

## **Does Remote Population Have Better Immune Protection Against Cardiovascular?**

Veshal Thupa<sup>1</sup>, Rahul Dherej<sup>1</sup>

<sup>1</sup>Faculty of Medicine, Swami Rama Himalayan University, India

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### **Abstract**

In isolated ethnic groups, the epidemiology of cardiovascular diseases (CVD) is yet unclear. The purpose of this research is to examine the impact of environmental, dietary, and endogenous variables on the prevalence of cardiovascular disease risk factors. To conduct a cross-sectional research on healthy individuals. Enzymatic techniques were used to assess glycaemia and lipids, and the results were analyzed using Body Mass Index and Blood Pressure. Animal proteins, saturated and unsaturated fats, sodium chloride, monosodium glutamate, and refined sugar are more prevalent in metropolitan foods than in rural ones. They are more sedentary and had higher BMI, DBP, and SBP levels ( $p < 0.0001$ ). There is a 1.5 times greater frequency of pre-HT, stage I/II HT, and atherosclerosis among city residents compared to those in rural areas, where the atherogenicity index is lower (2,77 vs 3,84). According to our results, none of the people in the study were underweight or malnourished. Despite this, cardiovascular risk variables like as CT, TG, CDL-C/HDL-C, glycaemia, and blood pressure rise as a result of lifestyle changes associated with urbanization among city dwellers. There is no evidence to suggest that the characteristics of the population under research make them more immune to these diseases than other populations.

**Keywords:** Remote Area Population, Immune, Protection

### **Introduction**

The main cause of disability and early mortality in the world today is cardiovascular disease (CVD) (Lozano et al., 2012; WHO, 2013) CVD is thought to be responsible for more than a third of all worldwide fatalities, with the majority (more than 80%) occurring in underdeveloped nations (WHO, 2013). The epidemiological change in sub-Saharan Africa is linked with a significant rise in cardiovascular disease (CVD) and its risk factors, particularly among urban populations (Touze, 2007; Dalal et al., 2011). There was a time when these ailments were not a serious concern, but now they are, and Sub-Saharan Africa faces a double burden of communicable and non-communicable diseases (Frohlich & Potvin, 2008; Mensah, 2008a; Lang, 2012; Lim et al., 2012; WHO, 2013; Houehanou et al., 2015).

Because to poor wages, difficulty getting treatment, and inadequate prevention, coronary heart disease and cerebrovascular accidents (CVA) are as common as infectious and nutritional disorders (Mensah, 2008b; Barton et al., 2011; Lang, 2012; Houehanou et al., 2015). CVDs have a significant impact on the economy because of the high expenses of therapy, illness management, and decreased productivity of those afflicted (Gaziano et al., 2008; Barton et al., 2011; Dalal et al., 2011; Lang, 2012; IDF, 2013; WHO, 2013). When it comes to CVDs, metabolic variables such as high blood pressure, high cholesterol, diabetes, being overweight, and inheritance typically have a role in the development of atherosclerosis (Ergul, 2000; Frohlich & Potvin 2008; WHO, 2013).

Ethnic communities in the region are still believed to be rather isolated. Those living in this region, which is landlocked and hilly, comprise just 0.1 percent of the total ethnic population. An endogamous marital structure underpins the group's cohesiveness. It is the goal of the current investigation to determine whether or not people moving to the city or staying put have increased their risk of cardiovascular disease (CVD).

## Methods

This investigation of the health of individuals who have recently visited their neighbourhood dispensary is based on the findings of a cross-sectional study. Due of this ethnic group's proclivity for endogamy, local authorities established a hemoglobinopathy screening program. According to the statistics, people between the ages of 18 and 65 account for 5.2 percent of the study population. The subjects were divided into two groups: Group I, which included 210 subjects (farmers and students) from a hamlet 200 kilometres from the capital, and Group II, which included 150 subjects (tradesmen and office employees) who had lived in the city for at least five years and was divided into two groups.

Five milliliters of venous blood are collected from each patient during a fasting period and kept at 4°C in a dry tube until they can be analysed in the laboratory. Centrifuged serum is prepared undiluted for immediate testing at 4°C, with the remainder kept at -20°C for further tests.

This was a semi-structured study of food habits conducted during educational lectures on the need of hemoglobinopathies screening. The subjects' eating habits were elicited. The sample day, participants' ethnicity, marital status, education level, employment goals, and all meals consumed throughout the 48-hour period were all recorded, as were their demographics. Weight measurements were taken on the subject using the SECA 786 scale, which may be obtained here (SECA, France). A Holtex 14287 measuring rod is used to determine an individual's height (Holtex, France).

To perform the research, it was necessary to take two blood pressure (BP) readings from participants while they sat and rested for at least 20 minutes using an automated arm blood pressure monitoring equipment (TB-102 Spengler SAS, Issoudun, France). The PAD and SAP were used to get blood pressure measurements. The JNC VIII reference levels are used to classify various forms of hypertension (James et al., 2014)

The Selectra ProM automaton, which is a multiparametric in vitro diagnostic analyzer, was supplied by ELITEch France. This equipment was used to conduct biochemical testing. Total cholesterol, triglycerides, and HDL-cholesterol levels in the blood were measured using the ELITECH reagent kits PAP CHSL-0455, PAP TGML-0455, and PAP HDLC-0230, respectively, from France. LDL cholesterol (g/L) was calculated using the Friedwald formula as  $CT - (TG/5 + HDL\text{-cholesterol})$ , and atherogenicity indices were calculated using the Friedwald technique as  $LDL\text{-C}/HDL\text{-cholesterol}$ . In the laboratory, GlucoDr Super Sensor electronic glucose meters (Allmedicus, Gyeonggi, Korea) are used to determine capillary glycemia. The PAP kit GPSL-0455 is used to validate the results of enzymatic analysis performed in the laboratory (ELITECH, France).

The GraphPad Prism 5.0 application is used to do statistical analysis on the acquired data. When presenting quantitative data, the Mean Standard Deviation is used. Following the ANOVA test, the Tukey's Multiple Comparison post-test was used to compare the results of the tests conducted by the two groups. This approach employs a 5% threshold of significance ( $p < 0.005$ ).

## Results and Discussion

### Nutritional and Socio-Professional Survey

The data collected has shown that tubers, cereals, vegetables, and fruits are the primary sources of carbohydrate consumption in towns and villages, with the remainder coming from other sources. The city is a major consumer of plant-based protein sources (cowpeas and soybeans). It is more common in the city than it is in the surrounding countryside to consume meat, eggs, fish, and shellfish, according to the USDA. Vegetable oils provide adequate amounts of lipids to meet the nutritional requirements of the human body (palm, soya, rapeseed, peanut, etc.). Fat-soluble and water-soluble vitamins may be found in a variety of meals, including oils, fruits and vegetables, among others. According to the investigation, the people who live in the outlying region eat two meals a day, each of which has an average of 85 percent carbs, 10 percent proteins, and 3 percent to 5 percent lipids. Domestic foods high in saturated and unsaturated trans fats, salt (NaCl), refined sugar, and monosodium glutamate (MSG) outnumber imported goods in the city's three daily meals, which include on average of 75 percent carbs, 15 percent proteins, and 10 percent lipids.

### Anthropometric Data

Table I depicts the demographic features of the study population, which are summarized in the following sentence. There were 360 individuals in all, including 177 males and 183 women (sex ratio of 0.97). Group I is made up of 210 people from the community, with 102 males and 108 women making up the group (sex ratio 0.95). Group II comprises of 150 participants from Lomé, with 75 males and 75 women making up the group (sex ratio 1). The average age of the subjects in the village is 36.61 20.70 years, but the average age of the subjects in Lomé is 35.52 13.41 years, according to the data.

Table I. Anthropometric parameters

		Age (ans)	Masse (kg)	Taille (m)	IMC (kg/m2)
<b>City (n=150)</b>	Male (n = 75)	36,16±13,86	64,24±10,55	1,72±0,07	21,17±3,04
	Female (n= 75)	34,66±11,17	65,47±15,3	1,58±0,04	25,82±5,27***
	total (n=150)	35,52±13,41	64,76±21,07**	1,66±0,10	23,15±4,75***
<b>Village (n=210)</b>	Male (n= 102)	31,81±19,50	50,10±13,32	1,62±0,12	18,47±2,87
	Female (n= 108)	40,56±22,59	51,54±10,97	1,55±0,1	20,94±3,87**
	Total (n=210)	36,61±20,70	50,89±12,08	1,58±0,10	19,90±3,66C

Individuals from Lomé had considerably higher mean BMIs and body mass indexes (p0.001, p0.0001) than subjects from rural villages, according to the findings of the height and body mass measures taken from the two groups shown in table I and figure 1. Women had higher BMI values than males in both the city (p0.0001) and the village (p0.001), according to the data.

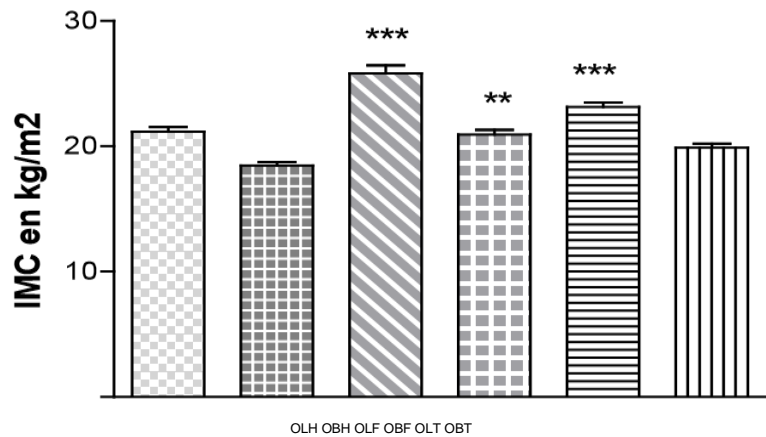


Figure 1. Body Mass Index

### Blood Pressure

The research took into account the individuals' blood pressure data, including PAD and PAS levels, as well as the presence or absence of hypertension. The city's PAD (p0.001) and PAS (p0.05) are both significantly greater than the national average.

Males and females in the village had statistically significant differences in their PAD and PAS, respectively. Normal blood pressure was detected in 62% of respondents in the hamlet and 43% of respondents in the city, respectively (PAS 120 mm Hg, PAD 80 mm Hg). Prehypertensive individuals (high normal blood pressure) are 1.5 times more prevalent in cities than in rural areas, with PAS values ranging from 120 to 139 mm Hg and PAD values ranging from 80 to 89 mm Hg, respectively. Women with hypertension outnumbered hypertensive males by a factor of 1.26 in the hamlet (25.9 percent to 20.6 percent), whereas the ratio was 1.12 in the city (25.9 percent to 20.6 percent) (38.3 percent vs 34.3 percent). Stage I hypertension (PAS 140-159 mm Hg, PAD 90-99 mm Hg) and stage II hypertension (PAS 140-159 mm Hg, PAD 90-99 mm Hg) are more prevalent in the city than in the suburbs (PAS: 160-179 mm Hg, PAD: 100-109 mm Hg). According to the World Health Organization, cities have a 1.56-fold greater prevalence of hypertension (stage I and II) than rural regions (36.43 percent vs 23.34 percent).

### Lipid Balance

The TG levels of the rural population were substantially higher (1.140.82 mg/l vs 0.650.27 mg/l; p0.001) than those of city dwellers (1.951.89 mg/l vs 1.870.52 mg/l; p0.001). Additionally, villager TG levels were substantially higher (1.140.82 mg/l versus 0.650.27 mg/l; p0.001). In comparison to the surrounding region, the city's residents had lower HDL-C values (0.390.17 mg/l vs. 0.430.22 mg/l), but higher LDL-C levels (1.502.00 mg/l vs. 1.210.5 mg/l). Men's LDL-C is considerably higher than women's HDL-C in this research (0.390.15 mg/l vs 0.360.19 mg/l; p 0.01); however, women's HDL-C is significantly higher (0.410.15 mg/l compared 0.360.19 mg/l). The outcomes of the study's surveys and dietary questionnaires performed in the city and hamlet indicate that respondents' lipid balance levels are consistent with the study's conclusions. There were no evidence of malnutrition or obesity in any of the individuals in this investigation (a BMI under 25). According to He et al. (2008) and the World Health Organization (2010), the large disparities in BMI and body mass observed are due to individuals' food choices, lifestyles, and levels of physical activity (farmers and students in the village, shopkeepers and office workers in the city). According to Tété-Bénissan and Gbéassor (2011), the ethnic group's BMI (21.30 3.13) is similar to that of village subjects (19.90 3.66). (Table 1). According to a recent research, a higher BMI and body mass index (p 0.001) among

city dwellers are connected with a sedentary lifestyle and a diet high in animal proteins, fats, and salt. As seen in the graph, there is a strong correlation between the city's performance (25.084.62) and its multi-ethnic population. Obesity is increasing in both rural and urban regions as a result of fast urbanization and considerable changes in the environment, behavioral, nutritional, physical inactivity, and smoking habits. Other studies have shown that obesity is growing in both rural and urban regions as a result of fast urbanization and considerable changes in the environment, behavior, nutrition, physical activity, and smoking (Agoudavi et al., 2012). (Jee et al., 2006; Touze et al., 2007; He et al., 2008; WHO, 2010; Agoudavi et al., 2012; Pessinaba et al., 2012; WHO, 2013).

According to the study's findings, the participants' BMI matches to the normal mean blood pressure levels in the hamlet and city, indicating that they are typically healthy. Prehypertension and hypertension (stages I and II) are 1.5 and 1.56 times more prevalent in the city, respectively, than in the rural. On the other hand, food, a sedentary lifestyle, and stress may all contribute to the higher blood pressure readings among city responders. Recent research has revealed an increase in hypertension in urbanized areas of the village (Agoudavi et al., 2012; Pessinaba et al., 2012; Baragou et al., 2014), as well as in other black African cities (Ergul 2000; Bosu, 2010; Fezeu et al., 2010; WHO 2010, Houéhanou et al., 2015), which has been linked to excessive fat and salt consumption. According to government figures, hypertension is the most frequent cardiovascular disease in Africa, accounting for 25% of the adult population on average. Patients with this condition are more likely to have renal damage (20–69 percent), a stroke (24–50 percent), or cardiac failure than non-patients (16 to 34 percent). Each year, 16.5 percent of the world's population is killed by hypertension, with strokes accounting for 51% of all deaths and coronary heart disease accounting for 45% of all fatalities (Lozano et al., 2010; Lang, 2012 Lim et al., 2012; WHO, 2013). As a result, Lomé residents are more likely to suffer from cardiovascular disease than residents of the hamlet (CVD).

Diabetes is significantly connected with an increased risk of heart disease (Nwaneli, 2010), and 8.3 percent of the global population has diabetes, with 80% of those persons residing in low- and middle-income nations (WHO, 2013). As a result, the incidence of diabetes is expected to climb by 109 percent throughout Africa during the next two decades (IDF, 2013). Despite the fact that neither village nor city suffers from hyperglycemia, which may result in the development of type 2 diabetes, the prevalence of which is estimated to be 4.02 percent in the village, this study showed that neither village nor city suffers from obesity (FID, 2013).

It has been shown that dyslipidemias linked with CT elevation, namely LDL-C elevation and HDL-C depression, contribute to the development of atherosclerosis, the process that causes the bulk of cardiovascular disease (CVD). As previously indicated, CT and TG are carried by lipoproteins. Cryoglobulin is a component of chylomicrons, and VLDL cholesterol is formed by mixing HDL and LDL cholesterol. HDL carries unbound free cholesterol from peripheral tissues to the liver, where it is metabolized. In the natural environment, excess cholesterol is eliminated from the body through the reverse cholesterol transport system. TG-rich particles interact with LCAT and lipoprotein lipase, which are both activated by HDLs carrying Apo A-I. These enzymes are thought to be involved in the increased transfer of cholesterol and lipolysis that occurs when these enzymes come into contact with TG-rich particles; the lower the total cholesterol level, the higher the HDL level. In other words, TG levels in the blood are inversely related to HDL-C levels (Tété-Bénissan et al., 2013; Thompson et al., 2008; Thompson et al., 2013). The subjects assessed did not exhibit symptoms of dyslipidemia based on their respective lipid profiles. On the other hand, the village inhabitants' much higher triglyceride levels are consistent with what has been seen. Due to their genetic history, black

persons are likely to have lower levels of apo C-II active forms or concentrations than Westerners. Apo C-II is required for LPL purification since it is a powerful LPL activator (Thompson et al., 2008; Tété-Bénissan et al., 2013). The term "additional C-II" is an acronym for "additional C-II." A city's population has a lower level of HDL-C and a greater level of LDL-C, indicating that the population is less protected against atherosclerosis. The ethnic group's atherogenicity score is much higher than that of the hamlet (3.84 vs. 2.77). (2.25). Numerous research have shown that the atherogenicity index is effective for atherosclerosis prevention (Greene et al., 2005; Thompson et al., 2008). According to this data, the most significant factors determining the prevalence of CVD risk factors in metropolitan regions seem to be dietary habits, environmental variables, physical activity, and psychological stress. Additional study is necessary to have a better understanding of the involvement of genetic factors in the development of cardiovascular disease (CVD) in urban areas.

## Conclusion

The findings of this research show that city residents who do not suffer from malnutrition or obesity are generally in good health. This suggests that individuals who stayed in the hamlet had maintained a certain level of nutritional equilibrium. Urban persons seem to have higher variables that support hypertension, the development of atherosclerosis, and the onset of CVD, according to average anthropometric, biochemical, and blood pressure characteristics. There would be increased security for the residents of the community. Contrary to popular belief, despite the fact that their genetics are associated with favored endogamy, individuals in cities endure the same fast epidemiological transitions as rural populations. As a result, there is an increase in the likelihood of cardiovascular disease (CVD). The epidemiologist will be able to better care for urban residents with this study's data, which contributes to the ethnobiological categorization of urban dwellers.

## Suggestion

In order to improve the performance of specialist doctors in the field of Putri Hijau Medan, it is recommended that doctors can be involved in decision making and policy formulation so that doctors appreciate any applicable policy changes.

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