Prevalence of Risk Factors for Coronary Artery Disease in the Community in Eastern Nepal – A Pilot Study

Sarathi Kalra*, Smiti Narain*, Prahlad Karki**, Jawaid A Ansari***, Kajan Ranabhat*, Nabin Basnet*

Abstract
Introduction: Coronary artery disease is a major cause of morbidity and mortality in Nepal, however, there are very few published reports of prevalence of various risk factors for coronary artery disease in the community from Nepal.

Method: We evaluated 140 adult subjects by simple randomization from all wards in the community in Dharan, a small city located in the foothills in eastern Nepal. After exclusion of subjects with insufficient data, 119 subjects were included for the final analysis. Age ranged from 35 to 86 (mean 54.1± 10.5) years and there were 63 males and 56 females. Various parameters which were studied included: history of diabetes mellitus, hypertension, coronary artery disease, smoking, hereditary history, family history, measurement of blood pressure, anthropometric parameters such as body mass index and waist hip ratio and biochemical parameters such as random blood sugar and serum cholesterol.

Results: The prevalence of various risk factors for coronary artery disease was found to be: hypertension – 42 (35.3%), diabetes mellitus – 19 (15.9%), history of current smoking – 46 (38.7%), hypercholesterolemia – 15 (12.6%), sedentary life style 56 (47.1%), body mass index > 25 kg/m² - 40 (33.6%) and central obesity 50 (42.1%). Approximately one third of the subjects had more than one risk factor.

Conclusions: The study highlights prevalence of various risk factors for coronary artery disease in the community. Since majorly of the risk factors are modifiable, timely intervention can help in reducing morbidity and mortality due to this disease.

Introduction
Coronary artery disease (CAD) as a lifestyle disease is slowly growing in importance in Nepal as a major cause of morbidity and mortality. The ‘elitist’ disease, which was once confined to the affluent class, is now increasingly involving people from lower socio-economic strata especially the younger age groups. The risk factors of CAD, if identified at an early stage can be extremely useful in planning primary and secondary preventive strategies for CAD and its complications. A major chunk of government resources can be saved which would otherwise be spent for investigation and treatment of patients with CAD and its complications.

Several risk factors have been investigated for their association with CAD. Using carotid intima-media thickness as an indicator of generalized atherosclerosis, Salonen and Salonen1 found that increasing age, ambulatory pulse pressure, number of years of smoking, serum LDL cholesterol level, history of ischemic heart disease, pre-exercise systolic blood pressure and diabetes mellitus (DM) were most strongly associated with atherosclerosis. Kalka et al2 reviewed the prevalence of risk factors of CAD in the elderly and found a beneficial effect of intensified physical activity, both in primary and secondary prevention of CAD. Despite the fact that it is the developing world that is and will be facing the epidemic of hypertension (HT) and other chronic diseases,3 research on cardiovascular diseases in a developing country such as Nepal has been limited.

There have been few studies on the prevalence of individual risk factors for CAD such as hypertension,4,5 obesity,6 etc. from Nepal, however, detailed assessment of multiple risk factors in the same community has not been done. In this pilot study to evaluate the prevalence of various risk factors of CAD in the community in Dharan, a small city in Eastern Nepal.

Material and Methods
A total of 140 adult subjects were initially recruited in the study. Dharan is a small city divided into various wards. Subjects were taken from every ward by simple randomization. After taking a written informed consent, subjects were provided with a questionnaire. The questionnaire included history of DM, HT, CAD, smoking, alcohol ingestion and tobacco consumption, family history of DM, HT, coronary artery disease, dietary history including a subjective account of daily fat intake. Besides this, body mass index (BMI) and waist/hip ratio were calculated and vital parameters like blood pressure and pulse rate were recorded and presence of xanthomas and xanthelasmas was noted. Biochemical investigations included estimation of random blood sugar and serum cholesterol. Random blood sugar above 200 mg/dL was taken as diagnostic of diabetes mellitus. Presence of DM, HT, hypercholesterolemia, obesity, history of smoking, sedentary life style and family history of CAD were taken as risk factors for CAD. Waist hip ratio >0.95 was taken as indicative of central obesity. Out of the whole group, complete clinical and biochemical data was available for 119 subjects who were included in the study.

*Intern, **Professor and Head, ***Ex-Associate Professor, Department of Medicine, B.P. Koirala Institute of Health Sciences, Dharan, Nepal
Received: 26.03.2010; Revised: 04.09.2010; Accepted: 30.12.2010
Table 1: Prevalence of risk factors for coronary artery disease in the community of Dharan, Nepal

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>No.</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>42</td>
<td>(35.3)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>19</td>
<td>(15.9)</td>
</tr>
<tr>
<td>History of current smoking</td>
<td>46</td>
<td>(38.7)</td>
</tr>
<tr>
<td>History of CAD</td>
<td>13</td>
<td>(10.9)</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>15</td>
<td>(12.6)</td>
</tr>
<tr>
<td>High dietary fat intake</td>
<td>39</td>
<td>(32.8)</td>
</tr>
<tr>
<td>Sedentary lifestyle</td>
<td>56</td>
<td>(47.1)</td>
</tr>
<tr>
<td>Family history of CAD</td>
<td>23</td>
<td>(19.3)</td>
</tr>
<tr>
<td>History of regular alcohol intake</td>
<td>27</td>
<td>(22.7)</td>
</tr>
<tr>
<td>BMI ≥25 kg/m²</td>
<td>40</td>
<td>(33.6)</td>
</tr>
<tr>
<td>Central obesity</td>
<td>50</td>
<td>(42.1)</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Although few studies have been conducted on prevalence of individual risk factors of CAD in Nepal, there is relative paucity of study of multiple risk factors in the same population in Nepal. In a population-based cross-sectional study done in the Dharan municipality involving 1000 males aged 35 years and above, the prevalence of hypertension was found to be 22.7%. The prevalence of hypertension in the present study compares with the Dharan municipality involving 1000 males aged 35 years and there were 63 (52.8%) males and 56 (47.2%) females. A history of HT was present in 18 subjects however on physical examination, a total of 42 (35.3%) subjects were found to be hypertensive. Based on history and biochemical investigations, 19 (15.9%) subjects were found to be diabetic. Hypercholesterolemia was found to be present in 12.6% of the study population. A history of high dietary fat intake was given by 39 (32.8%) subjects. 56 (47.1%) subjects led a sedentary lifestyle. Family history of CAD was present in 23 (19.3%) subjects. 38.7% of the subjects were current smokers and 27 (22.7%) gave history of regular alcohol consumption. Physical examination revealed that 40 (33.6%) subjects had BMI > 25 kg/m² and waist:hip ratio ≥ 0.95 was seen in 50 (42.1%) subjects. A history of CAD was given by 10.9% of subjects. Of the whole group, 36 (30.3%) subjects had more than one risk factor for CAD.

**Results**

The results have been summarized in Table 1. Age ranged from 35 to 86 (mean 54.1 ± 10.5) years and there were 63 (52.8%) males and 56 (47.2%) females. A history of HT was present in 18 subjects however on physical examination, a total of 42 (35.3%) subjects were found to be hypertensive. Based on history and biochemical investigations, 19 (15.9%) subjects were found to be diabetic. Hypercholesterolemia was found to be present in 12.6% of the study population. A history of high dietary fat intake was given by 39 (32.8%) subjects. 56 (47.1%) subjects led a sedentary lifestyle. Family history of CAD was present in 23 (19.3%) subjects. 38.7% of the subjects were current smokers and 27 (22.7%) gave history of regular alcohol consumption. Physical examination revealed that 40 (33.6%) subjects had BMI > 25 kg/m² and waist:hip ratio ≥ 0.95 was seen in 50 (42.1%) subjects. A history of CAD was given by 10.9% of subjects. Of the whole group, 36 (30.3%) subjects had more than one risk factor for CAD.

To conclude, various risk factors for CAD were found to be highly prevalent in our population. Though history of CAD was available in only 10.9% of the population, the prevalence of individual risk factors ranged from 12.6% to 47.1% and approximately one third of the subjects had more than one risk factor. Most of these risk factors are modifiable and can be improved by encouraging the patients to adopt a healthy lifestyle such as reducing daily fat intake, quitting smoking and engaging in more physical activities. Besides this, screening the community for presence of diabetes and hypertension and proper and timely intervention can definitely reduce the morbidity and mortality from this disease. However, it may be stated that it is a pilot study and detailed study would be required at a later stage.

**References**