

## Risk factors for ST- Elevation Myocardial Infarction in a tertiary hospital in central Nepal

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### ABSTRACT

**Background & Objectives:** Coronary artery disease is the common cardiac disease in Nepal. The objective of the study is to explore different risk factors for coronary artery disease. **Materials & Methods:** This was cross sectional hospital based study studying the baseline clinical and angiographic characters in ST Myocardial infarction who had Primary Percutaneous coronary intervention (PPCI) in College of Medical Science Teaching Hospital (CMSTH). **Results:** There were 95 cases with male 77 (82.1%) and female 18 (17.9%). The mean age overall was  $60.05 \pm 12.2$ . The mean age of male was  $59.9 \pm 12.5$  and of female was  $60.5 \pm 11.2$  years. Apart from chest pain, common clinical symptoms were sweating in 60 (63.2%) cases, dyspnea in 41 (43.2%), nausea/vomiting in 38 (40%), dizziness in 17 (17.9%) and epigastric pain in nine (9.5%) cases. Common risk factors were smoking in 83 (87.7%) cases, hypertension 59 in (51.6 %), diabetes in 24 (25.3%), dyslipidemia in 24 (25.3%) and family history in six (6.3%) cases. Common angiographic variables were single vessel disease (SVD) in 45 (47.4%), double vessel disease (DVD) in 20 (21.1%) and triple vessel disease (TVD) in 30 (31.6%) cases. Infarct related artery were Right coronary artery (RCA) in 43 (45.3%), Left circumflex artery (LCx) in seven (7.4 %) and Left anterior descending artery (LAD) in 45 (47.4 %) cases. **Conclusion:** Patients visiting CMSTH had classical symptoms and risk factors of myocardial infarction. Single vessel disease and Left anterior descending infarction was the most common vessel involved.

**Key words:** Coronary artery disease; risk factors; myocardial infarction

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### INTRODUCTION

Coronary artery disease is the common heart disease in Nepal with prevalence of four percent.<sup>1,2</sup> College of Medical Sciences Teaching Hospital (CMSTH) is the medical college located in Chitwan with the first few cath lab established outside valley.<sup>3</sup> It provides cardiac interventional services to rural areas like Chitwan, Nawalparasi, Makuwanpur, Tanahun, Gorkha, Rupendehi, Parsa and nearby hilly and terai districts.

Primary PCI has been the first recommended modality for treatment of Coronary artery disease.<sup>4</sup> Various risk factors have been described in patients with Myocardial infarction-mainly for male, middle

aged, smoking, diabetes, dyslipidemia and family history. Through coronary angiography, the infarct related artery can be identified and depending upon the lesion in other vessels, the classification into single, double and triple vessel disease can be defined.

The study aims to identify different presenting complains and risk factors among the patients visiting the cardiology department of College of Medical Sciences and Teaching Hospital, Bharatpur.

### MATERIALS AND METHODS

This cross sectional hospital based descriptive study was conducted in College of Medical Science,

Bharatpur. Patients with chest pain and ST elevation who underwent Primary Percutaneous Coronary Intervention ( Primary PCI) were studied for two years duration (2013 to 2015AD). Elective PCI, Rescue PCI and PCI for Non-ST elevation Myocardial Infarction were excluded. The study was approved by the institutional review committee of the institution. Baseline characteristics were recorded according to profoma. Continuous values were expressed as means and standard deviation and categorical values were expressed in frequency and percentages. Chi square test was used for analyzing categorical values. P < 0.05 was considered statistically significant. Data had been tabulated and analyzed in Microsoft Excel and SPSS version 20.

**RESULTS**

There were 95 cases with male 77 (82.1%) and female 18 (17.9%). The mean age was 60.05 ± 12.2 years. The mean age of males was 59.9 ± 12.5 and female 60.5 ± 11.2 years. Mean age for the single vessel disease (SVD) was 59.4 ± 11.5 years, double vessel disease (DVD) 60.2 ± 9.7 years and Triple vessel disease (TVD) 59.6 ± 12.8 years. The baseline clinical symptoms and distribution of the

Table 1. Baseline clinical characteristics and risk factors.

Symptoms	n (%)	Risk factors	n (%)
Sweating	60 (63.2)	Smoking	83 (87.4)
Dyspnea	41 (43.2)	Hypertension	59 (51.6)
Nausea/ Vomiting	38 (40)	Diabetes	24 (25.3)
Dizziness	17(17.9)	Dyslipidemia	24 (25.3)
Epigastric pain	9 (9.5%)	Family history	6 (6.3)

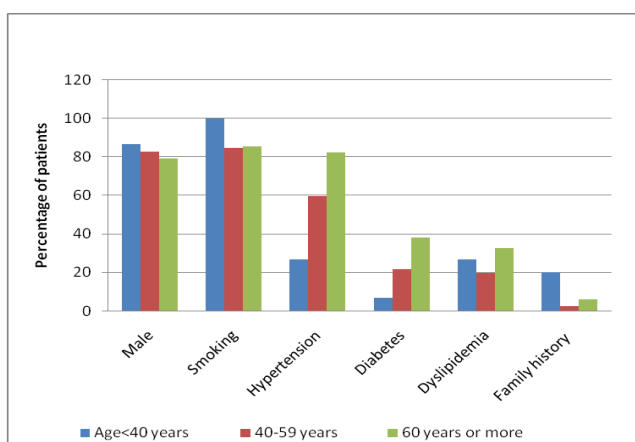


Figure 1. Risk factors distribution according to age categories.

risk factors are described in Table 1. The distribution of risk factors according to different age categories is illustrated in Figure 1. Between different age categories, statistical significant difference was noted in presence of hypertension (p=0.001) and diabetes (p=0.048). No statistical significances existed between male gender (p=0.824), smoking (p=0.275) and dyslipidemia (p=0.402) among different age categories. The baseline angiographic findings are illustrated in Table 2. The distribution of baseline angiographic findings according to age categories is shown in Figure 2. Statistically significant differences occurred in number of vessels involved (=0.036) but not for the type of infarcted vessels (p=0.648). Between gender, no statistical significance was noted regarding age categories (p=0.545), smoking (p=0.497), hypertension (p=0.432), diabetes (p=0.161), dyslipidemia (p=0.161), number of

Table 2. Baseline Angiographic findings.

No of vessels	n (%)	Infarct vessels	n (%)
Single vessel disease (SVD)	45 (47.4)	Right Coronary artery (RCA)	43 (45.3)
Double vessel disease (DVD)	20 (21.1)	Left Circumflex artery (LCx)	7 (7.4)
Triple vessel disease (TVD)	30 (31.6)	Left anterior descending artery (LAD)	45 (47.4)

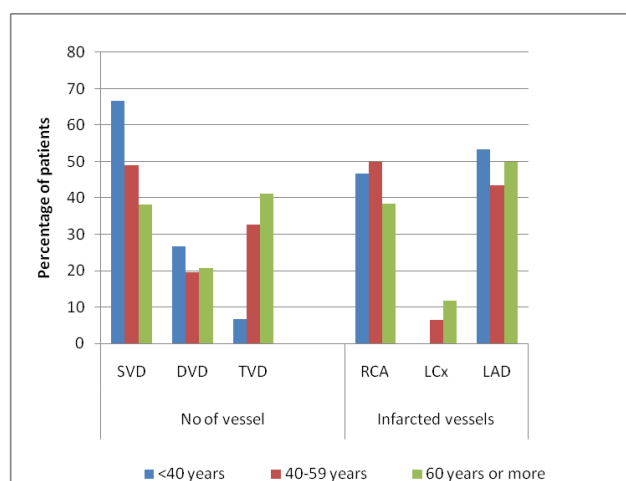


Figure 2. Angiographic baseline characteristics as per the age categories. SVD Single vessel disease DVD Double vessel disease, TVD Triple vessel disease; RCA Right coronary artery LCx Left circumflex LAD Left anterior descending

vessel involved ( $p=0.347$ ) and infarct related vessel ( $p=0.855$ ).

## DISCUSSION

Different studies of coronary artery disease have been published from Nepal. The mean age in our study was similar to Poudel et al<sup>5</sup> ( $64\pm 10.8$  years), Gautam et al<sup>6</sup> ( $64.54\pm 13.8$  years), Dubey et al<sup>3</sup> ( $56.31\pm 11.4$  years) and Simkhada et al<sup>7</sup> ( $59.5\pm 11.01$  years).

The male dominance in coronary artery disease was described by Poudel<sup>5</sup> (62%), Gautam<sup>6</sup> (63.1%), Simkhada<sup>7</sup> (72%) and Tamrakar<sup>8</sup> (74%). Females were elderly, hypertensive and dyslipidemic and less smokers compared to males.<sup>9</sup> Our study did not show any significant results different in risk factors between genders.

Risk factors for STMI in our study were noted accordingly to other contemporary studies. Gautam et al<sup>6</sup> in 2013 had presented following risk factors for CAD among 300 patients in Chitwan: smoking (50.8%), diabetes (43.3%), hypertension (36.8%), previous CHD (31.5%), dyslipidemia (26.3%), family history of CHD (26.3%) and obesity (15.7%). Dubey et al<sup>3</sup> has described risk factors in acute MI as smoking in 52 (76.47%) Diabetes in 20 (29.41%), systemic hypertension 41(60.29%) and dyslipidemia in seven (10.29%) cases. Adhikari<sup>10</sup> had also described hypertension (65%), smoking (57.8%), dyslipidemia (45.5%) and diabetes (31.1%) as risk factors for ST Myocardial infarction.

Among the patients of below 40 years, all patients had smoked and 20% had positive family history of heart disease in first degree relatives. Tamrakar<sup>8</sup> had described lower percentage of smoking (64.3%), dyslipidemia (9.6%) and family history (9.6%) in study involving ST MI less than 45 years and higher percentage of diabetes (15.6%) than our population. Single vessel disease and Left anterior descending artery were common in young MI as similar to Tamrakar.<sup>8</sup>

In age group > 60 years, distribution of triple vessel disease was more. Such elderly age-related variation in number of vessels involved had been described by DeGare.<sup>11</sup> It was described that during acute catheterization the elderly patients had more 3-vessel disease, higher left ventricular (LV) end-diastolic pressure, lower LV ejection fraction, and higher initial rates of thrombolysis in Myocardial Infarction (TIMI) trial 2 or 3 flow.<sup>12</sup>

In young MI < 40 years and elderly MI 60 years or

more, LAD was the most infarct related artery. Primary PCI for anterior wall infarction was more common than for non-anterior wall myocardial infarction (47.4% vs. 44.1%).<sup>4</sup> However, Adhikari et al<sup>10</sup> had described more inferior wall MI than anterior wall. The RCA as infarct related artery was found more in aged group 40 to 59 years in our study but statistically non-significant.

In STMI Wu<sup>12</sup> had described chest pain in 87.3% epigastric pain in 6.9%, cold sweating in 56.5%, nausea or vomiting in 14.6%, dyspnea in 34.2%, back pain in 8.1%, weakness in 9.6% and dizziness/syncope in 17.3% cases. Presenting symptoms in our study were similar. Sweating was the second common symptom after chest pain. Presence of sweating in 90.95% of STMI and only 10.43% of NSTMI has been described and sweating with ACS symptoms predicted probability of STEMI (Likelihood ratio:11.17 vs. 3.6).<sup>13</sup> Gokhroo et al.<sup>13</sup> had described firstly as sympathetic nervous system stimulation either as pain responsive or protective response to transient stunning induced hypotension and secondly as possibility of sympathetic cross connections between sweat glands and myocardial pain fibres, which have the same origin in thoracolumbar region.

Dyspnea had been present in 41% of patients which is much to the range eight to 22% in different literatures.<sup>14,15</sup> In our study, the dyspnea was unrelated to both age category, gender and number of vessels involved. The increase presenting symptom of dypnea in our study may be because of delay in presentations to the hospital and subsequent revascularization. Nausea and vomiting were common presenting symptoms in patients with either inferior or anterior wall AMI, but their frequency was unrelated to the infarct location. (69% vs. 56% and 33% vs. 26%, respectively).<sup>16</sup> Dizziness had been presenting symptoms in 26.4% of patients with STMI which was higher than 17% of our patients.<sup>17</sup> Epigastric pain had been described as in similar percentage as in our study.<sup>18</sup>

Limitations of the study: More varying parameters as symptoms and risk factors could have been added. We had collected data from the STMI patients who had undergone angioplasty and had excluded patients undergoing medical management. Most of the patients visiting our center could not afford the cost of PPCI even they had visited in the golden hours. Few of the patients get discharged on request or leave against medical advice to go to other center in Kathmandu. An extensive

prospective study including all patients undergoing medical and interventional management is suggested.

### CONCLUSION

Patients visiting CMSTH had classical symptoms and risk factors of myocardial infarction. Single vessel disease and Left anterior descending infarction was the most common vessel involved.

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