Exploration of Health Outcomes among Rural and Indigenous Populations in Guatemala

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Abstract

Introduction: Obesity and diabetes are chronic illnesses that are no longer just prevalent in high-income nations; they also impact developing countries. Research on these issues among Guatemala's rural and indigenous groups is limited. Field studies in public health can shed light on the incidence of certain illnesses in these localities.

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 comments were inputted into tables and interpreted. This project used Microsoft Excel and SPSS to analyze necessary data: health screenings and questionnaires. The data was analyzed to determine the current health status of community members.

Results: The 2019 Zacapa project had respondents with a mean (SD) age of 40.3 years, while the representatives from the 2021 Zacapa and Morales projects had respondents with a mean age of 31.6 years and 26.0 years, respectively. Statistical data analysis showed that the difference in means between Zacapa and Morales is statistically significant for blood glucose, systolic, and diastolic blood pressure. Still, the mean difference between Zacapa and Morales was not statistically significant for BMI.

Conclusion: The findings could be extended to the Hispanic community here because Virginia has a significant Hispanic population. The CMF framework, which consists of facilitation, motivation, and communication, should be used in the project's future iterations.

Introduction

Obesity is a chronic health condition and is no longer limited to high-income countries and adults. In 2016, approximately 650 million adults were obese, and over 340 million children and adolescents aged 5 to 19 were obese. The risk for noncommunicable diseases increases with each increase in BMI, a significant risk factor for diabetes and hypertension which is continually increasing in lower-income countries. Diabetes affects 7.5% of Guatemalans, while obesity affects 16.4%. Unfortunately, given their easy access to healthcare, this represents Guatemalans living in more developed areas. A switch to high-fat foods with the rise in availability of processed foods and a switch to a more sedentary lifestyle has led to an increase in obesity. Still, healthcare utilization is far lower for indigenous populations due to sociocultural barriers, discrimination, and difficulty accessing services.

Although obesity and diabetes are at the forefront of chronic disease care, anemia has grown. Anemia was studied to be a moderate health problem in Guatemala, Brazil, and the Dominican Republic, with a 21.4% to 38.3% prevalence among women of childbearing age. This study focused primarily on the nutritional aspect of the condition, suggesting iron supplementation and fortification to be implemented in these regions to alleviate anemia caused by iron deficiency. The Guatemalan government spends 2.3% of the GDP on health care, having designed a three-tiered health system to promote free health care for approximately 70% of the population. Sadly, services and population coverage are limited due to understaffing and resource shortfalls. Due to these limitations, those in rural areas rely on medical mission trips for simple medical care. This study provides insight into these diseases in these communities and compare the two years to interpret findings on health data regarding diabetes, hypertension, and anemia.

Methods

During the last week of May 2021, a group of researchers traveled to Zacapa and Morales, Guatemala, to participate in an outreach to rural and indigenous communities and perform health screenings targeting hypertension, diabetes, and obesity concerns. Between June and August 2021, questionnaires and health screenings were inputted, coded, and finally, the data were presented.

The data collected from the public health field project was inputted, cleaned, and coded. Community health assessments were conducted in collaboration with the local mission's coordinator at a local church and municipality officials, within local primary (elementary) schools, and at a church setting. Community health assessments involved gathering eligible participants' height, weight, body mass index (BMI), blood glucose, iron (anemia), and blood pressure measurements regardless of gender, health status, occupation, or employment. In addition, eligible participants could review their results, receive health education, and express any health-related concerns with a doctor, nurse, or public health researcher at the end of their assessment.

Blood glucose levels were assessed using a drop of blood, strips, and a Contour Next or Walgreens True Metrix blood glucose meter. Hemoglobin levels were measured using a HemoCue201 device with the same available drop of blood to assess for anemia. Appropriate measures for operating this device were followed according to the HemoCue Hb 201+ Operating Manual (HemoCue, 2019). Blood pressure readings were acquired using a sphygmomanometer and stethoscope. Appropriate ethical permissions were sought from the Institutional Review Board (IRB) with which the authors are affiliated. Health screenings, questionnaires, Microsoft Excel, and SPSS were used to analyze necessary data to determine the current health status of community members. Information from the health screenings was recorded in a health registry with the local coordinator to continue obtaining data throughout the year.

Table 1. Characteristics of the Sample

	2019 Zacapa		2021 Zacapa		2021 Morales	
Characteristic	***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 2. T-tests Assuming Equal Variance for Select Data Elements Between Zacapa and Morales, Guatemala

	Means			
Data Element	**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

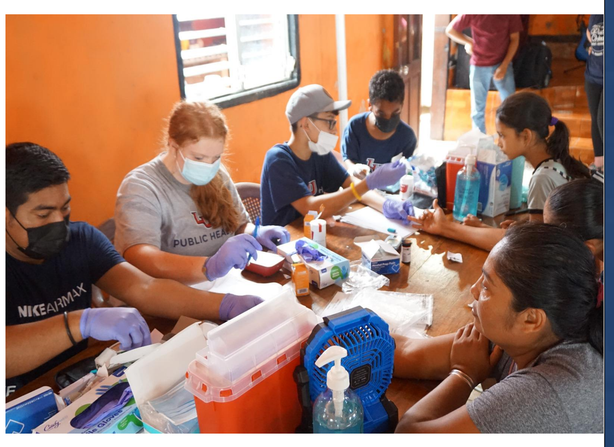

Fig. 1: Photo by [Dr. O. Attin] (Participants having their blood samples taken

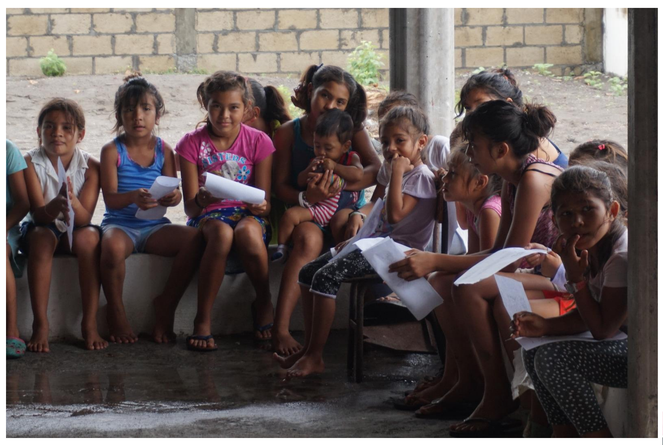

Fig. 2: Photo by [Dr. O. Attin] (Participants filling out the questionnaire)

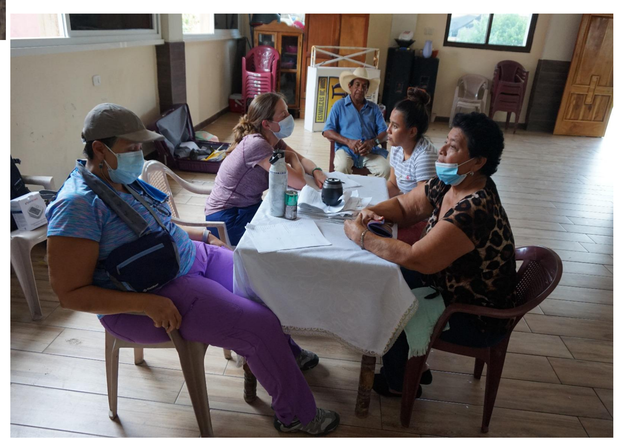

Fig. 3: Photo by [Dr. O. Attin] (Participants being educated in health concerns by the Public Health researchers

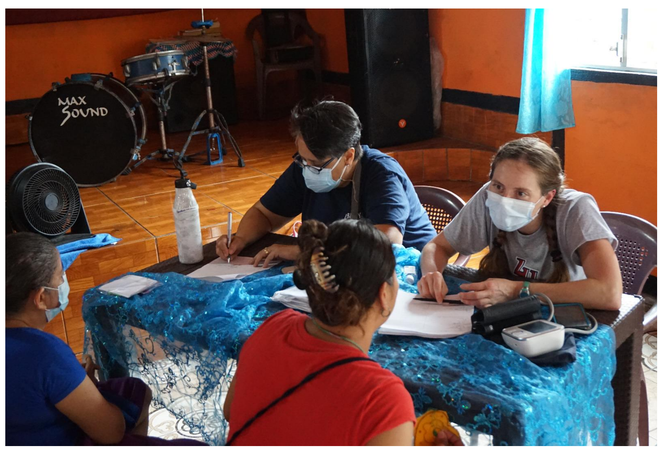

Fig. 4: Photo by [Dr. O. Attin] (participants being debriefed after results have been obtained)

Results and Conclusion

Results

Four t-tests assuming equal variance were performed to observe the mean difference between Zacapa and Morales, Guatemala, for BMI, blood glucose, systolic, 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. The difference in averages between Zacapa and Morales is statistically significant for blood glucose, systolic blood pressure, and diastolic blood pressure but not statistically significant for BMI. Diastolic blood pressure was statistically significant and impacted the outcome variable of BMI. Age and job were statistically significant in determining the outcome variable of blood glucose. Age and diastolic blood pressure had a statistically significant impact on the outcome variable of systolic blood pressure. Systolic blood pressure and BMI statistically significantly impacted the outcome variable diastolic blood pressure.

Conclusions

Data analysis from public health field studies between 2019 and 2021 offered insight into the rates of various health issues at the baseline, allowing for more health interventions to enhance outcomes with future public health field projects in the next years. Given the Commonwealth of Virginia's large Hispanic population, it is critical to emphasize that these conclusions about Guatemalan health conditions and outcomes can be generalized to the United States, as the Hispanic population accounted for 10.6% of the total population in the Commonwealth of Virginia by 2020.

Future Work

1. Incorporate traditional medicines into future medical mission trips
2. Provide care for the rural and indigenous people by making available community health workers and mobile health technologies
3. Make public health field projects like this more frequent as these trips are sometimes a community member's only opportunity to seek help.
4. Incorporate the CMF framework, which includes communication, motivation, and facilitation into future medical mission trips

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