

Abstract

Introduction: Obesity and diabetes are chronic health conditions that are no longer limited to high-income countries, non-communicable disease are also affecting developing countries and there is limited data on the topics among rural and indigenous communities in Guatemala. Public health field projects such as those conducted by the Department of Public and Community Health, can provide insight into the prevalence of these diseases in these specific communities.

Methods: Data collected from the 2019 and 2021 public health field projects conducted in the rural communities of Zacapa and Morales, Guatemala were entered, cleaned, coded, analyzed, and interpreted. The data analysis focused on Body Mass Index, blood glucose, systolic pressure, and diastolic pressure, among adults within these communities. The final analyses were inputted into tables and interpreted. During this project the following instruments were utilized to perform necessary data analysis: health screenings and questionnaires, Microsoft Excel, and SPSS. The data was analyzed to determine the current health status of community members.

Results: Data from public health field projects from 2019 and 2021 was inputted, cleaned, coded, and analyzed. T-tests and multiple linear regressions were performed. Data displays and their interpretations are displayed in results.

Conclusion: This report will be used in subsequent trips to Guatemala to continue the health outreach and education. Informational guides and educational programs for lay audience will be developed to improve health outcomes through personal education for future trips. A recommendation for the future project would be to incorporate the CMF framework which incorporates communication, motivation, and facilitation.

Introduction

Obesity is a chronic health condition, and the worldwide prevalence of obesity has nearly tripled between 1975 and 2016 and is no longer limited to high-income countries and adults.¹ The prevalence of obesity and diabetes is continually increasing in lower income countries. Within Guatemala the prevalence of diabetes is 7.5% and the prevalence of obesity is 16.4%.¹ Unfortunately, those numbers account mainly for Guatemalans that reside in more developed areas as they have ease of access to healthcare. Upwards of 66% of Guatemalans are indigenous and few studies have focused on these populations, regarding the prevalence of obesity and diabetes.⁴ A recent switch to high fat foods with the rise in availability of processed foods and a switch to a more sedentary lifestyle have led to an increase in the prevalence of obesity, but healthcare utilization is far lower for indigenous populations due to sociocultural barriers, discrimination, and difficulty in accessing services.⁵ Although obesity and diabetes are at the forefront of chronic disease care, anemia has been a growing issue as well. Anemia is categorized by a reduction in the number of red blood cells and the oxygen-carrying capacity of hemoglobin, and the World Health Organization (WHO) estimates that half of all anemia cases are caused by iron deficiency.^{6,7} The Guatemalan government only spends 2.3% of gross domestic product on health care, having designed a three-tiered health system to promote free health care for approximately 70% of the population.^{8,9} Unfortunately, due to the lack of resources, those in rural areas rely on medical mission trips for simple medical care.⁸

Purpose of Study

The aim of this study is to determine if there was a significant change between the two years the public health field projects were conducted, 2019 and 2021. The purpose of this project was to conduct and facilitate data analysis and interpretations of findings on health data regarding diabetes, hypertension, and anemia the population for this consisted of target population members with the specific sampling criteria. The data collected from the public health field project was inputted, cleaned, and coded. The data was inputted into the Microsoft Excel database organized on separate sheets for data from 2019 Zacapa, 2021 Zacapa, and 2021 Morales.



Table 1. Characteristics of the Sample

Characteristic	2019 Zacapa		2021 Zacapa		2021 Morales	
	n	%	n	%	n	%
Age (years)						
< 18	15	6.5	14	29.2	98	45.8
18-24	35	15.1	6	12.5	17	7.9
25-34	54	23.3	7	14.6	26	12.2
35-44	46	19.8	6	12.5	25	11.7
45-54	31	13.4	7	14.6	20	9.3
55-64	23	9.9	6	12.5	15	7.0
65+	28	12.0	2	4.1	13	6.1
Gender						
Male	37	15.9	12	25.0	65	30.4
Female	195	84.1	36	75.0	149	69.6
Married or Living with a Partner						
Yes	162	70.4	23	69.7	73	58.9
No	68	29.6	10	30.3	51	41.1
Personal Education						
None	36	16.3	8	24.2	26	21.3
Primary	129	58.4	12	36.4	69	56.6
Secondary	35	15.8	2	6.1	15	12.3
Career	15	6.8	8	24.2	11	9.0
Bachelors	1	0.4	2	6.1	0	0.0
Masters	5	2.3	1	3.0	0	0.0
Other	0	0.0	0	0.0	1	0.8
Employed						
Yes	53	22.8	14	42.4	37	29.8
No	179	77.2	19	57.6	87	70.2
Household Total Daily Income (Quetzal)						
0-30	60	26.8	5	15.6	66	53.2
31-60	87	38.8	11	34.4	32	25.8
61-100	45	20.1	6	18.8	17	13.7
101+	32	14.3	10	31.2	9	7.3

Table 1. The descriptive and demographic characteristics of all participants are displayed. The data includes participants from public health field projects conducted in 2019 in Zacapa Guatemala, and 2021 in Zacapa and Morales, Guatemala.

Methods

The following instruments were utilized to perform necessary data analysis: health screenings, health questionnaires, Microsoft Excel, and SPSS. Statistics were gathered using a digital scale (kg) and portable stadiometer. Blood glucose 21 levels were assessed using a drop of blood, blood glucose strips, and a blood glucose meter. Hemoglobin levels were measured using a HemoCue201 device with the same available drop of blood to assess for anemia. Finally, blood pressure readings were acquired using a sphygmomanometer and stethoscope. Eligible participants were able to review their results, receive health education, and express any health-related concerns at the end of their assessment. The data collected from the project was inputted, cleaned, and coded. Descriptive statistics was performed demonstrating frequencies within the total sample sets. Independent t-tests were performed, as the health data is continuous, and analyzed to observe any significance. The t-value and p-values were interpreted, and the values for BMI, hypertension, anemia, and age were separated and defined categorically to be analyzed with gender utilizing a multivariable logistic regression to assess the association between diabetes and each of the risk factors.^{11,12} Appropriate ethical permissions were sought from the Institutional Review Board (IRB) with which the authors are affiliated, with the submission of the IRB Annual Review Form, Change in Protocol Form, Investigator Agreement, Questionnaires, and Consent Forms.

Table 1. Four t-tests assuming equal variance were performed to observe the difference in means between Zacapa and Morales, Guatemala, for BMI, blood glucose, systolic blood pressure and diastolic blood pressure.

Table 2. T-tests Assuming Equal Variance for Select Data Elements Between Zacapa and Morales, Guatemala

Data Element	Means			
	Zacapa	Morales	t-Stat	p-value
Blood glucose	120.72	97.47	3.69	0.00013
Systolic pressure	123.26	128.48	-2.36	0.0094
Diastolic pressure	81.67	79.48	1.75	0.041
BMI	28.33	28.87	-0.8	0.21



Image 1

These images display how the health data was collected. In image 1 and 2, the missions team explains how to use blood pressure machines, glucometers, and devices for anemia checkups.



Image 2

Results

The descriptive and demographic characteristics of all participants are shown in Table 1 below. The sample from the 2019 Zacapa project was composed of community members aged 15 to 90 years old, with a mean age of 40.3 years. The samples from the 2021 Zacapa and Morales projects were composed of community members aged six months to 73 years old, with a mean age of 31.6 years; and members aged 12 days to 94 years old, with a mean age of 26.0 years, respectively. Most participants were females at 84.1% (n=232) from the 2019 Zacapa and 75% (n=48) from the 2021 Zacapa samples, and 69.9% (n=244) from the 2021 Morales sample. Most participants were married or lived with a partner, 70.4% (n=230) 2019 Zacapa, and 69.7% (n=33) 2021 Zacapa sample, and 58.9% (n=124) 2021 Morales sample. Four t-tests assuming equal variance were performed to observe the difference in means between Zacapa and Morales, Guatemala, for BMI, blood glucose, systolic blood pressure and diastolic blood pressure. Multiple linear regressions were performed on 2021 data with outcome variables of BMI, systolic blood pressure, diastolic blood pressure, and blood glucose. Four were performed for Zacapa's data and four for Morales's data. A table for each multiple linear regression was created, but all four t-tests were placed into a single table to demonstrate the results for effectively.

Conclusion/Future Work

Conclusion:

- Significant difference between blood glucose and systolic pressure between Zacapa and Morales in 2019 and 2021
- Could be attributed to COVID-19 Pandemic and Hurricanes
- Lack of resources and food sources

Future Work:

- Continuing to promote a healthy lifestyle and educate
- Communicating the issues in an easily understood way
- Incorporate the communication, motivation, and facilitation framework (CMF) 19
- Informational guides and educational programs for lay audience

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