



Comprehensive evaluation of male health in four communities in rural Honduras

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ARTICLE INFO

Keywords:

Honduras
Social determinants
Health literacy
Mosquito-borne illness
Contraception

ABSTRACT

PODEMOS (Partnership for Ongoing Developmental, Educational and Medical Outreach Solutions) has been a long-standing healthcare provider in 4 communities in northern rural Honduras. In this study, we sought to understand and quantify the health challenges faced by men in the rural communities served by PODEMOS in order to improve the way PODEMOS delivers healthcare. Between June and July of 2015, we conducted 104 structured survey interviews with men 18 years and older in rural Honduras. We found that most men face significant economic limitations in their ability to pay for healthcare and health-determining services and due to low formal education levels face health literacy challenges. Furthermore, we found that a quarter are at risk for health problems due to smoking, and the majority are at risk for musculoskeletal problems due to work in strenuous outdoor labor. However, we found that zero respondents drank alcohol heavily, which is defined as more than 14 drinks in one week. Lastly, we found varying opinions on female contraception use. Our findings indicate that medical brigades to the developing world should understand and quantify the relevant health challenges faced by their target populations.

1. Executive summary

1.1. Objectives

To understand and quantify the health challenges faced by men in the rural communities served by PODEMOS (Partnership for Ongoing Developmental, Educational and Medical Outreach Solutions) in order to improve the way PODEMOS delivers health care.

1.2. Background

PODEMOS was founded by medical students at The Ohio State University in 2008. Since that time, it has expanded and partnered with the Colleges of Nursing, Dentistry, and Pharmacy. A multi-disciplinary team of students and faculty travel to Honduras each June and December to provide primary and chronic care to residents of several communities. The biannual trips consist of 5 full clinic days set up in 4 different communities. During the interim months, PODEMOS works with local healthcare providers to check in on chronic care patients and help Ohio State to act as a primary care provider, at a distance. PODEMOS has established itself as a key player in providing care in the rural El Progreso region of Honduras and has the opportunity to have a

positive impact as the main primary care provider for the villages of Siete de Abril, Brisas de la Libertad, Brisas del Norte, and Colonia Ebenezer.

2. Materials and methods

2.1. Research design

Our structured survey took part in two phases. The first phase administered structured surveys to individuals who were present at a PODEMOS clinic during the June 15–June 19, 2015 trip. The second phase administered surveys to participants via door-to-door, face-to-face interviews with men living in the communities we were investigating. At Siete de Abril, 24 surveys were completed in 1 clinic day (June 15). At Brisas de la Libertad, 17 surveys were collected during the first day of clinic on June 16, 20 were collected during the second day of clinic on June 17, and 3 were collected in door-to-door visits during post-trip visits between June 22 and June 26. At Brisas del Norte, 20 surveys were conducted during clinic on June 18, while 7 were conducted during post-trip visits. Finally, at Colonia Ebenezer, all 13 surveys were conducted during the clinic day on June 19. Our study focused on men since PODEMOS researchers conducted a similar study in

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2013 that focused on maternal and child health. After an extensive search of the literature, we were unable to find data characterizing the health status of rural communities in Honduras similar to our study.

2.2. Sample

The target population for the first phase of the survey was men over 18 who presented to a PODEMOS clinic for medical attention. The study sample consisted of a total of 104 men from the villages Siete de Abril, Brisas de la Libertad, Brisas del Norte, and La Colonia Ebenezer. The survey response rate in clinics was 92.3% at Siete de Abril, 88.8% at Brisas de la Libertad, 90% at Brisas del Norte, and 100% at Colonia Ebenezer. The survey response rate in clinics was 92.3% at Siete de Abril, 88.8% at Brisas de la Libertad, 90% at Brisas del Norte, and 100% at Colonia Ebenezer. Brisas del Norte and Brisas de la Libertad have a population of around 25,039 and 44,549, respectively (Pueblos20.net, 2018). Data for Siete de Abril and Colonia Ebenezer was unavailable to us but we estimate based on the size of the villages that Siete has a population between 15,000–25,000 and Colonia Ebenezer between 10,000–15,000.

2.3. Measurement/Instrumentation

The survey was divided into multiple parts to assess various aspects of men's health: demographics, general health, environmental health, healthcare access, sexual history, and contraceptive use.

The phase 1 and phase 2 surveys ask the same questions to the participants, the difference between them was how the patient was recruited into the study.

Please see Figs. 1–5 attached to view the survey instrument used. We did not encounter any difficulties in communication (See Tables 1–3).

3. Discussion

3.1. Income and ability to pay for healthcare

The mean monthly income of the study population (5453L) was lower than the minimum wage (8448.4L) and the current monthly price of the market basket of consumer goods in Honduras (8326L) (Heraldo, 2017; Carranza, 2018). The market basket includes items such as dairy products, meats, eggs, beans, cereals, sugar, oil and butter, vegetables, fruits, and coffee that are meant to provide a basic supply of food each month to an average family of 5 in Honduras. It does not include prices of medications, healthcare visits, or education (Heraldo, 2017; Carranza, 2018; Panama, I.d.N.d.C.A.y, 2002). Honduras has the most expensive market basket in Central America, and the percentage of Hondurans who are unable to afford the market basket and thus fall into the poverty category is 60.9%. 42.6% of Hondurans live in extreme poverty, earning less than 2\$ per day (Carranza, 2018). The highest income of males was reported at Brisas de La Libertad, where the mean monthly income was 6143L. The lowest mean income was 4220L at Colonia Ebenezer. On average, men in wealthier communities reported earning at most 69% of the price of the market basket. In order to purchase more goods and services, including healthcare and education, these men interviewed would have to rely on their partners or other household income to cover the extra costs of living.

3.2. Education and health literacy

Our results showed that the most educated community was Siete de Abril with an average of 6 years of formal education, whereas Ebenezer had an average of only 2.6 years of formal education. Even with the use of translators, many of the men at Ebenezer have poor health literacy given their lower educational level. A study by Johnston et al. investigated the relationship between education obtained and health

knowledge and found that the level of education significantly impacts health understanding. According to their estimates, a one-year increase in schooling can increase health knowledge by 15% (Johnston et al., 2015). As the men in the communities become more educated and the average education level increases, so will the health literacy in the communities. Higher levels of health literacy is critical to better healthcare outcomes, and PODEMOS patients will be more prepared to perform basic health-related tasks, such as reading nutrition labels, following medication instructions, or adhering to a vaccination schedule (McKinney, 2013).

3.3. Smoking prevalence and possible interventions

Across all communities, approximately one in every four men was an active smoker. Smoking has long been established as a major risk factor for cardiovascular disease and stroke (Villablanca et al., 2000). A meta-analysis reviewing 114 articles on smoking cessation for the U.S Preventative Services Task Force concluded that both behavioural and pharmacological interventions improve rates of smoking cessation. Effective interventions include physician advice, nicotine replacement therapy, bupropion and varenicline (Patnode et al., 2015). As medical providers to communities in rural Honduras, PODEMOS should be aware of smoking rates within the communities. Furthermore, PODEMOS has the opportunity to contribute to education and prevention of cardiovascular and pulmonary disease.

Given the effectiveness of smoking cessation interventions, PODEMOS should consider educating patients on the harmful effects of tobacco smoking and provide pharmacologic treatment for smoking cessation. Purchasing or receiving donations of nicotine replacement gums and patches, bupropion, and varenicline could help PODEMOS combat the high prevalence of smoking in rural Honduras.

3.4. Prevalence of light to moderate and heavy alcohol use

Almost a quarter of the male responders drank at least one alcoholic drink per week. In all communities, the average male drank less than 14 drinks per week, and therefore is not considered a heavy drinker.

Light to moderate alcohol use (1 drink per day for women and 2 drinks per day for men) is associated with a decreased risk of total mortality, coronary artery disease, diabetes, congestive heart failure, and stroke. However, heavy alcohol use, defined as drinking > 14 alcoholic drinks per week, is associated with increased cardiovascular disease, development of non-ischemic dilated cardiomyopathy, new-onset or recurrent atrial fibrillation, and markedly increases the risk of both hemorrhagic and ischemic stroke (O'Keefe et al., 2014). Furthermore, even light to moderate alcohol consumption has been associated with increased risk of many types of cancers, including those of breast, rectum, liver, esophagus, and oropharynx (Testino et al., 2013).

Given the poor health literacy among the people in our communities, the perils of heavy alcohol consumption including risks of cardiovascular disease and cancer are likely to be relatively unheard of. Fortunately, the male responders in the communities did not seem to consume dangerous amounts of alcohol.

3.5. Risk of mosquito-borne illnesses

The *Aedes* spp. mosquito is a vector of the tropical diseases such as dengue, Chikungunya, and Zika in the country of Honduras. In 2015, there were 19,289 confirmed cases of dengue and 85,386 of Chikungunya in Honduras (Zambrano et al., 2017). During the PODEMOS trips from 2014 to 2015, providers encountered a significant volume of chronic musculoskeletal pain from patient-reported prior Chikungunya illness. Symptoms such as headache, fever, rash, headache, and arthralgia are common in all three diseases (Norman et al., 2016). During the nineties, a team of researchers from Johns Hopkins University tried different interventions to reduce the populations of

PODEMOS Summer 2015 Male Health Survey		
Date:		
Location:		
Surveyor Name:		
Translator Name:		
Section A: Demographics		
Participant Instructions: First, we will gather some information about your demographics. You may choose to answer or refuse to answer any or all of these questions. Your participation is completely voluntary and your answers will be kept anonymous. Your name and the names of your family members will not be recorded or presented with the information you give us. Likewise your treatment in the clinic will not be affected by any information you share with us. If you choose not to participate or feel uncomfortable and wish to pause or leave at any time you are free to do so without any penalty or loss of benefits to which you are entitled.		
No.	Question	Response
A1	What is your age?	# Years: _____
A2	What is your marital status?	A. Never married B. Married C. Divorced/separated D. Widowed E. Union libre F. Other (please explain): _____
A3	How many years of formal education have you received?	# years: _____
A4	Do you work outside of your home?	A. No (go to A5) B. Yes
	A4a. What kind of job do you have?	Open Response:
	A4b. Do you own your own business or property?	
A5	How many total people are in your household?	# _____
A6	How many children are in your household?	# _____
A7	What is your estimated annual income? (In lempiras)	# _____ lempira
A8	Do you or anyone in your household receive money from family outside of Honduras?	A. Yes B. No C. Do not know/Unsure
A9	Where do you live?	Open Response:
Section B Part 1: General Health		
Participant Instructions: The next set of questions asks about your general health. Please answer them to the best of your ability. You may choose to answer or refuse to answer any or all of these questions.		
No.	Question	Response

Fig. 1. Survey instrument page 1.

Aedes mosquitoes in the town of El Progreso, Honduras, the same town PODEMOS visits (Fernández et al., 1998; Leontsini et al., 1993). They successfully implemented a cleaning procedure on concrete washbasins, which act as harbors for Aedes ova, and the levels of mosquitoes capable of transmitting Dengue, Chikungunya, and Zika decreased. The cleaning method, “La Untadita”, consists of mixing chlorine bleach and detergent, applying the mixture to the washbasin to soak, and then scrubbing the basin with a bristle brush and rinsing off. (Fernández et al., 1998; Sherman et al., 1998). Their intervention consisted of educating and providing handouts and stickers to be placed on the

concrete washbasins to show community members how to perform “La Untadita” cleaning. Their results from 528 households showed that education effectively lowered the number of washbasins with any larva or pupa and lowered the Washbasin Infestation Index (Fernández et al., 1998). We evaluated the prevalence and consistency of cleaning of washbasins in the different communities.

The prevalence of knowledge on performing the “La Untadita” method to clean concrete washbasins was not assessed in the study. However, given the significant number of responders reporting not cleaning their concrete washbasins, future teams could focus on

B1	Have you ever had your blood pressure measured?	A. Yes B. No (Go to B2)
	B1a. If Yes, what were your results?	A. Elevated B. Low C. Normal D. I don't smoke now
B2	Have you ever had your blood sugar measured?	A. Yes B. No (go to B3)
	B2a. If Yes, what were your results?	A. Elevated B. Low C. Normal D. I don't smoke now
B3	How many cigarettes do you smoke on an average day now? (a pack has 20 cigarettes)	A. 41 cigarettes or more B. 21-40 cigarettes C. 1-20 cigarettes D. I don't smoke now
B4	Does anyone else in your house smoke?	A. Yes B. No (go to B5)
	B4a. If yes, how many people?	# _____
B5	What is the average number of alcoholic drinks you consume in a week?	Open response:
B6	Have you ever had a cholesterol test done?	A. Yes B. No (go to B7)
	B6a. If Yes, what were your results?	A. Elevated B. Low C. Normal D. I don't smoke now
B7	Have you ever taken adult vitamins?	A. Yes B. No C. Don't know/Unsure
B8	Have you ever had a testicular exam done by a doctor or self-exam?	A. Yes, a doctor B. Yes, a self-exam C. No
B9	Are you over 50?	A. Yes B. No (Go to B10)
	B9a. Have you ever had a colonoscopy?	A. Yes, more than twice B. Yes, once C. No
	B9b. Have you ever had a prostate exam?	A. Yes B. No
Section B Part 2: Environmental Health		
Participant Instructions: The next set of questions asks about the your environmental health. Please answer them to the best of your ability. You may choose to answer or refuse to answer any or all of these questions.		
No.	Question.	Response

Fig. 2. Survey instrument page 2.

creating an educational project to teach community members on the method of “La Untadita”. This could lead to lower rates of Chikungunya, Dengue, and Zika infections within the PODEMOS communities.

3.6. Musculoskeletal diseases

In all communities, the majority of men had jobs requiring intense

manual labor, including outdoor jobs in agriculture, construction, and security industry. Many of these men reported job activities including cutting weeds with machetes and doing intense physical labor in fields. In PODEMOS clinics, musculoskeletal complaints present frequently to physicians across all communities. A publication in the Journal Work by the Department of Health and Human Services reviewed occupational risk factors for osteoarthritis. For knee osteoarthritis, one of the most common occupational risk factors is heavy physical workload.

B11	Do you have access to electricity?	A. Yes: B. No:
B12	Do you have black water (waste) service?	A. Yes B. No
B13	Where do you wash your clothes?	Open Response:
B15	Do you have a pila at home?	A. Yes B. No
	If yes, how often do you drain it and wash it?	A. Twice a week or more B. Once a week C. Once a month D. Less than monthly E. I don't know F. Other:
B16	What is the main source of water for your household?	Open response:
B17	Do you do anything to treat your drinking water?	A. Yes: _____ B. No C. Don't know/Unsure
Section B Part 3:Healthcare Access		
Participant Instructions: The next set of questions asks about medical services you receive outside of PODEMOS clinics. Please answer them to the best of your ability. You may choose to answer or refuse to answer any or all of these questions.		
No.	Question	Response
B18	How often do you or a family member see a doctor or nurse?	A. Never (go to B23) B. Once a year C. More than once a year
B19	Where do you or a family member go to see a doctor or nurse?	A. Centro de Salud Guaymitas B. Hospital de progreso C. Centro de Salud de progreso D. Private clinic E. Other: _____
B20	Why do you or a family member go to see a doctor or nurse?	A. Sickness B. Injury C. A regular check-up D. Other: _____
B21	How much does it cost to see a doctor or nurse?	# Lempira: _____
B22	How is the service you or your family members receive?	A: Very good B. Good C. Bad D. Very Bad
B23	What are the barriers to going to see a doctor or nurse?	Open response:

Fig. 3. Survey instrument page 3.

This includes bending of the knee, kneeling or squatting, standing for long hours (> 2 h/day), walking > 3 km/day, regular stair climbing, and heavy lifting (> 10 kg) (Yucesoy et al., 2015). Furthermore, a Danish study showed that male farmers, agricultural workers, and construction workers were 3 times more likely to develop hip osteoarthritis in 10 years compared to male office workers (Andersen et al., 2012). Given the high prevalence of risk factors for the development of osteoarthritis among men in PODEMOS communities, they

are at high risk of suffering from musculoskeletal complaints such as joint and muscle aches and stiffness.

During the summer of 2016, PODEMOS incorporated a physical therapist as part of the providers for the trip. They completed basic assessments on range of motion and functional status, and were able to give general written information and targeted therapeutic exercise interventions to assist with rehabbing the affected areas. Our physical therapist believed most of their interventions were geared towards

Section C Part 1: Sexual History		
Participant Instructions: The next set of questions asks about past experiences and fathering of children. Please answer them to the best of your ability. You may choose to answer or refuse to answer any or all of these questions.		
No.	Question	Response
C1	Have you ever had sex?	A. Yes B. No (go to C4)
	C1a. How old were you when you first had sex?	# Years: _____
C2	Have you ever impregnated a woman?	A. Yes (go to C2a) B. No (go to C3) C. Do not know/ Unsure
C3	How many sexual partners have you had?	# _____
C4	Have you ever felt like you have had or been diagnosed with sexual impotence?	A. Yes B. No
	C4a. Have you ever taken medication to enhance sexual activity?/What kind?/Why?	Open Response:
C5	Have you ever been concerned that you have a sexually transmitted infection?	A. Yes B. No
C6	Have you ever visited a doctor or nurse to examine or test you for sexually transmitted infections?	A. Yes B. No
C7	Have you ever been diagnosed with a sexually transmitted infection?	A. Yes B. No
	C7a. If so, what infection?	Open Response:
	C7b. If so, did you receive treatment?	A. Yes B. No
C8	Are you currently sexually active?	A. Yes B. No (go to C9)
	C8a. With men, women, or both?	A. Men B. Women C. Both
C9	How many different sexual partners have you had at the same time chronologically, not during the same intercourse?	A. 1 B. 2 C. 3 D. 4 or more
Section C Part 2: Contraceptive Use		
Participant Instructions: The next set of questions asks about your past use with different methods of contraception. Please answer them to the best of your ability. You may choose to answer or refuse to answer any or all of these questions.		
No.	Question	Response

Fig. 4. Survey instrument page 4.

outpatient physical therapy, though some acute care was provided with splints and ACE wrapping. Since anecdotally many of the men presenting to PODEMOS clinics have musculoskeletal complaints, further education on preventing muscle overuse and taking scheduled breaks could benefit these patients. Overall, post-trip evaluations concluded that having a physical therapist provided benefit and value of care to PODEMOS clinics. In the future, PODEMOS can continue to include physical therapists in trips to continue to work on education and counselling relating to musculoskeletal complaints presented by

patients. Lastly, PODEMOS can focus on prevention as opposed to treatment, and be involved with partnerships in the ergonomics of the labor contexts in these communities.

3.7. Opinion on contraception

In Latin America, the introduction of contraception has not been easy. Catholic and other largely influential conservative groups have rallied against methods of contraception and in many cases have

C10	Have you ever used any form of contraception or birth control, including condoms or had a vasectomy?	A. Yes (go to C10a) B. No (go to C10b) C. Do not know/ Unsure
	C10a. Which one? (select all that apply)	A. Condom B. Vasectomy C. Abstinence D. Withdrawal (Pull-out Method) E. Outercourse F. Other: _____
	C10b. Why did you not use any form of contraception?	Open response:
C11	Do you know where you would be able to buy or request contraception or birth control if you wanted it?	A. Yes B. No C. Do not know/Unsure
C12	Would you be able to afford to buy or request contraception or birth control if you wanted it?	A. Yes B. No C. Do not know/Unsure
C13	Would you feel comfortable to buy or request contraception or birth control?	A. Yes B. No C. Do not know/Unsure
C14	Have you discussed using contraception with your partner?	A. Yes B. No
C15	Does your female partner/partners use contraception?	A. Yes B. No C. Do not know/Unsure
C16	How would you feel if your partner wanted use contraception, including birth control pills?	Open Response:
C17	How much do you know about female contraception use?	A. A lot B. Somewhat informed C. Do not know/Unsure
C18	How much do you know about male contraception use?	A. A lot B. Somewhat informed C. Do not know/Unsure

Fig. 5. Survey instrument page 5.

Table 1

Average monthly income for full time wages, years of formal education, current smoking percentage, and alcohol use among men in 4 communities in rural Honduras.

Community:	Mean income in lemps/Month for male respondents (% below poverty line)	Mean years of formal education	Percent of current smokers	Percent drinking any alcohol	Percent drinking alcohol heavily (> 14 drinks/week)
Siete de Abril (n = 24)	5105 (39.6%)	6.1	25%	12.5%	0%
Brisas de la Libertad (n = 40)	6143 (26.2%)	5.9	25%	27.5%	0%
Brisas del Norte (n = 27)	5335 (35.9%)	4.8	29.6%	33.3%	0%
Colonia Ebenezer (n = 13)	4220 (50%)	2.6	30.8%	0%	0%
Average in all communities (n = 104)	5453 (34.5%)	4.9	26.9%	22.1%	0%

succeeded from removing it from official health directives (Martin, 2004). Furthermore, it appears that contraceptive options are hard to find and expensive, especially for adolescents at risk for unwanted pregnancies and low-income women in rural areas (Martin, 2004). With

this in mind, we hypothesized that many PODEMOS men would have negative opinions towards female contraception.

It appears that around half of the men interviewed oppose their female partners using contraception. Our interviews suggest that the

Table 2
Male opinions towards female contraception use among men in 4 communities in rural Honduras.

Community:	Percent agreeing with female contraception use	Commonly cited reasons to disagree
Siete de Abril (n = 24)	70.1%	Side effects; Same as abortion; goes against objective of having sex
Brisas de la Libertad (n = 40)	42.5%	Harmful to wife's health; concerns for birth defects
Brisas del Norte (n = 27)	51.2%	Not effective; Harmful to health
Colonia Ebenezer (n = 13)	46.2%	Harmful to women's health
Average in all communities (n = 104)	51.9%	

Table 3
Prevalence of sanitation of water washbasins at risk for harboring *Aedes* mosquito larvae among 4 communities in rural Honduras.

Community:	Percent of responders who report cleaning washbasins at least once per week	Percent of responders who report cleaning washbasins at least once per month
Siete de Abril (n = 24)	100%	100%
Brisas de la Libertad (n = 40)	60%	10%
Brisas del Norte (n = 27)	74.1%	18.5%
Colonia Ebenezer (n = 13)	53.8%	38.5%
Average in all communities (n = 104)	65.4%	35.6%

reasoning behind this is due to lack of knowledge and education. For instance, many believed that all contraception options for women were harmful to their health. Other men were concerned about birth defects with use. PODEMOS can use this information to be more prepared to elicit concerns and questions patients may have before starting to take contraception in the future. Contraception education helps reduce the rate of unintended pregnancies and help families better control when they would like to have children in order to allow time for education and more financial planning (Burkman et al., 2001). Educating about the safety and effectiveness of modern contraceptive options can help dissipate the negative opinions and lead to more widespread use in the future.

4. Conclusion

The findings from this survey can help PODEMOS continue to tailor its interventions to meet the individual needs of the communities served. A key finding from our survey was that many respondents live below the poverty line and have limited formal education, which affect the communities' rates of health literacy and ability to afford health-care. We were encouraged by the fact that no men reported heavy drinking, but see room for improvement with education on smoking habits, contraception use, and reducing musculoskeletal pains. Having a multi-faceted approach that balances the need for increased education, reduced costs, and continued sensitivity to the existing beliefs of our communities can help PODEMOS successfully target these problems. By continuing to monitor our community's perspective on these issues, we can see whether our current practices are successfully combating these topics or whether they need further refining.

Expanding on these topics from 104 men in rural Honduras to a broader scope could help similar organizations increase their surveillance and data collection on these global health issues. Increased data collection from other communities allows for broader monitoring of how opinions vary across different settings and demographics, and can give further insight as to how these global health issues are being addressed at large. Though data collection itself is not an effective intervention, application of our findings can help guide which interventions can be most useful to our individual communities.

Acknowledgements

We would like to acknowledge PODEMOS (Partnership for Ongoing

Developmental, Educational, and Medical Outreach Solutions) for assisting with funding. Special thanks for Rashmi Kashoria, PharmD, and Kevin Hachey, MD.

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