Cardiovascular risk: associated factors, assessment and agreement between WHO/ISH risk prediction chart and Framingham Scoring System among Primary Care Patients in Kelantan, Malaysia

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Abstract

Background: Cardiovascular Disease (CVD) burden in Malaysia has strikingly increased and it is critically important to overcome the problem at primary care level. There is also very few studies in Malaysia that described the population 10-year CVD risk.

Objectives: To identify the associated factors of high 10-year cardiovascular disease risk based on WHO/ISH risk prediction chart and its agreement with Framingham Scoring System.

Methods: A cross-sectional study was conducted between between December 2012 till Mac 2013 among patients attending Outpatient Clinic, USM Hospital, Kelantan. Cardiovascular risk assessments were based on WHO/ISH risk prediction chart and Framingham Coronary Disease Risk Prediction Score.

Results: A total of 196 patients responded. The proportion of high 10-year cardiovascular disease risk (≥ 20%) based on WHO/ISH risk prediction chart was 7.7%. Secondary school educational level and income more than RM 2000 were significantly associated with high 10-year cardiovascular disease risk. The agreement between WHO/ISH risk prediction chart and Framingham Scoring System was 0.11 (*P* value 0.001).

Conclusion: Socio-economic status should be considered in primary prevention of cardiovascular disease. The agreement in 10-year cardiovascular disease risk between WHO/ISH risk prediction chart and Framingham Scoring System was marginally convincing.

Key words: Agreement, Cardiovascular Risk Assessment, Framingham Scoring System, Primary Care, WHO/ISH risk prediction chart

Running title: Cardiovascular risk: associated factors, assessment and agreement

Introduction

Cardiovascular Disease (CVD) is among the world most important causes of death and nearly 80% of these deaths occur in developing countries.[1] In Asia, the incidence of CVD was postulated to be due to socio-economic development and westernization of lifestyles.[2,3] However, socioeconomic status was not included as one of determinants in estimating 10-year CHD risk. In fact, standard Framingham Coronary Disease Risk Prediction Score (FRS) underestimates CVD risk for those at low socio-economic and by adding socio-economic to CVD risk assessment may reduce this bias.[4, 5]

FRS has different accuracy in different populations. There is a tendency to over-predict in low-risk populations and under-predict in high-risk populations. It is true that risk scores using the Framingham equations have been widely tested in North American and European populations of European[6-9] and even validated in a Chinese population[8-10] but this is not the situation among other populations.

CVD burden in Malaysia has strikingly increased and it is critically important to overcome the problem at primary care level. There is also very few studies in Malaysia that described the population 10-year CVD risk. This study is performed in an attempt to explore the Malaysian community level of 10-year CVD risk and identify the underlying socio-economic and lifestyle-related factors. This study too will be able to validate the existing sub-regional risk prediction chart for Western Pacific Region (B) of World Health Organization / International Society of Hypertension (WHO/ISH) for individual population subsequently improving the accuracy and predictive value of the current risk prediction charts. This study try to emphasize risk scores assessment which moves the focus of treatment from the management of individual single risk factors to an individual's overall risk of disease.[11] Physician and health workers in primary care setting are the first contact for medical care. A simple tool produced by WHO (2007) will help them to assess the cardiovascular risk of people rapidly and take appropriate action.

Thus, the objectives of this study were to identify the associated factors of high 10-year CVD risk based on WHO/ISH risk prediction chart and the agreement with Framingham Scoring System among patients attending Outpatient Clinic, Universiti Sains Malaysia (USM) Hospital, Kelantan, Malaysia. Cardiovascular risk was defined as probability of an individual experiencing a cardiovascular event over a 10-year period.[11] CVD risk assessments are based on WHO/ISH risk prediction chart[11] and FRS.[12] High 10-year CVD risk is defined as risk ≥20% of experiencing cardiovascular (CV) events and moderate-low risk as risk< 20% of experiencing CV events.

Methods

Study design and population

A cross-sectional study was conducted between December 2012 till Mac 2013 among patients attending Outpatient Clinic, USM Hospital, Kelantan. Patients aged 40 to 70 years old were included and those with established coronary heart disease and history of stroke were excluded. Systematic random sampling in the ratio of 1:2 based on attendance list in Outpatient Clinic was

applied. Sample size was calculated based on comparing two proportions using Power and Sample Size Calculation software. The biggest sample size was for the risk factor sex. Taking P_0 (proportion of female among medium-low risk) of 0.51,[13] alpha of 0.05 and power of 80%, the minimum required sample size was 164. After considering the non-response rate of 20%, the total sample size calculated was 196. The study proposal was reviewed and approved by the Ethical Committee of USM.

Research Tools

The tools consist case report form; biochemical samples; and cardiovascular risk assessment based on WHO/ISH risk prediction chart and FRS. Case report form comprised of clinical history, assessment of dietary intake and activity level. Assessment of dietary intake was done by via 24-hour dietary recall[14] and assessment of activity level was done by via 7-day physical activity recall. Physical examination comprised of measurement of height and weight, waist and hip circumference and blood pressure.

Biochemical samples comprised of fasting blood sugar. Fasting or non-fasting lipid profile via venous sampling (i.e. total cholesterol and high density lipoprotein) was taken. This was based on the Third Report of National Cholesterol Education Programme (NCEP) where it stated that in all adults aged 20 years or older, a fasting lipoprotein profile [total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C) and triglyceride (TG)] should be obtained once every 5 years. If the testing opportunity is non-fasting, only the values for TC and HDL-C were usable.[12]

Cardiovascular Risk Assessment Based On WHO/ISH Risk Prediction Chart

The chart has been calculated from the mean of risk factors and the average 10-year event rates from countries of the specific sub-region. It provides only approximate estimates of CVD risk in people who do not have symptoms of coronary heart disease (CHD), stroke or other atherosclerotic disease. However, they are useful as tools to help identify those at high total cardiovascular risk and to motivate patients particularly to change the behaviour of the patients.[11] Cardiovascular risk assessment based on WHO/ISH risk prediction chart took into account gender, age, systolic blood pressure, total blood cholesterol, smoking status and presence or absence of diabetes mellitus.

Cardiovascular Risk Assessment Based On Framingham Coronary Disease Risk Prediction Score (FRS)

The cardiovascular risk assessment based on FRS took into account gender, age, systolic blood pressure, total blood cholesterol, HDL and smoking status.[12] In both, subjects will be divided into 10-year risk for CHD of >30%, 20-30%, 10-20% and <10%.

Method of Data Collection

A Subject Information and Consent Form were given to respondents and signed. The researcher obtained information on socio-demographic profile and conduct physical examination. Biochemical samples were taken and reviewed. Assessment of the cardiovascular risk was done based on WHO/ISH risk prediction chart and FRS.

Statistical Analyses

Data entry and analyses were done using PASW version 19. Descriptive analysis was used to evaluate the 10-year CHD risk of study population based WHO/ISH risk prediction chart. Simple and Multiple Logistic Regression logistic regression analyses were used to determine the associated factors of high 10-year CVD risk based on WHO/ISH chart at baseline. The outcome variable was WHO/ISH cardiovascular risk categories (≥20%, <20%). Kappa analysis was used to determine the agreement in cardiovascular risk assessment between WHO/ISH risk prediction chart and FRS (>30%, 20-30%, 10-20%, <10%).

Results

A total of 196 patients attending Outpatient Clinic, USM Hospital were recruited giving a response-rate of 100.0%. Table 1 shows the socio-demographic, medical and life style-related factors. The age ranged from 40 to 70 years with mean (SD) of 56.6 (7.80) years for men and 54.0 (7.51) years for women. Table 2 shows the 10-year CVD risk based on WHO/ISH risk prediction chart where majority of respondents (78.6%) have 10-year CVD risk of < 10%.

The proportion of high 10-year CVD risk (≥ 20%) was 7.7% and moderate 10-year CVD risk (< 20%) was 92.3%. Table 3 shows the distribution of associated socio-demographic, medical and life style-related factors of high and moderate 10-year CVD risk based on WHO/ISH risk prediction chart.

Simple and Multiple Logistic Regression showed that respondents with secondary school educational level and income of more than RM 2000 per month were significantly associated with high 10-year CVD risk based on WHO/ISH risk prediction chart (Table 4). Those with secondary school educational level has 0.2 times at odds of high 10-year CVD compared to those with primary school educational level. Those with income more than RM 2000 have 0.01 times at odds of high 10-year CVD compared to those with income less than RM 500.

There was no significant interaction between the significant independent variables and no multicollinearity problem. Hosmer and Lemeshow goodness of fit was not significant (*P* value 0.245), showing that the model was fit. This was supported by Classification of table and Receiver Operating Characteristics (ROC) curve. The overall percentage was 93.33% and area under the curve was 76.2%.

Table 5 shows that majority of respondents (31.1%) have 10-year CVD risk of < 10% based on Framingham Scoring System. Kappa analysis of 10-year CVD risk between WHO/ISH risk

prediction chart and Framingham Scoring System was 0.11 with *P* value 0.001. This measure of agreement, while statistically significant, was only marginally convincing.

Discussion

Assessment of 10-year CVD risk

Majority of respondents (78.6%) in this study was shown to have 10-year CVD risk of <10% when assessed via WHO/ISH risk prediction chart. This was slightly lower compared to other low and middle income countries which ranged from 89.6% to 97.0%[15,16] using similar prediction chart. Meanwhile, the percentage of 10-year CVD risk of ≥20% was slightly higher (7.6%) compared to other countries which was less than 6.0%.[15,16] The 10-year CVD risk of ≥30% was within the range of 0.2% to 4.8% as compared to eight other different countries.[17]

An epidemiological survey involving 1417 respondents aged 55 to 95 years old from semi-rural community in Malaysia showed that the10-year CVD risk of <10%,10-20% and >20% based on FRS were 3.8%, 40.5% and 55.8% respectively among men; and 33.5%, 51.4% and 15.1% respectively among women.[18] In the current study, respondents recruited were between 40 to 70 years old and the difference in the result could be explained by younger mean age of respondents and women who contributed to almost two third of study population.

The 10-year CVD risk of <10%,10-20% and >20% based on Framingham Scoring system were 31.1%, 32.7% and 36.2% respectively indicating quite a vast difference on estimation of 10-year CVD risk between WHO/ISH risk prediction chart and Framingham Scoring system. The difference of 28.5% in 10-year CVD risk of >20% indicating the higher ability of Framingham Scoring system in identifying more high risk patients.

Contributory factors of high 10-year CVD risk based on WHO/ISH risk prediction chart

It has been postulated that people with better education background are more aggressive in practising healthy lifestyle, hence, reducing the risk for CVD and its complications. This was supported by the present study where the chance to have high 10-year CVD risk was 80% lower among those with secondary school educational level compared to those with primary school educational level. A study assessing 10-year CVD risk among Canadian adults using FRS is in concordance with this finding by showing that higher CVD risk was associated with lower educational background.[19]

In poorer regions of sub-Saharan Africa, level of education was still considered to be one of the main socio-economic determinants of health.[20] A study in Stanford further highlighted that higher education was the strongest and most consistent predictor of good health compared to income or occupation.[21] Similarly, the outcome of a cross sectional design of German Cardiovascular Prevention Study as measured by years of schooling reported that CHD was associated with lower level of education.[22]

Another study in China involving 4000 participants found that educational level was the most important key of socio-economic determinants for CVD risk factors when compared to occupation, income or marital status. It also showed that people with lower socio-economic status tend to have higher levels of CVD risk factors.[23] However, Avis *et al.* (1990) reported no relation between individual knowledge and CVD risk factor[24] thus, indicating that knowledge without proper behavioural act is unlikely to have an impact in minimizing CVD risk.

This study has shown that the chance to have high 10-year CVD was 99% lower among those with monthly income of more than RM 2000 compared to those with income of below RM 500.This result was almost similar to a previous population-based study whereby comparing CVD risk between highest income and upper middle income level families among Canadian adults showed that the risk was significantly less in the former group.[19] The relationship between lower income community and overweight and obesity, thus, increasing the risk for CVD has been acknowledged.[25]

A cross-sectional study involving 4556 participants in Korea based on secondary data from Third Korea National Health and Nutritional Examination showed that socio-economic factors played a main role in influencing cardiovascular risk factors. This is evidenced by higher proportion of CVD risk among participants with lesser education, lower financial status and unemployment regardless of different gender.[26] A balance economic status among members in a community plays an important role in securing lower cardiovascular risk.[27]

This study has attempted on associating dietary control and physical activity with CVD risk but was not significant. A cross-sectional study in Scotland showed that once other major risk factors (namely cigarette smoking, serum cholesterol level, antioxidants intake) were considered, dietary component no longer became significant independent predictors of CHD.[28] Other possible reasons for insignificant findings were small sample size and recall bias.[29]

Agreement in cardiovascular risk assessment between WHO/ISH risk prediction chart and Framingham Scoring System

The agreement in 10-year CVD risk between WHO/ISH risk prediction chart and Framingham Scoring System while statistically significant, was only marginally convincing. MONICA project for assessment of CVD showed that when the risk equation was averaged, the agreement between the two methods was good. However, WHO/ISH risk stratification using accurate or detailed measurement shows a poor agreement in the medium and high-risk participants.[30] Thus, early intervention for these groups need to be addressed.

Limitations

Other social factors such as stress may contribute to cardiovascular events but was not addressed in this study. Secondly, although the calculated sample size was based on a local study with smallest affordable detectable difference, the number of sample in this study was relatively

smaller.[15, 31] Finally, majority of respondents were Malays, thus, it cannot be inferred to other ethnic groups in Malaysia.

Conclusion and Recommendation

The proportion of high 10-year CVD risk based WHO/ISH risk prediction chart was 7.7% among patients attending Outpatient Clinic, USM Hospital, Kelantan. Educational level and income were significantly associated with high 10-year CVD risk. The agreement in 10-year CVD risk between WHO/ISH risk prediction chart and Framingham Scoring System was marginally convincing.

Socio-economic status should be considered in primary prevention of CVD. WHO/ISH risk prediction chart is a simple tool which will help the paramedics to assess the CVD risk particularly in settings with limited resources. FRS is still the preferred method for identifying particularly medium and high-risk patients; acknowledging and taking this into daily practice will provide a better outcome for patients, subsequently, reducing the financial burden of the country. Further research involving other ethnic groups is recommended to determine the generalizability of the findings.

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Conflict of Interest: None declared.

References

[1] Ramaraj R, Alpert JS. Indian poverty and cardiovascular disease. Am J Cardiol. 2008; 102: 102-06.
[2] Reddy KS, Yusuf S. Emerging Epidemic of Cardiovascular Disease in Developing Countries. Circulation. 1998; 97: 596-601.
[3] Yach D, Hawkes C, Gould C, Hofman KJ. The global burden of chronic diseases: Overcoming impediments to prevention and control. JAMA 2004; 291: 2616-22.
[4] Kaplan GA, Keil JE. Socioeconomic factors and cardiovascular disease: a review of the literature. Circulation. 1993; 88: 1973-98.
[5] Fiscella K, Tancredi D, Franks P. Adding socioeconomic status to Framingham scoring to reduce disparities in coronary risk assessment. Am Heart J. 2009; 157: 988 - 94.

[6] Brindle P, Emberson J, Lampe F, et al. Predictive accuracy of the Framingham coronary risk score in British men: prospective cohort study. BMJ (Clinical research ed). 2003; 327: 1267.
[7] D'Agostino RB, Grundy S, Sullivan LM, Wilson P. Validation of the Framingham coronary heart disease prediction scores. JAMA. 2001; 286: 180-87.
[8] Ferrario M, Chiodini P, Chambless LE, et al. Prediction of coronary events in a low incidence population. Assessing accuracy of the CUORE Cohort Study prediction equation. Int J Epidemiol. 2005; 34: 413-21.
[9] Marrugat J, D'Agostino R, Sullivan L, et al. An adaptation of the Framingham coronary heart disease risk function to European Mediterranean areas. J Epidemiol Community Health. 2003; 57: 634-8.
[10] Liu J, Hong Y, D'Agostino Sr RB, et al. Predictive value for the Chinese population of the Framingham CHD risk assessment tool compared with the Chinese Multi-Provincial Cohort Study. JAMA. 2004; 291: 2591-99.
[11] WHO. Prevention of cardiovascular disease: Pocket guidelines for assessment and management of cardiovascular risk. World Health Organization. 2007.
[12] National Institutes of Health. Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Executive Summary of The Third Report of the National Cholesterol Education Program (NCEP) Expert Panel (National Heart, Lung and Blodd Institute. JAMA. 2001; 285: 2486-97.
[13] Bruckert É, Bonnelye G, Thomas-Delecourt F, André L, Delaage P-H. Assessment of cardiovascular risk in primary care patients in France. Archives of Cardiovascular Diseases. 2011; 104: 381-87.
[14] Shahar S, Earland J, Abdulrahman S. Validation of a dietary history questionnaire against a 7-D weighed record for estimating nutrient intake among rural elderly Malays. Malaysian Journal of Nutrition. 2000; 6: 33.
[15] Otgontuya D, Oum S, Buckley B, Bonita R. Assessment of total cardiovascular risk using WHO/ISH risk prediction charts in three low and middle income countries in Asia. BMC Public Health. 2013; 13: 539.
[16] Ndindjock R, Gedeon J, Mendis S, Paccaud F, Bovet P. Potential impact of single-risk-factor versus total risk management for the prevention of cardiovascular events in Seychelles. Bull World Health Organ. 2011; 89: 286 - 95.
[17] Mendis S, Lindholm L, Anderson S, Alwan A, Koju R, Onwubere B. Total cardiovascular risk approach to improve efficiency of cardiovascular prevention in resource constrain settings. J Clin Epidemiol. 2011; 64: 1451-62.
[18] Chia YC, Srinivas P. Comparison of general cardiovascular disease risk profile with Framingham coronary heart disease formula in a developing country. J Hypertens. 2010; 28: e460
[19] Setayeshgar S, Whiting SJ, Vatanparast H. Prevalence of 10-Year Risk of Cardiovascular Diseases and Associated Risks in Canadian Adults: The Contribution of Cardiometabolic Risk Assessment Introduction. International Journal of Hypertension. 2013; 2013: 8.
[20] Mfenyana K, Griffin M, Yogeswaran P, et al. Socio-economic inequalities as a predictor of health in South Africa--the Yenza cross-sectional study. S Afr Med J. 2006; 96: 323-30.
[21] Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. Am J Public Health. 1992; 82: 816-20.

[22] Helmert U, Shea S, Herman B, Greiser E. Relationship of social class characteristics and risk factors for coronary heart disease in West Germany. Public Health. 1990; 104: 399-416.
[23] Yu Z, Nissinen A, Vartiainen E, et al. Associations between socioeconomic status and cardiovascular risk factors in an urban population in China. Bull World Health Organ. 2000; 78: 1296-305.
[24] Avis NE, McKinlay JB, Smith KW. Is cardiovascular risk factor knowledge sufficient to influence behavior. Am J Prev Med. 1990; 6: 137-44.
[25] Hartline-Grafton H. Food insecurity and obesity: understanding the connections.). Food Research and Action Center (FRAC). Washington, DC: FRAC, 2011; 5.
[26] Cho C-M, Lee Y-M. The relationship between cardiovascular disease risk factors and gender. Health. 2012; 4: 309-15.
[27] Kawachi I, Kennedy BP, Lochner K, Prothrow-Stith D. Social capital, income inequality, and mortality. Am J Public Health. 1997; 87: 1491-8.
[28] Bolton-Smith C, Woodward M. Coronary heart disease: prevalence and dietary sugars in Scotland. J Epidemiol Community Health. 1994; 48: 119-22.
[29] Halbert JA, Silagy CA, Finucane PM, Withers RT, Hamdorf PA. Physical activity and cardiovascular risk factors: effect of advice from an exercise specialist in Australian general practice. Med J Aust. 2000; 173: 84-87.
[30] Persson M, Carlberg B, Weinehall L, Nilsson L, Stegmayr B, Lindholm LH. Risk stratification by guidelines compared with risk assessment by risk equations applied to a MONICA sample. J Hypertens. 2003; 21: 1089-95.
[31] Chia YC, Pengal S. Cardiovascular disease risk in a semirural community in Malaysia. Asia Pac J Public Health. 2009; 21: 410-20.

Table 1: Socio-demographic, medical and life style-related characteristics of 196 respondents

Variables	mean(SD[a])	n(%)
Socio-demographic characteristics		
Age (years)	55.0(7.68)	
Sex		
Male		76 (38.8)
Female		120 (61.2)
Education level		
Primary school		33(16.8)
Secondary school		104(53.1)
College and university		59(30.1)
Marital status		
Married		177(90.3)
Single / Divorced		19(9.7)
Income (RM/month)		
<RM 500		27 (13.8)
RM 501 – 1000		43 (21.9)
RM 1001 – 2000		43 (21.9)
> RM 2000		83 (42.3)

Smoking status		
Non-smoker		151(92.3)
Smoker		15(7.7)
Medical characteristics		
BMI (kg/m^2)	27.6(4.47)	
Waist circumference (cm)	91.2(11.11)	
SBP (mmHg)	137.3(17.19)	
DBP (mmHg)	82.2(10.07)	
FBS (mmol/L)	5.3(1.70) [b]	
TC (mmol/L)	5.4(1.10)	
HDL-C (mmol/L)	1.3(0.25)	
Diabetes mellitus		
Absence		134(68.4)
Presence		62(31.6)
Hypertension		
Absence		62 (31.6)
Presence		134 (68.4)
Family h/o cardiovascular disease		
Absence		151 (77.0)
Presence		45(23.0)
Life style-related characteristics		
24-hour dietary recall	1478.2(477.62)	
7-day physical activity recall	2520.2(585.46)	

[a]Standard deviation
[b] median (interquartile range)

Table 2: 10-year CVD risk based on WHO/ISH risk prediction chart

Variable	n(%)
10-year risk of CVD	
> 30%	7 (3.6)
20 - 30%	8 (4.0)
10 - 20%	27 (13.8)
< 10%	154 (78.6)

Table 3: Associated socio-demographic, medical and life style-related factors of high and moderate 10-year CVD risk

Variable	High CVD risk	Moderate CVD risk
	n (%)	n (%)
Socio-demographic		

Education level		
Primary school	6 (40.0)	27 (14.9)
Secondary school	3 (20.0)	101 (55.8)
College and university	6 (40.0)	53 (29.3)
Income (RM/month)		
<RM 500	5 (33.3)	22 (12.2)
RM 501 - 1000	4 (26.7)	39 (21.5)
RM 1001 - 2000	3 (20.0)	40 (22.1)
> RM 2000	2 (20.0)	80 (44.2)
Medical		
BMI (kg/m^2)[a]	27.3 (5.03)	27.6 (4.43)
Waist circumference (cm) [a]	94.4 (10.56)	90.9 (11.22)
Family h/o CVD		
Absence	11 (73.3)	140 (77.3)
Presence	4 (26.7)	41 (22.7)
Life style-related		
24-hour dietary recall [a]	1545.0 (631.00)	1472.6 (464.50)
7-day phys. activity recall [a]	2399.4 (514.19)	2530.2 (591.14)

[a]Expressed as mean(SD)

Table 4: Associated factors of high 10-year CVD risk based on WHO/ISH risk prediction chart

Variable	Crude OR[a] (95% CI[b])	*P* value	AdjOR[a] (95%CI[b])	Wald stat[c]	*P* value
Socio-demographic					
Education level					
Primary school	1.00		1.00		
Secondary school	0.13 (0.031, 0.570)	0.007	0.20 (0.045, 0.890)	-2.11	0.035
College, university	10.66 (0.150, 1.730)	0.058	10.66 (0.926, 122.567)	1.90	0.058
Income (RM/month)					
<RM 500	1.00		1.00		
RM 501 - 1000	0.45(0.110, 1.857)	0.270	0.46 (0.099, 2.093)	-1.01	0.312
RM 1001 - 2000	0.33(0.072, 1.513)	0.154	0.10(0.009, 1.038)	-1.93	0.054
> RM 2000	0.17(0.037, 0.745)	0.019	0.01 (0.001, 0.194)	-3.11	0.002
Medical					
BMI (kg/m^2)	0.98(0.871, 1.106)	0.759			
WC (cm)	1.03 (0.982, 1.076)	0.238			
Family h/o CVD					
Absence	1.00				
Presence	0.81(0.244, 2.664)	0.723			

Life style-related		
24-hour dietary recall	1.00(0.999, 1.001)	0.572
7-day phy. act. recall	0.99(0.998, 1.001)	0.359

[a]Odds Ratio
[b]Confidence Interval
[c]Wald Statistic

Table 5: 10-year CVD risk based on Framingham Scoring System

Variable	n(%)
10-year risk of CVD	
> 30%	27 (13.8)
20 - 30%	44 (22.4)
10 - 20%	64 (32.7)
< 10%	61 (31.1)