Prevalence of Cardiovascular Risk Factors in relation to Socio-demographic profile of the Life Course Study in Cardiovascular Disease Epidemiology Study (LIFECARE) Philippine Cohort

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ABSTRACT

Objective. To describe the distribution of the clinical cardiovascular risk profile of the LIFECARE Philippine cohort in relation to its socio-demographic factors

Methods. We recruited a total of 3,072 apparently healthy participants from Manila and nearby provinces of Rizal, Batangas, Bulacan and Quezon. Face-to-face interview was done to obtain socio-demographic data. Baseline clinical parameters and biochemical tests were obtained. Prevalence of cardiovascular risk factors was determined by sex, place of residence, level of education and employment.

Results. Overall prevalence of diabetes mellitus was at 5%, similar between sexes, area class, educational attainment and employment status. More smokers were male, employed or with an elementary level of education. Prevalence of hypertension was at 14.5% and was seen more in males, urban dwellers, employed or with an elementary level of education. Dyslipidemia was seen more in males, living in the rural areas, employed or with a college level of education. Lastly, obese participants were seen more in females, living in urban areas, employed or with a college level of education.

Conclusion. Older, male and employed participants who are living in the urban areas have more cardiovascular risk factors.

Key Words: cardiovascular risk factors, socio-demographic, LIFECARE

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Introduction

For more than a decade, cardiovascular disease (CVD) remains to be the leading cause of mortality in the Philippines.[1] Pioneers in the study of CVD epidemiology perceived the idea that CVD is not an inevitable result of aging but rather due to factors that are related to the environment and change in lifestyle. CVD is a continuum that starts from a chain of events initiated by numerous risk factors such as cigarette smoking, diabetes mellitus, elevated cholesterol, diabetes mellitus, obesity and physical inactivity. These cardiovascular risk factors promote oxidative stress and enhance cellular adhesion molecules, which lead to endothelial dysfunction and progression of disease. However, these events do not happen in a sequential manner but may overlap and interconnect with each other.[2] Early identification of these risk factors and addressing treatment, whether pharmacologic or non-pharmacologic, retard the cascade of events that lead to CVD.

Since 1998, the National Nutrition and Health Survey (NNHeS) has been conducting a study every five years to look at the prevalence of cardiovascular disease and its risk factors.[3,4,5]. In the latest survey of 2008, the prevalence of cigarette smoking was 31%, diabetes mellitus by fasting blood glucose 3.9%, dyslipidemia 72%, hypertension 20.6%, obesity by body mass index (BMI) 4.9%, and obesity by waist:hip ratio 10.2% and 65.6% in males and females, respectively.[5] To date, the NNHeS is the only recognized prevalence data of CVD and its risk factors in the Philippines.

It has been a known fact for years that those living in the third world countries are observed to have poorer health outcomes. In the Philippines, access to quality medical care is limited for those who are indigent since the patient shoulders most of the expenses. There are numerous of evidences that show an inverse relationship between socio-economic status and CVD risk factors.[6-10] The aim of this

paper is to look into the prevalence of CVD risk factors in relation to socio-demographic profile among the participants of the Life Course Study in Cardiovascular Disease Epidemiology (LIFECARE) cohort study.

Objectives

General Objective

To describe the distribution of the clinical cardiovascular risk profile of the LIFECARE Philippine cohort in relation to its socio-demographic factors

Specific Objective

To describe the prevalence of clinical cardiovascular risk profile of the LIFECARE Philippine cohort in relation to sex, place of residence, educational attainment and employment status

Materials and Methods

Study Population

LIFECARE is a descriptive, prospective cohort study, which included apparently healthy individuals aged 20 to 50 years old. Recruitment of participants was done from the year 2009 to 2011. Certain provinces and barangays from Luzon namely, Metro Manila, Rizal, Batangas, Bulacan and Quezon were conveniently chosen based on proximity and safety. Excluded were those who have existing cardiovascular disease as determined by the respondent's medical history (previous myocardial infarction [MI], stroke, peripheral arterial disease [PAD]; history of malignancies [treated or otherwise]); plans to migrate outside their community within the next 5 years; pregnancy, breastfeeding or lactation in women, and those who are eligible but at home only once a month which would make them unavailable for follow-up. A detailed description on how the participants were randomly selected was discussed in a previous paper.[11,12] Informed consent was obtained in all participants.

Data Collection

Face-to-face interview was done at the participant's residence. Socio-demographic data such as age, highest educational attainment and employment status were obtained during the interview. They were also asked regarding their smoking history. On a separate day, participants were asked to go to a barangay hall or a health center for the physical examination. They were advised to fast for 10-12 hours prior to the medical examination. Anthropometric measurements (i.e., height, weight and waist circumference) were all measured using standardized techniques. Participants were asked to remove their shoes, heavy outer garments and hair ornaments prior to the measurement procedures. Height was measured using a stadiometer (microtoise), which was taped vertically to a hard flat wall surface with the base at floor level. The weight was measured using a Detecto weighing scale (Missouri, USA) that was calibrated at the beginning and end of each examination day. The scale was balanced with both sliding weights at zero and the balance bar aligned. Participants were instructed to stand at the center of the platform with weight distributed evenly to both feet. Waist circumference (WC) was measured using a tape measure at a level midway between the lower rib margin and iliac crest with the tape all around the body in horizontal position.

Blood pressure was measured using an automated device (Omron Model IA2, which has been validated for use among Filipinos) after at least 5 minutes of rest in the sitting position, using a cuff properly adapted to the arm size. The average of three blood pressure measurements was taken. A trained and registered medical technologist drew blood samples. Blood samples for fasting blood glucose (FBG), total cholesterol (TC), triglyceride (TG), low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C) determination were stored in an ice box and sent to the Medical Research Laboratory of the Philippine General Hospital. Biochemical tests were done using a Cobas Mira blood analyzer (Roche Diagnostics, USA)

Operational Definition

The classification of urban and rural area of residence was based from the Philippine National Statistical Coordination Board (NSCB). An urban area was defined as having a population density of at least 1,000 persons per square kilometer or a central district population of at least 500 persons per square kilometer where the occupation of most of its inhabitants is non-farming or fishing. Its network of streets is in either parallel or in a right angle direction. Furthermore there must be at least 6 commercial, manufacturing or recreational establishments and at least three of the following: a) a town hall, church or chapel with religious service at least once a month, b) a public plaza, park or cemetery, c) a market place or building where trading activities are done at least once a week, d) a public building like a school, hospital, health center and library. Any area that does not meet the following classification is classified as rural.[13]

Body mass index (BMI) is a ratio of weight in kilograms over the square of the height in meters that is used to classify weight in adults. Two (BMI) classifications were used: a) the Who Health Organization (WHO) classification: underweight <18.5, ideal 18.5 – 24.9, overweight 25 – 29.9 and obese ≥30, and b) the Asia Pacific classification: underweight <18.5, ideal 18.5 – 22.9, 23 – 24.9 overweight and >25 obese.[14] Based on WHO, abdominal obesity by waist circumference (WC) is defined as >102 cms (40 in) in males and >88 cms (35 in) in females, while waist:hip ratio (WHR)

is ≥0.9 in males and ≥0.85 in females.[15] Hypertension classification is based on the JNC 7 report. Prehypertension is defined as a systolic blood pressure (SBP) of 120-129 mmHg or a diastolic blood pressure (DBP) of 80- 89 mmHg. Stage 1 hypertension is a SBP of 140- 159 mmHg or a DBP of 90- 99 mmHg. Stage 2 hypertension is a SBP ≥160 mmHg or a DBP of ≥100 mmHg.[16] Fasting blood glucose (FBG) classification was based on the American Diabetes Association (ADA) 2008 report, in which serum FBG of 5.6-6.9 mmol/L is diagnosed as impaired fasting glucose (pre-diabetes) and FBG ≥ 7 mmol/L is diagnosed as diabetes, with no caloric intake for at least 8 hours.[17] Cut-off values for the lipid profile were adopted from the National Cholesterol Education Program Adult Treatment Panel 3 (NCEP ATP III) report. Dyslipidemia was defined as having one of the following: high TC, high TG, high LDL-C and/ or low HDL-C, non-HDL-C which were ≥ 6.2 mmol/L, ≥ 2.26 mmol/L, ≥ 4.1 mmol/L, ≥ 4.1 and ≤ 1.03 mmol/L, respectively.[18]

Statistical Method

Descriptive statistics such as mean, standard deviation (SD), and median were computed for continuous variables while frequency and percentages were presented for categorical variables. The Mann-Whitney U-test was applied to examine the statistical significance of each clinical risk factor by sex (Male vs. Female). All statistical analyses were performed using Stata 10 for Windows® (STATACORP LP1, College Station, Texas, USA). A statistical significance was set at $p < 0.05$.

Results

A total of 3,072 eligible participants were recruited, composed of 43% male and 57% female. Males had a higher median SBP, DBP, FBG and TG with a low median HDL compared to females. Females had a higher median LDL and BMI compared to males. There was almost similar median TC for both sexes (Table 1). However, in spite of these differences, the prevalence of diabetes, high TC and a high LDL-C were similar for both sexes (Table 2) Overall prevalence of diabetes mellitus was at 5%. The prevalence of smokers in the overall population was high (34.6%). More females (9 out of 10) than males (1 out of 3) denied having smoked. Overall prevalence of overweight in the cohort was 23.7% by WHO classification and 16.7% by the Asia Pacific classification. Meanwhile the overall prevalence of obesity was 6.84% by WHO and 30.6% by the Asia Pacific classification. Females were more obese than males using either criterion. Overall prevalence of those with hypertension was 14.5% of which two-thirds were at the stage 1 level. There were more hypertensive males than females. Nearly half (43%) of the males and a quarter (26%) of the females were in the pre-hypertensive level. Dyslipidemia, defined by a low HDL or a high TG, was seen to be higher in males. Low HDL (38%) was the most common lipid abnormality. (Table 2) There is a positive relationship of the prevalence of risk factors with age (except for smoking) as seen in both sexes (Table 3).

Table 1. Cardiovascular Risk Factors According to Sex

	Total (n = 3,072)	Male (n = 1,329)	Female (n = 1,743)	*p-value**
Systolic BP				
Mean (SD)	121.28 (18.48)	126.19 (17.38)	117.53 (18.43)	<0.0001
Median	118.33	124	114	
Diastolic BP				
Mean (SD)	72.45 (12.01)	73.32 (12.44	71.78 (11.63)	0.0003
Median	70.67	71.67	70	
Fasting Blood Glucose				
Mean (SD)	5.42 (1.58)	5.50 (1.49)	5.37 (1.65)	<0.0001
Median	5.14	5.24	5.06	
Total cholesterol				
Mean (SD)	4.77 (1.09)	4.76 (1.15)	4.78 (1.04)	0.333
Median	4.68	4.68	4.69	
Triglyceride				
Mean (SD)	1.44 (0.88)	1.70 (1.05)	1.24 (0.65)	<0.0001
Median	1.22	1.46	1.07	
HDL cholesterol				
Mean (SD)	1.16 (0.34)	1.09 (0.32)	1.22 (0.35)	<0.0001
Median	1.12	1.04	1.18	
LDL cholesterol				
Mean (SD)	2.94 (0.95)	2.89 (0.96)	2.98 (0.95)	0.0017
Median	2.89	2.82	2.94	
Body Mass Index				
Mean (SD)	23.35 (4.28)	23.12 (3.94)	23.53 (4.51)	0.055
Median	22.73	22.56	22.84	

**Mann-Whitney U-test*

Rural and urban

There were more overweight, obese, higher level (stage 2) of hypertension and pre-diabetic participants living in the urban areas. Rural dwellers tend to have more smokers, low HDL-C, high TC and high non-HDL-C. Dyslipidemia by high LDL-C and high TG were similar for both areas. Somewhat similar proportions of diabetics were seen in either area of residence. (Table 4)

Employment and Educational status

Those who were employed have more risk factors such as smoking, overweight, obesity by the Asia-Pacific criteria, hypertension, impaired fasting glucose and dyslipidemia (Table 5). Participants who have attained a college level of education were more overweight, obese and have a higher TC, LDL-C and TG levels. More smokers, hypertensive, diabetics and low HDL-C were seen in those participants who have reached at least a primary level of education (Table 6).

Table 2. Prevalence of Cardiovascular Risk Factors According to Sex

	Male (n = 1,329) %	Female (n = 1,743) %	Total (n = 3,072) %
Age (years)			
20-29	30.25	26.33	28.03
30-39	35.89	35.86	35.87
40-50	33.86	37.81	36.10
Smoking History			
Current smoker	53.57	7.86	27.64
Previous smoker	12.49	2.81	7.00
Non-smoker	33.94	89.33	65.36
Body Mass Index (WHO)			
(<18.5) Underweight	9.78	9.70	9.73
(18.5 – 24.9) Ideal	61.32	58.46	59.70
(25 – 29.9) Overweight	23.48	23.92	23.73
(≥ 30) Obese	5.42	7.92	6.84
Body Mass Index (Asia Pacific)			
(<18.5) Underweight	9.78	9.70	9.73
(18.5 – 22.9) Normal	44.32	42.00	43.00
(23 – 24.9) Overweight	17.01	16.47	16.70
(≥ 25) Obese	28.89	31.84	30.57
Blood Pressure			
Normotensive	40.11	63.35	53.29
Prehypertensive	42.81	25.90	33.22
Stage 1 hypertension	11.89	6.78	8.99
Stage 2 hypertension	5.19	3.96	4.50
Total Cholesterol (mmol/L)			
<5.2	69.50	69.19	69.34
5.2 - 6.1	20.92	21.51	21.26
≥ 6.2	9.56	9.29	9.41
LDL cholesterol (mmol/L)			
<2.6	40.63	35.80	37.89
2.6 - 3.3	33.33	33.56	33.46
3.4 - 4	15.65	19.85	18.03
≥4.1	10.38	10.79	10.61
HDL cholesterol (mmol/L)			
<1.03	47.63	31.04	38.22
1.03 – 1.54	45.37	53.82	50.16
≥ 1.55	7.00	15.15	11.62
Triglycerides (mg/dL)			
<1.7	62.23	82.10	73.50
1.7 – 2.25	18.28	10.73	14.00
≥ 2.26	19.49	7.17	12.50
Non – HDL Cholesterol			
<3.4	43.49	47.45	45.74
3.4 – 4	25.66	25.53	25.59
≥4.1	30.85	27.02	28.68
Fasting Blood Glucose (mmol/L)			
<5.5	63.60	72.95	68.90
5.5 – 6.9	31.50	21.94	26.08
≥7	4.90	5.11	5.02

Table 3. Comparison of Cardiovascular Risk Factors According to Sex and Age Group

	MALE (n = 1, 329)			FEMALE (n = 1,743)		
	20-29 (n = 402) %	30-39 (n = 477) %	40-50 (n = 450) %	20-29 (n = 459) %	30-39 (n = 625) %	40-50 (n = 659) %
Smoking History						
Current smoker	53.98	52.83	54.00	9.37	6.56	8.04
Previous smoker	7.96	11.11	18.00	2.18	2.56	3.49
Non-smoker	38.06	36.06	28.00	88.45	90.88	88.47
Body Mass Index (WHO)						
(<18.5) Underweight	14.93	8.18	6.89	16.34	8.80	5.92
(18.5 – 24.9) Ideal	65.42	61.22	57.78	62.96	59.52	54.32
(25 – 29.9) Overweight	15.42	24.95	29.11	14.38	24.16	30.35
(≥ 30) Obese	4.23	5.66	6.22	6.32	7.52	9.41
Body Mass Index (Asia Pacific)						
(<18.5) Underweight	14.93	8.18	6.89	16.34	8.80	5.92
(18.5 – 22.9) Normal	49.50	45.28	38.67	52.51	41.12	35.51
(23 – 24.9) Overweight	15.92	15.93	19.11	10.46	18.40	18.82
(≥ 25) Obese	19.65	30.61	35.33	20.70	31.68	39.76
Blood Pressure						
Normotensive	46.02	40.04	34.89	79.91	68.64	46.81
Prehypertensive	47.01	45.49	36.22	18.34	22.40	34.50
Stage 1 hypertension	6.47	10.48	18.22	1.75	5.76	11.25
Stage 2 hypertension	0.50	3.98	10.67	0	3.20	7.45
Total Cholesterol (mmol/L)						
<5.2	80.85	68.13	60.89	79.74	69.92	61.15
5.2 - 6.1	14.18	21.80	26.00	16.12	20.48	26.25
≥ 6.2	4.98	10.06	13.11	4.14	9.60	12.59
LDL cholesterol (mmol/L)						
<2.6	55.47	36.90	31.33	47.49	36.96	26.56
2.6 - 3.3	28.11	37.32	33.78	35.29	33.12	32.78
3.4 - 4	11.19	15.93	19.33	13.73	19.52	24.43
≥4.1	5.22	9.85	15.56	3.49	10.40	16.24
HDL cholesterol (mmol/L)						
<1.03	45.52	49.06	48.00	32.68	29.76	31.11
1.03 – 1.54	48.01	43.61	44.89	51.63	54.88	54.32
≥ 1.55	6.47	7.34	7.11	15.69	15.36	14.57
Triglycerides (mg/dL)						
<1.7	72.89	60.59	54.44	86.49	82.08	79.06
1.7 – 2.25	14.93	19.92	19.56	7.84	11.04	12.44
≥ 2.26	12.19	19.50	26.00	5.66	6.88	8.50
Non – HDL Cholesterol						
<3.4	61.19	39.83	31.56	60.35	49.44	36.57
3.4 – 4	20.40	27.25	28.67	24.18	24.32	27.62
≥4.1	18.41	32.91	39.78	15.47	26.24	35.81
Fasting Blood Glucose (mmol/L)						
<5.5	74.81	63.73	53.45	83.88	75.44	62.97
5.5 – 6.9	24.44	32.29	36.97	12.64	20.87	29.44
≥7	0.75	3.98	9.58	3.49	3.69	7.59

Table 4. Prevalence of Cardiovascular Risk Factors According to Place of Residence

	Urban (n = 817) %	Rural (n = 2,255) %	Total (n = 3,072) %
Smoking History			
Current smoker	25.95	28.25	27.64
Previous smoker	7.22	6.92	7.00
Non-smoker	66.83	64.83	65.36
Body Mass Index (WHO)			
(<18.5) Underweight	9.18	9.93	9.73
(18.5 – 24.9) Ideal	55.57	61.20	59.70
(25 – 29.9) Overweight	25.95	22.93	23.73
(≥ 30) Obese	9.30	5.94	6.84
Body Mass Index (Asia Pacific)			
(<18.5) Underweight	9.18	9.93	9.73
(18.5 – 22.9) Normal	36.96	45.19	43.00
(23 – 24.9) Overweight	18.60	16.01	16.70
(≥ 25) Obese	35.25	28.87	30.57
Blood Pressure			
Normotensive	51.29	54.02	53.29
Prehypertensive	34.15	32.89	33.22
Stage 1 hypertension	8.57	9.14	8.99
Stage 2 hypertension	6.00	3.95	4.50
Total Cholesterol (mmol/L)			
<5.2	72.58	68.16	69.34
5.2 - 6.1	18.85	22.13	21.26
≥ 6.2	8.57	9.71	9.41
LDL cholesterol (mmol/L)			
<2.6	37.09	38.18	37.89
2.6 - 3.3	32.93	33.66	33.46
3.4 - 4	18.85	17.74	18.03
≥4.1	11.14	10.42	10.61
HDL cholesterol (mmol/L)			
<1.03	33.29	40.00	38.22
1.03 – 1.54	53.98	48.78	50.16
≥ 1.55	12.73	11.22	11.62
Triglycerides (mg/dL)			
<1.7	73.68	73.44	73.50
1.7 – 2.25	13.95	14.01	14.00
≥ 2.26	12.36	12.55	12.50
Non – HDL Cholesterol			
<3.4	50.06	44.17	45.74
3.4 – 4	25.09	25.76	25.59
≥4.1	24.85	30.07	28.68
Fasting Blood Glucose (mmol/L)			
<5.5	65.61	70.10	68.90
5.5 – 6.9	28.89	25.06	26.08
≥7	5.51	4.84	5.02

Table 5. Prevalence of Cardiovascular Risk Factors According to Employment Status

	Employed* (n = 2,068) %	Unemployed (n = 1,004) %	Total (n = 3,072) %
Age (years)			
20-29	23.26	37.85	28.03
30-39	38.39	30.68	35.87
40-50	38.35	31.47	36.10
Smoking History			
Current smoker	33.27	16.04	27.64
Previous smoker	8.27	4.38	7.00
Non-smoker	58.46	79.58	65.36
Body Mass Index (WHO)			
(<18.5) Underweight	8.46	12.35	9.73
(18.5 – 24.9) Ideal	59.57	59.96	59.70
(25 – 29.9) Overweight	25.15	20.82	23.73
(≥ 30) Obese	6.82	6.87	6.84
Body Mass Index (Asia Pacific)			
(<18.5) Underweight	8.46	12.35	9.73
(18.5 – 22.9) Normal	41.92	45.22	43.00
(23 – 24.9) Overweight	17.65	14.74	16.70
(≥ 25) Obese	31.96	27.69	30.57
Blood Pressure			
Normotensive	49.15	61.81	53.29
Prehypertensive	36.43	26.62	33.22
Stage 1 hypertension	9.97	6.98	8.99
Stage 2 hypertension	4.45	4.59	4.50
Total Cholesterol (mmol/L)			
<5.2	67.94	72.21	69.34
5.2 - 6.1	21.81	20.12	21.26
≥ 6.2	10.25	7.67	9.41
LDL cholesterol (mmol/L)			
<2.6	36.90	39.94	37.89
2.6 - 3.3	33.46	33.47	33.46
3.4 - 4	17.94	18.23	18.03
≥4.1	11.70	8.37	10.61
HDL cholesterol (mmol/L)			
<1.03	38.93	36.75	38.22
1.03 – 1.54	49.85	50.80	50.16
≥ 1.55	11.22	12.45	11.62
Triglycerides (mg/dL)			
<1.7	70.70	79.28	73.50
1.7 – 2.25	14.94	12.05	14.00
≥ 2.26	14.36	8.67	12.50
Non – HDL Cholesterol			
<3.4	43.04	51.29	45.74
3.4 – 4	27.08	22.51	25.59
≥4.1	29.88	26.20	28.68
Fasting Blood Glucose (mmol/L)			
<5.5	66.88	73.08	68.90
5.5 – 6.9	27.99	22.13	26.08
≥7	5.13	4.79	5.02

* Employed – employed (regular), employed (not regular), and self-employed

Table 6. Prevalence of Cardiovascular Risk Factors According to Educational Attainment

	Elementary (n = 615) %	High school (n = 1,650) %	College (n = 800) %
Smoking History			
Current smoker	36.42	27.09	21.88
Previous smoker	6.34	7.58	6.25
Non-smoker	57.24	65.33	71.88
Body Mass Index (WHO)			
(<18.5) Underweight	10.41	10.24	8.00
(18.5 – 24.9) Ideal	64.72	59.45	56.25
(25 – 29.9) Overweight	19.67	24.30	25.87
(≥ 30) Obese	5.20	6.00	9.88
Body Mass Index (Asia Pacific)			
(<18.5) Underweight	10.41	10.24	8.00
(18.5 – 22.9) Normal	47.48	43.33	38.63
(23 – 24.9) Overweight	17.24	16.12	17.63
(≥ 25) Obese	24.88	30.30	35.75
Blood Pressure			
Normotensive	49.27	54.18	54.13
Prehypertensive	35.77	32.79	32.25
Stage 1 hypertension	9.43	8.85	9.00
Stage 2 hypertension	5.37	4.12	4.63
Total Cholesterol (mmol/L)			
<5.2	68.46	69.94	68.50
5.2 - 6.1	23.09	20.48	21.63
≥ 6.2	8.46	9.58	9.88
LDL cholesterol (mmol/L)			
<2.6	38.86	37.58	37.75
2.6 - 3.3	31.38	34.06	33.63
3.4 - 4	19.51	18.24	16.63
≥4.1	10.24	10.12	12.00
HDL cholesterol (mmol/L)			
<1.03	41.30	39.21	33.75
1.03 – 1.54	47.80	50.36	51.50
≥ 1.55	10.89	10.42	14.75
Triglycerides (mg/dL)			
<1.7	74.15	74.42	70.88
1.7 – 2.25	13.66	13.15	16.13
≥ 2.26	12.20	12.42	13.00
Non – HDL Cholesterol			
<3.4	44.55	45.82	46.38
3.4 – 4	26.18	25.64	24.88
≥4.1	29.27	28.55	28.75
Fasting Blood Glucose (mmol/L)			
<5.5	65.20	68.73	71.50
5.5 – 6.9	29.43	26.42	22.88
≥7	5.37	4.67	5.50

Discussion

The Philippine LIFECARE cohort is the first longitudinal study in this country that will look into the epidemiology of CVD. We included adults whose age range comprised mostly the workforce of our society. Individuals with known CVD were excluded since this study will later on look into all possible trajectories of development of the disease. The baseline data on prevalence of cardiovascular risk factors is common among this group. In contrast with the available national data, the NNHeS, showed a higher overall prevalence of smoking, hypertension and obesity but with less diabetes.[5] However, these two cohorts were incomparable since the NNHeS also included older individuals aged over 50 years old.

Our results showed that there were more males who have more cardiovascular risk factors compared to females. The widening gap in the frequency of risk factors between sexes maybe due to behavioural and psychosocial factors seen in men by which they are less adaptive to stressful events.[19] Another reason could be attributed to the hormonal state of women brought about by estrogen. Estrogen is a protective hormone to women in the reproductive state that affects the process of atherosclerosis through various mechanisms. Estrogens have been reported to have a lowering effect on TC and LDL by upregulating the LDL receptor,[20] increase levels of HDL,[21,22,23] and also have an acute vasodilatory effect on the vessel wall with inhibition of smooth muscle proliferation which may retard the process of hypertension.[24] However, contrary to these mechanisms the TC and LDL-C were similar for both sexes with more borderline high LDL-C levels in females. There were more females who were obese, which is also consistent with the NNHes data. This finding might be that females are more sedentary and tend to engage less in exercise.[25,26]

Effects of these risk factors to our cardiovascular system takes sometime to fully manifest into a disease. This is why we see a more cardiovascular risk factors and events as age increases. Age is considered to be a non-modifiable risk factor for CVD. In fact age is an independent risk factor used in scoring system for predicting cardiovascular events.[27,28]

Based on location, those living in the urban areas appear to be fatter and hypertensive with impaired fasting glucose, while those in the rural areas have more lipid abnormalities and are smokers. Risk factor variations among the different areas may be due to a difference in lifestyle. The livelihood in rural areas is mostly agriculture. Farmers consume more energy-rich foods to make it to their hard day of labor and also smoke to relieve some of their stress. In contrast, urban dwellers eat more energy-rich foods but with less energy expenditure due to their sedentary lifestyle. However, in other countries it has been seen that urbanization poses more risk for CVD due to increasing rate of obesity, hypertension, dyslipidemia and diabetes.[29]

Our findings of more risk factors seen in those who were employed could be due to stress from work and probably the financial capacity to support their vices and eat an unhealthy diet. However, in previous studies it has been shown that stress from work or also known as job strain was not associated with hypertension,[30] obesity,[31] and dyslipidemia,[30,32] but only to smoking[33] and diabetes.[30]

Similar findings of an inverse relation between level of education and blood pressure[34,35,36] and smoking[37,38] was seen in this cohort as reported in earlier reports. The probable reasons could be that the more educated participants seek earlier treatment, have awareness of the ill effects of hypertension and smoking, or, as seen in one of our articles, the preference for salty food by those with lower education attainment. This cohort showed that prevalence of obesity,

overweight and hyperlipidemia increased in those who have at least reached a college level of education. This is in contrary to other studies that showed inverse relationship between these risk factors and level of education.[39,40]

Awareness of unhealthy eating practices could be the key reason to this finding. It is not a common practice for most Filipinos to look at food labels for caloric content. Disseminating information to promote the importance of food labels and encouraging all Filipinos on how to prepare and eat healthy meals and live a healthy lifestyle should be part of strategies to re-educate the public.

Conclusion

Older participants, males and those who were employed tend have more cardiovascular risk factors. Urban dwellers were more hypertensive, overweight, obese and with impaired fasting glucose. More smokers and dyslipidemia by high TC, high non-HDL-C and low HDL-C were seen in those living in the rural areas. Participants who have at least reached a college level of education were more overweight, obese and have dyslipidemia by a high TC, TG and LDL-C while there were more smokers, low HDL-C and hypertensive participants who have reached a lower level of education. Therefore, health policies focused on this group should be implemented to alleviate the looming rise of CVD in our country.

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