



# Cardiovascular health in the developing world: community perceptions from Carriacou, Grenada <sup>☆</sup>

Ann Dozier <sup>a,\*</sup>, Robert Block <sup>b</sup>, Deborah Levy <sup>c</sup>, Timothy D. Dye <sup>d</sup>,  
Thomas A. Pearson <sup>b</sup>

<sup>a</sup> *University of Rochester, Community and Preventive Medicine, 601 Elmwood Ave Box 644, Rochester, NY 14618, United States*

<sup>b</sup> *Department of Community and Preventive Medicine, Box 644, University of Rochester, Rochester, New York 14642, United States*

<sup>c</sup> *HVMA Division of Medicine, Brigham & Women's and Faulkner Hospital, 1153 Centre Street, Boston, MA 02130, USA*

<sup>d</sup> *Axios International, Department of Research and Evaluation, 7 boulevard de la Madeleine, 75001 Paris, France*

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## Summary

**Background:** As developing countries shift to an increasing prevalence of cardiovascular risk factors and diseases (CVD), prevention efforts, both primary and secondary, become a public health priority. Designing effective methods requires a clear understanding of local beliefs and practices regarding health risks and behaviors.

**Methods:** A mixed gender and age team deployed a rapid assessment protocol (participant observation and interviews) over three days. Interviews from 25 residents of Carriacou, Grenada included leaders and community members representing a range of demographic characteristics (gender, age, employment).

**Results:** Residents expressed general uncertainty about their actual health. While acknowledging that certain conditions e.g. diabetes, hypertension were prevalent, heredity was viewed as being more strongly associated with CVD. Not being able to work or carry out one's daily activities often drove health care seeking behavior such as evaluation, care or initiating lifestyle changes. Health improvement activities when practiced were fragmented and did not involve an overall lifestyle change. Physical activity was implicitly valued but not universally practiced; it declined with age and increasing work and other commitments.

**Conclusions:** While public health programs benefit from understanding community attitudes and beliefs, research to inform program development is often not under-

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\* Corresponding author.

E-mail address: ann\_dozier@urmc.rochester.edu (A. Dozier).

taken or if undertaken not effectively utilized to make needed program modifications. Key to our conclusions was their perspective on health as illness oriented and reactive, strongly associated with heredity rather than preventive and associated with behavior change. A preventive focus informed by local practices is fundamental to designing effective and sustainable primary and secondary prevention programs and particularly useful in developing countries.

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## Introduction

*“We don’t worry except when you get sick”* – middle aged woman

The epidemiologic transition [1] describes the shift in population mortality from childhood infectious diseases, nutrient deficiencies, and epidemics at all ages, to degenerative and lifestyle-related diseases at a later age. Many developing countries are undergoing a contemporary version of this transition wherein improved public health measures and medical care help individuals live longer, more productive lives. Concurrently these countries often experience changes in diet e.g. fewer whole grains, higher fat intake and reductions in physical activity that lead to a higher prevalence of cardiovascular risk factors and disease [2].

Chronic noncommunicable diseases were estimated to contribute to 59% of global mortality (~32 million deaths) and 43% of the global burden of disease (1998 estimates) [3]. Cardiovascular diseases (CVD) accounted for 31% of worldwide deaths and 10% of global disease burden, based on disability-adjusted life years. A dramatic shift will occur by 2025, with low and middle income countries accounting for over 80% of the global CVD burden. While demographic shifts will drive much of this change, so too will the dramatic increases in urbanization, projected to exceed 40% by 2021. This trend and its associated lifestyles will contribute to higher rates of diabetes and other important cardiovascular risk factors [2].

Population based approaches to reduce CVD have had mixed success in developed and developing countries. Community education, incorporated into the Stanford Three-Community Study, demonstrated a reduced risk of CVD after 2 years among intervention communities relative to control communities [4]. The Finnish North Karelia Project, a comprehensive community program to reduce CVD risk failed to demonstrate a significant difference between intervention and control communities [5,6]. In the Minnesota Heart Health Program, selected interventions were effective in reducing risk in assigned groups [7], but overall the program’s effects were only modest and not statistically significant. In the Pawtucket Heart Health Program, early

significant differences between a community exposed to an educational, screening, and counseling program and a control community were not sustained [8]. In the Stanford Five-City Project, after a mass-media educational campaign, the intervention community lowered its short-term relative risk but over time experienced no significant difference in CVD events compared to control cities. The authors concluded, “it is most likely that some influence affecting all cities, not the intervention, accounted for the observed change.” (p. 322) [9].

Impact evaluations of similar programs in developing countries are limited. An intervention in Mauritius involving fiscal and legislative measures, the use of mass media, along with school, workplace, and community education, yielded significant 5-year reductions in the prevalence of smoking, hypertension, and hypercholesterolemia [10]. Concurrently, the prevalence of diabetes and obesity increased by 15% and 56%, respectively.

These studies, although community focused, did not employ research strategies that incorporated the community into the design of the intervention, which may explain the lack of sustained programmatic success while emphasizing the importance of ongoing efforts and the need to tailor programs to the target community. Understanding local norms, beliefs and attitudes is a critical first step in engaging the community and designing an effective sustainable intervention.

The World Heart Federation (WHF) initiated an epidemiologic study based in the three-island country of Grenada to examine effects of the epidemiologic transition on cardiovascular risk. In selecting this Western Hemispheric country, WHF considered several factors. First, Grenada’s geographic isolation made it amenable to public health measures focusing on the modification of local health practices. Second, the traditional Grenadian diet included liberal amounts of seafood, fresh fruit and vegetables, and thus preserving this diet would be expected to help prevent CVD. Third, Grenada was early in the epidemiologic transition, a stage where interventions that mitigate the transition’s negative health consequences would be more likely to have a positive effect. Lastly, its population of 95,000 would allow for a manageable project.

The research reported here was the first part of this multi-stage community-based research project to study heart health in each of the three islands of Grenada. Given the pre-existing differences among the three islands e.g. infrastructure, industry and access to health-related resources, generalizability of findings from one island to another was not assumed. On each island a similar methodology would be followed: formative research using qualitative methods; CVD and risk factor surveillance (epidemiologic survey); and programmatic interventions. The latter would be designed to moderate the development (primary prevention) or progression (secondary prevention) of CVD and its risk factors. The formative findings would inform the surveillance methods and processes and the program interventions to assure alignment with the local environment and the community's beliefs and practices. We report findings from the formative research conducted on one of the islands, Carriacou.

## Materials and methods

This project employed rapid assessment procedure (RAP), an anthropologically based method, used internationally to assess health-related attitudes and behavior and health systems [11–16]. Using mixed-methods, this focused, systematic approach contributes to time-efficient formative research [17] Given its abbreviated timeframe, RAP does not replace comprehensive ethnography; rather its focused, qualitative approach provides key insights about a particular issue or situation within a given community or sub-group e.g. how different groups perceive their health, understand causes, view solutions.

## Site

Grenada includes two smaller islands, Carriacou and Petit Martinique in addition to its main island Grenada. The research reported here describes our findings on Carriacou. With a population between 5000–8000, Carriacou has one small urban area Hillsborough with ferry service, a small airport and approximately 10 geographically distributed parishes (districts) in both inland and coastal areas. A hilly island of 13 square miles with winding, mostly paved roads connecting communities, Carriacou has a hospital and a main clinic situated inland on one of the island's peaks and three additional clinics located in the north, central and southern districts. Carriacou has several public primary and two secondary schools. Employment

**Table 1** Rapid assessment procedure domains

Health
Heart health
Cardiovascular risk factors (diabetes, high blood pressure, cholesterol)
Health behaviors (smoking, tobacco use, exercise, diet)
Stress
Locus of control (e.g. religious beliefs)
Migration <sup>a</sup>
Health services (utilization and perception) <sup>a</sup>

<sup>a</sup> Findings not included in this manuscript.

ranges from farming and fishing to shipping and construction as well as service industries (government, education, retail, health). Residents rely primarily on public transportation. Car ownership is the exception. Over 12 different religions are practiced on Carriacou.

## Measures

RAP on Carriacou utilized anthropological techniques, primarily in-depth interviewing coupled with direct and participant observation lasting approximately three days. The semi-structured interview guide included eight domains considered to be relevant to understanding cardiovascular health, health behaviors and health service utilization. For parsimony, only key data from selected domains are reported here (Table 1). In addition to US and Grenadian-based institutional review board approvals, the project's local community advisory board reviewed the methods and facilitated access to key community members.

During the three days of intensive data collection, daily team briefings reviewed progress and included an assessment of interviewees' representativeness across socio-demographic sub-groups and adequacy of data within each domain. Commonalities and differences across the data provided the basis for preliminary discussions of potential themes. Preliminary themes and recommendations emerged after iterative review of notes and were finalized following review and feedback from the local advisory board. The latter served as a form of respondent verification, reaffirming that our interpretation of the formative data was consistent with community beliefs and practices.

## Training

A mixed-gendered team consisting of three University of Rochester (UR) representatives and two

**Table 2** Respondent characteristics

Age category	Sex	
	Male	Female
Under age 40	5	5
Ages 40–60	5	4
Over age 60	3	3

## Representativeness of respondents

Health professional (public and private)	5
Government employee	4
School teacher/administrator	4
Religious leader	2
Community member <sup>a</sup>	10

<sup>a</sup> Retiree, business owner, self/business employed, housewife or unemployed.

residents of Carriacou, Grenada was led by a UR faculty member. Team members completed a joint four-hour RAP training workshop which included discussion, role plays of protocols and interview guide, ethical principles, cultural competency, purposive sampling strategies, and analytic matrices.

## Respondents

The 5-member team completed a windshield tour of the island and participant observations in retail and eating establishments, public venues (town squares, ferry landing site, beaches) and religious events. The team identified potential key informants among adults over age 18 based on their position, availability, representativeness e.g., age, gender or referral from a prior informant. When needed, approval from supervisors was obtained prior to approaching an employee during work. All interviewees received an informational card and an explanation of the project including the verbal consent language. No one refused. Several respondents, who initially had only a few minutes to talk, spent 60–75 min being interviewed. Most interviews lasted 30 min. Written notes were taken omitting identifiers other than general information about age category, gender and nature of employment (Table 2). Of the 25 key informants interviewed, over half occupied leadership or positions of authority in healthcare, education, government or religion. Three interviewees were members of the project's local advisory board.

Interviewees represented men and women ranging in age from early 20s into their 80s and included individuals from higher and lower socioeconomic status. Drawn from different communities, they included parents (in single and two-parent house-

holds), retirees, unmarried and widowed individuals and post-migration returnees. Employed participants held positions with regular weekday hours or were classified as self-employed, sometimes in several different lines of work. Given the absence of census or other demographic data about Carriacou the representativeness of the respondents cannot be determined.

## Results

### Attitudes and beliefs about health, heart health and related conditions

Beliefs regarding what constitutes health varied, ranging from a simple “absence of disease” definition to a more inclusive framework (social and economic factors). See Table 3 for specific respondent statements.

**Table 3** Respondent comments on attitudes and beliefs about health, heart health and related conditions

*“Heart disease is accepted as an illness, rather than thought of as preventable”* – middle aged woman

#### High blood pressure

- *“On average, people are not too concerned [about high blood pressure].”* – middle aged woman
- *“I have always felt good – never go to doctors; pressure checked regularly because [my] Dad died from it”*
- *“After one month you don’t take [pills]...use garlic for pressure...older people advise also the sugar bush, two times daily”* – middle aged woman
- *“Garlic and bush medicine used [for high blood pressure], and felt to work after 3 days of drinking bush tea”* – middle aged woman

#### Diabetes

- *“When you have high sugar, there are not immediate consequences...people only take things seriously when they have end-stage problems.”* – older man
- *“Diabetes is very common. ...It is because of the genetic pool. It is not because they are eating tons of carbohydrates. Lifestyle changes might modify the severity of it, but it may not prevent it.”* – older man

#### Cholesterol

- *“Most patients do not request cholesterol measurement, and coming in to specifically ask for that is very unusual”* – health care professional
- *“I have come to the conclusion that most of the things are genetic, even the cholesterol level.”* – health care professional

#### Health locus of control and spirituality

- *“God has part of your health. Your half of the bargain: eat healthy and exercise”* – middle aged woman
- *“...we are nothing without God; all exercise, diet, smoking-God has a plan for you that you cannot change-you will die when God is ready to let you die but can enjoy that time (if you take care of yourself)”* – older man

Health problems were thought to be primarily hypertension referred to as “high blood pressure” or simply “pressure” and diabetes (referred to as “sugar”). Other health problems such as cancer, asthma, STDs and HIV were rarely mentioned.

Respondents saw a strong association between family history and development of certain conditions, such as diabetes and high blood pressure. Awareness of family history shaped what an individual watched for e.g. symptoms; however care seeking was mainly for treatment not prevention. Preventing health problems or illnesses was not mentioned by lay respondents nor were the words ‘risk’ or ‘prevention’.

Health seeking behavior seldom occurred except when sick. This pattern was consistent across respondents regardless of whether they defined themselves as healthy or as not healthy. Regular medical check-ups were more common among women. Overall, many respondents noted that a functional limitation, especially affecting ability to work, increased whether the individual would consider or seek health care or screening or make a behavior change e.g. attempting to lose weight, exercising more. Taking time off from work to seek care was also mentioned as a barrier.

Among lay respondents, heart disease was considered an acute, not a chronic condition.

## Hypertension

While respondents viewed “pressure” as a major health problem, not all considered it fatal. Family history was cited as the major cause of hypertension. Respondents with hypertension usually treated their condition, but long term they were more likely to use ‘bush’ medicine a local term for herbal or alternative medicine. ‘Bush’, typically a tea or drink made from a local plant e.g. Caraili, sugarbush was viewed as a natural treatment. Self-treatment with “bush” typically started after a confirmed diagnosis and, sometimes after brief use of prescribed medication.

## Diabetes

Estimates of the prevalence of diabetes were high (40–70%) especially for those over age 40. Respondents viewed the risk of diabetes as fixed, due to heredity and aging, rather than modifiable through lifestyle. The association between diabetes and heart disease was rarely mentioned.

## Cholesterol

Respondents indicated that high cholesterol was not common on Carriacou noting that individuals were protected by genetic factors coupled with their low fat diet. As with diabetes, lay respondents did not associate high cholesterol with heart disease. Reports of cholesterol testing were rare. As with anti-hypertensive medications, individuals on cholesterol-lowering drugs may take them for only a month or two; no one mentioned treatment that included lifestyle modification.

## Health locus of control and spirituality

Despite the absence of an orientation to prevention, many respondents expressed a personal responsibility for their own health. Religious beliefs, although central to many individuals’ lives, did not appear to affect or limit their health care seeking behaviors.

## Health behaviors and risk factors

### Exercise

Many respondents cited gardening (vegetable gardens and tending domesticated animals) as their most common type of physical activity (Table 4). Exercise was viewed as a part of everyday activities or work, rather than a scheduled activity.

Community members reporting participation in some team-based or programmed physical activity (swimming, track, cricket, basketball) tended to be under age 35. Middle aged respondents commented on declining physical activity due to age, societal changes e.g. increase in motorized vehicles; availability of other entertainment, and increasing time constraints.

The heat and humidity of the Caribbean climate were not mentioned as factors affecting exercise or physical activity. Both male and female respondents referred to walking (alone or in groups) as a common source of local physical activity however respondents rarely reported walking themselves and few individuals were observed walking.

### Dietary attitudes and habit

Eating habits are affected by accessibility, availability, convenience (ease of preparation), cost, as well as taste. Some respondents noted an increasing awareness of the importance of optimal nutrition.

Respondents reported a daily diet including some form of protein and carbohydrates. Marine based protein sources were ubiquitous e.g. “lam-

**Table 4** Respondent comments about health behaviors and risk factors**Exercise**

- *"I exercise about twice a week but am so busy mostly I do physical activity through caring for sheep daily"* – younger man
- *"Before we used to do a lot more gardening. We don't do as much gardening now, and we sit and watch cricket and soaps [on TV]. So, even though you see more people walking, we are still less active."* – middle aged woman
- *"Exercise is not part of the culture here"* – younger man

**Diet**

- *"You see people who eat a lot [of healthy food], but it is a whole question of preparation... they do not prepare the food well."* – middle aged woman
- *"I love seafoods; I buy fish-stew, steam, not often fried"* – older man
- *"A great deal of carbohydrates are eaten on the island"* – older woman
- *"I grow what I eat and I eat what I grow."* – older man
- *"...eat vegetables mostly on Sundays as this is when the family prepares a large, diverse meal. This is a common custom on Carriacou"* – middle aged man
- *"After Ivan, things like tomatoes, lettuce, beets, plantains, figs... I had to do without them for quite a while. And when it was available, it was too expensive. It is quickly getting better [less expensive], but some people tend to keep the prices [high]."* – younger man
- *"I use regular oil because olive oil, while better, is too expensive"* – middle aged woman
- *"People rarely eat out – it is not like in the United States where people eat out all of the time. They prepare their own food at home and take it to work."* – middle aged man
- *"Sometimes, at night, I might eat a sandwich or something light, and nothing heavy. I usually eat a good lunch."* – younger woman

**Weight and body size**

- *"Many people feel that family history determines weight/obesity status"* – health care professional
- *"Looks does [sic] not say how healthy a person might be. A fat person or a thin person could be healthy. And a thin person or a fat person could have poor health. You can't tell."* – middle aged woman

**Stress**

- *"Yes, there is a lot of stress in the community. It is a different kind of stress. It is very real. Economic, personal relationships, sickness in family. After Ivan, we had other kinds of stress."* – older man
- *"Stress comes about when the work days are filled with ups and downs. This [makes the body feel] heavy and weary and tired. Stress is occasional, and does not change health conditions. So, sleeping sometimes eliminates the tension."* – middle aged man
- *"Life is hectic, I try... to download [get rid of] the stress"* – younger man

bi" (conch), fish and considered to be components of the "traditional diet". Daily vegetable consumption was common and ranged from one to three times a day. Most daily consumption was from starchy e.g. pigeon peas, corn rather than leafy green vegetables.

Most vegetables including carrots, caliloo (taro greens), okra, cabbage and greens were available for purchase and eaten fresh; frozen or canned vegetables were commonly available and added to stews. Due to preparation time, weekend meals generally included a greater variety of foods than weekday meals. Vegetables were less available and more costly since Hurricane Ivan (Fall 2004). While availability was improving, some respondents did not think hurricane-related cost increases would return to pre-Ivan levels.

Fruit consumption was also part the daily diet often in the form of juice in tins or freshly squeezed. Pharmacy stocks included vitamins and the grocery sold nutritional/energy drinks, but when typical diets were discussed, these drinks were rarely mentioned. A range of oils (olive, coconut, vegetable) was available for purchase. While

respondents mentioned using olive oil when possible, they also noted its higher cost as a barrier. Coconut and vegetable oils were more commonly mentioned for cooking. Lunch was generally the largest meal of the day. Adults commonly take lunch to work or buy take-away food. Snacking between meals was not a common practice but recognized as contributing to weight gain.

**Attitudes about weight and body size**

Body shape or size were not viewed as related to health. Neither thinness nor overweight were considered a good or ideal body size – being "thick" or filled out was preferable, particularly for women. More women than men appeared to be overweight or obese on Carriacou. Overweight was not viewed as a sign of health or power. Respondents associated weight or body size with heredity. Similarly, respondents emphasized that losing weight meant that you were probably ill e.g. HIV/AIDS or diabetes. Women were more likely to have attempted to lose weight, with little reported success. Several dieting methods were mentioned including eating less and differ-

ent food types. Over-the-counter diet pills, available in pharmacies were never mentioned.

**Smoking habits**

Smoking tobacco was atypical. More men than women reported smoking. With one exception, of the few smokers observed all were male. Use of ‘weed’ (marijuana) was mentioned as much more common than tobacco, and primarily by young adult males. ‘Kids are smoking too much marijuana today, wasting their lives’ — older man.

**Attitudes about stress and health**

Some respondents spontaneously mentioned stress, although their descriptions varied, from being experienced constantly to more situational. The latter was viewed as something brought on by one’s own commitments, particularly employment.

One younger man, a non-native, expressed surprise that residents talked about stress, ‘how can you be stressed here...look at the view...there is no traffic.’

Respondents did not consistently connect stress with health. Over-the-counter dietary supplements were available at the local pharmacies for one’s ‘hectic life’. Some respondents reported using relaxation, sleep, or ‘bush’ treatments for stress related headaches. No one mentioned religion or faith as a way to deal with stress.

**Discussion**

While public health programs benefit from understanding community attitudes and beliefs, research to inform program development is often not undertaken or if undertaken not effectively utilized to make needed program modifications. Key to our conclusions were their perspectives on health as ill-

**Table 5** Recommendations based on conclusions from formative research on Carriacou, Grenada

Program conclusions	Recommendations
Self-perception of health	Survey: Incorporate items into the survey about stress, and barriers to exercise; local foods and the manners of preparation/use; awareness of risk factors for disease Program: Address issues of uncertainty about health and the role of heredity; role of education and screening
Connection between prevention activities, risk, and heredity in cardiovascular disease development	Survey: Build risk profile into survey, help individuals establish their risk; provide counseling as first step to help individuals to identify how to reduce risk Program: Differentiate between harm reduction and risk reduction; address both programmatically. Clearly identify the role and value of prevention. Help individuals identify facets of their own risk profile, beyond just heredity. Promote individual empowerment (personal responsibility) through proficiency in using their risk profile to reduce their risk
Functional limitations	Survey: Assess work and physical activity Program: Design prevention programs in the context of maintenance of function, rather than the promotion of health
Health improvement activities	Survey: Use of natural/bush medicines; barriers to implementation of healthy lifestyle habits Program: Build existing practices into a coherent set of risk-based lifestyle changes, use risk profile to provide individualized priorities. Make use of their acceptance of natural (not prescription/medication) approaches to treating conditions. Link with faith-based organizations
Physical activity is implicitly valued, not practiced	Survey: Assess level and types of physical activity Program: Design skills building programs for time and stress management to create opportunities for exercise. When fashioning exercise promotion programs, build on existing sources of physical activity, such as gardening, job-related exercise
Institutionalization of dietary changes post Hurricane Ivan	Survey: Identify dietary patterns particularly consumption of fish, vegetables, fruits and use of fat Program: Work to better understand what is available and affordable on Carriacou. Redefine ‘what is a balanced diet’, based on what is currently available and affordable. Build on pre-Ivan dietary patterns

ness oriented and reactive, strongly associated with heredity rather than preventive or associated with one's behavior. With the shift to greater morbidity and mortality from chronic diseases, a longer term, preventive focus becomes a fundamental priority when designing cardiovascular risk reduction interventions.

Specific study conclusions on the design of cardiovascular surveillance and public health programs were wide ranging. To facilitate utilization, each conclusion generated from the findings was linked to specific recommendations (Table 5) informing the next phases of work on Carriacou e.g. epidemiologic survey; cardiovascular health programs and intervention.

### Summary of conclusions

Many local beliefs, customs, and traditions are closely related to self-perception of health among Carriacou residents. There was a general uncertainty about one's actual health. While the residents acknowledged that conditions such as diabetes and hypertension were prevalent, they did not see them as related to CVD. They held strong beliefs about the role of heredity in disease development while also recognizing their personal responsibility to take care of one's self. To maximize effectiveness, health program planning must acknowledge and incorporate these beliefs. Additionally any health communication or other health related discussion as part of the program should incorporate information about the interaction among prevention activities, risk reduction, and heredity in disease development. For example, in Carriacou the respondents lacked understanding of the linkages between conditions viewed as hereditary, such as diabetes and high blood pressure, and the value of dietary modification.

Functional limitations such as not being able to work or carry out one's daily activities often drove health care seeking behavior that could include evaluation, care or initiating lifestyle changes. Building on this existing motivator may engage some individuals, in secondary prevention or risk reduction activities, who might otherwise not be interested. Health improvement activities e.g. regular consumption of vitamins/herbs, healthier oils and weight loss attempts, while employed by some residents appeared fragmented, not a general health-related lifestyle change. Associating these activities with an individual's risk profile obtained during surveillance activities could begin to reduce this fragmentation. Similarly, physical activity was implicitly valued but not universally practiced.

Building physical activity into daily routines at work and home was common and may be a more effective, sustainable strategy than promoting exercise. This may help overcome the acknowledged decline of exercise with age and increasing work and other commitments. Lastly local dietary habits were affected by changes following Hurricane Ivan. While noting the change, residents did not appreciate that these changes (shifting away from their traditional diet) are possibly being institutionalized into the local diet.

Programs or approaches successfully implemented in developed countries to improve public health may not serve developing countries well. Formative research can inform proposed interventions by establishing an understanding of community norms and attitudes and in turn building this understanding into program or intervention design. This study describes a useful methodology to understand local views about cardiovascular health and risks, deployable in a developing country and how to translate findings into meaningful program recommendations.

### Conflict of interest statement

None declared.

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