

# 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  $53.68 \pm 15.01$  years. The mean cholesterol among non-smokers, ex-smokers, current smokers and all respondents were  $230.08 \pm 48.22$ ,  $223.58 \pm 42.80$ ,  $230.08 \pm 48.22$ , and  $226.65 \pm 46.58$  respectively. The mean triglyceride among non-smokers, ex-smokers, current smokers and all respondents were  $150.05 \pm 78.23$ ,  $148.47 \pm 69.80$ ,  $180.01 \pm 111.99$ , and  $154.87 \pm 83.71$ , respectively. In comparison among groups, there was no significant statistical difference in cholesterol level ( $p = 0.22$ ), but there was significant 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

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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<sup>(1)</sup>. 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<sup>(2,3)</sup>. 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<sup>(4)</sup>.

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<sup>(5)</sup>. The study of 80 male Bangkok Metropolitan Waterworks employees showed that smokers had significant lower levels of HDL cholesterol than non-smokers<sup>(6)</sup>. Another study of 133 clients for health check-up at Rajavithi Hospital showed that smoking affected decreasing of HDL cholesterol<sup>(7)</sup>. 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 %<sup>(8)</sup>.

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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  $53.68 \pm 15.01$  years. The mean cholesterol among non-smokers, ex-smokers, and current smokers were  $230.08 \pm 48.22$ ,  $223.58 \pm 42.80$ , and  $230.08 \pm 48.22$ , respectively. The mean triglyceride among non-smokers, ex-smokers, and current smokers were  $150.05 \pm 78.23$ ,  $148.47 \pm 69.80$ , and  $180.01 \pm 111.99$ , respectively (Table 2). In comparison among groups, there was no significant statistical difference in cholesterol level ( $p = 0.22$ ), but there was significant 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<sup>(9-12)</sup>. 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

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

Age group (year)	Number	Percent
Less than 30	9	2.2
31-40	86	21.4
41-50	93	23.2
51-60	82	20.4
More than 60	131	32.7
Total	401	100.0

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

Lipid type/ Smoking status	n	Mean	SD	F	p-value
Chol	Non-smoker	226	230.08	48.22	1.517 0.221
	Ex-smoker	105	223.58	42.80	
	Cur. smoker	70	220.18	46.26	
	Total	401	226.65	46.58	
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)

Smoking status	Mean difference	p-value
Non-smoker Ex-smoker	1.59-29.96	1.0000.026*
Ex-smoker Non-smoker	-1.59	1.000
Ex-smoker Current smoker	-31.55	0.043*
Current smoker Non-smoker	29.96	0.026*
Current smoker Ex-smoker	31.55	0.043*

\* 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<sup>(3,5)</sup>. 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<sup>(13)</sup>. The other factor that affects blood lipids are genetic variation<sup>(14)</sup>. The effect of smoking on the serum lipid levels is also dependent on age and gender<sup>(15)</sup>. 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<sup>(16-18)</sup>. 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<sup>(19)</sup>. 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<sup>(20)</sup>. Hypertriglyceridemia is frequently associated with other lipid abnormalities and the metabolic syndrome, which are linked to coronary artery disease<sup>(21-23)</sup>. Smoking is also a risk factor for pancreatitis<sup>(20)</sup>. 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.

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## ผลของการสูบบุหรี่ต่อไขมันในเลือดของพระสงฆ์ในกรุงเทพมหานคร

### ไพรัตน์ แสงดิษฐ

**วัตถุประสงค์:** เพื่อศึกษาผลของการสูบบุหรี่ต่อระดับไขมันโคเลสเตอรอลและไตรกลีเซอไรด์ในเลือดในพระสงฆ์ที่จำพรรษาในกรุงเทพมหานคร

**วัสดุและวิธีการ:** ได้ตรวจระดับไขมันโคเลสเตอรอลและไตรกลีเซอไรด์ในการตรวจสุขภาพพระสงฆ์ 401 รูปในกรุงเทพมหานครและมีการตอบแบบสอบถามเกี่ยวกับการสูบบุหรี่

**ผลการศึกษา:** 76.3 % ของพระสงฆ์อายุมากกว่า 40 ปี อายุเฉลี่ย  $53.68 \pm 15.01$  ปี ค่าเฉลี่ยของ โคเลสเตอรอลของกลุ่มที่ไม่สูบบุหรี่ กลุ่มที่เคยสูบบุหรี่แต่เลิกแล้ว กลุ่มที่สูบบุหรี่ และกลุ่มพระสงฆ์ทั้งหมดเป็น  $230.08 \pm 48.22$ ,  $223.58 \pm 42.80$ ,  $230.08 \pm 48.22$ ,  $226.65 \pm 46.58$  ตามลำดับ ค่าเฉลี่ยของไตรกลีเซอไรด์ในกลุ่มที่ไม่สูบบุหรี่ กลุ่มที่สูบบุหรี่แต่เลิกแล้ว กลุ่มที่สูบบุหรี่และพระสงฆ์ทั้งหมดเป็น  $150.05 \pm 78.23$ ,  $148.47 \pm 69.80$ ,  $180.01 \pm 111.99$ ,  $154.87 \pm 83.71$  ตามลำดับ ในการเปรียบเทียบระหว่างกลุ่มพบว่าไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติในระดับโคเลสเตอรอล ( $p = 0.22$ ) แต่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติในระดับไตรกลีเซอไรด์ ( $p = 0.02$ ) เมื่อเปรียบเทียบค่าเฉลี่ยของไตรกลีเซอไรด์ระหว่างกลุ่มที่ไม่สูบบุหรี่กับกลุ่มที่สูบบุหรี่ กลุ่มที่สูบบุหรี่แต่เลิกแล้วกับกลุ่มที่สูบบุหรี่พบว่ามีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ( $p = 0.026$ ,  $0.043$ ) ตามลำดับ

**สรุปผล:** จากผลการศึกษานี้ชี้ว่าการสูบบุหรี่มีผลเพิ่มระดับไตรกลีเซอไรด์ในเลือดในพระสงฆ์ แต่ไม่มีผลต่อระดับโคเลสเตอรอล ดังนั้นพระสงฆ์ที่สูบบุหรี่จึงควรตรวจระดับไตรกลีเซอไรด์เพื่อจะได้มีการป้องกันการเกิดโรคหลอดเลือดหัวใจและโรคที่เกิดจากระดับไตรกลีเซอไรด์สูงอื่นๆ