Effects of Cigarette Smoking on Serum Lipids among Priests in Bangkok

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Objectives: To determine the effects of cigarette smoking on the level of serum cholesterol and triglyceride among priests in Bangkok area.

Materials and Method: Serum total cholesterol and triglyceride were evaluated in the process of health check-up among 401 priests in Bangkok and a questionnaire about cigarette smoking was given.

Results: From the 401 priests, 76.3% of priests were more than 40 years old. The mean age of priests was 53.68 ± 15.01 years. The mean cholesterol among non-smokers, ex-smokers, current smokers and all respondents were 230.08 ± 48.22, 223.58 ± 42.80, 230.08 ± 48.22, and 226.65 ± 46.58 respectively. The mean triglyceride among non-smokers, ex-smokers, current smokers and all respondents were 150.05 ± 78.23, 148.47 ± 69.80, 180.01 ± 111.99, and 154.87 ± 83.71, respectively. In comparison among groups, there was no significantly statistical difference in cholesterol level (p = 0.22), but there was significantly statistical difference in triglyceride level (p = 0.02). The means of triglyceride between non-smokers and current smokers, and between ex-smokers and current smokers were significantly statistical different (p = 0.026, 0.043, respectively).

Conclusion: The results suggest that cigarette smoking increases serum triglyceride level in the priests but does not affect serum total cholesterol level. The priests who usually smoke should be checked for triglyceride for early intervention of coronary heart disease and other hypertriglyceridemia-induced diseases.

Keywords: Smoking, Lipid, Cholesterol, Triglyceride, Priests, Bangkok

Cigarette smoking is one of the major risk factors for cardiovascular disease. Smokers have a higher risk of coronary artery disease than non-smokers. Several possible explanations have been offered for this association, including altered blood coagulation, impaired integrity of the arterial wall, and changes in blood lipids. Several studies have shown an association between cigarette smoking and altered serum lipids. In conclusion, the studies revealed that cigarette smokers have lower high-density lipoprotein (HDL) cholesterol levels and higher levels of total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglyceride than non-smokers. It is evident that smoking causes endothelial dysfunction, decreased HDL cholesterol levels, hypertriglyceridemia and increased oxidation of LDL cholesterol and platelet activation leading to a prothrombotic state in Thailan.

In Thailand, there were some studies involving the association between smoking and blood lipids. The study of 501 clerks of Government Savings Bank showed that smoking and alcohol consumption were associated with hypertriglyceridemia and decreased HDL cholesterol, but were not associated with total cholesterol level. The study of 80 male Bangkok Metropolitan Waterworks employees showed that smokers had significant lower levels of HDL cholesterol than non-smokers. Another study of 133 clients for health check-up at Rajavithi Hospital showed that smoking affected decreasing of HDL cholesterol. Priests is a special group of population, i.e., all of them are male, the age is 20 years and above, they eat only 2 meals per day, their daily life usually does not involve with heavy exercise, they do not drink alcohol and the prevalence of smoking among them is around 25%.

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Priest Hospital started health check-up of priests in Bangkok in 2006. It is interesting to study the effects of smoking on their serum lipid for possible association among these variables and to get some clues to decrease coronary heart disease (CHD) among them.

**Objective**
To determine the effects of cigarette smoking on the level of serum total cholesterol and triglyceride in priests from Bangkok area.

**Material and Method**
Four hundred and one priests in Bangkok who participated in health check-up by Priest Hospital in 2006 were subjects of this study. Serum total cholesterol and triglyceride were evaluated from venous blood and a questionnaire about cigarette smoking was given. The subjects were classified according to smoking statuses into three groups, i.e., non-smokers, ex-smokers, and current smokers. The data were analyzed by using SPSS version 11 software to determine means, standard deviations, associations between smoking status and blood lipids and comparisons of mean difference of blood lipids between pairs of smoking status.

**Results**
Almost all of the respondents were more than 30 years of age, 65% of them were between 31-60 and 76.3% of them were more than 40 years old (Table 1). The mean age was 53.68 ± 15.01 years. The mean cholesterol among non-smokers, ex-smokers, and current smokers were 230.08 ± 48.22, 223.58 ± 42.80, and 230.08 ± 48.22, respectively. The mean triglyceride among non-smokers, ex-smokers, and current smokers were 150.05 ± 78.23, 148.47 ± 69.80, and 180.01 ± 111.99, respectively (Table 2). In comparison among groups, there was no significantly statistical difference in cholesterol level (p = 0.22), but there was significantly statistical difference in triglyceride level (p = 0.02) (Table 2). The means of triglyceride between non-smokers and current smokers, and between ex-smokers and current smokers were significantly statistical different (p = 0.026, 0.043, respectively (Table 3).

**Discussion**
Measurement of blood lipids in the clinical laboratory has become increasingly important because of the predictive association with cardiovascular diseases, especially coronary artery disease\(^6\)\(^\text{-}\)\(^12\). Lipid profiles in health check-up are usually the evaluation of total cholesterol, triglyceride, HDL cholesterol, and LDL cholesterol. In this study, only total cholesterol and triglyceride were measured for economic purpose. It showed that the mean triglyceride of non-smokers was significantly statistical different from current

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**Table 1.** Number of priests classified by age groups

<table>
<thead>
<tr>
<th>Age group (year)</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30</td>
<td>9</td>
<td>2.2</td>
</tr>
<tr>
<td>31-40</td>
<td>86</td>
<td>21.4</td>
</tr>
<tr>
<td>41-50</td>
<td>93</td>
<td>23.2</td>
</tr>
<tr>
<td>51-60</td>
<td>82</td>
<td>20.4</td>
</tr>
<tr>
<td>More than 60</td>
<td>131</td>
<td>32.7</td>
</tr>
<tr>
<td>Total</td>
<td>401</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table 2.** Comparisons of means of serum lipid classified by smoking statuses and association between smoking and serum lipid

<table>
<thead>
<tr>
<th>Lipid type/ Smoking status</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chol Non-smoker</td>
<td>226</td>
<td>230.08</td>
<td>48.22</td>
<td>1.517</td>
<td>0.221</td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>105</td>
<td>223.58</td>
<td>42.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cur. smoker</td>
<td>70</td>
<td>220.18</td>
<td>46.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>401</td>
<td>226.65</td>
<td>46.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| TG Non-smoker             | 226| 150.05 | 78.23 | 3.895 | 0.021*  |
| Ex-smoker                 | 105| 148.47 | 69.80 |       |         |
| Cur. smoker               | 70 | 180.01 | 111.99|       |         |
| Total                     | 401| 154.87 | 83.71 |       |         |

* significant level at p < 0.05
Chol = Cholesterol  TG = Triglyceride
Cur. smoker = Current smoker

**Table 3.** Comparisons of means of triglyceride classified by smoking status (n = 401)

<table>
<thead>
<tr>
<th>Smoking status</th>
<th>Mean difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smoker</td>
<td>Ex-smoker</td>
<td>1.59-29.96</td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>Current smoker</td>
<td>-1.59</td>
</tr>
<tr>
<td>Current smoker</td>
<td>Ex-smoker</td>
<td>-31.55</td>
</tr>
</tbody>
</table>

* significant level at p < 0.05
smokers and ex-smoker or smoking is associated with significantly higher serum concentrations of triglyceride which is the same as the other studies. However, the result of the association with total cholesterol is different from the other studies. There are many factors that are involved in the different results, such as, diet, physical activity, body weight and the waist/hip ratio, smoking, alcohol consumption and psychosocial conditions. The other factor that affects blood lipids are genetic variation. The effect of smoking on the serum lipid levels is also dependent on age and gender. The triglyceride level is one of several lipid parameters that can aid prediction of CHD risk. An elevated plasma triglyceride level is strongly associated with an increased risk of CHD. Raised triglyceride levels can be present in individuals at risk for CHD when the total cholesterol is normal. The role of triglyceride in CHD pathogenesis is thought to involve several direct and indirect mechanisms, such as effects on the metabolism of other lipoproteins, transport proteins, enzymes, and on coagulation and endothelial dysfunction. However, not all individuals with raised triglyceride levels have increased risk of CHD. Factors, such as, genetic defects, diet, age, lifestyle, and a range of medical conditions, drug therapy and metabolic disorders, can also affect the triglyceride level. Hypertriglyceridemia is frequently associated with other lipid abnormalities and the metabolic syndrome, which are linked to coronary artery disease. Smoking is also a risk factor for pancreatitis. Elevated triglyceride level in priests may be partly caused by eating more sugar than general male population. However, the priests who are smokers should be checked for serum lipids, especially triglyceride for early intervention of CHD and other diseases induced by hypertriglyceridemia.

Conclusion
The results suggest that cigarette smoking increases serum triglyceride level in this group of priests, but does not affect serum total cholesterol level. The priests who usually smoke should be checked for serum lipids, especially triglyceride for early intervention of CHD and other hypertriglyceridemia-induced diseases.

Acknowledgement
The author wish to thank Dr. Sawasdi Thakerngdej, the ex-director of Priest Hospital who initiated the health check-up program for the priests and Dr. Waraporn Bhumisawasdi, Director of Priest Hospital who supported this study.

References


ผลของการสูบบุหรี่ต่อไขมันในเลือดของพระสงฆ์ในกรุงเทพมหานคร

โทษทัน แสงศิริธุ์

วัตถุประสงค์: เพื่อศึกษาผลของการสูบบุหรี่ต่อระดับไขมันในเลือดของพระสงฆ์ในกรุงเทพมหานคร

วัสดุและวิธีการ: ได้รวบรวมข้อมูลไว้แล้วจำนวนกว่า 40 ปี อาบุรีเฉลี่ย 53.68 ± 15.01 ปี คำเลือยแบบ โรคเส้นด้ายของกลุ่มที่ไม่สูบบุหรี่ กลุ่มที่เคยสูบบุหรี่แต่ล้มแล้ว กลุ่มที่สูบบุหรี่ และกลุ่มพระสงฆ์ที่หน่วยเดินป่า 230.08 ± 48.22, 223.58 ± 42.80, 230.08 ± 48.22, 226.65 ± 46.58 ตามลำดับ คำเลือยของโรคกลีบเลือดในกลุ่มที่ไม่สูบบุหรี่ กลุ่มที่เคยสูบบุหรี่แต่ล้มแล้ว กลุ่มที่สูบบุหรี่และพระสงฆ์ที่หน่วยเดินป่า 230.08 ± 48.22, 223.58 ± 42.80, 230.08 ± 48.22, 226.65 ± 46.58 ตามลำดับ

ผลการศึกษา: 76.3% ของพระสงฆ์ที่อายุมากกว่า 40 ปี อาบุรีเฉลี่ย 53.68 ± 15.01 ปี คำเลือยของ โรคเส้นด้ายของกลุ่มที่ไม่สูบบุหรี่ กลุ่มที่เคยสูบบุหรี่แต่ล้มแล้ว กลุ่มที่สูบบุหรี่ และกลุ่มพระสงฆ์ที่หน่วยเดินป่า 230.08 ± 48.22, 223.58 ± 42.80, 230.08 ± 48.22, 226.65 ± 46.58 ตามลำดับ

สรุปผล: จากผลการศึกษาปรากฏว่าการสูบบุหรี่มีผลเพิ่มระดับโรคกลีบเลือดในเลือดของพระสงฆ์ แต่ไม่มีผลต่อระดับโรคเส้นด้ายของกลุ่มที่ไม่สูบบุหรี่ที่พระสงฆ์ที่หน่วยเดินป่า

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