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Clinical Outcomes of a Diabetes Education Program: A Six-Month Evaluation on a Marshallese Patient in Hawai'i

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Research Article

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Abstract

Objective: To evaluate the impact of the "Ohana" Diabetes Education Program on the clinical outcomes of a Marshallese patient over a 6 month period in Hawaii

Methods: The patient was receiving care at Hilo Bay Clinic, Hawai'i. After the initial type 2 diabetes mellitus diagnosis, the patient was instructed to attend the "Ohana" Diabetes Education program at Hilo Bay Clinic. This program met on a weekly basis in a group setting. Following the education classes, the advanced nurse practitioner, pharmacist, and interpreter met with the patient if there were abnormal blood glucose or blood pressure results to determine the course of action for the noted abnormality. Primary and secondary endpoints were measured and compared.

Results: The patient with type 2 diabetes mellitus improved in all primary and secondary endpoints by attending "Ohana" Diabetes Education during the 6-month period.

Conclusion: It has yet to be determined whether this 6-month period will have lasting effects on the patient's health. However, if the patient continues to attend these education classes it is likely that the health status will remain stable or continue to improve.

Key words: Marshallese, Diabetes Education Program, Ohana.

INTRODUCTION

Type 2 diabetes mellitus is an epidemic in developed countries that is associated with increasing obesity rates[1]. In Ebeye Island, Republic of Marshall Islands, the prevalence of diabetes in people 20 years of age or older was 20% (adjusted for age) compared to 8.3% and 4% for the United States and world populations, respectively[2]. The rapid industrialization, increased calorie diet, and sedentary lifestyle of the Marshallese people may account for the large disparity between the Pacific Islanders and the rest of the United States[3]. In addition, they may be predisposed to having thrifty genes, which alters fat storage, thus making them more susceptible to obesity and type 2 diabetes mellitus.

Under the Compact of Free Association Act (COFA) with the United States, the Marshallese people have access to many US programs and services including health care, which has led to an increase in migration to Hawai'i and the United States. Many of these people migrate to Hawai'i hoping for more opportunities and a better future, however, when they arrive to Hawai'i they are faced with economic hardship. Furthermore, their diet habits change from living off the land to a high calorie diet rich in white rice and other unhealthy foods. Their unhealthy eating habits and decreased amounts of exercise play an integral role in developing diabetes.

In the Republic of the Marshall Islands, patients with diabetes do not store their medications properly due to lack of patient education. In addition, non-adherence of medications makes many Marshallese patients susceptible to the long term complications as a result of uncontrolled hyperglycemia. Unknowingly the Marshallese people associate these complications with the clinical effects of the treatment. Thus, when they arrive to Hawai'i, these misconceptions influence many of them to opt out of treatment in fear that they will develop these long term complications. This creates another barrier for effective management of their diabetes conditions.

Upon arrival to Hawai'i, many Marshallese people are unaware of the severity and the consequences of living with type 2 diabetes mellitus. When compounded with a language and cultural barrier, it is extremely difficult to diagnose and treat these patients in the normal health care setting. The objective of this case report is to evaluate the impact of the Diabetes Education program on the clinical outcomes of a Marshallese patient over a 6-month period in Hawai'i.

MATERIAL & METHODS

The patient was recruited by the advanced nurse practitioner at Hilo Bay Clinic who established the patient's care. Eligibility criteria included being 18 years of age or older, Marshallese, and with a diagnosis of type 2 diabetes mellitus. Exclusion criteria included coronary artery disease, peripheral vascular disease, chronic kidney disease or retinopathy.

Table 1: Classes included in the "Ohana" Diabetes Education Program

Class #	Title	Purpose
Class 1	Diabetes disease process	Describe the definition, pathophysiology, and treatment of diabetes.
Class 2	The basics of eating	Describe how food groups impact blood glucose and the reasons for meal planning.
Class 3	Physical activity and exercise	Describe the effects of physical activity in blood glucose, discuss dietary changes in regards to activity increase and decrease, and help create individual exercise program.
Class 4	Medications	Describe the purpose, action, use, administration, and side effects of medications and insulin used to treat diabetes.
Class 5	Monitoring your diabetes	Improve patient and family knowledge about the purpose of self-blood glucose monitoring and how to record and use the results.
Class 6	Prevent, detect, and treat acute complications and personal health habits	Describe how to incorporate good personal health habits (foot and skin care, recognizing and preventing infections, dental care) into daily life.
Class 7	Managing blood glucose	Describe the management of blood glucose during hypo or hyperglycemia, ketones and ketosis, and managing sick days.
Class 8	Long term complications	Describe chronic complications and associated symptoms and ways to monitor and prevent complications.
Class 9	Goal setting and problem solving	Describe effective ways to set and carry out goals for better self-management of diabetes.

After the initial type 2 diabetes mellitus diagnosis, the patient was instructed to attend the American Diabetes Association (ADA) recognized Diabetes Self-Management Education program locally known as the "Ohana" Diabetes Education program at Hilo Bay Clinic in Hilo, Hawai'i. Classes included learning about the diabetes disease progress, nutrition, exercise, medications, blood glucose monitoring, hygiene, management of symptoms, and long term complications (table 1). The classes stressed the importance of maintaining a healthy lifestyle and adhering to medication therapy. Classes were held on a weekly basis in a group setting with a nutritionist, nurse, and a highly respected Marshallese interpreter who translated all classes and conversations for the patient who was not fluent in English. Following the classes, the advanced nurse practitioner, pharmacist, and interpreter met with patient if there were abnormal blood glucose or blood pressure results to determine the course of action for the noted abnormality.

Primary endpoints were A1c, measured at diagnosis and 6 months, and fasting blood glucose, measured weekly at the diabetes education program. Secondary endpoints were total cholesterol, HDL, LDL, and triglycerides, measured at diagnosis and 6 months. Weight and blood pressure were also measured weekly at the diabetes education program.

RESULTS & DISCUSSION

The patient was a 44 year old female of Pacific Islander race who was diagnosed with diabetes when establishing care at Hilo Bay Clinic. Throughout the 6 month period, the patient attended 9 diabetes education classes and made lifestyle changes that included a walking program of 30 minutes to 1 hour every day and a diet change that excluded white rice, fried foods and decreased intake of red meats. Additionally, the patient was started on metformin 500mg twice a day for 5 months then increased to 1000mg twice a day for the last month of the study. Glipizide 5mg twice a day was also initiated at diagnosis and continued throughout the study period. Lovastatin 20mg and lisinopril 5mg once a day were both initiated for the last month of the study.

The patient with type 2 diabetes mellitus improved in all primary and secondary endpoints over the 6 month period (Table 2). At diagnosis and 6 months, the patient's A1c was 11.4% and 7.8%, respectively, which resulted in a 31.6% reduction in 6 months.

Fasting blood glucose was also reduced by 45.9% from 318 mg/dL at diagnosis to 172 mg/dL at 6 months. Total cholesterol was reduced by 42.6% from 216 mg/dL to 124 mg/dL, HDL increased by 13.7% from 29 mg/dL to 33 mg/dL, LDL decreased by 51.6% from 126 mg/dL to 61 mg/dL, and triglycerides decreased by 51.6% from 306 mg/dL to 148 mg/dL over the 6-month period. Blood pressure and weight remained stable.

Table 2: Primary and Secondary Endpoints

Endpoints	At diagnosis	At 6 months	Difference
A1c	11.4%	7.8%	-31.6%
Fasting blood glucose	318 mg/ dL	172 mg/dL	-45.9%
Total cholesterol	216 mg/dL	124 mg/dL	-42.6%
HDL	29 mg/dL	33 mg/dL	+13.7%
LDL	126 mg/dL	61 mg/dL	-51.6%
Triglycerides	306 mg/dL	148 mg/dL	-51.6%
Systolic blood pressure	120 mmHg	108 mmHg	-10%
Diastolic blood pressure	80 mmHg	80 mmHg	0%
Weight	147 lbs	137 lbs	-6.8%

Like other ADA recognized Diabetes Self-Management Education Programs, the "Ohana" Diabetes Education program educated patients in group setting, which greatly benefited the Marshallese patients by dissipating the stress that they may experience when in a health care environment. Thus, the program was a bridge that enabled patients to build trust and feel comfortable with health care providers before meeting on a one on one basis to obtain individualized care. Since the program was based out of Hilo Bay Clinic, there was easy accessibility to health care providers and opportunities for immediate individualized interventions. This may be the key to initiating therapy and enhancing adherence because it avoids having to make appointments, which may be difficult due to high instances of miscommunication caused by the language barrier. To further diffuse the language barrier, a highly respected Marshallese interpreter was involved to facilitate communication and enhance the learning and adherence to non-pharmacological and pharmacological interventions.

Furthermore, patients had the option to attend classes on a weekly basis, compared to most national programs that meet monthly or quarterly for a limited amount of time. By meeting on a continual basis, health care providers hope that patients will maintain their adherence to treatment and avoid missing doses because they run out of medication, which is a common occurrence with the Marshallese patients.

The patient improved in all primary endpoints, A1c, and fasting blood glucose, as well as the secondary endpoints, lipid panel, blood pressure, and weight, over the 6-month period. This may indicate that small changes in diet, exercise, and medication therapy can have notable effects on a patient's health status in a short period of time. It has yet to be determined whether this 6-month period will have lasting effects on the patient's health if they revert back to their original lifestyle. However, if the patient continues to attend the education classes regularly it is likely that their health status will remain stable or continue to improve.

In an effort to continue to raise awareness in the Marshallese population, the program meets at a local park once a month for a diabetes class in hopes of gaining more patients who want to learn about diabetes in a less formal health care setting. In addition, a mobile screening clinic will be set up for the Marshallese population, so they will be able to take part in free A1c, lipid panel, and blood pressure screenings. With increasing amount of Marshallese migrating to Hawai'i, similar interventions and methods for treating this population can be used throughout Hawai'i to effectively manage their daily glycaemic control and control long term complications. Understanding their culture and customs may help to dissipate the frustration that health care providers may feel when treating this unique population.

From this report, it seemed that the "Ohana" Diabetes Education program can effectively improve awareness and management of chronic diseases like diabetes mellitus, especially in under-served populations similar to the Marshallese. In addition, this unique program helps to increase medication adherence which ultimately optimizes drug therapy for these patients. In the future, more patients will be included in this education program to determine the long-term outcomes.

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AUTHORS' CONTRIBUTIONS

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PEER REVIEW

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DECLARATION

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.