Point of Care Treatment Diabetes in Hispanic Migrant Worker Outcomes Study

Evidence-Based Practice

Deborah Chisholm Karas, DNP, APN-BC, RN

Community Health Partnership – Woodstock

info@deborahkaras.com

Abstract

Background: The uninsured, low health literacy, vulnerable Hispanic migrant and seasonal farm worker is frequently lost in the healthcare system and receives inadequate evaluation and treatment of their Diabetes Mellitus (DM). A Midwestern Community Health Partnership (CHP) implemented and evaluated a Hemoglobin A1c (A1C) point of care testing (POCT) program to increase access to care including testing, DM diagnosis and treatment in order to improve A1C levels. IRB was not needed due to a retrospective study and the project was exempt from IRB approval.

Purpose: This retrospective outcome chart review study was conducted to determine if utilization of a POCT A1C testing and treatment program, within a Hispanic immigrant migrant farm worker population in a Midwestern CHP, would assist this population to meet optimal standards of care for DM as measured by reduction of A1C levels. Point of care testing (POCT) of the A1C is defined as medical testing at the site of patient care, in this population being in the clinic, fields and barns where they work. The goal was that 50% or more patients with A1C levels greater than 6.5% would result in improved reduction of their A1C.

Intervention: Culturally competent staff were available with A1C monitors to provide POCT and treatment modification following national guidelines in order to improve control of diabetes in the population. Promotoras, (community lay workers) and family were involved in the dietary and DM education portion of the project.

Methodology: Chart data collection of initial A1C values at baseline was compared to A1C levels 3 month later. A paired t-test was utilized in analysis of the results.

Outcomes and Conclusions: A total number of 24 male and female Hispanic migrant farm workers met the criteria to be included in the study out of 273 charts reviewed. A (p value) decrease in A1C values was obtained. Thirteen patients, or 54.2%, achieved A1C goal levels of less than 6.5%. In this small pilot study, improvements in the A1C levels from baseline to three month follow-up support that POCT and treatment adjustments based on A1C data can be made in barns and fields.

Keywords: diabetes, Hispanic, migrant farm worker, HbA1c

Point of Care Treatment of Diabetes in Hispanic Migrant Workers

Identifying the Problem

Per the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2011) 2007-2009 survey, Hispanics have a 66% increased risk factor of diagnosed diabetes. In 2007, diabetes medical costs that included hospitalization, medical care, and treatment supplies, totaled $116 billion (NIDDK, 2011). The 2009 National Patient Information Reporting System (NPIRS) data reported Hispanic and Latino population represent 11.8% of the adults who were diagnosed with diabetes. According to the Institute of Medicine of the National Academies (IOM) (2011), this population has a high prevalence of diabetes and chronic disease, projected to increase in the future. The Hispanic and seasonal farm workers are migratory, medically underserved, uninsured, and most earn sub-poverty wages. Access to health care such as diagnostic work up, treatment and follow-up is a challenge for this migrant population. Longterm health complications and untreated diabetes are risk factors for this population. Hospitals and providers may have an indigent program for the uninsured and medically underserved, but covering the cost of care is still remains for the patients (D.Villarreal, September 2011).

Background

Significant barriers for this mobile population include lack of health insurance, low income and lack of transportation. These barriers contribute to lack of follow up for treatment and education of the diabetes. In a 2009 clinic patients chart review revealed only 60 patients with the diagnosis of diabetes were monitored on any consistent basis or followed in a clinic setting for glucose levels. Only 36% of these 60 patients (21 patients)

had HbA1c (A1C) levels of less than 7.0%, reflecting uncontrolled diabetes. Glycated hemoglobin, known as hemoglobin A1C, HbA1c, or A1C, measures the glycemic exposure of a patient's red blood cells over a 90-day period, and has become the standard DM indicator in the United States according to the American Association of Clinical Endocrinologists (AACE, 2009). Prior to August 2009, there was no in-house provider for the Community Health Partnership of Illinois (CHP), and all patient visits were referred to other community providers. In 2010, Hispanic migrant farm workers were seen one day a week in the CHP clinic by the nurse practitioner (NP). During this time period, the Hispanic patient with diabetes were diagnosed utilizing outside laboratory analysis for the A1C, resulting in driving a long distance to a laboratory site, or returning to the clinic for laboratory draws with the clinic nurse, many times on another day. These issues resulted in increased visits and out of pocket costs for the patients, while delaying the DM treatment. In the past, only non-fasting random glucose accuchecks were completed upon clinic registration along with vital signs of weight, height, and blood pressure. The patient was then recommended to follow up with the clinic to make an appointment with the onsite one day per week provider or referred to another outside community provider. With the prior use of only accuchecks, diagnosis and the development of a treatment plan were delayed significantly or perhaps not even appropriately developed at all related to lack of follow-up. There was no on site point of care analysis machine for A1C in the clinic setting at that time. Point of care analysis or testing (POCT) of the A1C is defined as medical testing at the site of patient care, in this population may be in the fields and barns where they work.

In 2010, 171 patient charts were reviewed at CHP to assess quality of care for patients with a diagnosis of diabetes. Chart reviews reflected lack of consistent DM diagnoses,

laboratory analysis, inconsistent provider visits and uncontrolled type I and II diabetes. During the initial encounter visit with the patient the medical history included blood pressure, height, weight, and random glucose accucheck. Elevated random glucose levels were not consistently assessed with A1C analysis. As a result of the chart review, a plan was developed to evaluate an A1C point of care testing program to improve access to care, eliminate additional clinic visits and costs while providing consistent testing and monitoring, DM diagnosis and treatment adjustments in order to improve patient's A1C levels. The DM treatment goal was to reduce the patient's A1C to equal to or less than 6.5%. Patient education based on the A1C result would also be provided during this one visit.

Purpose

The purpose of this retrospective outcome study was to determine if consistent application of Evidence Based Practice (EBP) guidelines for both Type I and II diabetes diagnosis, applied to the Hispanic migrant farm workers population, utilizing A1C point of care analysis resulted in improved control of diabetes. The program based on the AACE guideline to treat to an A1C of less than 6.5% consisted of early diagnosis, treatment and management for the patient. Patients' charts, which indicated a diagnosis of diabetes, beginning January 1, 2011 through November 15, 2011, were reviewed for the initial A1C value, and the 3-month A1C repeat analysis. The hypothesis of the study was that early identification and consistent application of EBP based treatment plans, by utilizing POCT for this population, would result in a significant lowering of the A1C value to equal to or less than A1C 6.5% in 50% of the patients with previously uncontrolled DM.

Literature Review

A literature search was performed using bibliographic electronic databases Cumulative

Index to Nursing and Allied Health Literature (CIHAHL), Medline/PubMed, Agency for Healthcare Research and Quality (AHRQ), American Diabetes Association (ADA), American Association of Clinical Endocrinology (AACA), Cochran and Google Scholar. The U.S. government agency site for the National Diabetes Information Clearinghouse, Center for Disease Control, Migrant Network Council and Community Health Partnership websites were searched. The literature search was limited to English language articles from the year 2005 to 2011 in each of the databases. The initial keywords used were diabetes and Hispanic, and the results yielded over 2,500 articles. Adding the keywords migrant farm worker, the search was modified. 38 articles are found to be relevant to diabetes and the Hispanic migrant farm workers to support this study. HbA1c was added to the keyword search. This author reviewed titles of articles and abstracts and then read relevant articles for use as references. In many cases, the references of particular articles were also reviewed as possible references.

According to the National Diabetes information Clearinghouse (2011), 11.8% of the Hispanics / Latinos have diagnosed diabetes. A study by Culica, Walton, & Prezio (2007) on education of uninsured Mexican Americans supported the utilization of community-based programs to reduce the burden of diabetes in this population. Clingerman (2008) supported the new American Diabetes Association (ADA) standard for diabetes diagnosis, the A1C analysis to treat to less than 6.5%. The AACE recommend that all diabetic patients achieve an A1C of less than 6.5% (AACE, 2009, Hanelsman et al., 2011). When treating the A1C to less than 6.5%, the fasting glucose average level will be less than 110 mg /dL and the two hour postprandial glucose concentrations will average less then140 mg /dL This A1C target reflects good glycemic control and aims to prevent diabetes associated health complications. The ADA and AACE standard of

care guideline to reduce diabetic related chronic risk complications and increase patient self-care education and management was supported by Kantayya & Lidwall (2010).

Weiler & Crist (2007) recommend involvement of the family and community as essential to improving the health in the migrant Latino population. Goertz, Calderon & Goodwin (2007) support integrating diversity and cultural competence as an important goal in development of a health care team to meet the needs of this Hispanic population. Diabetes Care (2011) supports the use of POCT to allow for timely decisions in treatment plans.

Population specific factors

Bauer and Kantayya (2010) discussed barriers to successful identification and interventions that included population and environmental issues. Farm workers are migratory and frequently move out of an area unexpectedly, when a harvest is completed in the fall or weather conditions change. At the end of the working and growing season, many of the families return to Mexico for 3 to 6 months during the winter season. Language differences and educational status create challenges between the care provider and migrant workers when 92% of CHP's patients required language support. Of the migrant farm worker families served by CHP, 81% earn incomes below 100% of federal poverty guidelines and could not afford to pay for basic episodic health care, medications, diagnostic services, and specialist consultations (Bauer & Kantayya, 2010). With this migrant population and barriers to health care, the opportunity to adjust lifestyle and multiple clinic visits for retesting is not a realistic approach to the treatment plan. POCT is timely, efficient and can be cost effective.

Migrant farm workers are challenged in obtaining transportation to and from work and the clinic due to (a) a lack of public transportation in the rural areas, (b) the current cost of gasoline, and (c) no accessible automobile. At times employers do not allow time off from work

for illness or clinic appointments, and patients will not request this time off due to fear of job loss. Some employers were unwilling to allow the clinic staff onto the employment property to provide an outreach program on the employment site during the lunch or break times. Additional barriers included lack income and access to nutritional foods for a diabetic diet; the patients are uninsured and not eligible for programs such as Medicaid and pharmaceutical patient assistance due to lack of personal identification, documentation, and immigration status; lack telephones or access to telephone service ((D.Villarreal, November 2010).

Interventions

Based on the data obtained from the 2010 chart review, it was determined there was lack of diagnosis of diabetes, treatment and follow up for the patients. The health care team included the involvement of the promotoras de salud (community lay workers) and four clinical staff (clinical director, receptionist, registered nurse, and primary investigator (PI), the nurse practitioner team leader. The health care team planned an outreach program to the employment site in the fields and barns for increased access to health care with POCT.

The team's plan to reach the goal of increased access to diabetes care and lowering of the patients A1C was to develop the following interventions: (a) monitor the A1C every three months using POCT, (b) assist patients develop self-management goals, (c) enlist promotoras (community lay workers) who were knowledgeable regarding diabetes risk complications to assist in patient and family education, (d) make telephone calls to the patients to remind them of appointments and time for the A1C recheck, and (e) place health clinic staff in outreach programs in the fields and work environment of the diabetic patients. By meeting the needs of diabetic patients in their place of employment such as in the fields and barns, the interventions would improve the glucose levels of the patients to meet AACE guidelines of A1C equal to or

less than 6.5%. Reducing diabetic complications through A1C reduction would (a) improve patient's overall health status (b) increase access to health care, (c) decrease healthcare costs, (d) decrease loss in work time and income for the patient, and (d) reduce long-term health care risks related to DM (Stiles, 2011).

The culturally competent clinic staff, promotoras and team leader provided outreach that occurred (a) during the lunch hour at the employment sites, (b) in the evenings and on weekends by the promotoras and other clinic staff, and (c) at the family homes if the residency was known. There was open registration, identification, and interventions at the clinic site during clinic hours on weekdays, Monday through Friday. With an increase in outreach, clinic staff and team leader involvement in the project, POCT and treatment adjustments, and DM interventions occurred for the newly identified and uncontrolled diabetic patients at the time of the visit.

As the team leader and coordinator of the project, this author was available additional days at the clinic and during outreach times in the community. For known diabetic clinic patient registrants with a random accucheck value of 140 or greater 2 hours after eating, an A1C was obtained as soon as possible utilizing the POCT to develop earlier treatment interventions. Diabetes education material in Spanish was provided to all diabetic patients. If the patient did not read, picture education for diet and other diabetic information was provided. The clinic staff was available during clinic hours for diabetic walk-in patients to receive accuchecks or A1C analysis in addition to the work site visits. A list of diabetic patients was developed and patients were monitored for the three month follow up. The clinic staff was educated about the POCT and monitoring process resulting in closer contact with the DM patients. Patients were called and reminded to follow up, and clinic staff continued the diabetes education during the clinic

visits. DM medication treatment was adjusted at the time of the visit either in the clinic or the fields based on the POCT.

Project outcome analysis

A retrospective chart review for 286 patients was completed for the current year, January through November 15, 2011. Laboratory data and point of care analysis for a baseline A1C were obtained at registration and another three month post follow up A1C level was reviewed. Study inclusion criteria included patients with a baseline A1C greater than 6.5%, and a three month A1C follow up. There were 73 patients with an elevated A1C greater than 5.7%. Twenty four of the 73 patients had a baseline of greater than 6.5%, the criteria for the study. There was a significant statistical improvement in the overall A1C value for all 24 patients, meeting the study criteria, with an initial A1C levels equal to or greater than 6.5% at the baseline measurement. A mean value of 7.3583 was obtained on the first A1C to the last mean A1C analysis of 6.6708 for the 24 patients. The lowest level achieved for the 24 patients was A1C of 5.10% for one subject and the highest level was A1C of 10.40% for one subject.

Conclusion and Implications

The utilization of point of care A1C testing was the foundation in early identification of diabetes and early development of treatment plans. With consistent follow up there was a statistically significant decrease in the baseline A1C of greater than or equal to a 6.5 % initial measurement for the 24 patients who returned for the final A1C analysis.

A paired t-test analysis was conducted to determine if there were significant changes in A1C measurements from the baseline test to the final test. This analysis included the 24 patients for whom both baseline and final A1C values were available. The results are found in table 1.

Table 1

Integrated Table: Achieving HbA1c Goal

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Successfully Achieved Goal of HbA1c <= 6.5	13	17.8	54.2	54.2
Did not achieve HbA1c	11	15.1	45.8	100.00
Elevated HbA1c but Did not meet criteria of =/ >6.5%	49	67.1		
Total patients with HbA1c > 5.7%	73	100.00		

Note: Adapted from CHP Patient Chart Review conducted from January 1, 2011 through November 15, 2011

Table 2

Integrated Table: Identified 24 patients > 6.5% Paired Samples Statistics

	Mean	N	Std. Deviation	Std Error Mean
First HbA1c	7.3583	24	1.754234	.35808
Last HbA1c	6.6708	24	1.33758	.27303

Note: Adapted from CHP Patient Chart Review conducted from January 1, 2011 through November 15, 2011

The 2011 chart review of 286 patients' revealed 73 patients with elevated A1C levels greater than 5.7% reflecting either a risk for diabetes or a diagnosis of diabetes. Of the 73 patients with elevated A1C values, 24 patients had 6.5 or higher value, reflecting uncontrolled glucose levels and a diagnosis of diabetes. Thirteen of these 24 patients (54.2%) who returned for the second A1C analysis achieved the therapeutic goal of reducing the A1C values to equal to

or less than 6.5%. Eleven of the 24 patients (45.8%) who returned for the second A1C analysis did not achieve the A1C value of below or equal to 6.5%. The mean value for the 24 patients on the first A1C was 7.3583 and the last mean value of A1C was 6.6708, reflecting a statistical significance in the lowering the A1C values. The lowest level achieved for the 24 patients was an A1C level of 5.10% for one patient with the highest level an A1C level of 10.40% for one subject. The remaining 49 of the 73 patients with elevated A1C greater than 5.7% were at risk for diabetes but did not meet the criteria for the AACE and ADA guidelines for this project. However all of these 49 patient's treatment plans were reviewed and patients were treated as per the clinic protocol.

The success of this project was measured by various patient outcomes. These outcomes included identification of diabetic patients at annual registration of 286 patient chart reviews with 73 charts reflecting a A1C greater than 5.7% per AACE guidelines for at risk of diabetes or a diagnosis of diabetes. The chart reviews were for the time frame of January 1, 2011 through November 15, 2011. The lowering of A1C levels equal to or less than 6.5% or lower resulted in 54.2% (13 patients) of the 24 patients within 3 to 4 months of treatment implementation or adjustment to the treatment plan. The results did reach and exceeded the study goal of 50% of the patients. A significant decrease in A1C overall values is important for all patients with elevated glucose levels to improve quality of life, reduce diabetic health risk complications and reduce health care costs (AACE, 2009). The mean first A1C was 7.3583 for all the 24 patients and the last A1C mean was 6.6708 reflecting a statistically significant decrease in the overall mean value for the entire group. The standard AACE and ADA guideline of utilization of the POCT A1C analysis for early identification and interventions will continue as a clinic protocol to

manage the patient with diabetes to reach the HbA1c goal of equal to or less than 6.5%. Patients will continue to be monitored in the clinic or at the work site.

Ongoing Patient Management

Tracking the CHP patients at the end of the growing season in the fall includes updating a clinic tracking system and close patient monitoring. The patients in the retrospective study will continue to be CHP clinic patients if they remain in the clinic geographic area. The clinic will follow patients in need of insulin and oral diabetic medication prescription refills for treatment plan compliance. If patients leave the clinic geographic area for 3 to 6 months, refills with the plan of care is provided for the patient. If the patients leave the geographic area for the winter season, laboratory analysis results are copied and given to the patients in the event they need medical care during their absence from the CHP clinic area.

An alterative treatment monitoring plan is available which is a national tracking system using the government sponsored Migrant Clinicians Network (MCN). This tracking system is available to the migrant farm worker if they leave the CHP clinical area. The patient's verbal release to MCN during the patient's telephone registration could be obtained and the patient could be enrolled in the MCN following system. This opportunity was offered to the CHP patients in the project, but the patients declined, stating they did not need this MCN service at this time.

MCN is a national health care tracking program for the mobile poor. It is a central program location for the migrant worker medical records, and MCN staff will follow up enrolled patients to remind them of necessary laboratory diagnostic needs and medication refill wherever they may live, including Mexico. Currently CHP patients are not using this national healthcare tracking program due to lack of CHP patient willingness to enroll or declining this service. The

CHP patients remain satisfied and comfortable with the CHP clinic program. The enrollment and monitoring by the MCN system remains a concern and hesitancy by the CHP migrant patients (personal communication, D.Villarreal, September 2011).

Discussion

The procedure for using the A1C POCT analysis on a regular basis in the clinic setting and field was significant for this migrant population in order to monitor and manage their diabetes process. The new POCT protocol prevented delays in diagnosis, treatment plan implementation or changes in the treatment plan. The team leaders close involvement in the migrant workers employment to observe their diet during the lunch meal, the migrant farm workers main daily meal, and by observing lifestyles and adjusting medications at the time of the visit, the team leader provided early and accurate change in treatment plans for successful outcomes. Barriers to health care access remain for this patient population, as health care is not always affordable. This small sample study illustrates that if medical community providers, following AACE and ADA diabetes guidelines, are flexible and reach out to this migrant population, diabetes improvement can result.

References

Bauer, S., & Kantayya, V. S. (2010). Improving access to primary care and health outcomes in migrant farm worker populations: Challenges and opportunities. *Disparity Monthly*, *56*(12), 706–718.

Clingerman, E. (2008). Type 2 diabetes among migrant and seasonal farm workers. *Hispanic Health Care International*, *6*(2), 97–106.

Culica, D., Walton, J. W., & Prezio, E. A. (2007). CoDE: Community diabetes education for uninsured Mexican Americans. *Baylor University Medical Center Proceedings*, *20*(2), 111–117. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=17431443

Executive Summary: Standards of Medical Care in Diabetes (2011). *Diabetes Care*, *34*, *1*, S4-S10. Retrieved from www.diabetesjournals.org DOI: 10.2337/dc11-S004

Goertz, H. D., Calderon, V. J., & Goodwin, S. (2007). Understanding health needs of migrant workers in America's heartland. *Urologic Nursing*, *27*(5), 429–436.

Hanelsman, Y., Blonde, L., Bloomgarden, Z. T., Dagogo-Jack, S., Einhorn, D., Garber, A. J., Vinik, A. (2011). American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for Developing a Diabetes Mellitus Comprehensive Care Plan. *Endocrine PRACTI*CE, *17*(S2), 1–53.

Institute of Medicine of the National Academies. (2011). *Leading health indicators for Healthy People 2020*. Retrieved from www.iom.edu/healthindicators 2020

Kantayya, V. S., & Lidwall, S. (2010). Community health centers: Disparities in health care in the United States 2010. *Disease –A- Month*, *56*, 681–697.

National Institute of Diabetes and Digestive and Kidney Diseases. (2011). *National diabetes statistics, 2011*. Retrieved from http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#Glucose

Schultz, E. (2011). Vitamin D may improve pancreas function. *American Journal of Clinical Nutrition, online*. Retrieved from http://www.reuters.com/assets/print?aid=USTRE7676QG20110708

Stiles, S. (2011). HbA1c may sharpen CV-event prediction in diabetics. *Medscape, LLC.* Retrieved from http://www.medscape.com/viewarticle/747067_print

Sullivan, M. G. (2011). Small changes count in type 2 diabetes patients. *Family Practice News,* Retrieved from http://www.familypracticenews.com/index.php?id=2934&type=98&tx_ttnews[tt_news]=78913&cHash=da03e20e36

Ting, R. H.-W., Szeto, C. C., Chan, M. H.-M., Ma, K. K., & Chow, K. M. (2006). Risk factors of Vitamin B 12 deficiency in patients receiving metformin. *Internal Medicine, 166.*

Weiler, D., & Crist, J. D. (2007). Diabetes self-management in the migrant Latino population. *Hispanic Health Care International, 5*, 27–33. Retrieved from http://scholarworks.boisestate.edu/nursing facpubs/5