

A Multi-Year Mixed Methods Public Health Needs Assessment in Rural Honduras

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Abstract:

Introduction: In Honduras, 58% of rural citizens are classified as living in extreme poverty, and a multitude of health problems accompany this extreme poverty. Taulabé is a municipality in rural Honduras where aid organizations are currently working. Before interventions can be planned to improve population health, there must be a deeper understanding of the public health problems in Taulabé, Honduras. Therefore, the purpose of this study was to gain an increased understanding of the public health needs in rural Honduras from the perspectives of patients and providers at a rural health clinic over three years. The goal of the study was to inform future efforts of various non-profit organizations who serve in the area.

Methods and Materials: The study was set in rural Honduras, in Taulabé. Three years of clinic data regarding nutrition, fitness, communicable diseases, and education were collected and analyzed. Clinical data on height, weight and blood pressure were also collected. In 2018 clinic patients were also interviewed in order to give them an opportunity to voice their opinions about their own community's health. Additionally, in 2019, one of the physicians who staffed the clinic was interviewed about their perspective of the health needs in rural Honduras.

Results: Over the three years, 373 participants completed the surveys. Seventy nine surveys were completed in 2016, 194 in 2016, and 100 in 2018. The most common chief complaints were "cold and flu" (35.8%, 117/327), followed by stomach complaints including pain, diarrhea, and parasites (19.9%, 65/327), followed by head pain (19.9%, 65/327). The average body mass index (BMI) of patients was 30.9 kg/m² and 38.0% were classified as obese (95/250). Fifty four percent (170/253) were classified as having stage one or two hypertension. Forty-two percent (112/264) reported eating processed foods (fries, fried street foods) weekly and over half do not eat recommended amounts of fruits and vegetables daily (50.2%, 132/263 and 68.8%, 181/264).

Conclusions and Future Implications: Rural Hondurans could benefit from increased health education in the areas of cardiovascular health, communicable diseases, maternal and perinatal health, as well as nutritional education. Interventions such as, community health workers, nutrition education, and updated government policies are needed to assist Hondurans in improving personal and community health status.

Introduction:

Taulabé is a rural town in Comayagua, in the Midwest of Honduras. Taulabé has approximately 25,000 citizens.¹ The majority of citizens in Taulabé, as in all of rural Honduras, are classified to be in extreme poverty.² The life expectancy for a person living in Honduras is 73 years.³ The top causes of death in Honduras are cardiovascular diseases (27%) and communicable, maternal, perinatal and nutritional conditions (23%).⁴ The incidence of diabetes in Honduras is 7.4%.⁵ Thirty four percent of adults in Honduras are overweight and 21% are classified as obese.⁵ Twenty two percent of the adult Honduran population have been diagnosed with hypertension.⁵ Hondurans living in rural areas have multiple sociodemographic risk factors contributing to poorer health including 46.6% of the population having no formal education and between 44.5% to 51.2% living in extreme poverty.⁵

Rural Hondurans often do not have continuity of care as there are only 0.37 physicians per 1,000 citizens while the global average is 1.537 physicians per 1,000 citizens.^{6,7}

Approximately 18% of Hondurans do not have access to health care providers or services.⁸ A large majority (88.3%) of the population relies on the Honduran Ministry of Health for care,

even though the majority of facilities are located in the large cities far from rural populations.⁹ Approximately 90% of Hondurans do not have any kind of health insurance.⁸

Community health interventions are needed to address the plethora of health needs in rural Honduras. Multiple studies have analyzed the impact of community health worker training programs in rural areas in Honduras. In one such case after 15 months of five days a week of clinics led by community health workers, 2,347 patients were seen presenting with over 3,000 health problems.¹⁰ Another, less sustainable solution that international organizations have acted upon is short term medical brigades. Groups of doctors, nurses, paramedics and other health care providers and workers travel from their home country into Honduras and set up a temporary clinic for one to five days, often times in a local church or community center. These brigades are volunteer based and all medical care and medications are free for patients. At these brigades, primary care is commonly offered as well as same day surgical procedures depending on the training of the volunteers. Medical brigades are “well accepted by the population and local health care workers”.¹¹ As a member of a medical brigade serving Taulabe for the last three years, I have found the medical brigade to be well-accepted by the local population. One multi-brigade study showed that 36.3% of patients suffered either from gastrointestinal infections or malnutrition.¹⁰ Medical brigades can provide valuable short term health care, health education, and partnerships with governmental and non-governmental organizations but are not by themselves a sustainable solution. Short term clinics can assist with long term planning through data collection, as said by Carmentate-Milián et al. This data collection is very useful when planning future interventions, policies, and programs to improve public health.⁸ Therefore, the purpose of this study was to collect data in order to provide a deeper understanding of what future interventions and policies could be useful in rural Honduras.

Methods and Materials:

Data were collected in December of 2015, 2016, and 2018 at week-long medical clinics located near the municipality of Taulabé, Honduras. Data was not collected in 2017 due to no clinic being held because of political unrest preventing international travel for the team of American volunteers. All data were collected via one-on-one verbal interviews with printed questionnaires, all adults at the clinic were surveyed. Biometrics including height, weight, and blood pressure were collected by trained medical staff and students. Seventy nine patient data forms from 2015 clinics were digitized and analyzed. One hundred and ninety four data forms from 2016 were digitized and analyzed. One hundred data forms from 2018 were digitized and analyzed. In 2015 all data was from one clinic location in Carrizales while in 2016 and 2018 information was gathered from clinics in the rural towns of Carrizales, Honduras and Buenos Aires, Honduras. Not all patient data forms were able to be computerized due to difficulty reading handwriting from various interpreters as well as forms which were damaged in transit from Honduras to the United States of America. Of note, the denominators vary greatly due to the fact that not every question, quantitative or qualitative, were answered by each patient. Data were then imported into Statistical Package for the Social Sciences (SPSS) and frequencies were generated.

Questions regarding nutrition, fitness, communicable diseases, family health history, and education were asked. The majority of questions were asked every year with some variation. A list of questions from each year is included in the Appendix. Between 2016 and 2018, a new list of questions was created and approved by the Institutional Review Board at East Carolina University. The new questions focused more on open ended responses that went beyond personal

health into public health. Questions relating to family history of disease were removed in place of questions regarding prior healthcare experience. Questions about mental health as well as food security were added.

Patients were asked directly regarding how many days a week they exercise as well as if they eat processed foods, fruits, or vegetables and how often. Additionally, patients at the clinic were given the opportunity to share their perspectives and opinions regarding the health of their community and what can be done to improve it. Questionnaires were translated into Spanish with the assistance of two native Spanish speaking students at East Carolina University.

Questionnaires were reviewed for cultural sensitivity by the leaders of Fuente De Vida, the nonprofit which helped host the medical clinics in Honduras.

Patients were asked to state their chief complaint—stated another way, they were asked the reason that they chose to visit the medical clinic. Three hundred twenty-seven patients reported a total of 603 individual chief complaints in the form of signs and symptoms, and this was verbally reported to translators and written in an open text field. Chief complaints were grouped as stated in the below table. The complaints grouped into “cold and flu” were based on explanation from Dra. Aracely Pineda. According to Dra. Pineda, the Spanish word for “cold” is gripe which translates directly in English to “flu”. Table 1 provides further details on the methodology behind chief complaint groupings.

Table 1. Chief complaint groupings with translated examples.

Chief Complaint Group	Examples (translated quotes from data forms)
Cold and Flu	Cough, cold, flu, asthma
Stomach Issues	Stomach or belly pain, diarrhea, vomiting
Head Pain	Head Pain, headache, migraine
Leg Pain	Leg, ankle, knee, foot pain
Back Pain	Upper or lower back pain

Vision Issues	Blurry vision, eyes hurt when reading, need glasses
Arm Pain	Arm, elbow, wrist, shoulder, hand pain
Chest and Heart Pain	Chest pain, heart pain
Rash	Rash or bumps on skin, allergic reaction on skin
Bone and Body Pain	Bone pain, bone hurts, body hurts, overall body pain
Dizzy and Fatigued	Dizzy, tired, fatigued, very sleepy
Blood Pressure Issue	Blood pressure high, blood pressure low
Fever	Fever, high temperature
Other	Including but not limited to: fat in liver, bruises, diabetes, dry mouth, motorcycle accident, prostate issue, sick, snoring, stress, teeth problems

Information was also obtained via interviewing Dra. Aracely Pineda, a family medicine physician who works in Taulabé, Honduras. She was interviewed in person and through continued messaging in December 2019.

Results

Of the 373 patient data forms collected, the average Body Mass Index (BMI) was 30.9 kg/m². Thirty eight percent (95/250) of patients were classified as obese and 30.0% (75/250) were classified as overweight. Almost one quarter of patients (24.5%, 62/253) had a blood pressure classified as hypertension stage one. Twenty nine percent (73/253) had a blood pressure classified as stage two hypertension. The mean number of days of exercise per week was 4.38 from 40 respondents. Almost half of surveyed patients (from 2015 and 2016) responded that they ate processed foods (fries, fried street foods) weekly (42.4%, 112/264). Over half of participants indicated that they did not eat the recommended amounts of vegetables (68.6%, 181/264) or fruits (50.2%, 132/263) daily. Over three quarters (75.3%, 61/81) of surveyed participants admitted to having never seen the Honduran food guide published by the Honduran Ministry of Health.

Relating to food insecurity (asked only in 2018), 24.4% (20/82) participants responded that, in the last 12 months, the food their family bought “just did not last and they did not have money to get more”, “a few times”. Other response options included “weekly, monthly, a few times, or never”. Twenty two percent (18/81) of participants said that in the last 12 months, their family had to “cut the size of meals or skip meals because there was not enough money for food”, “a few times”.

Participants were asked about their family's history regarding hypertension, diabetes, stroke, heart attack, cancer, and liver disease. Fifty eight percent (149/255) of respondents indicated that a close family member had been diagnosed with hypertension. Forty eight percent (126/258) of respondents indicated that a close family member has been diagnosed with asthma. The minority of patients indicated that a close family member was diagnosed with stroke (22.1%, 56/253), heart attack (24.1%, 62/257), diabetes (41.2%, 106/257), cancer (17.6%, 45/256), and liver disease (16.7%, 39/234). Of those who had family members diagnosed with hypertension, 49.6% (56/113) had blood pressure that were classified as stage one or two hypertension.

Slightly more than half (51.1%, 45/88) of patients surveyed in 2018 responded that they had been to a dentist at least once in their life. The only age group in which this differed was children age zero to nine. The majority of children age zero to nine years old indicated they had not been to dentist ever (73.9%, 17/23). All other age groups indicated that the majority (50.0% or greater) had visited a dentist at least once. The majority of responses from 2018 indicated that patients had not previously been tested for cancer (88.8%, 71/80). In the age groups of 0 to 9 years old, 20 to 29 years old, as well as 40 to 49 years old, zero individuals responded that they had ever been tested for cancer.

Relating to chief complaints and reasons for visiting the clinic, 169 individuals had greater than two chief complaints. Cold, cough, flu, throat or nose infections were grouped together and 35.8%, 117/327 patients reported as their chief complaint. The next most common complaint was stomach issues ranging from nausea and vomiting to diarrhea or constipation, as identified by 19.9% (65/327). The same number of patients (19.9%, 65/327) also reported headaches and head pain as a chief complaint. Other complaints included leg or foot pain (52/327), back pain (49/327), vision problems (38/327), arm and wrist pain (31/327). The remaining complaints included allergies, asthma, blood pressure, chest pain, fatigue, hearing problems, fever, numbness, skin rash, urination problems, swollen limbs, and tooth pain. The chief complaints seen were accurately representative of the most common health problems in rural Honduras according to Dr. Aracely Pineda.¹³ In 2018, when asked, respondents indicated that the biggest health problem in their community was “cold, flu” (43.2%, 19/44), followed by diarrhea (6.8%, 3/44) and diabetes and injuries (both with 4.5%, 2/44).

The three most common chief complaints were the same during the years of 2016 and 2018. The most common was "cold and flu" (76.5% 52/58 in 2018, 41.0% 75/183 in 2016) followed by stomach complaints (29.4% 20/68 in 2018, 26.8% 49/183 in 2016) and then headache and pain (25.1% 46/183 in 2016, 23.5% 16/68 in 2018). The three most common chief complaints in 2015 were back pain (42.5%, 31/73), leg pain (41.1%, 30/73) and vision problems (28.8%, 21/73). The change in chief complaints was potentially due to a change in location of clinic therefore a change in patient demographic characteristics (See Table 2 below). Additionally, the chief complaints from 2015 varied much more than in 2016 and 2018 perhaps due to different translators and interviewers' documentation style.

Table 2. Demographic characteristics by year.

Demographic Characteristic	2015	2016	2018
Gender: Female	46 (58.2%)	152 (78.7%)	68 (68.0%)
Gender: Male	33 (41.8%)	41 (21.2%)	32 (32.0%)
Average Age	44.5 years old	27.9 years old	33.0 years old
Age < 10	2 (2.5%)	51 (27.9%)	32 (32.0%)
Age 10-19	8 (10.1%)	31 (16.9%)	11 (11.0%)
Age 20-29	5 (6.3%)	24 (13.1%)	6 (6.0%)
Age 30-39	12 (15.2%)	26 (14.2%)	12 (12.0%)
Age 40-49	18 (22.8%)	11 (6.0%)	9 (9.0%)
Age 50-59	16 (20.3%)	15 (8.2%)	9 (9.0%)
Age 60-69	14 (17.7%)	12 (6.6%)	9 (9.0%)
Age ≥ 70	4 (5.1%)	13 (7.1%)	12 (12.0%)

Those who had a BMI categorized as obese most commonly complained of head pain (15.6% 27/173) followed by leg pain (14.5%, 25/173). Those who were classified as overweight most commonly complained of cold and cough (15.3%, 20/132) followed by back pain (12.9%, 17/132). This trend was the same for those with a normal BMI, cold and cough (15.3%, 19/124) followed again by back pain (13.7%, 17/124). Patients classified as overweight were more likely to indicate that they do not eat recommended amounts of vegetables daily as compared to those within normal BMI classifications (70.9% 39/55 vs 64.9% 37/57).

Conclusions

As seen in this assessment of the needs of rural Hondurans, acute problems including cough, upper respiratory infections, diarrhea, and pain of the head and stomach are more commonly causes of concern as opposed to more chronic conditions such as obesity, diabetes and hypertension. Less than 60% of Hondurans are estimated to visit a doctor regularly which provides a plausible explanation for lack of awareness relating to chronic conditions as they are

not being diagnosed by physicians.⁹ Hondurans have difficulty visiting physicians due to many reasons including the small number of physicians who practice in Honduras, most of whom are located in the urban cities. Potential policies to incentivize Honduran physicians to practice in rural areas are needed to ameliorate the health problems faced by rural Hondurans.

Health education, reaching citizens who do not regularly visit physicians, is needed.¹³ Governmental policy changes are needed which prioritize and emphasize the importance of health education in rural settings. Public health education relating to topics including obesity, diabetes, hypertension, heart attack, stroke, asthma, are warranted. It was noteworthy that our data did not uncover the need for infant and maternal mortality prevention programs, even though this is known to be a key priority for improving health in the developing world.² Although the Taulabé clinics did not specifically focus on maternal health, it is well documented that these women are a vulnerable population that require specific health interventions.² These educational campaigns will need to utilize both written and visual materials as 14.9% of the Honduran population are not considered literate.¹⁴ This percentage increases in rural areas. According to our needs assessment, the majority of citizens living near Taulabé have only completed primary school therefore educational materials should be at the reading level of 5th to 6th grade. Of note is that the health literacy rate in rural Honduras is assumed to be much lower than the overall literacy rate.

There is an opportunity for health education relating to various chronic and acute health issues. Health education with the goal of preventing cardiovascular diseases is necessitated, as cardiovascular disease (CVD) is the top cause of death in Honduras.⁴ However, it is also noteworthy that cardiovascular disease and its comorbidities were not the chief complaints mentioned in the clinic. Therefore, educational efforts should focus on CVD prevention

including lifestyle changes such as increasing physical activity, improving dietary behaviors. Other CVD education should include what signs and symptoms necessitate medical attention. Health education in Honduras is also needed regarding communicable diseases as well as maternal and perinatal health care as those are two other common causes of death.⁴ This health education should cover hygiene practices as an increase in hygiene should cause a resulting decrease in communicable diseases. Additionally, specific health education materials should be targeted toward women of reproductive age in hopes of decreasing maternal and infant mortality and increasing overall health of children and mothers.

Health education relating to diet and exercise should be further explored and created due to the fact that diet-related diseases are linked to 23% of deaths in Honduras.⁴ The majority of patients interviewed during this needs assessment were classified as obese or overweight which aligns with the World Bank's "Nutrition at a Glance" report stating that 46% of Hondurans are overweight or obese.¹⁵ According to the Centers for Disease Control and Prevention "Central American Profile" this is due to "rapid urbanization, adoption of modern Western diets high in refined carbohydrates, saturated fats, and sugars, and increasingly sedentary lifestyles".¹⁶ Additionally, Hondurans also commonly do not consume adequate levels of vitamin A and iron.¹⁵ Education relating to strategies in improving diet to decrease and prevent obesity while also decreasing malnutrition are recommended. Education should focus on helping Hondurans visualize the link between nutrition, physical activity, weight status and overall health. It has been shown that obesity is linked to impaired immunity.^{17,18} Because Hondurans stated that "cold and flu" are the major health issues in their community, it might be most effective to encourage healthy eating and exercise to prevention of communicable diseases such as cold and flu.¹⁹

Hondurans struggle with food insecurity and obesity due to many factors. One factor leading to food insecurity may be that most employment is sporadic in rural Honduras with minimal Hondurans working in the same job for multiple months.²⁰ Relating specifically to agricultural production in Honduras, five years of drought and below average rain fall coupled with hurricanes providing short heavy destructive rain and wind have caused a decrease in agricultural yield.²¹ Governmental restructuring and involvement will be required in order to improve the Honduran economy specifically for rural agriculture workers. Advances in the economy of rural Hondurans will allow citizens to not only pay for their own healthcare but also afford healthier food options.

The findings of this needs assessment suggest that the role of non-profit and foreign aid organizations should be to increase access to health care while training and educating Honduran citizens. Aid organizations can improve the effectiveness and sustainability of their impact through training Honduran citizens to be advocates for their own and their communities health.^{10,11} Through training Honduran citizens, the impact of an individual aid organization will grow exponentially. Additionally, Honduran citizens are the most equipped to create and distribute health education materials to their neighbors. Additionally, Hondurans citizens once educated are the most compelling advocates through which governmental and community change can occur.¹⁰

Limitations of this study include that less than 400 patients were interviewed as well as that approximately eight various individuals served as interviewers which could skew responses based on individual interviewer perceptions and biases. Another limitation of this assessment included that responses were gathered while patients were waiting to receive medical care which could have biased the responses to be more extreme as patients wanted to ensure that their

reported symptoms would warrant time spent with the doctor. Finally, the largest limitation was that not every question was asked each year and not every patient answered every question. The missing data could be missing not-at-random, perhaps increasing the risk of systematic bias.

This project was successful due to the continued partnership between researchers at East Carolina University and Hondurans who work for the non-profit Fuente de Vida. Continued partnerships between researchers, nonprofits, and citizens are essential to accurately understand and address the changing needs of rural communities not only in Honduras but around the world.

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Appendix A: Patient Medical Form used in 2015 and 2016

1. Name
2. Sex (Male or Female)
3. Age
4. Occupation
5. Civil Status
6. Educational Attainment:
7. Town Residence:
8. Family History 1st Relatives
 - a. Hypertension (yes/ no)
 - b. Stroke (yes/ no)
 - c. Heart Attack (yes/ no)
 - d. Diabetes (yes/ no)
 - e. Asthma (yes/ no)
 - f. Cancer (yes/ no)
 - g. Liver Disease (yes/ no)
9. Weight
10. Height
11. Body Mass Index (BMI)
12. BMI classification
13. Body Fat percentage
14. Blood Pressure
 - a. Reading 1
 - b. Reading 2
 - c. Blood Pressure Average
15. Smoking (never, current, passive, stopped: <1 year, >1 year)
16. Alcohol intake (never, occasionally, regularly)
17. In the last month, have you had more than 5 drinks in one time? (yes/ no)
18. Eats processed foods weekly [fries, fried street foods]? (yes/ no)
19. Drinks more than 5 sodas in a week? (yes/ no)
20. Eats 3 cups of vegetables every day? (yes/ no)
21. Eats 2-3 cups of fruit every day? (yes/ no)
22. Has the patient ever been diagnosed with diabetes? (yes/ no)
23. If so, are they on any medications? (yes/ no)
24. Does the patient have the following symptoms?
 - a. Polyphagia [eats shortly after meals, never feels full]? (yes/ no)
 - b. Polydipsia [feels thirsty even after just drinking]? (yes/ no)
 - c. Polyuria [frequently urinates]? (yes/ no)
25. When did the patient last eat?
26. Blood Sugar reading
27. Has the patient ever had any pain or discomfort or any pressure or heaviness in their chest? (yes/ no)
28. Has the patient ever experiences pain in the center or left of the chest or up and down their left arm? (yes/ no)
29. Does patient get pain when walking uphill or in a hurry? (yes/ no/ not applicable)

30. Does the pain go away when patient stands still or take medicine, if so what medicine? (yes/ no/ not applicable)
31. Does the pain go away within 10 minutes? (yes/ no/ not applicable)
32. Has patient ever had severe chest pain across the front of your chest lasting longer than ½ an hour? (yes/ no)
33. Has patient ever experienced any of the following: difficulty in talking, weakness of arm and or leg of one side or numbness? (yes/ no)

Appendix B: Patient Medical Form used in 2018

1. Name
2. Age
3. Gender (male or female)
4. Martial status (single/ married (legal or religious)/ divorced/ widow)
5. Birthplace
6. Current place of residence
7. Children (genders and ages)
8. Monthly income (L0-5,000/ 5,000-10,000/ 10,000+)
9. Job
10. Highest level of education (primary/ middle/ academic or vocational secondary/ university)
11. Where do you go when you are sick?
12. How many days in the past month was your health not good?
 - a. Regarding physical health and injuries (0-5/ 5-15/ 15-30)
 - b. Regarding mental health, depression, and anxiety (0-5/ 5-15/ 15-30)
13. How do you pay for medical care?
14. Where do you get the majority of your health information?
15. Have you ever been to the dentist? (yes/ no)
 - a. If yes, where was the dentist located?
16. Have you ever had a tooth removed? (yes/ no)
17. Have you ever had any surgeries? (yes/ no)
 - a. If yes, where:
 - b. If yes, what procedure(s):
18. Have you ever had any tests for cancer? (yes/ no)
 - a. If yes, where:
 - b. If yes, what kind of tests?
19. How often do you exercise every week? Exercise means planned and structured physical activity, beyond walking around your home. (___ minutes/ ___ days per week)
20. Do you eat from each of the food groups? Fruit, vegetables, grains, protein, dairy. (yes/ no)
21. Have you seen the “Honduras Food Guide” image before? (yes/ no) Patients were shown a printed image of the guide.
22. In the last 12 months, did the food that you/ your family bought just didn’t last, and you/ your family didn’t have money to get more. How often? (weekly/ monthly/ a few times/ never)

23. In the last 12 months, did you/ your family ever cut the size of your meals or skip meals because there wasn't enough money for food? (weekly/ monthly/ a few times/ never)
24. What is the biggest problem in your community?
25. If you could do one thing to improve the health of your fellow community members, what would it be?
26. What health care services do you think are needed in your community?
27. What is the main cause of death in your community?
28. Where have you given birth? Who helped you? Only ask to women who have indicated they have children.
29. Did you go to the doctor when you were pregnant? (yes/ no) Only ask to women who have indicated they have children.
30. Do you smoke cigarettes or other substances? (yes/ no)
 - a. How much?
31. Do you drink alcohol? (yes/ no)
 - a. How often? ___ per week
32. Do you take drugs? (yes/ no)
 - a. If yes, please specify?
33. Are you currently taking any medications? (yes/ no)
 - a. Please specify:
34. Do you have any known medical conditions? (yes/ no)
 - a. If yes, what?
35. How many times in the past month have you had diarrhea?
36. Symptoms:
37. Height
38. Weight
39. Body Mass Index (BMI)
40. Pulse
41. Blood Pressure
42. Blood Glucose
43. Doctor's Notes and Diagnosis
44. Prescriptions (given: yes/ no)