

Policy Brief #3

In general, wealthier households, men, and urban households had higher cardiovascular risks than poorer households, women, and rural households.

UPecon Foundation

Measuring Socioeconomic Disparities in Cardiovascular Risk Factors for Better Targeting of Patients¹

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Introduction

Cardiovascular disease (CVD) has become a major health problem not only in industrial countries but in middle-income/emerging economies as well, including the Philippines. For this reason, the prevention, control, and treatment of CVDs has been included in the national health plan. Moreover, under the UN’s Sustainable Development Goals, the Philippines has committed to a 2030 target of one-third reduction in premature mortality from noncommunicable diseases (NCDs) and CVDs are a major contributor to NCDs.

Meeting this lofty goal, however, is currently constrained by the absence in the Philippines of information on how cardiovascular risk affects different social and economic classes, making targeting of cost-effective preventive interventions near impossible. This pioneering study fills this information gap by aiming to predict the risk of CVD event within ten years across household wealth groups (or quintiles), urban/rural residence of respondents, and their educational attainment.

Data and Methods

The study uses data on risk factors for 8,462 individuals aged 40-74 from the 2013 Philippine National Nutrition Survey. Aside from the usual data on sex, age, and residence of respondents, this survey contains their data on the following: (a) proximate CVD risk factors – systolic blood pressure (SBP), total cholesterol (TC), high blood glucose (HBG) or sugar – a marker for diabetes, and smoking; and (b) distal CVD risk factors – body mass index (BMI), physical activity (PA), fat intake (FI), and alcohol consumption.

Because the study is on the measurement of CVD risk factors the effects of which will show up in the future, it excluded participants who already showed outward CVD risks, i.e., who reported either having been diagnosed with CVD or having experienced symptoms of myocardial infarction or stroke, such as sudden slurring of speech, or weakness or numbness in parts of the body lasting more than 24 hours.

The study modelled each of the proximate factors (SBP, TC, and HBG) as a function of the distal risk factors (BMI, PA, and FI) and age. SBP and TC were modeled using generalized linear model with Poisson distribution while HBG was modelled using logit.

¹Based on the article, “Risk factor contributions to socioeconomic disparity in cardiovascular risk in the Philippines: a cross-sectional study of nationally representative survey data” by Callum Brindley, Tom Van Ourti, Joseph Capuno, Aleli Kraft, Jenny Kudymowa and Owen O’Donnell. *BMC Public Health* 23 (2023) <https://doi.org/10.1186/s12889-023-15517-x>.

The study used the Globorisk laboratory-based equation to predict the probability of an individual experiencing, over a period of 10 years, a fatal or non-fatal CVD event, including death from ischemic heart disease or sudden cardiac death, death from stroke, or non-fatal myocardial infarction.

To analyze socioeconomic disparity, the study constructed wealth indices categorizing respondents into quintiles which arrayed households (and therefore the individual respondents) into five groups, from the poorest fifth to the richest fifth group. Across these groups, the study compared the means (or averages) of CVD risk and the risk factors used to predict the risk. The study used a Shapley value decomposition to apportion disparity in CVD risk into contributions of the risk factors.

Results and Findings

Incidence of CVD risks – Table 1 shows the incidence of CVD risks by sex. Out of 4,516 females and 3,946 males, about 29 percent of female participants and 33 percent of male participants had high systolic blood pressure, about 30 percent of female participants and 19 percent of male participants had high total cholesterol, and about 8 percent of female participants and 9 percent of male participants had high blood glucose.

Table 1. Respondents Showing Proximate CVD Risk Factors

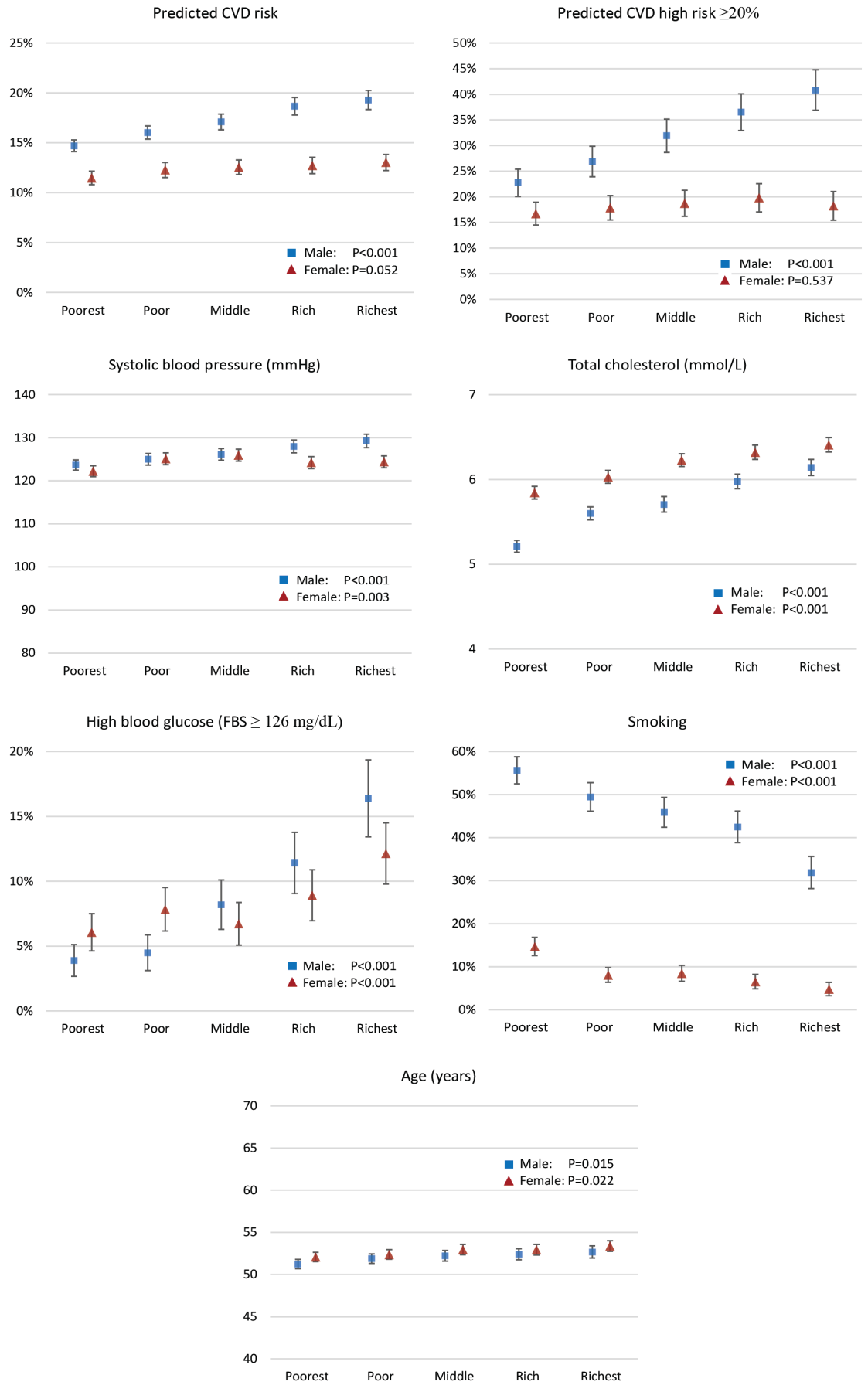
PROXIMATE CVD RISKS	FEMALE (N=4,516)		MALE (N=3,946)	
	n	%	n	%
Systolic blood pressure	1,364	29.3	1,312	33.3
Total cholesterol	1,366	29.8	688	31.3
High blood glucose	371	8.3	314	8.9

Note: In this table, proportions (%) are weighted while counts (n) are not.

Disparity in CVD risk and risk factors - The poorest quintile appears to face lower CVD risk than the richest quintile. The mean CVD risk was only 14.7 percent among the poorest quintile compared with 19.3 percent of the richest quintile. Only about 22.7 percent of the poorest quintile males were exposed to high CVD risk compared to 40.8 percent of the richest quintile males. The higher risk among the wealthier two quintiles was most pronounced in total cholesterol and high blood glucose.

In contrast to the other risk factors, smoking was much more prevalent in poorer quintiles, particularly among males.

Mean CVD risk and risk factors by wealth index quintile group and sex. Individuals aged 40-74 years. Females: n=4516. Males: n=3946. Whiskers show 95 percent confidence intervals. P values from tests of equal means across groups.



Socioeconomic decomposition of disparity in CVD risk factors

Overall risk factors - Wealthier individuals were more exposed to all risk factors, except for smoking, and had higher CVD risks. These socioeconomic disparities were greater for males.

Proximate risk factors - Total cholesterol and high blood glucose accounted for 58 percent and 34 percent, respectively, of the disparity of CVD risk for males, while for females, it was 63 percent and 69 percent, respectively. Systolic blood pressure accounted for 26 percent of the higher CVD risk of wealthier males and had an offsetting effect for females. If smoking prevalence had not been higher among the poor, then the CVD risk disparity against the rich would have been 35 percent higher for males and 75 percent higher for females.

Distal risk factors - Body mass index and fat intake (measured as share of energy intake) contributed most to disparities in systolic blood pressure, total cholesterol, and high blood glucose.

Implications

Table 2. Findings and Implications on CVD Risk Factors

CVD RISK FACTORS	FINDINGS	IMPLICATIONS
Proximate CVD Risk Factors		
Total cholesterol (TC)	TC and HBG contributed most to wealthier quintiles having higher CVD risks	Interventions should focus more on diet and pharmacological therapies
High blood glucose (HBG)		
Distal CVD Risk Factors		
Body mass index (BMI)	BMI and fat intake contribute most to SBP, TC, and HBG	
Fat share of energy		
Physical activity	<Not significant>	Interventions should focus less on exercise and more on diet

Table 3. Findings and Implications on Socioeconomic Decomposition of Risk Factors

FINDINGS	IMPLICATIONS
Wealthier quintiles had higher CVD risks, particularly among males	Interventions to reduce levels of cholesterol and blood sugar can have greatest impact by targeting wealthier individuals
Filipino men had higher CVD risk than women	Interventions could be more fine-tuned to address men's CVD risks
CVD risk is higher, on average, in urban areas	Interventions should focus more on cities and metropolitan areas
Smoking is more prevalent in poorer quintiles, especially among males	Smoking prevention programs should be targeted to poorer individuals, especially males.