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Clinical and demographic profile of patients presenting to cath-lab in a tertiary care center in Nepal

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ABSTRACT

Background & Objectives: Coronary Artery Disease (CAD) is one of the leading killers in the world. This is a demographic study of patients who underwent coronary angiography for CAD with regard to sex, age, ethnicity and prevalence of risk factors. **Materials & Methods:** Hospital based retrospective study conducted at the Department of Internal Medicine, B.P. Koirala Institute of Health Science (BPKIHS), Dharan, Nepal. **Results:** The Study showed that out of 382 patients who presented to the cath-lab 216 patients underwent angiography alone and 166 patients had PCI. The most common indication for presentation to cath -lab was S-T Elevation Myocardial Infarction (STEMI), which accounted for 46.3% cases. The most common age group of presentation was 51-60 years of age with 35% cases. During the procedure, it was found that 32.8% had normal vessels, 29.6% had single vessel disease and 38% had 2 or more vessels involved. The most common coronary artery involved was left anterior descending (LAD), which was implicated in 96.9 % of total cases. Coronary Artery Disease was defined as having at least one vessel 50% obstructed. A total of 158 males and 99 females had CAD with a sex ratio of 1.59. It was found that 36.1% belonged to Brahmin / Chettri ethnicity whereas 34.0% belonged to Janjati. Hypertension was the most common risk factor, present in 67 % of the patients. **Conclusion:** It appears that among the population of eastern Nepal, the age group most likely to suffer from an episode of ACS leading to invasive evaluation is between 50 to 60 years. And the most significant risk factors associated are hypertension and smoking.

Key words: Coronary Angiography, Coronary Artery Disease Epidemiology, Percutaneous intervention

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INTRODUCTION

Coronary Artery Disease is fast becoming a leading cause of mortality in developing nations with an estimated 4.5 million deaths occurring every year.[2] It has also been projected that CAD mortality rates will double from 1990-2020 with approximately 82% of the increase attributable to the developing world.[2] Social and economic changes that have occurred with urbanization and industrialization has probably lead to a higher prevalence of the main cardiovascular risk factors. The problem is compounded by low availability of preventive measures to decrease exposure to risk factors, less access to evidence-based therapies and interventions for the great majority of patients, and their outcome, both in terms of morbidity and mortality, is thus often poor.

Ischemic heart disease is one of the leading causes of death world-wide. An estimated 7.4 million people died due to IHD in 2012 alone.[3] The advent of catheterization procedures and availability of Percutaneous Interventions (PCI), have contributed to a decrease of mortality due to this disease over the years as compared to management with medication alone.[4]

Although this disease has been widely studied over the years, there is still wide variability in clinical presentation especially among different age groups and between the two sexes. There are also differences regarding risk factor such as hypertension, Diabetes Mellitus, dyslipidemia, smoking, etc. Some individuals may have multiple risk factors whereas others may not have any. A wide variation also exists in the management of these individual cases, some requiring only medical management whereas some requiring invasive

procedures such as PCI.

Thus, a study on the demographic profile of patients requiring invasive procedures for IHD becomes highly relevant, as this study would give us valuable information regarding the common indications for doing a procedure. It would also give us information regarding the common age group at which patients present with IHD, the risk factors involved in the population, the extent of vessels involved and the outcome of the procedure. This study could also bring awareness among health -care related personnel regarding the prevalence of disease in both the groups in the Eastern region of Nepal and help make comparisons between the various risk factors in play for the disease process.

MATERIALS AND METHODS

This is a hospital based retrospective study conducted at the Department of Internal Medicine, B.P. Koirala Institute of Health Science (BPKIHS), Dharan, Nepal, a tertiary referral centre in eastern part of the country serving more than five million people from three zones comprising of 16 districts.[5] Most of the cases of Ischemic Heart Diseases are referred here for acute intervention and long term management.

The study included 382 patients who presented to cath-lab with features of Ischemic Heart Disease from 18th January 2011 to 9th December 2012. The procedures were performed in the cath-lab of BPKIHS by the CCU team. The procedures were prospectively documented and kept into records. These records were retrieved and analyzed with respect to socio-demographic profile, indications for procedure, and risk factors for the disease, severity of the disease and the outcome of the procedure.

Those included in the study were patients who underwent coronary angiography electively or for primary PCI. Those patients having at least one vessel involved (equal to or more than 50% obstructed), were labeled as having CAD.

RESULT

The research showed that out of 382 patients who presented to the cath-lab 310 (81.1%) underwent angiography for urgent presentations like ACS or CCF or cardiac arrhythmia while 72 (18.8%) did not present acutely, and had elective angiography.

Among those undergoing elective coronary angiography, six (8.3%) underwent angioplasty and stenting where Bare Metal Stent (BMS) was used in four and Drug Eluting Stent (DES) was used in two patients. Among the 66 who didn't undergo angioplasty, 61 were managed with medical follow up one was advised for angioplasty and stenting but refused, four were referred to another center for CABG.

Among those undergoing urgent angiography, 160 (51.6%) underwent angioplasty from which 152 (95%) had one or more stents placed. Ninety patients received DES and 62 received BMS. Among the 150 who didn't get angioplasty, 105 were managed medically 21 were advised for angioplasty and stenting but refused and 24 were referred to another center for CABG.

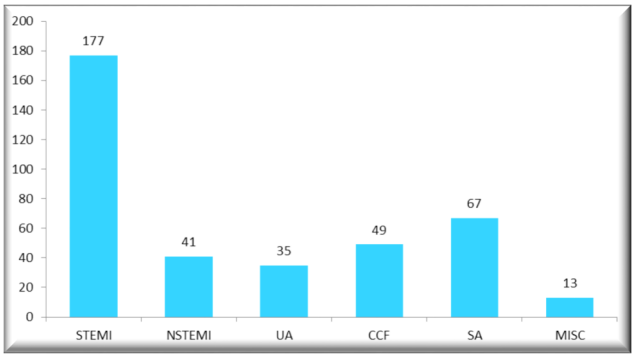

Figure 1. Indications for angiography

STEMI; S-T Elevation Myocardial Infarction. NSTEMI; Non S-T Elevation MI. UA; Unstable Angina. CCF; Congestive Cardiac Failure. SA; Stable Angina. MISC; Miscellaneous.

Table 1. Distribution of Indications for presentation to cath-lab according to age groups

Age group	STEMI	NSTEMI	UA	CCF	SA	Misc
<30	1	0	0	0	0	0
31-40	6	3	4	0	7	2
41-50	27	5	8	4	14	4
51-60	58	8	11	28	27	2
61-70	59	17	10	12	19	4
>70	26	8	2	5	0	1
Total	177	41	35	49	67	13

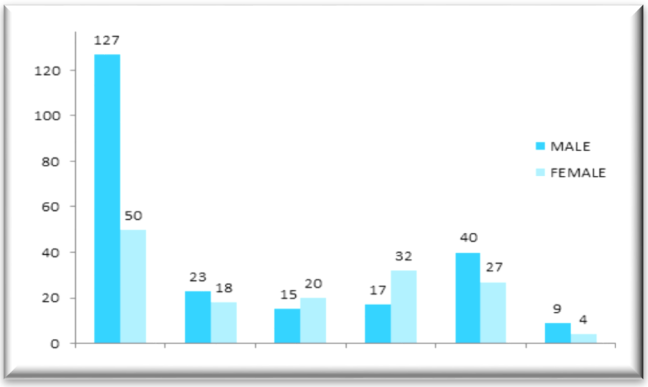

Figure 2. Indications for performing an angiography according to sex

The most common indication for presentation to cath-lab was STEMI which accounted for 177 cases (46.3%) followed by anginal chest pain which accounted for 67 cases (17.5%) (Figure 1). Among the cases that presented as STEMI 58 cases (32.7%) were between 51-60 years of age and 59 cases (33.3%) were from ages 61-70 years (table 1).

Out of the 257 patients that were having CAD (defined here as having at least one vessel 50% obstructed), 90 (35.0%) were from an age group ranging 51-60 years followed by 82 (31.1%) patients who presented between age groups 61-70 years and there was one case with STEMI at age 14 years (figure 3 and table 1). A total of 158 males (61.4%) and 99 females (38.5%) had CAD with a sex ratio of 1.59. 93 cases (36.1 %) belonged to Brahmin/ Chettri ethnicity whereas 87 cases (34.0 %) belonged to Janjati (Table 2).

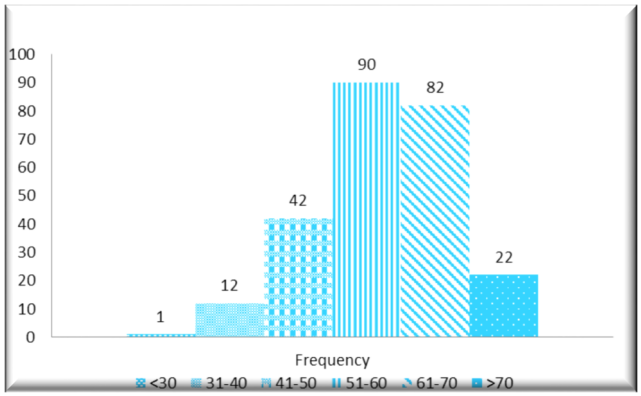

Figure 3. Distribution of patients with CAD according to age group

In terms of risk factors, out of the 257 that had CAD, 71.9% had hypertension, 36.9% had a sedentary lifestyle, and 36.5 % said that they were smokers (Table. 3)

Table 3. Assessment of Risk factors in cases

FACTOR	Number of patients	%
Sedentary lifestyle	95	36.9
Hypertension	185	71.9
Diabetes	81	31.5
Smoking	94	36.5
Dyslipidemia	68	26.4

During the procedure it was found among the 382 that presented to the cath-lab that 125 patients (32.8%) had normal vessels, 113 patients (29.6%) had 1 vessel disease and 144 patients (38 %) had 2 or more vessels involved. (Figure 4). Among the 257 cases that were shown to have abnormal blood vessels during coronary angiography 249 cases (96.9%) had LAD involvement, the RCA was involved in 219 cases (85.2%) and the LCX vessel was involved in 128 cases (49.8%). (Table 4)

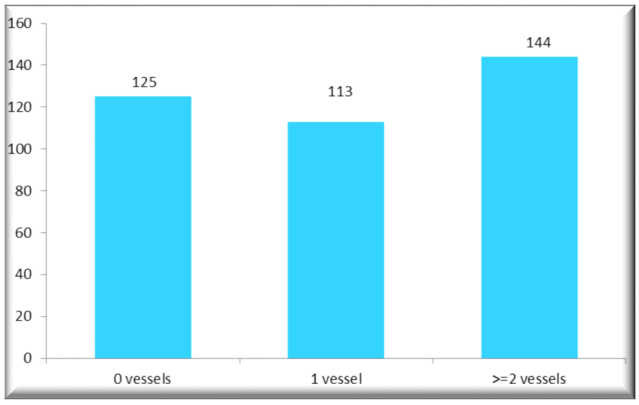

Figure 4. Distribution of cases according to number of vessels involved

Table 4. Vessels involved in patients with significant CAD

Vessel Name	Frequency (n)	Percentage of total cases (%)
LM	8	3.1 %
LAD	249	96.9 %
LCX	128	49.8 %
IA	12	4.6 %
RCA	219	85.2 %

DISCUSSION

The Study done in this tertiary care centre in eastern Nepal showed that among the patients who were diagnosed as having CAD, 158 (61.4%) cases were males and 99 (38.5 %) were females with a sex ratio of 1.59. In a similar cross-sectional study done in NAMS,[8] Kathmandu it was found that 65.7 % were males and 34.3 % were females. In another hospital based study in Kathmandu out of 518 patients 75 % were males and 25 % were females. The higher percentage of males having critical obstruction in their coronaries might be due to higher presentation rates and presence of more risk factors. The male to female ratio of 1.59 was; however, lower than the 1.96 in NAMS.

In our research the majority of patients who had CAD were between ages 51-60 years (35.0 %) followed by age of 61-70 (31.1 %) with a mean age of 59.3 years and SD of 11.2 (Refer figure 3). This was a contrasting finding than the mean age groups observed in the same centre (BPKIHS)[1] in 2008 and 2011 where the mean age groups were 62(SD 12) and 61(SD 10) respectively which could probably

mean that people have started presenting to BPKIHS at a younger age as more awareness and information has been spread regarding the availability of coronary interventions at this center. This finding was similar, though, to the research done in NAMS[8] where the mean age of presentation was 58.6 years with a SD of 11.8. In contrast a study done in Manipal Teaching Hospital (MTH), a tertiary referral hospital in western Nepal[7] found the mean age to be 64 years. This finding leads us to speculate that the presentation of ACS to a hospital set up is similar now in Eastern and Central regions of Nepal but much later in Western regions of Nepal. The youngest patient in our research was 14 years old and the oldest was 86 years. ACS becomes progressively more common with increasing age. When compared to patients from developed countries the mean age of onset of ACS in our country starts about a decade earlier. This can be due to the fact that a bulk of the population of Nepal is younger than the age of 40.

It was found in this study that the main indication for coronary angiography was STEMI (46.3%) followed by angina chest pain (stable) (17.5%), then CCF (12.8 %). In contrast the study in MTH showed that the main indication for admission was STEMI (46.4 %) followed by UA (43.1 %). Recent data from Europe also shows a lower portion of UA among ACS patients. It is possible that because the criteria for UA is rather liberal and does not require stringent ECG changes, UA was being over diagnosed in some hospitals of Nepal owing to a lack of proper ECG facilities.

The research showed that the main risk factor for the patients was HTN and Smoking. Among the patients 71.9% were hypertensive. In a study done in India[7] HTN was seen in only 39% of the patients presenting with ACS. The emergence of HTN as a major risk factor might be due to dietary habits in Eastern Nepal with a higher amount of salt intake and a fattier diet e.g. pork consumption.

After HTN, the major risk factor was smoking which was seen in 36.5% of the patients. This finding was similar to the study done in MTH where 46.6% undergoing coronary angiography were smokers and smoking more than or equal to 15 cigarettes a day for more than or equal to 15 years. The patients who had Diabetes Mellitus were 31.5%. This is in contrast to the studies done in the same center in 2008 and 2011 where diabetes was present in 14% and 19% respectively.[1] This could imply the ever increasing effect of Westernization of the Nepalese lifestyle and with it, the increase in prevalence of obesity, diabetes and hypertension.

Thus it could be concluded that HTN and smoking were the major risk factors seen in the patients of Eastern Nepal. This finding could be helpful in the future to reduce the burden of the disease in the population by having blood pressure screening programs after 35 to 40 years of age and keeping the HTN well controlled in diagnosed individuals through medication. Further it necessities health awareness programs regarding smoking, especially in the young age group and also educate existing smokers on how to quit.

After angiography was performed it was found that 32.8 % had non-significant stenosis (significant stenosis>=50% of diameter), 29. 6 % had SVD (Single Vessel Disease) and 37.7 % had MVD (Multi vessel disease). In a similar angiographic research done in NAMS[8], Kathmandu SVD accounted for only 37.84 % of cases whereas MVD accounted for 62.16 %. By contrast a study done in Norvic hospital,[6] Kathmandu, showed than more patients presented with SVD (69.06 %) than with MVD (30.9%).

This variation in the severity of vessel involvement could be due to the fact that in the more predominantly rural areas of Eastern Nepal the patients presented later in the course of the disease with multiple vessel involvement as compared to an urban setup which had a predominantly SVD in presenting population.

The vessels most commonly involved was LAD (62.8%) followed by RCA (21.2%) and LCX (14.15%) compared to the study in Norvic hospital[6] where Left Anterior Descending artery was most frequently affected (56.0%) followed by Left Circumflex Artery (34.2%) and Right Coronary Artery (31.4%). Thus in both researches the most common coronary artery to found stenosed was LAD.

CONCLUSION

It appears that among the population of eastern Nepal, the age group most likely to suffer from an episode of ACS is between 50-60 years. And the most significant risk factor associated is hypertension and smoking. Thus there is an urgent need for good screening programs for hypertension especially in rural areas where it can be otherwise undiagnosed for several years prior to an episode of ACS. Furthermore awareness programs need to be created to discourage tobacco use especially in

younger age group and encourage a healthier lifestyle.

Limitations of the Study

1. The records of the patients for each procedure were the sole source of patient information and could not be independently verified through additional means.

2. The records that were retrieved for the study did not elaborate on the level of physical activity the patient had, the number of cigarettes the patient smoked and the years smoked, the number of years the patient was diabetic or hypertensive.

3. Details of the long term follow up of these patients were not known.

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