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Glycemic Relapse in Uninsured Asian-Americans/Pacific Islanders with Diabetes

Chen-Yen Wang[1]*, Nafanua Braginsky[2] and Anne Leake[3]

[1]*Associate Professor, University of Hawaii at ManoaHonolulu, Hawaii, KalihiPalama Health CenterHonolulu, Hawaii, USA*
[2]*Assistant Professor, University of Hawaii at ManoaHonolulu, Hawaii, KalihiPalama Health CenterHonolulu, Hawaii, USA*
[3]*Queens Medical Center, Honolulu, Hawaii, USA*

Abstract

Purpose: The purpose of this study is to examine the rate of glycemic relapse in uninsured Asian-Americans and Pacific Islanders attending the diabetes clinic of a community health center in Honolulu, Hawaii.

Methods: Target study population was patients who came to the diabetes clinic between November 1, 2011 and February 29, 2012. Their medical charts between January 2009 and February 2012 were reviewed for retrieving levels of HbA_{1C}, LDL (low-density lipid), Triglyceride, and blood pressure. Changes in these outcomes were compared with baseline. Percent of patients with glycemic relapse was calculated. Through a 'talk story' session, the management team members gathered their perspectives in educating Asian-Americans and Pacific Islanders with diabetes.

Findings: Medical records of 111 patients (60 females and 51 males) with diabetes were reviewed. Average age ranged from 22 year-old to 81 year-old with mean of 58.91 (SD=9.63) year-old. Levels of HbA_{1C} and LDL were computed at 3 ± 1 months, 6 ± 1 months, 9 ± 1 months, and 12 ± 1 months. Compared with the initial visit, means in HbA_{1C} and in LDL at 3-month and/or 6-month follow-up visits significantly decreased.

Conclusions: The diabetes management team provided group and individual diabetes education and counseling, culturally tailored diabetes education sessions, and empowerment of diabetes self management through demonstrations and explanations. There is a need to search the intervals of reinforcement program to prevent glycemic relapse. The team also provided medical care and preventative care taking into account complementary and alternative health care practices of the different ethnic groups. Health literacy was a key barrier to optimal diabetes self management in the Asian-Americans and Pacific Islanders. Community health workers played essential roles in facilitating diabetes management.

Keywords: Diabetics; Asian - Americans; Pacific Islanders.

Introduction

Several studies have discovered that patients with HbA_{1c} levels greater than 7% have a higher risk of developing medical complications than those having an HbA_{1c} less than 7% [1,2,3,4]. 10-year follow-up of the intensive glucose control indicated lower rates of retinopathy, nephropathy, neuropathy, and macrovascular disease [5]. Inadequate adherence to medication and/or diabetes regimens has been associated with increased healthcare utilization, costs, and risk for diabetes related medical complications.[6] Patients with persistent hyperglycemia have higher average length of hospitalizations and average number of hospitalizations than those with normal glycemia [7].

Maintaining recently learned behaviors in patients with chronic illnesses (e.g. diabetes, hypertension, hypperlipidemia, and obesity) is a challenge in their daily lives. The United Kingdom Prospective Diabetes Study found the probability of glycemic relapse after one year of intervention to be 38% for type 2 diabetes and 56% for type 1 diabetes [8]. After three years of intervention the probability of relapse was 70% and 86% for type 2 and type 1 diabetes, respectively. Glycemic relapse is defined as an HbA_{1c} greater than 8%, and an increase of 1% from the baseline (initial visit) measurement.

According to the 2000 U.S. census, about 21 percent of Asian-Americans and Pacific Islanders lack health insurance compared to about 16 percent of the general population [9]. In 2001, the rate of death related to diabetes was 14.9 per 100,000 in the Asian-Americans and Pacific Islanders versus 6.9 in Whites in Hawaii [10]. The purpose of this article was to examine the changes in the serum levels of glycemic and the low-density lipoprotein in a nurse practitioner leads diabetes clinic where the healthcare team implemented a cultural-specific diabetes self-management education to the uninsured or underinsured Asian-Americans and Pacific Islanders.

The AADE7™ Self-Care Behaviors framework [11] promotes seven steps in its "Self-Care Behavior Framework", including healthy eating, being active, monitoring, taking medication, problem solving, reducing risks and healthy coping [9]. The key objectives of these modules are to support informed decision-making, self-care behaviors, problem-solving and active collaboration with the health care team, resulting in improvement in clinical outcomes, health status, and quality of life.

Qualitative research provided a route to gather perspectives from the community members with diabetes in order to formulate appropriate cultural approaches to treatment. The study with 15 focus groups in 112 Native Hawaiians or Pacific Islanders [12], revealed four major themes: food-related issues (i.e. portion and stimulus control, using economical meal planning), physical activity-related issues (i.e. exercising in groups), social support issues (i.e. changes in eating made by the entire family, eating together more often, time and stress management, targeting self-efficacy in making healthy lifestyle changes), and community assets (i.e. using existing community resources such as farmer's market).

The method of, 'Talk story' has been found effective in exploring

***Corresponding author:** Chen-Yen Wang, Associate Professor, University of Hawaii at Manoa Honolulu, Hawaii, Kalihi Palama Health Center Honolulu, 2528 McCarthy Mall, Webster Hall 215, Honolulu, Hawaii 96822, USA, Tel: (808) 258-898; Fax: (808) 956-3257; E-mail: chenwang@hawaii.edu

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perspectives of Hawaiians related to their health and practices. A study to explore perceptions on breast cancer screening [13] utilized seven 'Talk story' group sessions and ten individual interviews in four medically underserved Hawaiian communities. Findings revealed that older women were perceived as the primary focus to influence breast cancer screening as well as several other cultural aspects such as the intergenerational family of blood relations ('ohana) and fictive kin (hoahanau or 'church family'), caring for each other (malama ke kahi I ke kahi), and responsibility to the collective (kuleana) for the children and future generations.

Method

This is a retrospective study to evaluate effectiveness of a culturally tailored nurse practitioner lead diabetes clinic in a community health center. Data were collected through 'talk story' method among healthcare team and 'chart review' of patients whocame to the diabetes clinic between November 1, 2011 and February 29, 2012.

This walk in diabetes clinic in Honolulu is accredited by the American Diabetes Association. The Association of Asian Pacific Community Health Organizations (AAPCHO) website *(www.aapcho.org)* was an excellent resource to provide information on the organizations serving the underserved populations in Honolulu. 'Talk story' among the diabetes management team was used to explore providers' perspectives of client demographics, access to diabetes care, diabetes management and challenges, and economic as well as how to empower individual patients in managing their diabetes by integrating cultural perspectives.

Setting

The Diabetes Clinic was established in 1998 as a project to target the Filipino-American community with a media campaign to increase awareness of the importance of diabetes control. Providers were noticing that uninsured patients with diabetes were unlikely to return for follow-up before their medications ran out, making it difficult to know if medications were effective at treating to target. The clinic began as a diabetes education group led by a nurse practitioner, and it included some medical management when needed (prescription refills, specialist referrals, lab ordering). The patients at that time were mostly uninsured. Later the Diabetes Clinic was handled as a medical encounter with complimentary visits. More staff members were added which allowed patients to see two nurse practitioners, a nutritionist, a Certified Diabetes Educator Registered Nurse (CDE RN), and/or a psychiatric social worker as part of their visit. With the expansion of the 340B pharmacy program for low-cost medications, a $25 charge per visit, equal to the lowest cost of a visit for an established patient was instituted in November 2010. This charge was based on sliding scale that had been established for all patients of the Kalihi Palama Health Center (KPHC). The KPHC provides health care services to all in need of care regardless of their social-economic status or ability to pay for the services. The KPHC provides uncompensated care for more individuals and families than any other federal qualified health centers in the state. The diabetes clinic was held once a week; and the number of patients ranged from 8 to 18 for one nurse practitioner.

The team including nurse practitioners and support medical staff developed the flow chart of care at the Diabetes Clinic. Patients accessed the clinic either by making appointments through referrals from providers or by walking in with the knowledge that the patients with appointments had priority to be seen by the nurse practitioner. The Medical Assistant (MA) measured body weight, blood pressure, and blood glucose. The CDE or the dietitian held group education at the waiting room. The CDE and visiting nursing students performed foot screening and education on foot care at a private area.

The MA made a list of preventative healthcare including mammogram screening, colon cancer screening, Pap smear, depression screening, tetanus, Tdap, shingles, pneumococcal vaccination, influenza vaccination, annual physical examination, dilated fundus examination, and Tuberculosis skin test or PPD screening as free or at low cost. The nurse practitioner checked the list and prescribed preventative healthcare as needed. She reviewed laboratory results with patients, collected subjective data and focused objective data, made diagnoses, and prescribed laboratory tests, referrals, and medications.

Follow-up visits were scheduled for three months, one month, two weeks, or one week based on the patients' progresses. An appointment card reminder was given to the patients before they left. In addition, the receptionist called patients the day before to remind them about the appointments. The patients might not be reached because of the changes in addresses and phone numbers; therefore, patients were encouraged to call the receptionist or the CDE to schedule and/or confirm appointments or to ask questions about diabetes management.

Community health workers (CHW) in various languages provided translation. Many patients had established relationships with CHWs who translated written documents and oral communication between providers, MAs, and patients. CHWs played essential roles in facilitating communication among providers in the diabetes management team.

Development of Culture-specific Diabetes Self-care Management Program

Based on need assessments, key informant interviews from 2007-2009, and discussions with our staff and community health works (CHWs) we decided to address health literacy and cultural issues of non-English speaking populations using the English class curriculum as a starting base. Several patients had limited English skills. It became apparent there were many areas of misunderstandings.

Our CHW staff is well established and stable. All of them have been with the center for at least 5 years and many had been educators in their own countries. They were eager and passionate to improve diabetes knowledge of their patients and were self confident in their ability to take on new roles as health advocates and educators.

After a series of in-services on diabetes taught by our dietitian and CDE to all CHWs, two CHWs were selected to begin the classes in Chuukese and Marshallese languages. They were invited to take the English classes, translate and modify the content as they wished to reflect the most urgent issues of their own culture. They preferred to maintain the power point presentations in English to help them prompt their delivery but each conducted the class in their own style and language. Teaching methods focused on the use of pictures and demonstrations.

Program Evaluation

This is a retrospective chart review of selected outcomes. Target study population was patients whocame to the diabetes clinic between November 1, 2011 and February 29, 2012. Their medical charts between January 2009 and February 2012 were reviewed for retrieving laboratory results, weight, and blood pressure. To protect personal identification, each patient was assigned a code. Health outcomes were analyzed as group data. Laboratory tests such as hemoglobin A_{1C} levels, comprehensive metabolic profile, and lipid profile were checked every

3 months; and urine micro albumin once a year if patient showed up for their visits.

Data Analyses

Descriptive statistics was used to analyze the ranges and mean scores of age and HbA1c at the base line, 3-month, 6-month, 9-month, and 12-month follow-ups. Frequency table was created to describe patient characteristics. Paired-t testing was performed to examine the changes in A1C and LDL between 3-month, 6-month, and 9-month follow-ups, compared with those at the initial visit.

Results

Total of 137 (77 females and 60 males) patients' charts were reviewed. Forty patients had their first visit at the diabetes clinic after November 1, 2011. They only had laboratory tests at 3 months, not 6 months or beyond. Some of them came to clinic for hypertension and/or hyperlipidemia only. Following outcome analyses were based on 111 patients (60 females and 51 males) had been diagnosed with diabetes. Average age ranged from 22 year-old to 81 year-old with mean of 58.91 (SD=9.63) year-old. Results of their laboratory tests between January 2009 and February 2012 indicated that the mean in HbA_{1C} levels were 9.04% (SD= 2.44%, ranged from 6.1% to 16.0%) at their initial visit. Mean scores in HbA1c decreased to 7.86% (SD=1.34) at 3-month follow-up, but rebounded to above 8% at 6-month follow-up. The number of patients returned for follow-ups decreased gradually. Percentages of patients came to DM Clinic for follow-up were 38.7% at 3-month follow-up, 36.9% at 6-month follow-up, 25.2% at 9-month follow-up, and 33.3% at 12-month follow-up. (Table 1) indicated paired t-test in HbA_{1C} among initial visit and follow-up visits. The paired t-testing were based on those patients came back for follow-up visits.

Paired differences in the mean scores of HbA1c levels between the initial visit and the 3-month follow-up among forty-three patients who came to the Diabetes Clinic for 3-month follow-up was 1.132%. Paired-t test showed significant decrease (t=3.282, df=42, p=.002). The paired differences in the mean scores of HbA1c levels between the initial visit and the 6-month, 9-month, and 12-month gradually decreased. Paired-t test showed the t scores decreased. There are no significant differences in the mean scores of HbA1c at 6-month, 9-month, and 12-month follow-up, compared with the mean scores at the initial visit.

The mean in LDL levels at their initial visit was 109.52 mg/mL (ranged from 30 mg/mL to 223 mg/mL). (Table 2) indicated paired t-test in LDL among initial visit and follow-up visits. Levels of HbA_{1C} and LDL were computed at 3 ± 1 months, 6 ± 1 months, 9 ± 1 months, and 12 ± 1 months. Paired differences in the mean scores were 15.884 mg/mL between pair initial and 3-month follow-up; increased to 20.447 mg/mL between pair initial and 6-month follow-up; decreased to 8.316 mg/mL between pair initial and 9-month follow-up; and decreased to 6.028 mg/mL between pair initial and 12-month follow-up. Compared with the initial visit, means in LDL at 3-month and/or 6-month follow-up visits significantly decreased. There are no significant differences in the means in HbA1c and in LDL between the initial visit and at 9-month follow-up visit. Comparison between Table 1 and Table 2 showed that patients maintained decrease of LDL better than of HbA1c.

	N	Minimum	Maximum	Mean	Std. Deviation
A1	111	6.10	16.00	9.04	2.44
A3	43	5.80	12.10	7.86	1.34
A6	41	6.40	12.30	8.31	1.75
A9	28	6.20	13.60	8.17	1.67
A12	37	6.20	14.60	8.30	1.80

Table 1a: Levels of HbA_{1C} at visits.

	Paired Differences		t	Df	Sig. (2-tailed)
	Mean	Std. Deviation			
Pair1 A1-A3	1.132	2.263	3.282	42	.002
Pair2 A1-A6	.761	2.272	2.145	40	.038
Pair3 A1-A9	.696	1.950	1.889	27	.070
Pair4 A1-A12	.489	1.836	1.620	36	.114

Table 1b: Paired t-test in HbA_{1C}.

	Paired Differences		t	Df	Sig. (2-tailed)
	Mean	Std. Deviation			
Pair1 LDL1-LDL3	15.884	33.90	3.073	42	0.004
Pair2 LDL1-LDL6	20.447	36.68	3.258	37	0.002
Pair3 LDL1-LDL9	8.316	32.38	1.583	37	.122
Pair4 LDL1-LDL12	6.028	48.29	.749	35	.459

Table 2: Paired t-test in LDL.

Discussion

Even with culture-specific diabetes management program, approximately one fifth of patients had glycemic relapse at 9-month follow-up visits. The main reason for fluctuation of hemoglobin A_{1C} was the excuse of 'run out of medicine' for one month, two months, even six months. Other reasons included: 'just came back from home country' or 'don't have transportation to come', or 'no insulin, but still have Metformin'. Sharing of insulin and other medications among family members and friends with diabetes was one challenge; but language barrier seem to be the major challenge in managing diabetes among the Asian-Americans and Pacific Island patients. Only 42 out of 111 patients had laboratory tests at 3 months Excluded forty new patients and 6 patients who had HbA_{1C} lower than 6.5% and no need blood test at 3 months, no show rate was approximately twenty-one percent.

Some of the new immigrants with diabetes from the Pacific islands found shelter in the Institute for Human Services (IHS) and they had no control over what they ate and physical activities they could do. Sometimes these new immigrants moved to live with different family members, and it became a challenge to reach them for follow up appointments. The use of complementary and alternative treatments was common in the Asian-Americans and Pacific Islanders; and treating symptoms with herbal medicine in the Asian-Americans patients was more common than in the Pacific Islanders. The belief of 'Do no harm' and 'restore of imbalance between person and environment' were major reasons of using the herbal medicine.

Perspectives from the Diabetes Management team

Our diabetes management team identified 'Health Literacy' as the primary barrier for optimal diabetes self management for target population. Health literacy was defined as "the cognitive and social skills which determined the motivation and ability of individuals to gain access to, understand and use information in ways which would promote and maintain good health" according to the World Health Organization [17]. A systematic review of the literature on health literacy identified twenty four articles that met the criteria [18]. Ten out of twelve studies in this review article showed the strong association between health literacy levels and knowledge necessary to understand certain health conditions. It also showed that health literacy and lower knowledge levels were associated with behaviors and adherence.

In one meal planning class, the CDE had to teach the Pacific Islanders how t o cut and cook the eggplant. Some of them were either not familiar or had never seen an eggplant before. Patients perceived

that vegetables were for goats and that they were very expensive. A few patients stated that the brown rice was so hard to chew; but the CDE found out that they ate uncooked brown rice. Thus, the diabetes management team of this study suggested a basic hands-on cooking demonstration integrating familiar food items from each ethnic group. The community health workers should also be involved in demonstration and explanations of how to cook using their own language.

The word 'exercise' was not in the vocabulary of the Marshallese because physical activities such as fishing, walking, and gardening were part of their daily lives. Patients went swimming in their native islands, but not in Hawaii. The patients would explain that the 'Doctor told me don't have salt,' which they interpreted as they could not go swimming in the ocean because of its salt content. Patients lived in government housing projects or apartments which meant they were at close proximity of each others' homes, and did not need to walk long distance to visit relatives. Walking from one place to another was common in their native islands, but that activity had been replaced by the bus ride in Honolulu. The Asian-Americans and Pacific Islanders were fearful to walk in this new urban and unfamiliar territory. They were afraid of being lost, getting hurt by moving vehicles or being assaulted by gangs. They felt safer in their homes and thus became couch potatoes.

The Pacific Islanders tended to perform more of own self monitoring of blood glucose compared to the Asian-Americans who asked their spouses or family members to check the blood glucose for them. As alluded to earlier, the cost of the test strips was one reason why the Asian-Americans and Pacific Islanders did not check their blood glucose at home, even though they took insulin injections twice a day. Intake of too much simple carbohydrate (e.g., juice or coke) to treat the symptoms of hypoglycemia was a common phenomenon in these patients who wished to enjoy life with their grand children and kin, and did not want to die from hypoglycemia.

Overweight and obesity were risk factors for diabetes; and these conditions were prevalent in the Asian-Americans and Pacific Islanders. Our suggestion is to involve training and supporting champions to customize the programs for culturally appropriate diabetes groups as described by researchers [14,15,16]. This approach would be important in the weight loss programs. Perspectives from fifteen focus groups involving 112 Native Hawaiian or Pacific Islanders on the topics of motivation, family, friends, and community influence in addressing the problem of overweight/obesity indicated the strong influence of social/community and family factors on individual behaviors [17].

Cost was one of the barriers to medical care for the Asian-Americans and Pacific Islanders. A study found that the adherence rate to antidiabetic medications was 72.7% in patients with Type 2 diabetes on oral antidiabetic medication (OAD) only (n=55,356) and 74.5% in patients with Type 1 diabetes on OAD with or without insulin (n=96,734). Findings showed that adherence to antidiabetic medications for patients on OAD only reduced 5.4 percent. This reveals a $10 increase in the patient cost-sharing index versus 6.2% reduction on the counter group [18].

Conclusion

This walk in diabetes clinic provided invaluable services to the community. The key diabetes management team was comprised of a nurse practitioner, a certified diabetes educator, a nutritionist, a medical assistant, community health workers and psychiatric social workers. They provided group and individual diabetes education and counseling, culturally tailored diabetes education sessions, and empowerment of diabetes self management through demonstrations, explanations, reinforcements and follow up. The team also provided medical care and preventative care taking into account complementary and alternative health care practices of the different ethnic groups.

Health literacy [19] was a key barrier to optimal diabetes self management in the Asian-Americans and Pacific Islanders. The community health workers in the clinic were able to meet this need of this target population. Community health workers played essential roles in facilitating diabetes management. We suggested a future study of comparison in patient outcomes between patients who managed diabetes as a group with CHWs and those who came alone for treatments. There are needs to research how to prevent glycemic relapse.

Limitation of the Study

1. High rate of 'no show' decreased number of patient laboratory reports for paired-t testing at follow-up visits.
2. Ethnicity of patients was not categorized into sub-groups. Some of sub-groups in the Asian/ Pacific Islander might sustain their changed behaviors better than other sub-groups did.
3. Chart review process might not capture reasons why patients were not able to sustain behavior change after six months.

Clinical Implication

1. Community health workers are valuable team members. They have the skills and languages to make phone calls, to facilitate progress, and to encourage patients to return to clinic for follow-up.
2. Providers should be able to document reasons why patients are not able to sustain behavioral change.

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