นิพนธ์ต้นฉบับ

Screening for cholesterol and triglyceride levels in a middle-aged population.

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A screening for serum cholesterol and triglyceride levels was conducted at the Department of Laboratory Medicine, Chulalongkorn Hospital. The screening population consisted of 696 middle-aged workers in Bangkok, age 35 to 59 years, attending their annual check up program. The population consisted of 453 (65%) males and 243 (35%) females. Characteristics of the study population included 119 (17%) smokers, 33 (5%) with hypertension, 6 (1%) with diabetes mellitus, 6 (1%) with thyroid diseases and 22 (3%) with other ailments (allergy, peptic ulcer, asthma, hepatitis, gout, tuberculosis, etc.). Our results ($\bar{x}$ ± 2 SD) of cholesterol and triglycerides were 267 (± 148) mg/dl and 197 (± 144) mg/dl in males, and 279 (± 149) mg/dl and 142 (± 122) mg/dl in females respectively. It was found that the serum cholesterol and triglyceride levels were age-dependent ($p < 0.05$) when the results were analysed by 5-year age interval. According to the recommendations of the adult treatment panel of the National Cholesterol Education Program in the U.S.A. the study population were classified with 18% in the desirable group, 20% in the borderline risk group, and 62% in the high risk group for cholesterol. If we classified by using the CHD guideline of Charuruks N, et al., 1994, we found that 68% of our population was classified as being in the desirable group, 17% in the borderline risk group, and 15% in the high risk group.

Key words: *Screening for blood lipids, A middle-aged population.*

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สาคร ปิงสุทธิวงศ์, นวพรรณ จารุรักษ์, ปราณี ไกรลาศศิริ. การตรวจกรองหาระดับ โคเล็สเทอรัล และไทกลีสเซอไรด์ในกลุ่มคนกลางอายุ. จุฬาลงกรณ์เวชสาร 2537ตุลาคม; 38(10): 571-577

การตรวจกรองหาระดับ cholesterol และ triglycerides ในเลือดในกลุ่มคนทำงานในกรุงเทพฯ ที่มารับการตรวจสุขภาพประจำปี อายุระหว่าง 35 ถึง 59 ปี จำนวน 696 คน แบ่งเป็นชาย 453 คน คิดเป็นร้อยละ 65 และหญิง 243 คน คิดเป็นร้อยละ 35 กลุ่มคนดังกล่าวประกอบด้วยผู้สูบบุหรี่จำนวน 119 คน คิดเป็นร้อยละ 17 มีโรคความดันโลหิตสูง 33 คน คิดเป็นร้อยละ 5 เป็นโรคเบาหวาน 6 คน คิดเป็นร้อยละ 1 เป็นโรคต่อมธัยรอยด์ 6 คน คิดเป็นร้อยละ 1 มีประวัติเป็นโรคอื่น ๆ เช่น ภูมิแพ้, แผลในกระเพาะอาหาร, หอบหืด, ตับอักเสบ,ไขข้ออักเสบ, วัณโรค เป็นต้น จำนวน 22 คน คิดเป็นร้อยละ 3 ค่ามัชฌิมเลขคณิต ($\bar{X}$) และค่ามัชฌิมเลขคณิต ± 2 เท่าค่าเบี่ยงเบนมาตรฐาน ($\bar{X} \pm 2\ SD$) ของ cholesterol และ triglycerides ในเพศชายเท่ากับ 267 (± 148) mg/dl และ 197 (±144) mg/dl, ในเพศหญิงเท่ากับ 279 (± 149) mg/dl และ 142 (± 122) mg/dl เมื่อแบ่งตามกลุ่มอายุพบว่าระดับ cholesterol และ triglycerides ในเลือดสูงขึ้นตามอายุ ($p < 0.05$) เมื่อนำมาแบ่งตามกลุ่มความเสี่ยงต่อโรคหลอดเลือดหัวใจอุดตันเนื่องจากระดับไขมันในเลือดสูงที่เสนอโดยใช้เกณฑ์ The National Cholesterol Education Program (NCEP) ของประเทศสหรัฐอเมริกา พบว่าระดับ cholesterol ในเลือดอยู่ในระดับที่ไม่มีความเสี่ยงร้อยละ 18 ระดับที่มีความเสี่ยงกำกึ่งร้อยละ 20 และในระดับที่มีความเสี่ยงสูงถึงร้อยละ 62 ของประชากรที่ตรวจหาระดับไขมันในเลือด แต่เมื่อใช้ระดับความเสี่ยงต่อโรคดังกล่าวที่ระดับต่าง ๆ ที่ได้ทำขึ้นสำหรับกลุ่มคนกลางอายุของคนที่ทำงานในกรุงเทพ ฯ โดย นวพรรณ จารุรักษ์ และคณะ, 2537 พบว่าระดับ cholesterol ในเลือดอยู่ในระดับที่ไม่มีความเสี่ยงร้อยละ 68 ระดับที่มีความเสี่ยงกำกึ่งร้อยละ 17 และในระดับที่มีความเสี่ยงสูงร้อยละ 15 ของประชากรที่ได้รับการตรวจไขมันในเลือด

Coronary heart disease (CHD) is still our major cause of death and awareness is growing that reduction of elevated blood cholesterol and triglyceride levels are important for the prevention of CHD.[1-3] For success in identifing and treating adults at high risk for CHD, all adults should know their blood cholesterol and triglyceride levels and to be aware of the implications of elevated blood lipids, and they should seek the help of a physician should that be necessary.[4] In 1988, the Lipid Research Clinics Coronary Primary Prevention Trial (LRC-CPPT) and the National Institutes of Health (NIH) concluded that elevated blood cholesterol is a major cause of CHD, and the lowering of elevated blood cholesterol levels will reduce the risk of heart attacks attributable to CHD.[4] The NIH Consensus Conference of 1992 summalized that current evidence does not allow one to conclude that comparable causality exists between the presence of high levels of plasma triglycerides and CHD. Nevertheless, triglyceride-rich lipoproteins can be atherogenic. Furthermore, elevated triglyceride levels produce increases in several clotting factors and decrease fibrinolytic activity and this may contribute over time to the atheroslerotic process.[5] After careful review of experimental and clinical trial evidence, the Concensus Conference Penel of the National Cholesteral Education Prgsram (NCEP) of the U.S.[4] recommended classifying those adults in the 75th percentile as being in the borderline or moderate risk group and those in the 90th percentile as being in the high risk group. For classification of blood lipid levels into the desirable group, borderline or moderate risk group, and high risk for CHD by the NCEP and our previous study,[6] we determined to analyze the levelsof cholesterol and triglycerides of 696 Bangkok workers.

Materlals and Methods

Blood samples were drawn by using evacated tubes (Venoject^{R}) 5 ml after a 12 hour fast[7] from 696 subjects attending the in annual check up program at the Department of Laboratory Medicine, Faculty of medicine, Chulalogkorn Hospital. The serum was analysed for cholesterol and triglycerides by the enzymatic colorimetric method.[6]

The 696 middle-age workers from Bangkok were aged age 35 to 59 years. The population con-sisted of 453 (65%) males, 243 (35%) females, 119 (17%) smokers, 33 (5%) with hypertension, 6 (1%) with diabetes mellitus, 6 (1%) with thyroid diseases, and 22 (3%) with other ailments (allergy, peptic ulcer, asthma, hepatitis, gout, tuberculosis, etc.)

The arithmatic mean ($\bar{X}$) standard deviation of each parameter was calculated. The anova test was used to test the statistical significance between males and females for cholesterol and triglyceride levels of different age and p-value < 0.05.

Results

The characteristics of our study population are shown in Table 1. The distribution of our study population is presented by histogram in Figure 1. Most of the sample population were males (65%) and a large proportion (60%) were under 45 years. Table 2 displays the cholesterol level distribution of our CHD data according to the recommendations of the adult treatment panel of the NCEP for classification of patients and Table 3 displays the cholesterol level distribution by using our risk guidelines from our own previous study. According to the NCEP recommendations for classification of patients,[4] our study population was classified as 18% in the desirable group, 20% in the borderline risk group and 62% in the high risk group for cholesterol. If we classified by use of the CHD guideline of Charuruks N, et al., 1994,[6] we found that 69% were classified as being in the disirable group, 17% in the borderline group, and 15% in the high risk group. Our results ($\bar{X}$ ± 2SD) for cholesterol and triglyceride levels were 267 (± 148) mg/dl and 197 (± 144) mg/dl in males or and 279 (±149) mg/dl and 142 (± 122) mg/dl in females. It was found that the serum cholesterol and triglyceride levels were age-dependent ($p < 0.05$) when the results were analysed by 5-year age interval. The means ($\bar{X}$) and the ranges ($\bar{X}$ ± 2 SD) for each 5-year age interval of cholesterol and triglyceride levels in each sex are shown in Figure 2, and 3.

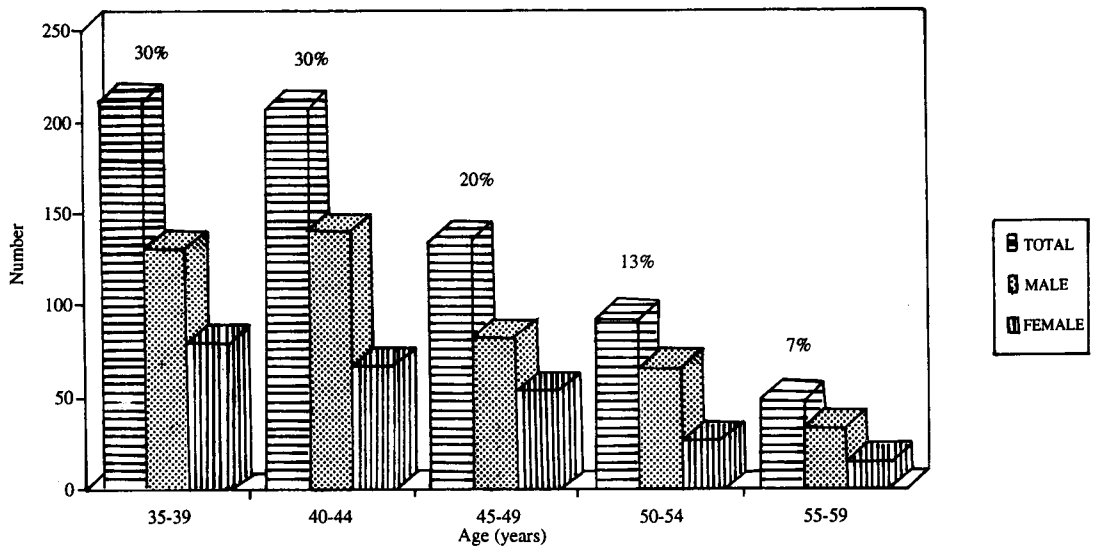

Figure 1. Histogram of age distribution.

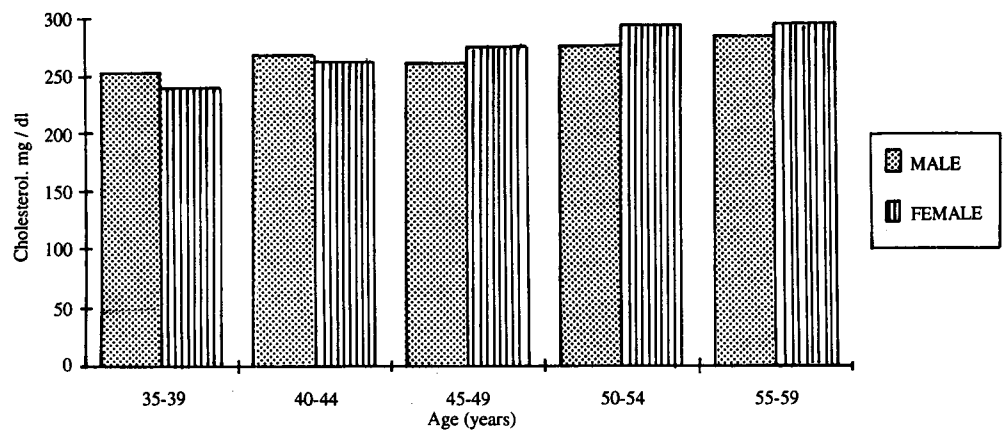

Figure 2. Five year interval histogram of male and female cholesterol. [in mean]

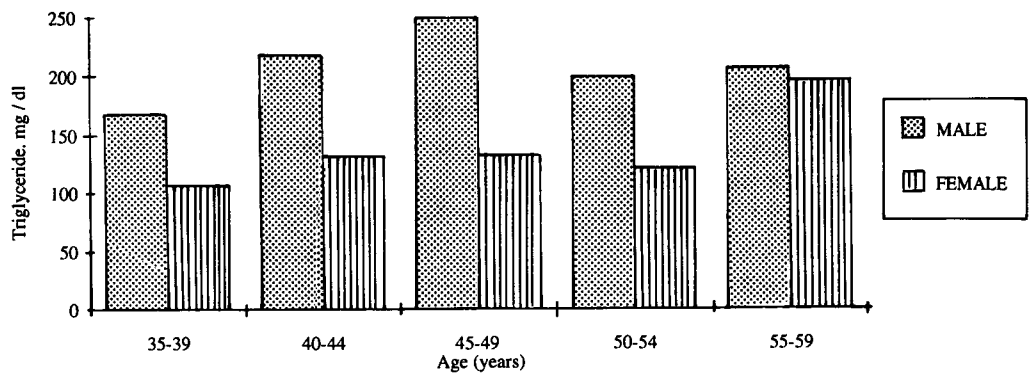

Figure 3. Five year interval histogram of male and female triglyceride. [in mean]

Table 1. Characteristics of 696 samples.

Characteristics	Number	Percent
Sex	696	100
Male	453	65
Female	243	35
Smoking	119	17
Hypertension	33	5
Diabetes Mellitus	6	1
Thyroid diseases	6	1
Allergy	7	3
Peptic Ulcer	3	
Asthma	5	
Hepatitis	3	
Gout	2	
Tuberculosis	2	

Table 2. The cholesterol distribution of our data according to the classification of the adult treatment panel's charg of the NCEP[4]

classification of patients according to the NCEP	male No. (%)	female No. (%)	total No. (%)
desirable level < 200 mg/dl	70(16)	55(23)	125(18)
borderline risk 200-240 mg/dl	83(18)	56(23)	139(20)
high risk > 240 mg/dl	300(66)	132(54)	432(62)
Total number(%)	**453(100)**	**243(100)**	**696(100)**

Table 3. The cholesterol distribution of our data according to our CHD risk guideline of Charuruks N, et al., 1994.[6]

classification of our data according our guideline	male No.(%)	female No. (%)	total No. (%)
desirable level < 288 mg/dl	301(66)	176(72)	477(68)
borderline risk 288-314 mg/dl	94(21)	21(9)	115(17)
high risk > 315 mg/dl	58(13)	46(19)	104(15)
Total number(%)	**453(100)**	**243(100)**	**696(100)**

Discussion

Obviously, every approach to health risk assessment and management has its strengths and limitations. We must continue to refine our basic knowledge about the mechanisms of impact of major risk factors and the other potentially important but less well understood factors. In the spirit of the recent NIH Consensus Development Conference on lowering blood cholesterol levels every effort must be made to educate health professionals and the public as to the approximate levels at which cholesterol and its subfractions become dangerous. these levels must be considered in light of the total health cheracterization of each patient, and perhaps more significantly, his or her children. Attention to such details during education may have an impact at a much earlier point in the course of degenerative vascular disease. The savings in time and money and increases in productivity, and the joy of living could be immense. Only when reference ranges for blood lipid values approach a range of values unassociated with risk for atherosclerosis can true reconciliation of reference ranges and patient values occur[1].

In the previous study of Charuruks N, et al., 1994[6], we had analysed data from 554 healthy Bangkok workers, age 35 to 59 years, and had established our reference levels and the adult treatment panel's recommendations. We found that our reference (normative) levels were higher than the reference levels of the NCEP. Our desirable level was < 288 mg/dl, the borderline level was 288-314 mg dl, and the high risk level was > 315 mg dl, which are also higher than the recommendations of the NCEP.[4] Since reference ranges and cutoff levels vary widely between laboratories and between geographical regions,[8,9] the adult treatment panel's recommendation is to develop practical and detailed guidelines for clinicians to use in measuring, assessing, and treating high blood cholesterol in adult patients and these should be adopted by each laboratory for identifying adults at risk for CHD by using blood cholesterol or triglyceride levels above the 75th percentile but below the 90th percentile for borderline risk and the 90th percentile and above for high risk[4].

This study demonstrates that screening for cholesterol and triglyceride should be implemented as part of the annual check up program of the middle-age population. Reference ranges and CHD risk guidelines should be independently established by each laboratory since they are affected by many factors.

Finally, the screening of serum cholesterol and triglyceride levels should be part of the annual check up of the middle-aged population even if it is clear that many important questions remain unanswered regarding the impact of thes two major lipids.

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