



Hypertension and related lifestyle factors among persons living in rural Nicaragua



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ARTICLE INFO

Article history:

Received 21 November 2014

Revised 31 March 2015

Accepted 20 May 2015

Keywords:

Rural health
Hypertension
Lifestyle factors
Nicaragua

ABSTRACT

Background: Globally about 40% of adults are diagnosed with hypertension, with high-income countries having a lower prevalence than low-income countries. However, there are limited data about adult hypertension prevalence in Nicaragua. The purpose of this study was to determine the prevalence of hypertension in rural coffee farm workers.

Methods: A convenience sample of 229 adult coffee farm workers was used. Blood pressure was measured using an established protocol and the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-7) guidelines.

Results: Nearly 60% of the sample reported at least one prior blood pressure measurement. Hypertension was detected in 16.7% of males and 26.3% of females (20.7% of the total). Prehypertension was detected in 59.3% of males and 27.7% of females (46.2% of the total). Of the men, 51.4% reported smoking at least some days and just over one third of the sample reported adding extra salt to their food.

Discussion: While the prevalence of hypertension in this sample is lower than global estimates, almost half of the sample had prehypertension, demonstrating an area where health promotion efforts could be focused. Given the limited funding and resources often available in these areas, increasing disease prevention efforts (including health promotion and wellness programs) and establishing settings that provide outreach and education, may improve chronic disease management and prevent comorbidities from occurring.

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1. Background

As chronic disease begins to drain already struggling healthcare systems in developing countries, focusing limited resources on appropriate health promotion and education will be more essential. This exploration of hypertension and related life-style factors among rural populations in Nicaragua contributes to a limited body of knowledge and suggests potential areas for resource allocation. The purpose of this study was to determine the prevalence of hypertension in rural coffee farm workers in the department of Jinotega in north central Nicaragua.

The importance of hypertension as a major cause of morbidity and mortality in economically developed nations is well-recognized, however its role in less economically developed nations is not as well understood (Kearney et al., 2005). Globally, the prevalence of hypertension varies widely by country and world region and developing regions are no exception (Ibrahim & Damasceno, 2012). Data from most countries and world regions suggest that between 40% of adult men and women have hypertension (World Health Organization, 2013).

Many developing countries experience an epidemiological transition as they simultaneously address persistent infectious diseases and rising rates of chronic illness with a struggling healthcare infrastructure and limited resources. Not surprisingly, rates of awareness, treatment, and control of hypertension have been reported as low in developing countries (Ibrahim & Damasceno, 2012). This suboptimal management contributes to the rising costs and prevalence of cardiovascular disease in developing countries, with long-term prospects of increasing challenges. An analysis of worldwide hypertension data suggests that, by 2025, almost three-quarters of people living with hypertension will be living in developing countries (Kearney et al., 2005). This projection demonstrates the need to focus attention not only on hypertension, but also on prehypertension, in an effort to mitigate the potential health consequences.

1.1. Prevalence of cardiovascular disease in Latin America and Nicaragua

Nicaragua is a country of nearly 6,000,000 inhabitants, about 55% of whom live in urban areas (Pan American Health Organization (PAHO), 2007). Ranked 129 out of 187 countries and territories on the Human Development Index, about 12% of Nicaraguans live below the international poverty line of less than US \$1.25 of purchasing power parity per day (United Nations Development Program, 2013). Those living in poverty are disproportionately rural, as 70% of this population is considered poor (PAHO, 2007).

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Cardiovascular diseases are the leading causes of death in Nicaragua. Death rates in 2004 were higher in men than in women, 74.7 and 68.1/100,000 respectively. The most commonly reported causes of cardiovascular deaths were: acute myocardial infarction (43%), stroke (27%), and hypertension (12%). For men, myocardial infarction accounted for more than one half of cardiovascular deaths, while for women stroke was the leading cause of cardiovascular deaths (PAHO, 2007).

Despite the increasing burden of chronic diseases in Nicaragua, relatively little is known about the prevalence of hypertension or diabetes. The Central American Diabetes Initiative (CAMDI) was initiated to address this gap in the literature. This cross-sectional descriptive study of 10,822 adults from six Central American countries, including Nicaragua, demonstrated an estimated prevalence of hypertension of 28.9% in urban Nicaraguan adults (PAHO, 2011). Prevalence of hypertension was higher in females than males (32.3 and 25.4% respectively) in this sample of 1694 adults age 20 and over. Guidelines used to define hypertension were: any blood pressure reading above 89 diastolic or 139 systolic, or self-reported hypertension regardless of blood pressure measurement. The prevalence of prehypertension, defined as 80–89 diastolic or 120–139 systolic, was 33.2% overall. Prevalence of prehypertension was higher in males than in females (44.5 and 21.5% respectively). Only 38% of the sample had normal blood pressure readings; 29.2% of males and 46.3% of females (PAHO, 2011).

Blondin and Lewis (2007) reported prevalence of hypertension to be 43.2% in women and 37.8% in men for an overall prevalence of 41.1% in a sample of 1300 adults from a rural Nicaraguan community. Hypertension was defined as follows: any reading above 89 diastolic or 139 systolic, or self-reported antihypertensive medication use regardless of blood pressure measurement. Compared to men, women in their study were more likely to be aware of their hypertensive status, to be taking medication, and to have better control.

1.2. Rural populations and health

Globally, people who live in poverty and extreme poverty are overwhelmingly rural. Less than one half of Nicaragua's population lives in rural areas, yet 65% of the poor and 80% of the extreme poor live in these communities (World Bank, 2008). Nicaragua demonstrates major regional disparities, with areas like Jinotega being disproportionately affected by extreme poverty. Additionally, rural poverty is often more profound than urban poverty, with rural communities facing multiple challenges that may put residents at increased risk of negative health outcomes. Stressors include inhospitable physical terrains, inadequate infrastructure on many roads, sparse electricity, and often unreliable water sources. Additionally, underemployment and low productivity primarily concentrated in the agricultural sector effects the poverty experienced in rural communities. In Nicaragua, agriculture accounts for 50% of the income of the poorest 20% of the people in this country (World Bank, 2008). Many people living in rural communities rely on agriculture for their livelihood, which can be vulnerable to market variations and climatic conditions such as drought, excessive rain, hurricanes, earthquakes or pest-infestation. Natural resources may also be limited in certain regions, and over exploited land can impact food security and health outcomes.

2. Methods

2.1. Design and sample

The purpose of this study was to assess selected lifestyle practices and explore the prevalence, awareness, and treatment of hypertension and prehypertension in a rural community in north central Nicaragua. The study was reviewed and granted exemption by the Institutional Review Board at the university. This study was conducted at a coffee farm located in north central Nicaragua, in the department of Jinotega. There are approximately 300 adults who live and work on this coffee farm

year round. During harvest season the number of workers increases to approximately 2000 due to the influx of migrant labor. Workers are provided with housing, toilet and shower facilities, and meals prepared and served on-site in a communal kitchen/eating area. There are two small bodegas on the farm that sell snack foods. Healthcare is provided at an on-site clinic staffed by two registered nurses. Adjacent to the clinic is a small pharmacy where medications are available at no or low cost. The nearest health center is a 60 minute bus ride outside of the farm.

Although it is not unusual for a worker at the farm to be in his or her late teens, for purposes of this study, adult is defined as age 18 or more. Migrant workers who do not live year-round at the farm, those less than 18 years old, and those with cognitive impairment that precluded responding to questions were excluded from the convenience sample. While there are recognized limitations to using a convenience sample, time factors such as distance to the coffee farm on challenging roads and work schedules of the laborers, and a request from the clinic staff to screen as many people as possible influenced the sampling rationale.

All adult workers and their family members were invited to a day-long health event at the on-site clinic. Workers were encouraged to attend by their work supervisors and by the clinic nurses, who are an integral part of the community. The regional Ministry of Health (MINSAs) also participated in the event, providing free immunizations, women's preventive and diagnostic health services, and primary care services. MINSAs also helped to advertise the event by making announcements throughout the farm and playing music during the day. All data for this project were collected by teams of student nurses from two United States universities and bilingual (Spanish/English) Nicaraguan students from the Universidad Centroamericana (UCA) in Managua. Under faculty supervision, each team of students was trained to collect a specific component of the data and collected that data for the duration of the project.

2.2. Assessment of life-style factors

Demographic characteristics, health status, risk factors such as smoking and dietary habits, and access to health care and treatment including medications were measured using selected items from the Central American Diabetes Initiative (CAMDI) Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors. This survey was developed by the Pan American Health Association specifically for the CAMDI study; no reliability or validity statistics were available (PAHO, 2010).

Survey questions were administered by the native Nicaraguan students from UCA. These students are primary Spanish speakers and were instructed to ask the questions in the order printed on the instrument, without modifying the format of the questions. Smoking status was determined using one question asking about frequency of smoking, with possible responses of: daily, some days, and none. Use of salt was assessed using one question to determine frequency of addition of salt at the table, with possible responses of: always, sometimes, and never. Both smoking and use of salt were collapsed into dichotomous variables to distinguish between any use and no use. To assess access to health care, participants were asked if their blood pressure had ever been measured previously. Possible responses were yes or no/not sure.

2.3. Assessment of hypertension and prehypertension

Blood pressure was measured by senior student nurses. Each participant was asked to sit with his/her feet flat on the ground, with his/her left arm resting on a flat surface level with the heart. The measurement was taken on the left arm, after the participant had been seated for at least 5 minutes. One blood pressure measurement was recorded on each person using a Littmann Classic II SE sphygmomanometer.

Participants were classified as hypertensive if their blood pressure measurement was above 89 diastolic or 139 systolic or if they reported taking anti-hypertensive medication. All reports of anti-hypertensive medication use were confirmed by the clinic nurse. Participants were

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