rural migrant camps.

Purpose

This study had three specific aims. First, to determine if Latino CHWs can use the ADA diabetes risk screening tool, a non-laboratory tool, to identify risk for development of diabetes amongst Latino migrant farmworkers with the same accuracy as a registered nurse (RN). Second, to determine if Latino CHWs can use the non-laboratory cardiovascular risk prediction tool, which was designed and validated by Gaziano et al. [2], to identify risk for development of CVD amongst Latino migrant farmworkers with the same accuracy as a RN. Third, to determine the percentage of Latino migrant farmworkers who seek health care after they are identified as having moderate to high risk for developing diabetes or CVD through non-invasive screening by a Latino CHW.

Methods

Setting

Ten housing complexes for migrant farmworkers in Nelson County, Virginia made up the setting of the study. These camps are in rural areas of the county and most are several miles from state maintained roads. The specific camps were identified based on which camps had residents during the data collection component of the project. Each camp housed between 5 and 35 men. The housing quality varied. Some were equipped with air conditioning, multiple restroom facilities and washing machines. Other camps had insufficient kitchen space, bathrooms, and bedrooms for the

number of men living within the houses. The screenings took place from July 2012 to September 2012 after working hours and often concluded after nightfall as this was the only time which the farmworkers could predictably be at the camp housing.

Sample

The University of Virginia Institutional Review Board approved the study (IRB HSR# 16176). A total of 66 farmworkers, eight CHWs and three RNs participated in the study. Recruitment of the farmworkers was via flyers placed at each camp 1 week prior to screening sessions. A $10 Wal-Mart gift card was offered as compensation for completion of the study. Potential CHWs were identified with assistance of the RHOP outreach coordinator and letters were mailed to their homes inviting them to participate in the study. Each of the six CHW who completed the study was given a $50 visa gift card.

Eligible farmworker participants must have migrated, to or within the US, within the last 6 months for the purpose of work. Further inclusion criteria included male gender; age between 18 and 64 years, Latin American country of origin; have the ability to understand and give verbal consent; and have access to a telephone for the 2 week follow-up call if they are deemed at risk. Eligible CHWs had previous training in obtaining blood pressure readings using an automatic cuff and attended a one-time training session on diabetes and CVD. Furthermore, they had to be able to speak and read Spanish and consider themselves of Latino or Latina heritage. They each committed to attend a minimum of one screening session and had access to a telephone to make the follow-up calls. RNs were eligible if they held current licenses to practice in Virginia. Each participant gave verbal consent in their primary language. An interpreter assisted with the CHW and farmworker consents.

Study Instruments

An automatic blood pressure cuff, a digital scale, a measuring tape, a calculator and a body mass index (BMI) chart were provided for the CHWs and RNs for the completion of the diabetes and CVD risk screening tools. The diabetes tool is free to the public on the ADA website. This tool was based on the validated tool created by Bang et al. [15] which yields 79 % sensitivity and 67 % specificity. It is a simple eight question survey which identifies individuals with a score of five or higher at risk for diabetes. The CVD risk scoring tool was created by Gaziano et al. [2]. Standard risk factors, including age, systolic blood pressure, smoking status, total cholesterol, diabetes status, and hypertension treatment, were used in the laboratory risk screen. BMI is substituted for cholesterol in the non-laboratory risk scoring tool. This tool was validated using a study group of 6,186 people. The data was collected using the National Health and Nutrition Examination Survey (NHANES). Gaziano et al. [2] compared the accuracy of their CVD risk score with the Framingham Risk Score in the NHANES database and found them to be equally accurate to predict a first CVD event. These tools offer a cost effective way to accurately screen individuals in resource poor environments.

Data Collection

Demographic data was collected for each CHW during the training session. The age, gender, educational background, country of origin and years living within the US can be found in Table 1. Each CHW was assigned an identification number and data was entered into an excel spreadsheet for analysis.

One to two CHWs and one RN attended each farmworker screening session. A Spanish interpreter assisted the RN throughout the study. The CHW completed a study packet for each farmworker. The packet included a demographic information sheet, the diabetes risk screening tool, the CVD risk screening tool, and an education and referral check-off sheet. The smoking status, marital status, age, country of origin, time in the US and educational level of each farmworker was obtained and can be found in Table 2 of the "Appendix". Height in inches, weight in pounds, BMI, and the mean of three systolic blood pressures, taken 3–5 min apart, were calculated and are available in Table 3. The diabetes and CVD risk tools were then completed. Results were placed in a sealed envelope and given to the researcher with an assigned participant numeric identifier on the outside of the envelope and on each page within the envelope. The CHW then entered the name, a phone number, assigned participant numeric identifier and reason for referral for all referred participants in a confidential notebook. The CHW used this information to call the participants to determine if appointments with healthcare professionals were scheduled and attended within 2 weeks of screening. The contact information was destroyed after the phone call was placed.

The RN then completed a modified version of the screening tool packet for each farmworker participant. This included a physical data sheet, a BMI chart, a diabetes risk screening tool, a CVD risk screening tool and a referral recommendation sheet. The RN placed this information in a sealed envelope with the letters RN and her designated RN number plus the assigned participant numeric identifier on the outside of the envelope and on each page within the envelope. All of this data were submitted to the researcher.

At the end of the screening sessions at each camp, the researcher opened the envelopes to compare the results. Farmworkers receiving a diabetes risk score of five or greater and/or a CVD risk score >10 % were deemed at risk and should have been referred for healthcare. The CHW was advised to notify any participants regarding a change in their risk status once the results were compared. The risk assessment calculations by the RN were considered the gold standard for the purpose of this study. The CHW made a referral for care and provided educational materials to those individuals deemed at risk by the RN. All referred individuals were called by the screening CHW 2 weeks after completion of the screen.

Data Analysis

The data collected by the CHWs and RNs were analyzed using STATA and G*power3 statistical software. Percentages, means and standard deviations were calculated for farmworker time spent in the U.S. Percentages related to marital status, smoking status, and years of education were also calculated. The minimum, maximum and average blood pressures, weights, and BMIs for the farmworker population were calculated based on the CHW and RN results. These results were compared using a paired t test. A Pearson χ^2, Fisher's exact test, and a paired t test were used to calculate the percentage agreement between CHW generated risk scores and RN generated risk scores for diabetes and CVD.

Results

Diabetes Risk Score

The mean difference between diabetes risk scores of the CHWs and RNs was not significantly different (mean difference $= -0.15$, $t\ (65) = -1.34$, $p = 0.1$, $\alpha < 0.05$). Table 4 contains the results of the Pearson's χ^2 showing no significant difference in diabetes risk scores obtained by CHWs and RNs [χ^2 (7, n = 66) = 8.38, $p = 0.31$].

When each risk level was analyzed, 28 (42.42 %) of the farmworkers received the same diabetes risk score by the CHW and RN. The other 38 (57.58 %) farmworkers were rated slightly differently by the CHW and RN, but not significantly different. Specifically, the RN gave a score of five or higher to 17 subjects; whereas the CHW awarded a five or higher to 16 subjects. Treating the RN's evaluation of the farmworker to be the 'true positive' or gold standard, the estimated sensitivity of the CHW's diabetes risk assessment of the farmworkers was 94 %. The specificity of the CHW's diabetes risk assessment of the farmworkers was estimated at 92 %, based on the fact that the RN labeled 49 subjects as not at risk for diabetes; whereas the CHWs found 45 to be not at risk for diabetes.

Cardiovascular Disease Risk Scores

The CHWs calculated a risk prediction score for each of the 24 farmworkers who met both the study eligibility requirements and were 35 years of age or older. The CHWs identified fourteen farmworkers with low risk (<10 % risk); six farmworkers with moderate risk (10–20 % risk); and four as high risk (>30 % risk). This correlates to 58.33 % of the sample having low risk; 25 % with moderate risk; and 16.67 % with high risk for developing a cardiovascular event in the next 5 years. The CHWs educated each of the 10 moderate or high risk individuals on the findings and prevention strategies. Referral was recommended for follow-up for the 10 at risk individuals.

The RNs identified 14 farmworkers to have a risk level of <10 %; 4 with risk levels <20 %; and six with risk levels over 20 %. These findings correlated to 58.34 % of the sample having low risk levels; 16.67 % of the sampling having moderate risk; and 25 % of the sample being at high risk for developing a cardiovascular event in the next 5 years. The RN recommended that 10 farmworkers seek healthcare and be educated on prevention methods.

The individual levels of risk assigned by the CHW and RN were exactly the same in 45.83 % of the participants. Table 5 portrays the number of subjects assigned to CVD risk category (<5 %; 5–10 %; 10–20 %; 20–30 %; >30 %) by RNs versus CHWs. When each subject was further grouped into each of the three standard categories of low (<10 %), moderate (10–20 %) or high risk (>20 %), there were only three discrepancies. Two individuals were assigned low risk levels by a CHW while the RN assigned these individuals moderate risk levels. One individual was determined to by high risk by a RN but the CHW assigned him into a low risk category. A Pearson χ^2 and Fisher's exact test showed that the differences between the CHW generated scores and the RN generated scores were not statistically significant. This means that the findings were similar between the CHW and RN generated screens.

Referred Participants

Subjects were referred if they had DM risk scores of five or higher or if they a CVD risk of over 10 %. The CHWs initially referred 27.27 % of the total subjects for healthcare visits; whereas the RNs referred a total of 33.33 % of the men. When the RN results were compared to the CHW results, a total of eight farmworkers required re-education on risk levels by the CHW and referral recommendations were adjusted based on the RN findings. Two of these farmworkers were determined to not be at risk by the RN

whereas six were determined to be at risk. Nine subjects were referred for both DM and CVD risk. Twelve were referred for elevated DM risk alone. One subject was referred for CVD risk alone.

Follow-Up Calls

The CHWs called each of the farmworkers who were referred after the results of the RN and CHW screenings were compared. There were a total of 21 referrals made. Eight (38.1 %) of the referred farmworkers scheduled and attended healthcare visits. All of these appointments were on the mobile clinic. Four (19 %) of the referred farmworkers did not make appointments. One farmworker cited a problem with finding transportation as the reason that he did not seek healthcare. Two farmworkers blamed time constraints and one told the CHW that there was another barrier which he did not elaborate upon. The remaining nine (42.86 %) of the referred individuals were not reachable via phone 2 weeks after the screening sessions and it is uncertain if healthcare was sought or obtained.

Discussion

This study revealed that CHWs perform similarly to RNs in the use of non-invasive DM and CVD screening tools. The CHWs were able to use these risk tools to determine those in need of further healthcare. Previous research has shown that Latino CHWs are reliable patient educators, motivators and advocates for urban-dwelling Latinos with diabetes or CVD living in the US. There are few previous studies which include rural participants. The addition of the risk identification role, specifically in rural communities, gives the CHW the ability to identify individuals who are in immediate need of disease prevention education and early referral for healthcare. By rapid identification and education of at risk individuals, the CHW could impact vulnerable migrant and other underserved populations by reducing the number of individuals who develop diabetes or CVD or complications from these diseases. This health promoting intervention could be an avenue for meeting diabetes and CVD goals defined by healthy people 2020 in rural Latino farmworker communities.

Limitations

Limitations of the study include a small, non-randomized sample which included only migrant farmworkers from Mexico migrating through Virginia. This could limit the generalizability of the results to farmworkers from other Hispanic countries or to those traveling along different migrant streams. The transient nature of the population made it difficult to capture the follow-up data as 37.5 % of those referred were not reachable via phone for the 2-week follow-up phone call. This was likely due to the unpredictable work schedules and migration of the subjects. Farmworkers are at the mercy of the crops. They are often unaware of when they will be moving to find work elsewhere. This makes continuity of care difficult and highlights the need for disease prevention and early detection.

Further research is needed to strengthen the evidence that the CHW can accurately identify those at risk for diabetes and CVD in rural, migrant farmworker communities. A study which includes subjects from various Hispanic countries who migrate through different farmworker streams could improve the generalizability of the findings. A longitudinal, experimental design with a large migrant farmworker sample size would be ideal. Subjects could be re-evaluated for risk during two migrant seasons by both a CHW and RN. These seasons are approximately nine to 12 months apart. This would provide an opportunity to compare accuracy in risk scores between RNs and CHWs on a larger sample size. Such a study would also give insight into the impact that a one-time disease prevention educational intervention and knowledge of risk has on health behavior and health outcomes.

CHW programs vary across the US and typically target the health of minority communities, such as Latino or African American communities. Further research would be necessary to determine if the findings of this study are generalizable to CHWs with different levels of training or from different ethnic groups. It is possible that the benefits of risk identification by CHWs could expand beyond the Mexican migrant farmworker population.

Conclusion

Latino CHWs have fewer barriers to access to the migrant farmworker population than traditional healthcare workers as they are not typically viewed as outsiders and do not have to overcome language barriers. Early risk identification in vulnerable populations is a vital first step in health promotion and disease prevention. The findings of this pilot study show that CHWs can utilize non-invasive, diabetes and CVD screening tools with similar accuracy to RNs. The ability of the CHW to identify those individuals at risk for heart disease or diabetes will further enhance the impact that the CHW has on the health of the population. If given the tools, the CHW can independently visit a migrant farm camp and quickly identify those in need of health

education, motivational support and further evaluation by a healthcare provider. This could be an affordable approach to providing much needed assessment and education in a high risk population.

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Appendix

See Tables 1, 2, 3, 4 and 5.

Table 1 Characteristics of CHWs

Characteristic	Number	Percentage	Mean (if indicated)
Gender			
Male	1	16.67	
Female	5	83.33	
Language			
English	5	83.33	
Spanish	6	100	
Age			
18–20	2	33.33	27
>20–<25	0	0	
>25–<30	1	16.67	
>30–35	3	50	
Years of education			
0–3	0	0	13.33
>3–6	1	16.67	
>6–9	0	0	
>9–12	1	16.67	
>12–14	3	50	
>14	2	33.33	
Years as CHW			
<1	3	50	1.17
1	1	16.67	
2	1	16.67	
3	0	0	
4	1	16.67	
>4	0	0	
Years living in US			
<5	1	16.67	14.83
>5–10	1	16.67	
>10–15	1	16.67	
>15–20	2	33.33	
>20	1	16.67	

Sample (N = 6) includes the CHWs who completed the study. Age is in years

Table 2 Characteristics of farmworkers

Characteristic	Number	Percentage	Mean/SD (if indicated)
Married			
Yes	35	53.03	
No	31	46.97	
Country of origin			
Mexico	66	100	
Other	0	0	
Age			
18–<20	3	4.55	33.67/11.36
≥20–<25	17	25.76	
≥25–<30	9	13.64	
≥30–<35	14	21.21	
≥35–<40	4	6.06	
≥40–<45	6	9.09	
≥45–<50	5	7.58	
≥50–<55	3	4.55	
≥55–<60	5	7.58	
≥60–<65	0	0	
Smoker			
Yes	22	33.33	
No	35	53.03	
Quit	7	10.61	
Unknown	2	3.03	
Years of education			
0–3	8	12.12	
>3–6	18	27.27	
>6–9	18	27.27	
>9–12	11	16.67	
>12–14	5	7.58	
>14	4	6.06	
Unknown	2	3.03	
Months in US (this visit)			
≤6	42	63.64	
>6–≤12	8	12.12	
>12–≤24	1	1.52	
>24–≤36	2	3.03	
>36–≤48	9	13.64	
>48	4	6.06	
Months living in US (total)			
≤6	6	9.09	
>6–≤12	7	10.61	
>12–≤24	9	13.64	
>24–≤36	5	7.58	
>36–≤48	4	6.06	
>48	33	50	
Unknown	2	3.03	

Sample of farmworkers (N = 66). Unknown means the data was not reported

Table 3 Height, weight, BMI of farmworkers

Farmworker	RN calculated	CHW calculated	Difference
Min height	60	61	1
Max height	74	76	2
Average height	66.39	66.77	0.39
Min weight	106	106	0
Max weight	294	296	2
Average weight	175.91	175.72	0.19
Min BMI	19	19	0
Max BMI	42.5	41	1.5
Average BMI	28.12	27.94	0.17

Height is in inches and weight is pounds

Table 4 Percentage agreement of CHW and RN generated diabetes risk scores

	Agree [n (%)]		Disagree RN–CHW [n (%)]		Disagree CHW–RN [n (%)]	
1	2	7.14	4	10.53	6	15.79
2	5	17.86	7	18.42	10	26.32
3	9	32.14	12	31.58	6	15.79
4	3	10.71	4	10.53	8	21.05
5	4	14.29	4	10.53	5	13.16
6	2	7.14	7	18.42	0	0
7	2	7.14	0	0	3	7.89
8	1	3.57	0	0	0	0
Pearson χ^2	*df*(7)		5.9711	0.543	8.5312	0.288
Fisher's exact				0.621		0.312

Farmworker sample N = 66. RN versus CHW: Pearson $\chi^2(7) = 5.9711$ Pr = 0.543 Fisher's exact = 0.621 CHW versus RN: Pearson $\chi^2(7) = 8.5312$ Pr = 0.288 Fisher's exact = 0.312

Table 5 Farmworkers at each level of CVD risk

Score	RN		CHW	
1	4	16.67	5	20.83
2	10	41.67	9	37.5
3	4	16.67	6	25
4	2	8.33	1	4.17
5	4	16.67	3	12.5

This depicts the level of CVD risk assigned to each of the 24 eligible subjects in the study

1 ≤ 5 % risk; 2 = 5–10 % risk; 3 = 10–20 % risk; 4 = 20–30 % risk; 5 ≥ 30 % risk

Scores 1 and 2 = low risk; Scores 3 = moderate risk; Scores 4 and 5 = high risk

Pearson $\chi^2(5) = 1.0197$ Pr = 0.961 Fisher's exact = 0.980

References

1. American Heart Association. (2010). Heart disease and stroke statistics—2011 update. *Circulation, 123*, e18–e209. doi:10.1161/CIR.0b013e3182009701.
2. Gaziano, T. A., Young, C. R., Fitzmaurice, G., Atwood, S., & Gaziano, J. M. (2008). Laboratory-based versus non-laboratory-based method for assessment of cardiovascular disease risk: The NHANES I follow-up study cohort. *Lancet, 371*, 923–931.
3. Go, A. S., Mozaffarian, D., Roger, V. L, et al. on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2014). Heart disease and stroke statistics—2014 update: A report from the American Heart Association. *Circulation, 129*, e28–e292.
4. Kochanek, K. D, Xu, J., Murphey, S. L, Minino, A. M., & Kung, H. C. (2012). Deaths: Final data for 2009. *National Vital Statistics Reports, 60*(3). Hyattesville, MD: National Center for Health Statistics.
5. Hunt, K. J., Resendez, R. G., Williams, K., Haffner, S. M., Stern, M. P., & Hazuda, H. P. (2003). All-cause and cardiovascular mortality among Mexican-American and non-Hispanic white older participants in San Antonio heart study—evidence against the "Hispanic paradox". *American Journal of Epidemiology, 158*(11), 1048–1057. doi:10.1093/aje/kwg249.
6. Balcázar, H., Alvarado, M., Hollen, M. L., Gonzalez-Cruz, Y., & Pedregón, V. (2005). Evaluation of Salud Para Su Corazon (health for your heart)—National council of La Raza promotora outreach program. *Preventing Chronic Disease, 2*(3), 1–9.
7. Daviglus, M. L., Talavera, G. A., Aviles-Santa, M. L., et al. (2012). Prevalence of major cardiovascular risk factors and cardiovascular diseases among Hispanic/Latino individuals of diverse backgrounds in the United States. *JAMA, 308*(17), 1775–1784.
8. National Center for Farmworker Health. Facts about farmworkers. Retrieved at http://www.ncfh.org/docs/fs-facts%about%20farmworkers.pdf. National Heart, Lung, and Blood Institute. Calculate your body mass index. Retrieved from http://nhlbisupport.com/bmi/.
9. U.S. Department of Labor. (2000). *National agricultural workers survey*. Retrieved from http://www.doleta.gov/agworker/report9/chapter1.cfm.
10. Ingram, M., Torres, E., Redondo, F., Bradford, G., Wang, C., & O'Toole, M. L. (2007). The impact of promotoras on social support and glycemic control among members of a farmworker community on the US–Mexico border. *The Diabetes Educator, 33*(6), 172S–178S.
11. Sarker, U., Fisher, L., & Schillinger, D. (2006). Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? *Diabetes Care, 29*(4), 823–829.
12. Hu, J., Wallace, D. C., & Tesh, A. S. (2010). Physical activity, obesity, nutritional health and quality of life in low-income Hispanic adults with diabetes. *Journal of Community Health Nursing, 27*, 70–83.
13. Medina, A., Balcázar, H., Hollen, M. L., Nkhoma, E., & Moto, S. F. (2007). Promotores de salud: Educating Hispanic communities on heart-healthy living. *American Journal of Health Education, 38*(1), 194–202.
14. Mendis, S., Lindholm, L. H., Mancia, G., et al. (2007). World Health Organization (WHO) and International Society of Hypertension (ISH) risk prediction charts: Assessment of cardiovascular risk for prevention and control of cardiovascular disease in low and middle income countries. *Journal of Hypertension, 25*, 1578–1582.
15. Bang, H., Edwards, A. M., Bomback, A. S., et al. (2009). Development and validation of a patient self-assessment score for diabetes risk. *Annals of Internal Medicine, 151*, 775–783.