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## Prevalence of abnormal lipid profiles in early postmenopausal women

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Taechakraichana N, Panyakhamlerd K, Pasatrat S, Limpaphayom K. Prevalence of abnormal lipid profiles in early postmenopausal women. *Chula Med J* 1997 Mar;41(3): 181-90

**Objective** : *To determine the prevalence of abnormal serum lipid profiles of women in early postmenopause*

**Design** : *Prospective study*

**Setting** : *Menopause Clinic, Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University*

**Subjects** : *Sixty healthy women who underwent spontaneous menopause between 1-5 years, were recruited for the study. All subjects did not receive any hormone regimen or lipid lowering drugs in the previous 6 months.*

**Main outcome** : *Measurements of serum total cholesterol (TC), triglycerides (TG) and high-density lipoprotein (HDL) cholesterol were done by the enzymatic method (Automatic COBAS MIRA S). Low - density lipoprotein (LDL) cholesterol was estimated using the formula of Friedewald, et al.*

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**Results** : *The mean age, body mass index and time since menopause of the studied population were  $51.95 \pm 3.68$  years,  $23.65 \pm 2.90$  kg/m<sup>2</sup> and  $2.39 \pm 1.42$  years, respectively. The results showed that 71.6% had TC levels of higher than 240 mg/dl. Only 3.33% had TG levels higher than 200 mg/dl. Moreover, 40% of the women had LDL cholesterol levels of more than 190 mg/dl, while 35% had HDL cholesterol levels of lower than 50 mg/dl.*

**Conclusion** : *This preliminary study revealed the prevalence of abnormal lipid profiles in a group of early postmenopausal women. The association of these lipid parameters as causes of atherosclerosis and coronary heart disease is complicated. This study may serve as initial information for further research in this area.*

**Key words** : *Abnormal lipid profiles, Early postmenopause.*

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นิमित เตชไกรชนะ, กระเชียร ปัญญาคำเลิศ, โสภิตศจี ปสาทรัตน์, กอบจิตต์ ลิมปพยอม.  
ความชุกของระดับไขมันที่ผิดปกติในสตรีที่เข้าสู่วัยหมดระดูในระยะต้น. จุฬาลงกรณ์เวชสาร  
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**วัตถุประสงค์** : เพื่อศึกษาความชุกของระดับไขมันในเลือดที่ผิดปกติในสตรี ที่เข้าสู่วัย  
หมดระดูในระยะต้น

**รูปแบบการวิจัย** : การศึกษาไปข้างหน้า

**สถานที่** : คลินิกสตรีวัยหมดระดู ภาควิชาสูติศาสตร์-นรีเวชวิทยา คณะแพทยศาสตร์  
จุฬาลงกรณ์มหาวิทยาลัย

**ผู้เข้าร่วมการศึกษา** : เป็นสตรีที่หมดระดูตามธรรมชาติ 60 ราย โดยหมดระดูมา 1-5 ปี มี  
สุขภาพแข็งแรงดี ไม่ได้รับยาฮอร์โมนใด ๆ หรือยาลดไขมันในระยะเวลา  
6 เดือนที่ผ่านมา

**การวัดผล** : ได้ทำการตรวจวัดระดับ Total cholesterol (TC), triglyceride (TG),  
high density lipoprotein (HDL) cholesterol ด้วยวิธีการตรวจ  
เอ็นไซม์ ด้วยเครื่อง Automatic COBAS MIRA S สำหรับระดับ  
Low density lipoprotein (LDL) cholesterol คำนวณจากสูตรของ  
Friedewald และคณะ

**ผลการศึกษา** : กลุ่มสตรีที่ทำการศึกษามีอายุเฉลี่ย, ดัชนีมวลกายและระยะเวลาเฉลี่ยหลัง  
หมดระดู เท่ากับ  $51.95 \pm 3.68$  ปี,  $23.65 \pm 2.90$  กิโลกรัม ต่อตารางเมตร  
และ  $2.39 \pm 1.42$  ปี ตามลำดับ พบว่า ร้อยละ 71.6 มีระดับ Total  
cholesterol สูงเกินกว่า 240 มิลลิกรัมต่อเดซิลิตร มีเพียงร้อยละ 3.33  
ที่มีระดับ Triglyceride สูงเกินกว่า 200 มิลลิกรัมต่อเดซิลิตร นอกจากนี้  
นั้นยังพบว่า ร้อยละ 40 มีระดับ LDL สูงเกินกว่า 190 มิลลิกรัมต่อ  
เดซิลิตร ในขณะที่ร้อยละ 35 มีระดับ HDL ต่ำกว่า 50 มิลลิกรัมต่อ  
เดซิลิตร

**วิจารณ์และสรุป** : การศึกษาเบื้องต้นในครั้งนี้นำแสดงถึงความชุกของความผิดปกติของไขมัน  
ในเลือดในสตรีที่เข้าสู่วัยหมดระดูในระยะต้นกลุ่มหนึ่ง กลไกของระดับ  
ไขมันที่ผิดปกติที่สามารถก่อให้เกิดสภาวะหลอดเลือดแข็งตัวและอุดตัน  
โดยเฉพาะเส้นเลือดหัวใจ เป็นขบวนการที่สัมพันธ์กันอย่างซับซ้อน ผล  
การศึกษาดังกล่าว คงเป็นข้อมูลเบื้องต้นที่จะนำไปสู่การวิจัยต่อไปใน  
สาขานี้ต่อไป

Cardiovascular disease is the most common cause of death in the United States.<sup>(1)</sup> It is also one of the top five causes of death in our own fast-paced socioeconomic development society.<sup>(2)</sup> The male-to-female ratios for mortality from coronary heart disease (CHD) varies from 3:1 to 6:1 among 27 countries.<sup>(1)</sup> This suggests that there is an intrinsic gender-mediated difference that could be explained by differences in sex hormones. The simplest hypothesis is that estrogen is protective.<sup>(3)</sup> However, after menopause the mortality rate from CHD in women rises.<sup>(4)</sup> This is probably, partly, due to estrogen deficiency. Some epidemiological studies have demonstrated gradual rising of total cholesterol (TC), low density lipoproteins (LDL) cholesterol and triglycerides (TG) with increasing age,<sup>(5)</sup> though the latter is not quite obvious. On the contrary, high density lipoprotein (HDL) cholesterol, particularly HDL<sub>2</sub>, decreases with increasing age. Nevertheless, the rising of TC, LDL-cholesterol and the dropping of HDL-cholesterol are more striking at menopause.<sup>(5)</sup> Lack of ovarian hormones may be one of the crucial factors for these significant changes. Hence, we conducted a study to assess the prevalence of abnormal serum lipid and lipoprotein profiles in Bangkok women who were in their early postmenopausal period.

## Materials and Methods

This pilot study was conducted at the Menopause Clinic of the Department of Obstetrics and Gynecology of Chulalongkorn Hospital from

October 1995 to August 1996. Sixty healthy postmenopausal women aged between 40-60 years were recruited into the study. Postmenopausal status was confirmed by measurement of serum gonadotropins and estradiol levels. Subjects were naturally postmenopausal for more than 1 year but not more than 5 years before enrollment in the study. None had received any hormone regimen, lipid lowering drugs or any regular medication within the prior 6 months. These women had no chronic disease, smoking habits, regular alcohol consumption nor drug addiction. All had body mass indexes (BMI) of not more than 30. Each woman reviewed and signed the consent form approved by the Faculty Ethical Committee.

Blood samples were obtained in the morning after an overnight fasting for at least 12 hours. The samples for lipid assays were analyzed within 24 hours. Serum total cholesterol levels were measured using an enzymatic colorimetric test with cholesterol esterase, cholesterol oxidase and 4-aminophenazone.<sup>(6)</sup> Triglyceride levels were measured using an enzymatic colorimetric test with glycerol phosphate oxidase and 4-aminophenazone.<sup>(7,8)</sup> High density lipoprotein (HDL) cholesterol levels were measured after precipitated low density lipoprotein (LDL) and very low density lipoprotein (VLDL) cholesterol with phosphotungstic acid and magnesium chloride.<sup>(9-11)</sup> HDL cholesterol was measured from the supernatant by enzymatic procedures.<sup>(11)</sup> The LDL cholesterol concentration was estimated using the formula of

Friedewald, et al.<sup>(12)</sup> [LDL cholesterol (in mg/100 ml) = total cholesterol-triglycerides/5-HDL cholesterol]

The reagents for lipid assays were cholesterol PAP for cholesterol assay, unimate 7 TRIG for the triglycerides, and HDL reagent for LDL and VLDL precipitation. Control serum N (human) and P (human) were used for quality control of the assays (F. Hoffman, La Roche Ltd. Company. Diagnostic, Basel, Switzerland). The analyzer for the lipid assays was an autoanalyzer COBAS MIRA S (F. Hoffman, La Roche Ltd. Company. Diagnostic, Basel, Switzerland.)

Descriptive statistics were carried out on the data where it was appropriate.

## Results

The demographic characteristics of the study population are shown in Table 1. The lipid and lipoprotein profiles are illustrated in figures 1-4. Of all 60 subjects, 91.67%, 71.6% and 58.33% had total cholesterol levels higher than 200 mg/dl, 240 and 250 mg/dl, respectively. Concerning triglycerides, 3.33% of the women had a level higher than 200 mg/dl, but none in this study had a level of more than 500 mg/dl. Referring to the LDL-cholesterol, 40% had levels of more than 190 mg/dl. However, 35% of the subjects had HDL-cholesterol levels lower than 50 mg/dl.

**Table 1.** Population characteristics (N=60).

Characteristics	Mean + SD	Min	Max
1. Age (y)	51.95 + 3.68	40	60
2. Parity	1.73 + 1.49	0	6
3. BMI* (kg/m <sup>2</sup> )	23.65 + 2.90	17.78	30.00
4. T-men** (y)	2.39 + 1.42	1.0	5.0
5. SBP*** (mmHg)	119.21+15.48	90	150
6. DBP**** (mmHg)	75.24 + 9.13	60	90
7. Occupation			
Housewives	14 (23.33%)		
Traders and businessmen	8 (13.33%)		
Government and state enterprise officials	23 (38.33%)		
Employees	15 (25.00%)		
8. Income (Baht)			
< 5,000	7 (11.67%)		
5,001-10,000	11 (18.33%)		
10,001-20,000	14 (23.33%)		
20,001-50,000	20 (33.33%)		
> 50,000	8 (13.33%)		

\* BMI = Body mass index

\*\* T-men = Time since menopause

\*\*\* SBP = Systolic blood pressure

\*\*\*\* DBP = Diastolic blood pressure

## Discussion

It has been well accepted that the common consequences of dyslipidemia or dyslipoproteinemia are atherosclerosis and coronary heart disease (CHD) morbidity and mortality.<sup>(13)</sup> An excess of total cholesterol (TC), triglycerides (TG) and low-density lipoprotein (LDL) cholesterol is probably harmful to the heart, particularly for postmenopausal women, while high levels of high-density lipoprotein (HDL) cholesterol is cardioprotective. All of these mechanisms were extensively reviewed in our previous study.<sup>(14)</sup>

Bass, et al.<sup>(15)</sup> reported the 14-year follow-up of the Lipid Research Clinic that HDL cholesterol levels of <50 mg/dl and triglyceride levels of >200 mg/dl each were independently associated with a significantly increased risk for CHD in women. In 1993, the National Cholesterol Education Program (NCEP) developed guidelines for the detection, evaluation and treatment of hypercholesterolemia and related disorders.<sup>(16)</sup> Total cholesterol and LDL-cholesterol levels that are considered to be high are >240 mg/dl and >190 mg/dl, respectively.<sup>(16)</sup> Referring to the results of our study, these subjects were healthy and in their early postmenopausal period. The results revealed that 71.6% and 40% of the subjects have a high levels of TC and LDL-

cholesterol, respectively, under the NCEPs guidelines.

Even though only 3.33% had triglyceride levels of more than 200 mg/dl, and 35% had a HDL-cholesterol level lower than 50 mg/dl which was an independent risk for CHD in women, as mentioned earlier.<sup>(15)</sup> Regarding the original cutoff value of HDL-cholesterol of <35 mg/dl was derived from the lipid study in males.<sup>(17)</sup> In females, particularly postmenopausal women, an appropriate cutoff value may better serve as a guideline for health intervention.

There is some complicated association between different lipids and lipoprotein parameters in atherosclerosis and CHD. For instance, individuals with elevated triglycerides should be considered at risk for CHD unless the total cholesterol/HDL cholesterol ratio is under 3.5.<sup>(18)</sup>

The results of this study may serve as initial information for further research in the Thai population.

## Acknowledgement

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## Total cholesterol (TC) (N=60)

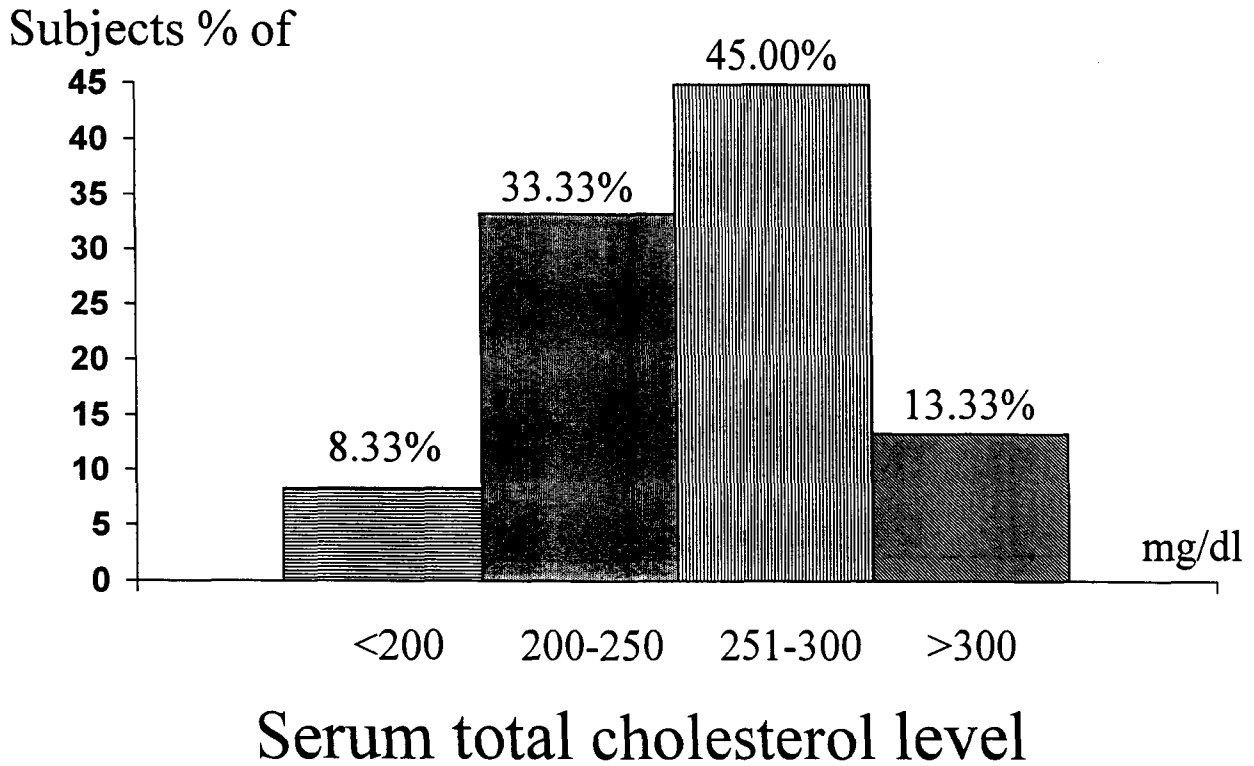


Figure 1.

## Triglycerides (TG) (N=60)

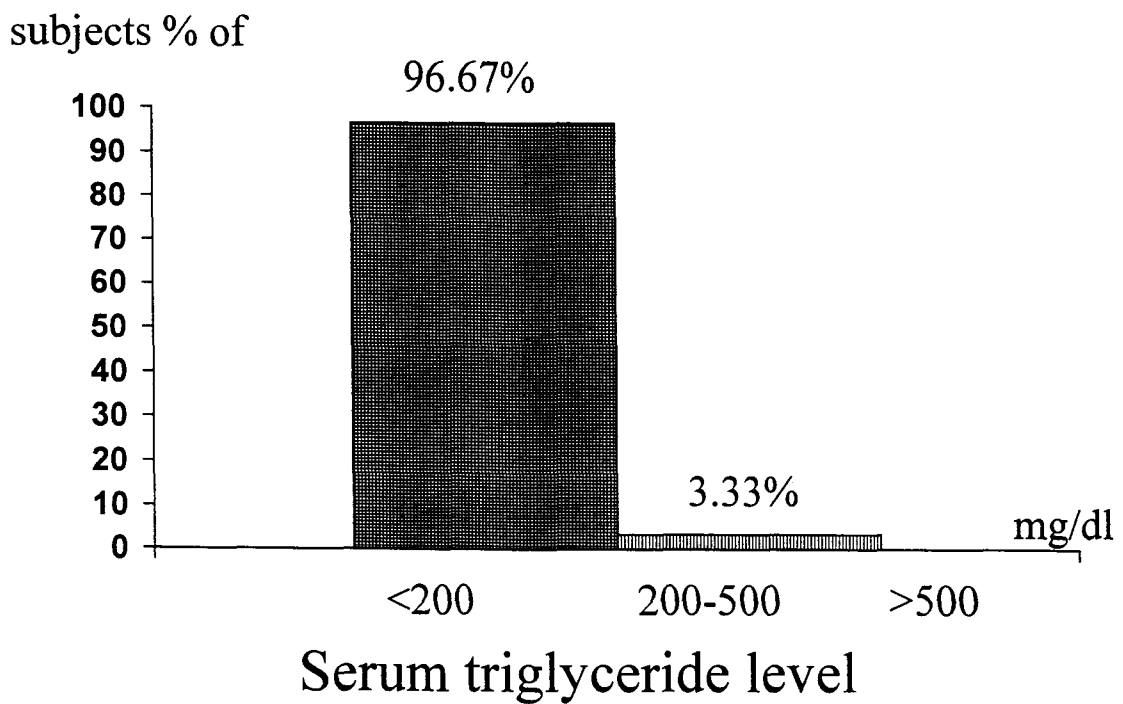


Figure 2.



# LDL cholesterol (N=60)

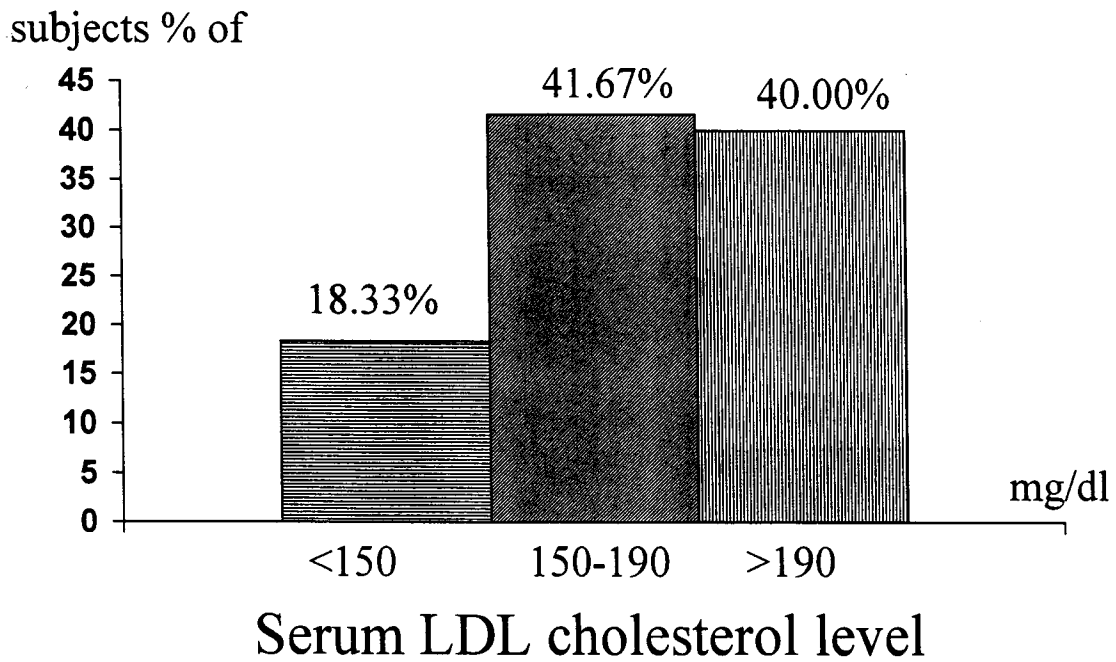


Figure 3.

# HDL cholesterol (N=60)

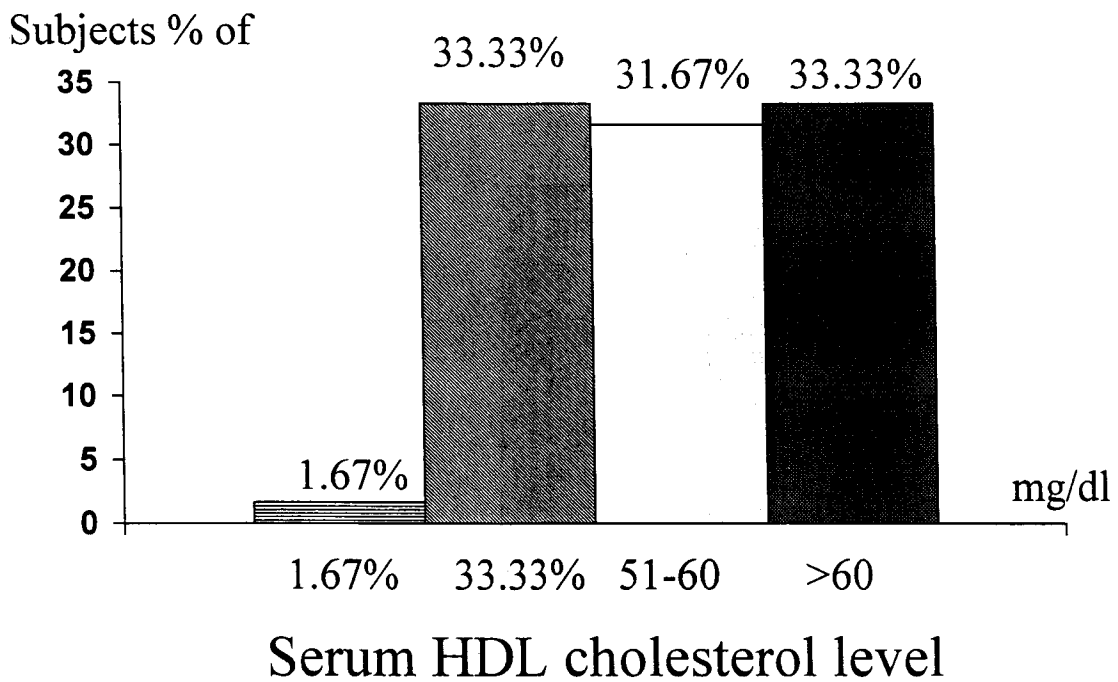


Figure 4.

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