Prevalence of Coronary Artery Disease in Different Ethnic Groups at a Tertiary Care Hospital

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Objective: *To compare the prevalence of coronary artery disease (CAD) between Thai Muslim and Thai Buddhist patients.*
Material and Method: *A hospital based retrospective study was carried out to investigate the prevalence of CAD and cardiovascular risk factors of these two ethnic and religious groups at Nopparat Rajathanee Hospital between June 2012 and December 2012. All Thai Muslim patients aged ≥35 years who visited the internal medicine outpatient department (OPD) were studied. The compared population was randomly selected and matched by age and sex from the Thai Buddhist patients in the same period.*
Results: *Five hundred seventy nine patients with median age of 62 years (interquartile range = 24) were studied. There were 289 Thai Muslims and 290 Thai Buddhists. The prevalence of definite CAD in Muslims (14.2%) was significantly higher than the prevalence in Buddhists (6.2%) (p = 0.002). The prevalence of diabetes mellitus, hypertension, high total cholesterol (≥240 mg/dl), and high triglyceride in Muslims were significantly higher. For high-density lipoprotein cholesterol (HDL-C), only Muslim females showed significantly higher prevalence of low HDL-C than that of Buddhist females.*
Conclusion: *Thai Muslims showed significantly higher prevalence of definite CAD than that of Thai Buddhists. The greater prevalence of certain risk factors may contribute to higher prevalence of CAD in Thai Muslim patients.*

Keywords: Ethnic differences, Thai Muslims, Coronary artery disease

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Coronary artery disease (CAD) has become a major health problem in Thailand[1] because of industrialization, changing lifestyles and longer life expectancy of Thai population. Thailand is known as the Kingdom of great ethnic and religious diversities. Muslims make up the second largest minority group, after the ethnic Chinese population. There are approximately 7.5 million Thai Muslims in the Kingdom or about 12% of the total Thai populations[2]. Ethnic difference was found to play a role in causing the variation in the prevalence of CAD and cardiovascular risk factors. Thai Muslims have difference of cardiovascular risk factors when compare to Thai Buddhists at Songkhla province in the Southern region of Thailand[3]. Muslim males had lower HDL-C and Muslim females had a higher prevalence of hypertension when compared to Buddhist males and females, respectively[3]. The data from Singapore showed distinct differences in the prevalence of all cardiovascular risk factors between Malays (mainly Muslims) and Chinese[4,5]. Malays had higher prevalence of diabetes mellitus, hypertension, hypercholesterolemia, obesity, and smoking when compared to Chinese[4]. The risk factors for cardiovascular disease of these two ethnic groups may differ because of genetic and different lifestyles[6]. The incidence of CAD in terms of acute myocardial infarction (MI) among Malays was also two-times higher than that of Chinese[7]. In addition, the fatality rate of MI for Malays was much higher than that of Chinese[7], too. However, there is currently no data comparing the prevalence of CAD between Thai Muslims and Thai Buddhists in Thailand. Nopparat Rajathanee Hospital is located in Kannayao district, the eastern part of Bangkok. The hospital serves a large number of Thai Muslim patients because they live mainly in these areas of Bangkok, like in the Southern region of Thailand. Thus, the hospital is suitable for assess the prevalence of CAD and cardiovascular risk factor in Thai Muslims.

The aim of the present study was to compare the prevalence of CAD between Thai Muslim and Thai Buddhist patients.

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Material and Method

The present study was approved by the Ethics Committees of Nopparat Rajathanee Hospital. The present study population consisted of all Thai Muslim patients aged ≥35 years who visited the internal medicine outpatient department (OPD) at Nopparat Rajathanee Hospital between June 2012 and December 2012. The compared population was randomly selected and matched by age and sex from the Thai Buddhist patients in the same period by computer-generated randomization according to SPSS software.

Medical records from OPD cards were reviewed to obtain prior history of CAD and cardiovascular risk factors. CAD was defined as those with either definite or probable CAD. Definite CAD was a patient who had previous history of acute coronary syndrome, a stenosis ≥50% in at least one coronary artery as assessed by coronary angiography or coronary CT angiography, or a status post previous PCI/CABG. Probable CAD was a patient who had history of stable angina and was informed by the physician as having CAD. Risk factors studied were age, hypertension, diabetes, lipids, and cigarette smoking. Hypertension (HT) was defined as systolic BP ≥140 mmHg or diastolic BP ≥90 mmHg. Diabetes mellitus (DM) had to have fasting plasma glucose ≥126 mg/dl, or previously diagnosed and on treatment with oral hypoglycemic agents. Borderline high total cholesterol (TC) was defined as TC 200-239 mg/dl. High TC was defined as TC ≥240 mg/dl. High triglyceride (TG) was defined as TG ≥150 mg/dl. For high-density lipoprotein cholesterol (HDL-C), low HDL-C was defined as HDL-C ≤35 mg/dl for males and ≤40 mg/dl for females. Smoker was defined as a person currently smokes or had ever smoked.

Statistical analysis

Statistical analysis was performed using the SPSS software version 18 for Windows. The values of the variables with continuous outcome were expressed as the median and interquartile range. The prevalence of CAD and cardiovascular risk factors were represented as percentage and were compared between these two ethnic groups. Two group comparisons for categorical data were performed using Chi-squared test. All tests were two-tailed and p-value of less than 0.05 was considered statistical significance.

Results

Five hundred seventy nine patients were studied. The median age of patients was 62 years (interquartile range = 24). There were 289 Thai Muslims (missing data of one subject in Thai Muslim patients) and 290 Thai Buddhists. Thai Muslims and Thai Buddhists comprised of 47.8% and 46.7% of male patients, respectively. Baseline characteristics including age and gender were not different between these two ethnic groups. The prevalence of definite CAD was 14.2% in Thai Muslim, and 6.2% in Thai Buddhist patients. The prevalence of probable CAD was 7.3% in Thai Muslim, and 4.1% in Thai Buddhist patients. The prevalence of definite CAD in Thai Muslim was significantly higher than that of Thai Buddhist patients (p = 0.002). The prevalence of probable CAD was not significantly different between two ethnic groups (p = 0.104). Prevalence of

Table 1. Prevalence (%) of coronary artery disease and cardiovascular risk factors

CAD and risk factors	Total (n = 579)	Muslims (n = 289)	Buddhists (n = 290)	p-value
Definite CAD	10.2	14.2	6.2	0.002
Probable CAD	5.7	7.3	4.1	0.104
HT	75.1	83.4	66.9	<0.001
DM	39.2	47.4	31.0	<0.001
TC ≥200	36.8	38.4	35.2	0.419
TC ≥240	22.1	28.0	16.2	0.001
TG ≥150	41.5	50.9	32.1	<0.001
HDL, M ≤35	19.2	21.0	17.4	0.445
HDL, F ≤40	23.1	30.5	15.8	0.002
Smoking	28.8	27.7	30.0	0.538

CAD = coronary artery disease; HT = hypertension; DM = diabetes mellitus; TC = total cholesteral; TG = triglyceride; HDL = high density lipoprotein

cardiovascular risk factors is reported in Table 1. Thai Muslim showed significantly higher prevalence of DM, HT, high TC (≥240 mg/dl), and high TG when compared to Thai Buddhist patients. For HDL-C, only Thai Muslim females showed significantly higher prevalence of low HDL-C than that of Thai Buddhist females. For smoking, prevalence was not different between two ethnic groups.

Discussion

Coronary artery disease (CAD) has been one of the leading causes of death in Thailand[8]. According to the WHO data reported in April 2011[9], CAD deaths reached 10.3% of total deaths in Thailand. The prevalence of CAD in Thailand was 9.9/1,000, appeared much lower than that of many developed countries because of lower proportion of some major cardiovascular disease risk factors[1]. In the present study, the overall prevalence of definite CAD was 10.2%. The prevalence was considerably higher than the findings from previously reported because this was the prevalence of the outpatient population from hospital-based study, not a true population prevalence. Ethnic difference was found to play a role in the variation of CAD and cardiovascular risk factors[4-7,10,11]. Thai Muslim had higher prevalence of definite CAD (14.2%), compared to Thai Buddhist patients (6.2%). This data was consistent with studies in Singapore that Malays (mainly Muslim) was at greater risk of CAD, compared to Chinese[7,10].

Several factors likely contribute to ethnic differences in the prevalence of CAD in the same geographic area[12]. These factors include variations in both of the prevalence of environmental risk factor (e.g. diet, activity, smoking), which is related to cultural factors, and prevalence of traditional and novel risk factors. Genetic factors may also contribute to inter-ethnic differences because of variable gene frequencies among ethnic groups.

Ethnic differences in the prevalence of DM, HT, dyslipidemia, and smoking were also observed in the present study. DM, HT, high TC (≥240 mg/dl), and high TG were more prevalent in Thai Muslim patients. For HDL-C, only Thai Muslim females showed significantly higher prevalence of low HDL-C than that of Thai Buddhist females. These pattern was similar to reports from Singapore[4,5] which showed that Malays tended to be higher prevalence of risk factors, such as impaired glucose tolerance, DM, HT, obesity, high total cholesterol, and smoking, when compared to Chinese although not as high as Indians. However, this pattern was different from the previous study in Southern Thailand[3], which showed only higher prevalence of HT in Muslim females and low HDL-C in Muslim males, when compared to Buddhists of the same gender. The urban lifestyles and older subjects in the present study may partly explain the high prevalence of risks and quite differences in risks between these two ethnic groups. The greater prevalence of certain risk factors such as HT, DM, high total cholesterol, and low HDL-C may contribute to higher prevalence of CAD in Thai Muslim patients.

Some limitations need to be considered in the present study. First, the study was conducted in a hospital setting, so the prevalence of CAD in this study was not true population prevalence, but rather the hospital base prevalence at the Nopparat Rajathanee Hospital. Second, the small number of subjects was observed in short period. Further studies are required to assess true prevalence of CAD and cardiovascular risks factors in this area.

Conclusion

Thai Muslims showed significantly higher prevalence of definite CAD than that of Thai Buddhists. The prevalence of CAD is very high in the internal medicine OPD at Nopparat Rajathanee Hospital. Therefore, there is a need to focus attention towards primary prevention of CAD in all ethnic groups, especially Thai Muslims, in this geographic area.

Potential conflicts of interest

None.

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ความแตกต่างทางชาติพันธุ์ของการเกิดโรคหลอดเลือดหัวใจตีบในโรงพยาบาลตติยภูมิ

ธัญญ์ สุวัฒนวิโรจน์, สุกิจ แย้มวงษ์

วัตถุประสงค์: *เพื่อเปรียบเทียบความชุกของโรคหลอดเลือดหัวใจตีบระหว่างกลุ่มผู้ป่วยชาวไทยมุสลิม และกลุ่มผู้ป่วยชาวไทยพุทธ*
วัสดุและวิธีการ: *เป็นการศึกษาย้อนหลังเพื่อเปรียบเทียบความชุกของโรคหลอดเลือดหัวใจตีบระหว่างผู้ป่วยสองกลุ่มดังกล่าวที่เข้ารับการรักษาที่โรงพยาบาลนพรัตนราชธานี ระหว่างเดือนมิถุนายน ถึง เดือนธันวาคม พ.ศ. 2555 โดยเปรียบเทียบระหว่างกลุ่มผู้ป่วยชาวไทยมุสลิมทุกราย ที่อายุมากกว่า 35 ปี ซึ่งเข้ารับการรักษาที่ห้องตรวจผู้ป่วยนอก แผนกอายุรกรรม และกลุ่มผู้ป่วยชาวไทยพุทธที่ถูกสุ่มเลือกตามอายุและเพศเดียวกัน ซึ่งเข้ารับการรักษาที่ห้องตรวจผู้ป่วยนอกในช่วงเวลาดังกล่าวเช่นเดียวกัน*
ผลการศึกษา: *จำนวนผู้ป่วยที่ศึกษาทั้งสิ้น 579 ราย ค่ามัธยฐานของอายุเท่ากับ 62 ปี (interquartile range = 24) แยกเป็นผู้ป่วยชาวไทยมุสลิม 289 ราย และผู้ป่วยชาวไทยพุทธ 290 ราย ผลการศึกษาพบว่าความชุกของโรคหลอดเลือดหัวใจตีบในกลุ่มผู้ป่วยชาวไทยมุสลิมเท่ากับ 14.2 เปอร์เซ็นต์ สูงกว่าอย่างมีนัยสำคัญ เมื่อเปรียบเทียบกับกลุ่มผู้ป่วยชาวไทยพุทธซึ่งมีค่าความชุกของโรคเท่ากับ 6.2 เปอร์เซ็นต์ (p = 0.002) นอกจากนี้ยังพบความชุกของโรคเบาหวาน โรคความดันโลหิตสูง โรคไขมันโคเลสเตอรอลและไขมันไตรกลีเซอไรด์ในเลือดสูง ในกลุ่มผู้ป่วยชาวไทยมุสลิมสูงกว่ากลุ่มผู้ป่วยชาวไทยพุทธอย่างมีนัยสำคัญอีกด้วย สำหรับความชุกของภาวะ HDL-C ในเลือดต่ำนั้น พบว่า เฉพาะหญิงชาวไทยมุสลิมเท่านั้นที่มีความชุกของภาวะดังกล่าวสูงกว่าหญิงชาวไทยพุทธ*
สรุป: *ผู้ป่วยชาวไทยมุสลิมพบความชุกของโรคหลอดเลือดหัวใจตีบสูงกว่าผู้ป่วยชาวไทยพุทธ ความชุกของปัจจัยเสี่ยงต่าง ๆ ต่อการเกิดโรคหัวใจและหลอดเลือดที่สูงกว่าอาจเป็นสาเหตุหนึ่งที่ทำให้พบความชุกของโรคหลอดเลือดหัวใจตีบมากกว่าได้*