

Diabetes Management in Resource Poor Countries

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How to cite this paper: Stratton, A.G., Matus, C.D. and Sweitzer, K. (2019) Diabetes Management in Resource Poor Countries. *Journal of Diabetes Mellitus*, 9, 24-30.

<https://doi.org/10.4236/jdm.2019.91003>

Received: January 13, 2019

Accepted: February 25, 2019

Published: February 28, 2019

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Abstract

The aim of this study was to evaluate the diabetes status and health beliefs of individuals living in villages in Northeast Guatemala. Our study explored current understanding of diabetes in the Peten region of Guatemala concerning the cause, treatment, and effect of type two diabetes by engaging and interviewing 21 diabetic patients in a qualitative study. Interview results showed that among study participants, the cause of diabetes was often “unknown”. With an average of 3.5 years of education among survey participants and many reporting being mostly or fully illiterate, it is likely that health education status plays a major role in their concept of diabetes. The majority of responses claimed some form of “asusto”—defined as a negative emotional event causing physical maladies—to have caused their diabetes. Patient surveys revealed that God and prayer ranked the highest among factors controlling their diabetes, with medications being seen as a tertiary control factor, as seen in **Figure 1**. Only two study participants (2/21) ranked diet/exercise as more impactful on their diabetes than god/prayer. Survey responses also show that most individuals agree that taking their medications is important, with the most commonly reported barriers to control of their blood sugar being cost of medications and lifestyle barriers. Altogether, lack of education and resource availability appears to be the most heavily implicated reasons why uncontrolled diabetes is on the rise in Guatemala—it is clear that health education needs to be a major part of therapeutic efforts in this region.

Keywords

Type II Diabetes, Global Health, Guatemala, Health Education, Health Beliefs

1. Introduction

Diabetes is a major, yet largely underexplored issue in the developing world.

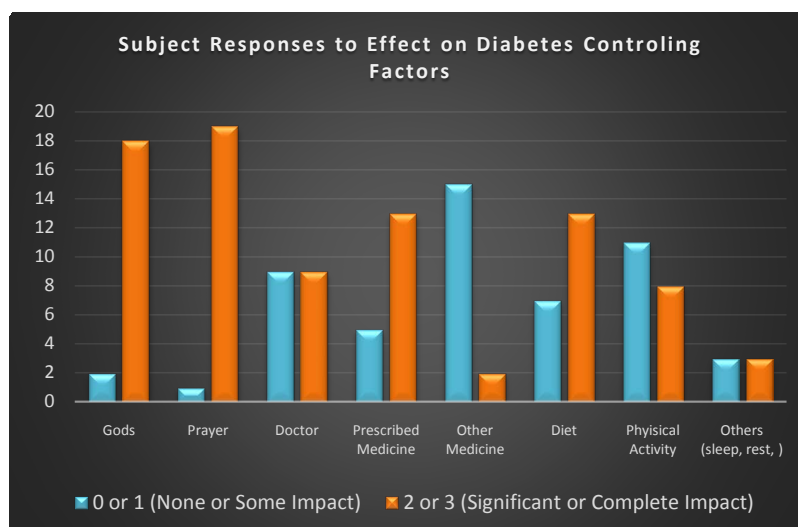


Figure 1. Subject Reported Factors Contributing to the Control of Diabetes.

With the number of cases expected to surpass 366 million globally by the year 2030, diabetes is rapidly approaching global pandemic status [1]. This may largely be due to the increasing westernization of diet and surging prevalence of overweight/obesity worldwide, estimated in 2014 by WHO to exceed 1.9 billion adults, joining malnutrition and infectious disease as major issues to be dealt with in global public health [2]. In South and Central America, more than 50% of adults are overweight/obese, and type two diabetes prevalence is 8% on average, but as many as 50% of cases may be undiagnosed [3]. Type II diabetes is also a leading cause of amputation and new blindness in the developing world. The International Diabetes Federation estimated that 1.25 million diabetes-related foot amputations were performed in South and Central America, the developing world representing an incidence of diabetic amputations more than double that of the developed world [4]. The aim of this study was to evaluate the diabetes status and health beliefs of individuals living in villages in Northeast Guatemala. Chary *et al.*, described major barriers to diabetes management in Guatemala, high among those were patient understanding of the disease, and cost of medication. Our study expanded upon this understanding, by engaging and interviewing twenty-one diabetic patients in a qualitative study to discern current understanding of diabetes in the Peten region of Guatemala concerning the cause, treatment, and effect of type two diabetes.

2. Methods

2.1. Study Design

The study was composed of two phases: identification of potential patients, and patient interviewing. IRB approval was sought and obtained for this study.

2.2. Patient Selection

Non-pregnant patients over the age of 18 with a previous or new diagnosis of

type two diabetes mellitus who were seen in the SewHope clinic in Peten, Guatemala during the months of May and June 2017 were invited to participate in the study.

2.3. Interviewing

Patients who consented to participate in the study were administered a two-page questionnaire via interview in Spanish. Patients were either interviewed at the conclusion of their visit or returned later in the same week to be interviewed. The questions (see **Figure 2**) were aimed at an understanding of the patient’s concept of the development, control, and cause of their diabetes. The survey also asked patients to rank their confidence in various controlling factors of diabetes. Factors questioned included: God, prayer, doctor, prescription medicine, other medicines, diet, physical activity, and other. Patients could select from “no impact”, “some impact”, “significant impact”, and “complete control.” Careful consideration was taken to prevent bias, and interviewers were instructed not to provide any responses or information to patients during the interview. After completion of the surveys, patients were invited to join an information/discussion session to answer any questions they may have had.

Diabetes study

Patient's age: How long have you had diabetes?

1. How does diabetes affect your life and health?
2. How did you feel when you found out you had diabetes?
 - a. Are there things you think caused you to develop diabetes?
3. What are the treatments you have tried and how have they helped? (Change in diet, meds, physical activity)
 - a. How long did it take? Do you continue it?
 - b. What kinds of treatments do you know other people have tried?
4. What factors contribute to helping control your diabetes? (Ask the patient to quantify each element and the response of the circle)

God?	None	Some	Significantly	Completely
Prayer	None	Some	Significantly	Completely
Doctor?	None	Some	Significantly	Completely
Prescription Medicine?	None	Some	Significantly	Completely
Other Medications?	None	Some	Significantly	Completely
Diet?	None	Some	Significantly	Completely
Physical activity?	None	Some	Significantly	Completely
Something Else?	None	Some	Significantly	Completely

1. What resources would you need to control your diabetes?
2. What things prevent you from controlling your diabetes?

Figure 2. Questionnaire (Translated to English).

2.4. Statistical Methods

Survey responses were analyzed, and diabetes factors were ranked and tabulated by assigning a score to each response. “No impact” responses were given a score of 0, “some impact” responses were given a score of 1, “significant impact” responses were given a score of 2, and “complete control” responses were given a score of 3. The total impact score for each category was the sum of the scores (e.g. 0, 1, 2, or 3) for each response (e.g. none, some, significant, complete) in that category (e.g. prayer, god, medicine, doctor). Graphs were generated from these results and were placed below.

3. Results

Survey Findings

Twenty-one patients were interviewed between June 9th and 18th, 2017. Patients had ages ranging from 30 to 87. Three patients were male, and eighteen were female. The average length of education was 3.5 years. Patients had reported to know about their diabetes for an average of 3.6 years. The most commonly occupation reported was “housewife” (n = 13) other occupations included, “construction worker” (n = 2), “cleaner” (n = 2), and “cook” (n = 1). God (n = 11) and prayer (n = 14) had the highest number of “complete control” responses for diabetes controlling factors. “Doctor”, “diet”, and “prescription medicine” had 5, 7, and 10 “complete control” responses respectively. See **Figure 1** and **Figure 3** below for complete results. “Prayer”, “god”, and “prescribed medicine” had the highest total impact scores, with 53, 49, and 41 respectively. Based on a 95% confidence interval, the error range for these results is ± 0.95 , ± 0.45 , and ± 1.25 respectively. Only two study participants (2/21) ranked diet/exercise as more impactful on their diabetes than god/prayer. Written responses were analyzed for responses, and numbers were tabulated as such: Twelve (12/21) patients responded that

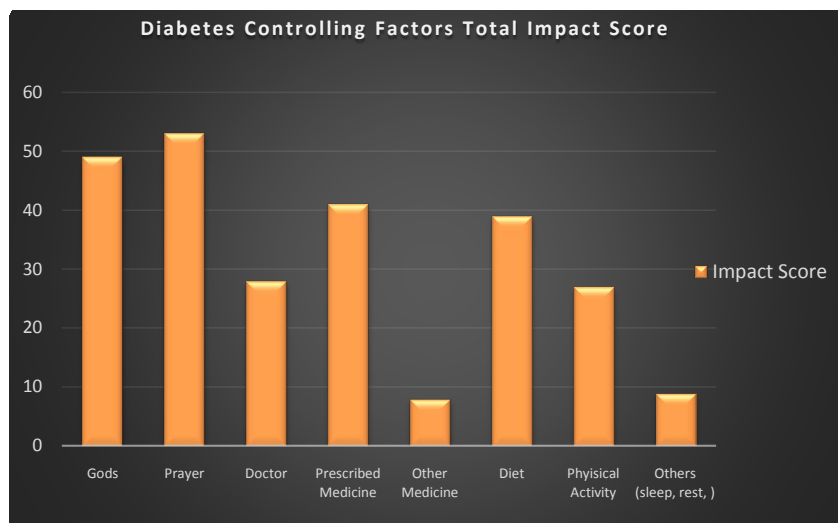


Figure 3. Total Impact Score.

money or resources for medicine were the major barriers to controlling their diabetes. Eight (8/21) responded that diet change was a major impeding factor to controlling their diabetes. When asked what was the cause of the development of diabetes, eleven (11/21) patients stated that it was due to their emotional status or an emotional event, six (6/21) reported that they didn't know or were unclear as to the cause, two (2/21) stated it was diet related, two (2/21) mentioned it may be a familial condition, and one (1/21) stated it was due to sleep disturbance.

4. Discussion

4.1. Study Findings, Diabetes Control

The data clearly show a trend toward patients assigning control of their diabetes to god and religion. Christianity and religious belief are widespread along the region, with only 11% of Guatemalans claiming “no religion/atheist/agnostic” according to US Department of State [5]. It is likely that the very high contribution of responses in this category is largely cultural, indicating that therapeutic efforts must take this factor into consideration. Despite the large emphasis on god/prayer, patients did stress the impact of their medicine in the control of their diabetes and noted that lack of medication was a major barrier to management of their disease. This can be interpreted as the importance of medication being common knowledge among participants, possibly due to the medication directly alleviating some of their symptoms, or prior patient education by clinic staff. More notably however, the much lower acknowledgment of the role of diet and exercise in control of diabetes may be a direct result of the low education status of many study participants. The United Nations 2015 Human Development Report listed that the average year of education in Guatemala is 6.3 years, with only 36.1% of the population having some secondary schooling (compare to 95.3% in the USA) [6]. Without proper understanding of weight management/healthy eating as a component of diabetes treatment, patients may not be receiving the most effective therapy. Further studies on changes in blood glucose and HBA1C as a result of therapy would shed light on the effectiveness of type two diabetes treatment in Northern Guatemala. Furthermore, many patients noted that diabetes was caused by an emotional event (often referred to as “asusto”), and several also attributed an “emotional component” to the cause of their symptoms. The high number of “unknown” responses to the question of how the patient's diabetes developed indicates a gap in knowledge among patients about the pathogenesis of type two diabetes. Only a very small number of patients mentioned a familial component to type two diabetes, suggesting that perhaps genetic predisposition to disease is not common knowledge. Further studies that investigate the status of health education in Guatemala (for example, questions regarding heart, liver, or neurologic disease) would help to elucidate whether this issue is specific to diabetes, or if health education status is lacking in general. With all factors considered, these results are

highly suggestive that health education should be considered as a portion of any type two diabetes therapy for patients in this region. A large number of patients stated that financial resources prevent them from treating their diabetes, likely due to high costs of medicine. Therapeutic efforts should therefore focus on creative solutions to bypass this financial barrier. More importantly however, this evidence further supports that non-pharmaceutical interventions are of critical importance in type two diabetes treatment in Guatemala, this can likely be expanded to most resource-poor countries in Central America and globally.

4.2. Study Limitations, Confounding Factors

In addition to a somewhat small geographic footprint, a possible confounding factor herein relates to the large number of females in the study. Our clinic was open during daytime hours, meaning only those available during those hours could attend. The clinic also offers ultrasound and other OB/GYN services and is connected to a women's clinic. This may account for the high proportion of female study participants, who reported "housewife" as their profession. Further studies should be expanded to a larger number of patients, across a wider demographic range, and include quantitative data on diabetes status. Further studies planned also include expansion on this investigation outside of Guatemala. A second confound could be that some patients were previously treated at this clinic, and may have received health education from staff, skewing the results in favor of the importance of drug therapy. Future studies could eliminate this bias by selecting only new patients to the clinic.

Acknowledgements

The authors would like to thank SewHope Clinic for allowing our study to be conducted on their premises in Guatemala.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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