The prevalence of dyslipidemia in the elderly who live in the rural areas of Thailand was determined in this study. Random sampling of volunteers aged ≥ 60 years in 3 districts of Samut Songkhram and Ratchaburi provinces was done. After 12-hour fast, blood sampling was drawn for the analysis of total cholesterol, triglycerides, high-density lipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) cholesterol. Eighty men and 123 women aged 60-87 years old, were included in the study. Mean serum lipid levels of cholesterol, LDL cholesterol, HDL cholesterol and triglycerides were 261.74±47.58, 180.35±45.06, 43.72±12.06, and 188.38±103.84 mg/dl respectively. Women had significantly higher body mass index, cholesterol and LDL cholesterol levels than men. Seventy percent of them had cholesterol ≥ 240 mg/dl and LDL cholesterol ≥ 160 mg/dl. Twenty-five percent had HDL cholesterol ≤ 35 mg/dl. However, LDL/HDL cholesterol ratio > 5 which indicated high risk for coronary heart disease were found in only 34%. In conclusion, prevalence of dyslipidemia was very high in Thai rural elderly. Further surveillance in this population is essential in verifying the impact of dyslipidemia as a risk of cardiovascular disease in Thai elderly people.
DYSLIPIDEMIA IN THE ELDERLY

Total cholesterol was calculated by using Friedwald’s formula if triglycerides levels did not exceed 350 mg/dl (Friedwald et al, 1972).

Statistical analysis

Statistical analysis was performed by Statistical Package for Social Science (SPSS) for Windows release 7.5.1 (Social Science Data Service, University of California Davis). Means and standard deviations of various numerical parameters were calculated. Non-paired Student’s t-test was used to compare the mean serum lipid levels among groups.

RESULTS

There were 203 elderly subjects recruited in the study. Their age ranged from 60-87 years old (mean±SD 69.3±6.67 years). Thirty-six percent of them were farmers, while other 23% were employees, 12% housekeepers and 12% work in their family business. The BMI of women and men were 24.51±3.94 and 22.76±3.81 kg/m² respectively. Women had significantly higher BMI than men (p = 0.002).

The means and standard deviations of serum total cholesterol, triglycerides, HDL cholesterol and LDL cholesterol were 261.74±47.58, 180.35±45.06, 43.72±12.06, and 188.38±103.84 mg/dl respectively. The means and standard deviations of the subjects in each sex are shown in Table 1. Women had significantly higher total cholesterol and LDL cholesterol levels than men. The distribution of serum total cholesterol, triglycerides and LDL cholesterol in each sex are shown in Figs 1, 2 and 3 respectively. All women and 87.5% of the men had total cholesterol greater than 200 mg/dl, 87% of women and 67.5% of men had serum total cholesterol greater than 240 mg/dl respectively. On

<table>
<thead>
<tr>
<th>Serum lipids</th>
<th>Women (no. = 123)</th>
<th>Men (no. = 80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>271.76 ± 42.54</td>
<td>246.35 ± 50.98*</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>197.32 ± 113.97</td>
<td>174.64 ± 84.83</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>44.09 ± 12.13</td>
<td>43.15 ± 11.99</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>190.29 ± 39.27</td>
<td>168.59 ± 49.23*</td>
</tr>
</tbody>
</table>

p < 0.005
the other hand, 25.2% of women and 31.2% of men had serum triglycerides greater than 200 mg/dl. Only 6.2% of women and 25.7% of men had LDL cholesterol lower than the desirable level of 130 mg/dl. Eighty percent of women and 55.4% of men had LDL cholesterol greater than 160 mg/dl. However, a HDL cholesterol level lower than 35 mg/dl was found in only 23.6% of women and 26.3% of men. Thus, only 34% of them had cholesterol/HDL cholesterol ratio > 5 which indicated a high risk for coronary heart disease.

DISCUSSION

There are few studies about the elderly in Thailand and most of the data in the past few decades reflected malnutrition as a major problem for them (Swaddiwudhipong et al., 1991; Yasamutr and Suwannarungsri, 1985). Only one study had mentioned serum lipid levels in the elderly in institutions (Viseshakul et al., 1982). In that study, the mean total cholesterol was below 200 mg/dl. Interestingly, the authors reported HDL cholesterol level that was higher than an average HDL cholesterol in many other countries. The total cholesterol levels in the present study were higher and HDL cholesterol level was lower than those in previous reports. This might be the result of changing dietary pattern and lifestyle of Thai people in the past 15 years.

The most recent community study that included the elderly as a part of the population in that survey was the National Health Survey in the Thai Population in 1991-1992 (Chuprapawan, 1996). From that study, prevalence of hypercholesterolemia increases with age from below 10% in young adult, to about 25% in the elderly. However, that study was conducted throughout the country which differed from the present study which focused on a small group of the elderly in the seaside area. The difference in location may partly explain the higher prevalence of hypercholesterolemia in our population. The other explanation may be the semi-urbanization of the area which was only about 1 hour drive from Bangkok, the capital of the country. The cholesterol levels and prevalence of dyslipidemia in the present study were close to but slightly higher than those in the report in younger population in Singapore, the other country in southeast Asia which has a similar change in lifestyle in the past decades (Teo et al., 1992).

It is clear that high cholesterol level increases risk for coronary artery disease in most populations (Anderson et al., 1987; Neaton et al., 1992; Stamler et al., 1993; Yano et al., 1988). However, the ability of total cholesterol level to predict coronary heart disease in the elderly has been repeatedly questioned. The effect of total cholesterol levels on coronary heart disease in the elderly has been shown to be a U- or J-shaped relationship (Anderson et al., 1987; Staessen et al., 1990) or not related to risk for death (Kronmal et al., 1993; Krumholz et al., 1994). However, recent data suggested that elevated serum total cholesterol is a risk factor for death from coronary heart disease and the apparent adverse effects associated with low cholesterol levels are secondary to co-morbidity and fragility (Corti et al., 1997). In addition, data from the Established Population for Epidemiologic Studies in the Elderly (EPESE) suggested that a low HDL cholesterol level is a more specific and powerful predictor of risk for coronary death than total cholesterol (Corti et al., 1995). Thus, screening for dyslipidemia in the elderly is recommended. On the other hand, there is no strong evidence that cholesterol lowering drugs are cost-effective in primary prevention of coronary heart disease in this group of people. So, the National Cholesterol Education Program (NCEP II, 1993) has recommended diet therapy and lifestyle modification as major strategies in lowering cholesterol level in primary prevention of coronary artery disease and limited use of cholesterol lowering drugs to only in high risk elderly who are otherwise in good health.

The very high prevalence of dyslipidemia in this group of people is alarming and more attention should be paid to the elderly in urban and rural area of this country. Even though the benefit of treatment of individuals with hypercholesterolemia for primary coronary prevention is controversial, health education and campaigns to lower fat and cholesterol intake in this population are mandatory. In addition, long term follow-up is necessary to verify the impact of high cholesterol levels in this elderly population.

CONCLUSION

Dyslipidemia, especially hypercholesterolemia is highly prevalent in the elderly living in the seaside area of Thailand. However, most of the cases had high HDL cholesterol levels and had cholesterol/HDL cholesterol ratio lower than 5. Even though
long-term follow-up is required to determine the impact of high cholesterol levels on risk of coronary heart disease and death, this high prevalence should be alarming. Community intervention is necessary to decrease the cholesterol levels and other risk factors in this population.

ACKNOWLEDGEMENTS

This report is a part of the “Nutritional survey of Geriatric Population in the Rural Area”. This survey was supported by World Health Organization in collaboration with the Division of Disease Prevention and Control, Ministry of Public Health under project THA NUT 001/RB94-95/BL2.1 (THPA-92-93/029).

The authors feel so grateful for the kind support of the directors of Wat Phleng, Bang Khonthi and Naphalai district hospitals and for giving permission to the team to collect data from the geriatric day centers under their responsibility. In addition, the team would like to thank the personnel of those district hospitals, Miss Siriya Chokvivatavanit, and Miss Keerada Krainuwat from the Research Center for Nutrition Support, Siriraj Hospital, for their contribution in this study.

REFERENCES


