

## Üçüncü Basamak Hastanelerinde Koroner Arter Hastalığı Olan Hastalarda Konvansiyonel Risk Faktörleri Üzerine Çalışma, Pokhara, Nepal

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### Öz

Koroner arter hastalığı (KAH) son birkaç yılda gelişmiş dünyada kayda değer bir düşüş göstermiştir, ancak gelişmekte olan dünyada özellikle Güney Asya'da endişe verici bir artış göstermiştir. Bu çalışmanın amacı, dört konvansiyonel risk faktörünü araştırmaktır: Nepal'deki Pokhara vadisinin üçüncü basamak hastanelerinde koroner kalp hastalığı olan hastalarda hipertansiyon, diabetes mellitus, dislipidemi ve sigara kullanımı. Koroner bakım ünitesi (KBU) ve koğuştta çalışmaya kabul edilen KAH olan 100 hasta katıldı. Demografik bilgileri not edildi. Boy, kilo ve kan basıncı standart yöntemlerle kaydedildi. Kan şekeri ve lipid profili, gece boyunca 12 saatlik aç kaldıktan sonra hesaplandı. Risk faktörleri ölçümler, laboratuvar değerleri ve ayrıca aynı hastalık ve geçmiş ilaç öyküsü ile kullanıldı. İstatistiksel analiz için SPSS-16 kullanıldı. Hastaların yaş ortalaması  $64,61 \pm 11,363$ , en az 40, en fazla 94 idi. Genel olarak risk faktörleri dağılımı çoktan aza doğru sırası ile sigara içme (% 55), hipertansiyon (% 50), dislipidemi (% 49) ve diabetes mellitus (% 32) idi. Risk faktörlerinin dağılımı 55-69 yaş grubunda en fazla idi. Bu çalışma koroner kalp hastalığı olan hastaların çoğunun konvansiyonel risk faktörlerine sahip olduğunu ve hastalığın gelişiminde büyük rol oynadığını göstermektedir. Değiştirilebilir dört risk faktörünün yanı sıra, aynı zamanda yaş ve cinsiyetin de değiştirilemeyen bu hastalığın önemli katkıları olabileceğini çalışmamız göstermektedir.

**Anahtar Kelimeler:** Koroner arter hastalığı, diabetes mellitus, dislipidemi, etnisite, hipertansiyon, risk faktörleri, sigara içme

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## Study on The Conventional Risk Factors in Patients with Coronary Artery Disease in Tertiary Care Hospitals, Pokhara, Nepal

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### Abstract

Coronary artery disease (CAD) has shown a remarkable decline in the developed world in past few years, but has shown an alarming increase in the developing world especially South Asia. The aim of the study was to investigate four conventional risk factors: Hypertension, diabetes mellitus, dyslipidemia and smoking in patients with coronary heart disease in tertiary care hospitals of Pokhara valley, Nepal. 100 patients with CAD who were admitted in the wards and coronary care unit (CCU) participated in the study. Their demographic information was noted. Height, weight and blood pressure were recorded with standard methods. Blood glucose and lipid profile were estimated after 12 hours of fasting overnight. Risk factors were determined using the measurements, laboratory values and also from the past history of the same illness and medications if any. SPSS-16 was used for statistical analysis. Mean age of the patients was  $64.61 \pm 11.363$  years with minimum age 40 and maximum 94 years. Overall distribution of risk factors in descending order was smoking (55%), hypertension (50%), dyslipidemia (49%) and diabetes mellitus (32%). Distribution of risk factors was maximum in the age group 55-69 years. This study shows that most of the patients with coronary heart disease have conventional risk factors and they play a major role in the development of the disease. Beside the four modifiable risk factors, our study also shows that age and gender can be major contributors of the disease which can't be modified.

**Keywords:** Coronary artery disease, diabetes mellitus, dyslipidemia, ethnicity, hypertension, risk factors, smoking

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## INTRODUCTION

Cardiovascular disease (CVD) has emerged as a major health burden worldwide. CVD contributed to 15.3 million deaths in 1996, of which 5.5 million was from developed countries and 9.77 million from developing countries. There has been a rise in the prevalence of CVD in the early half of twentieth century and a subsequent decline in the latter half in the industrialized countries. However, the scenario is reversed in developing countries with a steady escalation in prevalence of CVD.<sup>1</sup>

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.<sup>2</sup> Though this disease is rapidly increasing specially amongst the higher socio-economic group, no definite study has yet been done to find out the prevalence of this disease in Nepal.<sup>3</sup> It is a disease in which plaque builds up inside the coronary arteries that supply oxygen rich blood to the heart muscle. Disease of coronary arteries is almost due to atheroma and its complications. However, occasionally the coronary arteries are involved in other disorders such as congenital anomalies, arthritis, polyarteritis and connective tissue diseases.<sup>5</sup> The Framingham Heart study in 1948 was the first study to show the

association of risk factors with coronary artery disease (CAD). It showed elevation in blood pressure and cholesterol level is associated with increased incidence of ischemic heart disease and acute myocardial infarction. Later further epidemiologic studies have established cigarette smoking, hypertension, diabetes and hyperlipidemia as independent risk factors for CAD and treatment of these risk factors has convincingly shown to reduce the future cardiac events. So these 4 risk factors have been often labeled as conventional risk factors.<sup>6</sup> 80% to 90% of patients with Coronary Heart Disease (CHD) have conventional risk factors.<sup>7</sup> Besides these there are other risk factors such as age, sex, obesity, physical inactivity, stress and positive family history. Other possible factors newly researched are Homocysteine A, C- reactive protein, Lipoprotein A etc. Risk factors often occur in clusters and may build on one another.<sup>8</sup> To provide guidance to the clinicians to assess their patients' risk for CAD, the Framingham Risk Score is often applied globally.<sup>9</sup> Eventually age may increase the baseline risk factor independent of any risk factors. So patients without any risk factors at young age may also present the disease once their baseline risk increases significantly enough to cause the disease.<sup>10</sup> This study mainly aims to assess the conventional risk factors ie. Hypertension, Diabetes Mellitus, Dyslipidemia and Smoking in patients with

CAD in tertiary care hospitals of Pokhara and their distribution with respect to age, sex, and ethnicity.

## MATERIALS AND METHODS

This study was conducted after getting approval from the institutional ethical committee of Manipal college of medical sciences, Pokhara and was conducted on patients of Manipal teaching hospital and western regional hospital of Pokhara. 100 patients (63 males and 37 females) with CAD who were admitted in the wards and coronary care unit (CCU) participated in the study. Their demographic information was noted. Height, weight and blood pressure were recorded with standard methods. Blood glucose and lipid profile were estimated by using XL-300 autoanalyzer after 12 hours of fasting overnight. History of smoking was taken in pack years along with history of hypertension, diabetes mellitus and medication history in the past. Risk factors were determined using the measurements, laboratory values and also from the past history of the same illness and medications if any. SPSS-16 was used for statistical analysis.

## RESULTS

Out of 100 patients under study, 63% were males and 37% were females. We found that maximum patients were in the age group 55-

69 years as depicted in [Figure 1](#). Similarly patients were divided according to ethnicity as depicted in [Figure 2](#). Maximum patients (46%) fall under hill caste group (Brahmin, Chhetris, Thakuri, Giri, Puri, Sanyasi), 33% in hill ethnic group (Gurung, Rai, Magar, Newars, Tamang), 17% in Dalit group ( Kami, Sarki, Chamar ) and 3% in Muslim and others. The conventional risk factors for CAD were smoking (55%) hypertension (50%), dyslipidemia (49%) and diabetes mellitus (33%) as shown in [Table 1](#) and [Figure 3](#). The percentage of smoking as a risk factor was highest which constitutes 41 (74.5%) males and 14 (25.5%) females. Maximum risk factors were in the age group 55-69 years ([Table 2](#), [Table 3](#)). Most of the patients had combination of two risk factors. Only 4 patients were found to have no conventional risk factor ([Table 4](#)). Significant relation was found between age and hypertension and age and dyslipidemia as depicted in [Table 5](#). Only Diabetes mellitus was found to be significantly associated with ethnicity ([Table 6](#)).

## DISCUSSIONS

Though there are many factors that play a role, the importance of conventional risk factors has been well established as their treatment or modification has shown to reduce the future cardiac events in many researches. In present study also, among 100 CAD patients, there

were greater number of males than females with 63% and 37% respectively. The mean age of the patients was  $64.61 \pm 11.363$  yrs with 63.94 years and 65.76 years in males and females respectively which is comparable with the study done by Parajuli et al., where mean age of the patients was 63.54 years.<sup>11</sup> So the mean age of CAD did not differ significantly in males and females.

In our study the risk factors for CAD were in the descending order as smoking (55%) hypertension (50%), dyslipidemia (49%) and diabetes mellitus (33%). This is consistent with the study done by Poudel et al., where smoking was the major risk factor (68.6%) followed by hypertension, DM and alcohol.<sup>12</sup> Also in another study done by Shrestha *et al.*, smoking was found to be a major risk factor (46.10%) followed by dyslipidemia and hypertension.<sup>3</sup>

Cigarette smoking is the most important modifiable risk factor of CAD. Difference in smoking rate contributed markedly to increase in incidence of CAD in men. In the present study also, out of 55 smokers, 74.5% were males and 25.5% were females. Majority of the patients with smoking history (43.63%) were in the age group 55-69 years. Smoking was significantly associated with gender in our study (P value = 0.008). This was consistent with the study done by Khot Umesh et al. where gender difference in smoking was statistically significant (P value < .001).<sup>10</sup> The

retrospective study done by Achari and Thakur also shows the significant association between gender and smoking in patients with CAD.<sup>13</sup>

Hypertension was found in 50% of CAD patients in our study which is consistent with the study done in university of Florida where among 5000 CAD patients half had hypertension.

It is a major risk factor for CAD and the incidence of both conditions increases with age. So the majority of individuals > 65 yrs with CAD probably also have hypertension.<sup>14</sup>

In the present study also age was highly associated with hypertension and it was found most among patients falling in the age group 70-89 years. Younger patients less than 55 yrs old were least hypertensive. But there was no significant association of gender with hypertension which was in contrast with the study done by Khot et al., where gender was significantly associated (P value < 0.001) with hypertension.<sup>10</sup> Studies have shown increased prevalence of CAD in patients with high TG, high LDL and low HDL levels.<sup>15</sup>

The NCEP and guidelines from Europe consider diabetes to be a CHD equivalent.<sup>16</sup> Its impact on CAD mortality is equivalent to combination of any two conventional risk factors. Moreover hypertension develops at least in 50% diabetic patients and multiple risk factors of cardiovascular disease are also present in diabetics.<sup>12</sup> In our study also patients having diabetes mellitus alone as a

risk factor were only 4%. It was mostly present along with hypertension and dyslipidemia.

Various studies carried out at international level have highlighted ethnic variation in incidence of CAD and lifestyle factors also contribute to the ethnic difference in susceptibility to various risk factors.<sup>17</sup> Other than diabetes, no statistically significant ethnic difference was found with other risk factors. Most of the patients under our study (32%) were found to have two risk factors and 15% of the patients had more than three risk factors. Only 4% of the total patients were found to have no conventional risk factor.

### **Conclusions**

Although globally coronary artery disease has emerged as the major cause of premature morbidity and mortality, developed countries have shown a declining trend. But the disease has shown an alarming increase in the developing countries especially in South Asia. In Nepal also, 40 fold increases in acute myocardial infarction has been seen in the past 30 yrs in Kathmandu city alone. The national data regarding incidence of CAD and prevalence of risk is still lacking.

There were least number of patients (19%) in the younger age (45-54 years) group and maximum in the age group 55-69 years. This finding in our study is in agreement with the conventional thinking that age is one of the nonmodifiable risk factor. Cigarette smoking

was found to be major risk factor (55%) in our study followed by hypertension, dyslipidemia and diabetes mellitus. All the risk factors were present in highest frequency in the age group 55-69 years. Only 4% of the total patients had no conventional risk factor. Most of the patients had combination of two risk factors (32%) and combination of hypertension and smoking was more frequent. Similarly diabetes mellitus was found to occur more in combination with other risk factors than alone. As far as gender comparison for the risk factors is concerned, it was found to be highly associated with smoking only. But all the risk factors were found to be more in males than females. No significant association was found between ethnicity and risk factors like hypertension, smoking and dyslipidemia. Only diabetes mellitus was found to be significantly associated with ethnicity.

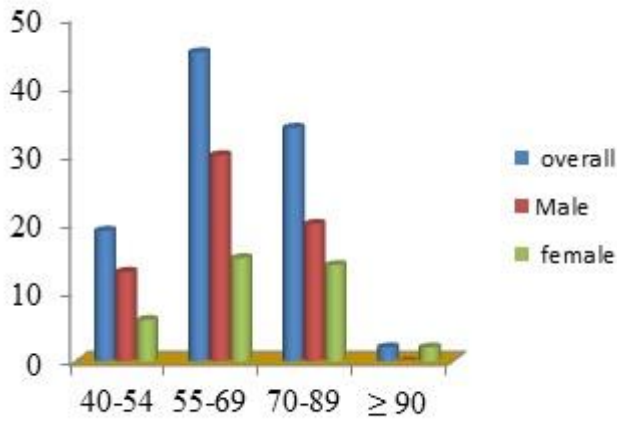
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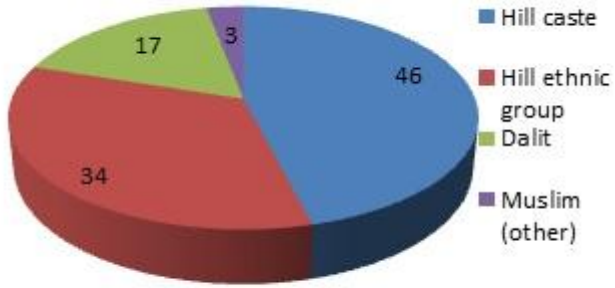
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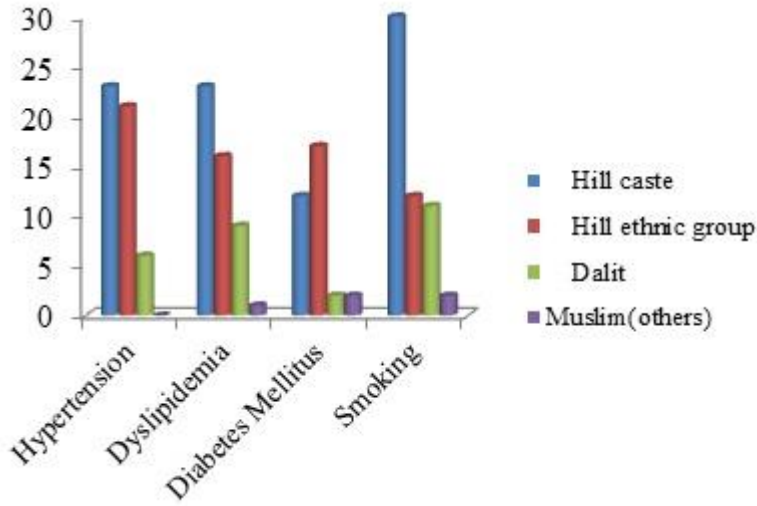


**Figure 1.** Age Distribution in patients





**Figure 2.** Distribution of patients according to ethnicity



**Figure 3.** Distribution of risk factors according to ethnicity

**Table 1.** Distribution of various risk factors.

Risk factors	Overall (n=100)		Male		Female	
	Frequency	%	Frequency	%	Frequency	%
Hypertension	50	50	27	54	23	46
Dyslipidemia	49	49	29	59.1	20	40.9
Diabetes Mellitus	33	33	18	54.5	15	45.5
Smoking	55	55	41	74.5	14	25.5

**Table 2.** Distribution of Risk Factors according to age.

Age (years)	Hypertension	Diabetes mellitus	Dyslipidemia	Smoking
40-54	4(8%)	5(15.15%)	10 (20.4%)	9 (16.36%)
55-69	23(46%)	16 (57.57%)	27 (55.1%)	24 (43.63%)
70-89	21(42%)	10 (30.30%)	10 (20.40%)	22 (40%)
≥ 90	2(4%)	2 (6.06%)	2 (4.08%)	0 (0%)
Total	50	33	49	55

**Table 3.** Relation between gender and smoking.

	<b>Smoking N (%)</b>	<b>P value</b>
<b>Male</b>	41/63 (65%)	0.008
<b>Female</b>	14/37 (37.8%)	
<b>Total</b>	55%	

N: Number of smokers

**Table 4.** Distribution of number of risk factors in patients with CAD.

No. of risk factors	Overall		Male		Female	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
No risk factor	4	4	3	75	1	25
Single risk factor	27	27	17	63	10	37
Two risk factors	32	32	18	56.25	14	43.75
Three risk factors	22	22	13	59.09	9	40.91
Multiple risk factors	15	15	12	80	3	20

**Table 5.** Relation between dyslipidemia and hypertension in different age groups.

<b>Age group in years</b>	<b>Dyslipidemia</b>	<b>Hypertension</b>
40-54	10/19 (52.6%)	4/19 (73.68%)
55-69	26/45 (57.8%)	23/45 (51.1%)
70-89	10/34 (29.4%)	21/34 (61.8%)
≥ 90	2/2 (100%)	2/2 (100%)
P value	0.03	0.009

**Table 6.** Relation between ethnicity and Diabetes Mellitus.

<b>Ethnicity</b>	<b>Diabetes Mellitus</b>
Hill Caste	12/46 (26.1%)
Hill Ethnic	17/34 (50%)
Dalit	2/17 (11.8%)
Muslim (others)	2/3 (66.7%)
P value	0.015