NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

Assessment of Demographic Characteristics Among CAD Patients by Ethnicity

Mamta Bista
Asst. Professor, Faculty of Public Health, Nepal Institute of Health Sciences, Kathmandu, Nepal
bistamamta88@gmail.com
https://orcid.org/0009-0006-3777-7202

Saroj Prasad Gaudel
Consultant physician, Internal Medicine, Everest Hospital pvt.ltd
saroz.gaudel@yahoo.com
https://orcid.org/0009-0001-9069-6130

Kshitij Gartoulla
Asst. Professor, Nepal Institute of Health Sciences, Kathmandu, Nepal
mrgartoulla@gmail.com
https://orcid.org/0009-0003-2322-068X

Sunita Dhakal Lamichhane
Lecturer, Department of Public Health, School of Medicine, Nepalese Army Institute of Health Sciences, Kathmandu, Nepal
sunitadhakal257@gmail.com
https://orcid.org/0009-0000-1251-0495

corresponding author; Mamta Bista
email: bistamamta88@gmail.com

Type of Article: Original Research

Received: February 24, 2024; Revised & Accepted: June 9, 2024

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

Abstract

Background: This study was carried out to assess the demographic characteristics among CAD by ethnicity.

Methods: Retrospective study was performed in (SGNHC) Shahid Gangalal National Heart Centre, Kathmandu, Nepal. Hospital Database of 837 patients were used to gather the information about the disease during one year period. SPSS version 20 was used for statistical analysis.

Results: As the hospital lies in the Capital city and Central Region of the country, most of the population 604 (72.2%) had come from Central region, 126 (15.4%) from Western region, 62(7.6%) from Eastern region, 15(1.8%) from Far-western region and 11(1.3%) from Midwestern region.

Conclusion: The study examined 837 CAD patients, primarily Brahmin/Chhetris (44.7%), with an average age of 58.6 years and 71.9% being male. Most patients were from Nepal's Central Region.Acute STEMI was the most common diagnosis, particularly among Newars, while NSTEMI and Angina Pectoris were more prevalent in Dalits. Single vessel disease was frequent in Muslims, with Dalits showing higher rates of triple vessel disease, highlighting demographic and regional variations in CAD severity.CAD has been identified as public health priority in Nepal given the current and predicted burden of all forms of heart disease within the country. This study found that there was a diverse distribution in its well-known traditional risk factors among major Nepalese ethnic groups and demographic characteristics.

Keywords: Coronary artery disease, risk factors, disease outcome, Nepal

1.1 Introduction

Coronary artery disease is a persistent public health problem globally (Hussain, Khan, Uddin, & Al Nozha, 2014). Coronary Heart Disease (CHD) is one of the most common causes of preventable death and ranks second and third in male and female over 15 years of age respectively in terms of disease burden as judged by Disability-Adjusted Life Years lost (Mackay, Mensah, & Greenlund, 2004). Cardiovascular diseases account for most NCD deaths, or 17.7 million people annually, followed by cancers (8.8 million), respiratory diseases (3.9million), and diabetes (1.6 million). These 4 groups of diseases are the major contributors of premature NCD deaths (Collaborators, 2016; Organization, 2015). Various researches have been done to evaluate the epidemiology of CAD and several risk factors have been found. Nevertheless, the frequency and hazards of CAD have not declined significantly especially in low and middle income countries (Programme, 2017).

Forces that include rapid unplanned urbanization, globalization of unhealthy lifestyles and population ageing drive these diseases. Moving towards urbanization and change in life style factors and are the major risk factors for the increase in morbidity and mortality from CAD (Programme, 2017). However, the risk factors, frequency, incidence, prevalence and deaths may vary among people with different age, gender, socioeconomic status, races and

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

ethnicities, exposure to risk factors and so on. Even though, there are many studies about occurrence of disease in special group such as CAD is believed to affect the 40 years and above age group and Male are more susceptible for the occurrence. Various recent studies have proved these facts weaker because, the occurrence of CAD has been increasing in young age group and females are also more susceptible with higher chance of mortality. There have been also numerous studies where people from a particular area with particular characteristic (race, ethnicity, socioeconomic status, etc.) have higher rate of morbidity and mortality whereas, same kind of people have lower rate of morbidity and mortality in different part of world depending on the other correlated factors.

Being female makes higher chances for the risk and higher rate of mortality from CAD worldwide (Ahmad & Bhopal, 2005; Al-Nozha et al., 2004; Jousilahti, Vartiainen, Tuomilehto, & Puska, 1999). On the contrary, Chinese males had higher prevalence of CAD than females (Yang et al., 2011) .Similarly, Russian male encountered more deaths due to CAD than females (Yusuf, Reddy, Ôunpuu, & Anand, 2001). In Pakistan the prevalence of CAD for both gender was equal (Jafar, Jafary, Jessani, & Chaturvedi, 2005). Conflicts in gender based risk of CAD have also been reported in other studies too (Shaha, 1992). Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from a NCD may show up in people as raised blood pressure, increased blood glucose, elevated blood lipids and obesity. These are called metabolic risk factors that can lead to cardiovascular disease, the leading NCD in terms of premature deaths (Collaborators, 2016). The South Asians; India, Pakistan, Bangladesh, Sri Lanka, and Nepal account for about a quarter of the world's population and contribute the highest proportion of the burden of cardiovascular diseases as compared with any other region globally (Reddy, 2004; Reddy & Yusuf, 1998; Yusuf et al., 2001). The bulk of CAD burden is allied to modifiable risk factors. Meanwhile, there are also substantial ethnical/racial disparities both in the frequency of these CAD risk factors and in the severity of the disease (Dalton, Bottle, Soljak, Majeed, & Millett, 2014; Francis et al., 2015; Kurian & Cardarelli, 2007). Different ethnic groups are predisposed to develop CAD at different rates, giving rise to a higher prevalence or severity of the disease in certain populations. This disparity has been shown in both developed (Budoff et al., 2006; Dalton et al., 2014; Francis et al., 2015; Kurian & Cardarelli, 2007) and developing (Babusik & Duris, 2010; Misra & Khurana, 2009; Yeo et al., 2006) countries. There are more than 120 ethnic groups in Nepal, as documented in the census of 2011 and these ethnic groups are somehow different in their cultures, traditions, nutrition, and habits, which may predispose them to a diversity of CAD risk factors. In turn, they may experience different severity and outcome of cardiac diseases. There are a few studies having indicated differences in the risk factors among diverse ethnic groups. There was different number of patients of CAD in different ethnic group like 51.6% were Brahmin/ Chhetri ethnicity, 33.6% were from indigenous group of people whereas 15% were from Dalit ethnicity (R. Shrestha, 2015) . However, to the best of our knowledge, data on the distribution of the risk factors and the disease outcome of CAD among various ethnic groups in Nepal are scarce. Accordingly, we sought to assess the distribution of

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

the well-known CAD traditional risk factors and the outcome of CAD among major Nepalese ethnic groups.

1.1.1. Definition

Impedance or blockage of one or more arteries that supply blood to the heart, usually due to atherosclerosis, abbreviated as CAD. A major cause of illness and death, CAD begins when hard cholesterol substances (plaques) are deposited within a coronary artery. Plaque buildup causes the inside of the arteries to narrow over time.

The plaques in the coronary arteries can lead to the formation of tiny clots that can obstruct the flow of blood to the heart muscle, producing symptoms and signs of CAD, including chest pain (angina pectoris), heart attack (myocardial infarction), and sudden death. Treatment for CAD includes bypass surgery, balloon angioplasty, and the use of stents.

The diagnosis of CAD could be made by cardiologists on the basis of both clinical symptoms and further testing including; electrocardiogram (ECG) abnormalities, cardiac enzymes and/or echocardiography. Patients who had a history confirming current or previous cigarette smoking were considered as smokers. Patients with a history of CAD in first-degree male relatives of ≤ 55 years or in female relatives less than ≤ 65 years were regarded as having a positive family history of premature CAD. Patients taking oral hypoglycemic drugs, insulin or those having fasting blood sugar greater than 7 mmol/l or impaired fasting blood sugar between 5.6-6.9 mmol/l were regarded as having diabetes mellitus. Patients with the history of hypertension diagnosed and treated with medication or lifestyle modification or whose systolic pressure was above 140 mmHg and/or diastolic blood pressure above 90 mmHg taken on two subsequent measurements in sitting position were considered as having hypertension.

History of Dyslipidemia diagnosed and/or treated by physician or meets the criteria of Serum lipid reference levels using the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) guideline define hypercholesterolemia as total cholesterol greater than 5.18 mmol/l; Hypertriglyceridemia as Triglyceride (TG) more than 2.0 mmol/l or, Low-density lipoprotein (LDL) greater than or equal to3.37 mmol/l; or High-density lipoprotein (HDL) less than 1.04 mmol/l (Mosca et al., 2011). Dyslipidemia was defined by the presence of one or more abnormal serum lipid concentration measurement (Li, Yang, Xu, & Xia, 2005).

Objective of the study

2.1 General

This study was carried out to assess the demographic characteristics among coronary artery disease patients admitted in the coronary care unit (CCU) of the Shahid Gangalal National Heart Center (SGNHC).

2.2 Specific

The specific objectives of the study were:

1. To find out the number of CAD patients according to ethnic groups of the patients.

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

2. To assess the demographic characteristic among coronary artery disease.

3. Literature review

PubMed, Nepal heart Journal (NHJ), Journal of Nepal Medical Association (JNMA), and other websites were used for literature review using terms CAD, ethnicity, health disparities, risk factors, Nepal.

1.2 Material and methods

1.2.1 Study area

Coronary care unit (CCU), Shahid Gangalal National Heart Center (SGNHC) Kathmandu, Nepal. Kathmandu is the capital and most populous city of Nepal. SGNHC is a national referral center for cardiovascular diseases. Patients from all over the country come for health care and treatment to this center either directly by themselves or referred by other medical centers.

1.2.2 Research design:

This study was a hospital based single center descriptive, retrospective study.

1.2.3 Sources of data:

A hospital database was used to gather the information about the patients and disease. Data has included the information related to demographic information, major and contributing risk factors for coronary artery disease and outcome of disease.

1.2.4 Criteria for sample selection

Patients who are diagnosed with Myocardial infarction and/or angiographically proven CAD will be selected as a sample population.

Inclusion Criteria: Patients with acute onset of coronary artery disease or known case of coronary artery disease were included in the study.

Exclusion Criteria: Patients who were not diagnosed with coronary artery disease such as Rheumatic Heart Disease, congenital Heart Diseases, Vascular Diseases, and etc. patients' records with missing major information were excluded from the study.

1.2.5 Data collection:

Secondary data was collected from 14th April 2014 to 13th April 2015; the retrospective, observational study was done. Hospital Registry recorded 837 in-patients with coronary artery disease were taken. Ethnic groups were categorized according to the National Legal Code (Muluki Ain), 1854. (Bennett, Dahal, & Govindasamy, 2008; Gurung, 2003) and Health Management Information System, Department of Health Services, Ministry of Health and Population (Bhandari, Angdembe, Dhimal, Neupane, & Bhusal, 2014).The castes are divided as following:

1. Brahmin/ Chhetri- known as upper castes including upper castes in Tarai.
2. Newar- Unenslavable Advantaged indigenous group.
3. Janajati- Enslavable indigenous group.
4. Tarai/ Madhesi other castes (Madhesi)- Enslavable Other indigenous castes residing in Specific region of the country.

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

5. Dalits- lower castes, untouchable and water unacceptable.
6. Muslim- lower castes, water unacceptable.

1.2.6 Data collection tools

A predefined questionnaire was developed and used to gather consisting of socio-demographic, behavioral factors and other necessary information about the sample population prepared based on The American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease, 2013. Ethnicity of cases was classified into six groups based on the Health Management Information System, Department of Health Services, Ministry of Health and Population (Bhandari et al., 2014). Additional questions were developed as per the objectives of the study based on an initial desktop review and expert opinion. The research instrument was reviewed and approved by Institutional Review Board, SGNHC and Review committee of National Health Research Council, Nepal. Required information were retrieved from the patient file using the data collection tool.

1.2.7 Validity and reliability of tool

The data collection tool was prepared based on the key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease.

1.2.8 Data Analysis:

Descriptive statistics was used as frequencies and percentages for categorical variables (Age, Gender, Residence, diagnosis, CAG Findings, etc.) and as mean and standard deviation (SD) for continuous variables (Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Left Ventricle Ejection Fraction (EF %), Total Cholesterol, Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Random Blood Sugar (RBS). SPSS V20.0 for Windows (IBM SPSS Inc., Chicago, Illinois, USA) used for all statistical analysis, and to estimate the frequencies and percentages of descriptive variables, cross-tabulation and Chi-square test and KW Test were used to determine the level of significance and to find the relationship between variables in the study area. A p value ≤ 0.05 was considered as statistically significant.

Dependent Variables: Baseline Characteristics of the study Population (age, sex, residence, diagnosis, CAG Findings, Clinical Findings, etc.)

Independent Variables: Ethnicity (Brahmin/Chhetri, Newar, Janajati, Madhesi other castes, Dalit and Muslim).

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

1.3 Results

A total of 837 patients who were discharged with the diagnosis of CAD were included in this study. Among the recruited patients, 44.7% were Brahmin/ Chhetris and 27.4,13.9, 7.4, 3.6 and 3.1% were Newars, Janajatis, Madhesi, Dalits and Muslims respectively. The mean age was 58.6 ±13.7 years, 391(46.7%) patients were from age group 41-60 years, which was the highest number of patients followed by 339 (40.5%), 63 (7.5%) and 44 (5.3%) and age was statistically significant with Ethnicity (P= 0.025). Of the total number of patients included in the study, 602 (71.9%) were male and 235 (28.1%) were female. Table 1. 1 illustrates the baseline characteristics of the patient sample included in the study. As the hospital lies in the Capital city and Central Region of the country, most of the population 604 (72.2%) had come from Central region, 126 (15.4%) from Western region, 62(7.6%) from Eastern region, 15(1.8%) from Far-western region and 11(1.3%) from Midwestern region. Based on the Kruskal–Wallis test, the residence was significantly different in comparison among the different ethnic groups (P = 0.002). The most common diagnosis among ethnic groups was Acute ST Elevation Myocardial Infarction 526(62.8%), which had affected the highest percentage of patients in Newars (67.2%) and lowest in Muslims (53.8%) among all other diagnoses. The walls affected by Acute STEMI were diagnosed according to the report of ECG, ECHO or CAG as per patients' need. Recent/Old MI was most common in Madhesi population (16.1%) and least common among Dalits (3.3%)whereas, NSTEMI and Angina Pectoris including Angina on Exertion (AOE) or Unstable Angina (UA) were most commonly found in Dalits (26.9% and 13.3% respectively) and less common in Newars (14% and 7.4% correspondingly). Diseased vessels were categorized on the basis of number of affected coronary arteries visualized during Coronary Angiography, 317(37.9%) patients were found having Single Vessel Disease, 155(18.5%) with Double Vessel Disease, 91(10.9%) with Triple Vessel Disease and 16 (1.9), 7 (0.8%) were diagnosed with Non- critical Coronaries and Normal Coronaries respectively. In addition, Single and Double vessel coronary artery involvement were more frequently detected in the Muslims (53.8%, 23.1%) whereas, Triple vessel coronary artery involvement was more common in Dalits (20%) than in the other ethnic groups.

1.3.1 Characteristics of the study population

Table 1. 1 Baseline characteristics of the study population

Characteristics	**Number (%)**							**P-value**
Ethnic groups	**Brahmin/ Chhetri 374(44.7)**	**Newar 229(27.4)**	**Janajati 116(13.9)**	**Madhesi 62(7.4)**	**Dalit 30(3.6)**	**Muslim 26(3.1)**	**Total 837**	
AGE (IN YEARS)								0.02
21- 40	21 (5.6)	21(9.2)	11(9.5)	4(6.5)	3(10)	3(11.5)	63 (7.5)	
41- 60	166(44.4)	111(48.5)	54(46.6)	3251.68)	15(50)	13(50)	391(46.7)	

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

61- 80	162(43.3)	81(35.4)	50(43.1)	24(38.7)	12(40)	10(38.5)	339(40.5)	
>81	25(6.7)	16(7)	1(0.9)	2(3.2)	0	0	44 (5.3)	
GENDER								0.152
Male	279(74.6)	163(71.2)	77(66.4)	42(67.7)	24(80)	17(65.4)	602(71.9)	
Female	95(25.4)	66(28.8)	39(33.6)	20(32.3)	6(20)	9(34.6)	235(28.1)	
RESIDENCE								0.002
Central Region	29(7.9)	5(2.2)	8(7.2)	14(23)	3(10.3)	3(11.5)	62 (7.4)	
Eastern Region	241(65.5)	209(93.7)	75(67.6)	42(68.9)	18(62.1)	19(73.1)	604 (72.2)	
Western Region	79(21.5)	8(3.6)	25(22.5)	4(6.6)	6(20.7)	4(15.4)	126 (15.1)	
Midwestern Region	6(1.6)	1(0.4)	3(2.7)	0	1(3.4)	0	11 (1.3)	
Farwestern Region	13(3.5)	0	0	1(1.6)	1(3.4)	0	15 (1.8)	
Missing address							19 (2.2)	
DIAGNOSIS								0.266
Acute STEMI	235(62.8)	154(67.2)	72(8.6)	34(54.8)	17(56.7)	14(53.8)	526 (62.8)	
Recent/ Old MI	44(11.8)	26(11.4)	8(1)	10(16.1)	1(3.3)	2(7.7)	91(10.9)	
NSTEMI	57(15.2)	32(14)	22(2.6)	11(17.7)	8(6.9)	7(26.9)	137 (16.4)	
Angina	38(10.2)	17(7.4)	14(1.7)	7(11.3)	4(13.3)	3(11.5)	83 (9.9)	
CAG FINDINGS								
							*251(30)	0.891
SVD	140(37.4)	88(38.4)	42(36.2)	19(30.6)	14(46.7)	14(53.8)	317 (37.9)	
DVD	69(18.4)	40(17.5)	25(21.6)	11(17.7)	4(13.3)	6(23.1)	155 (18.5)	
TVD	41(11)	28(12.2)	7(6)	7(11.3)	6(20)	2(7.7)	91 (10.9)	
Non-critical coronaries	7(1.9)	5(2.2)	2(1.7)	2(3.2)	0	0	16 (1.9)	
Normal Coronaries	3(0.8)	1(0.4)	3(2.6)	0	0	0	7(0.8)	

Data are presented as n (%)
*Number of the Patients on whom CAG was not performed

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

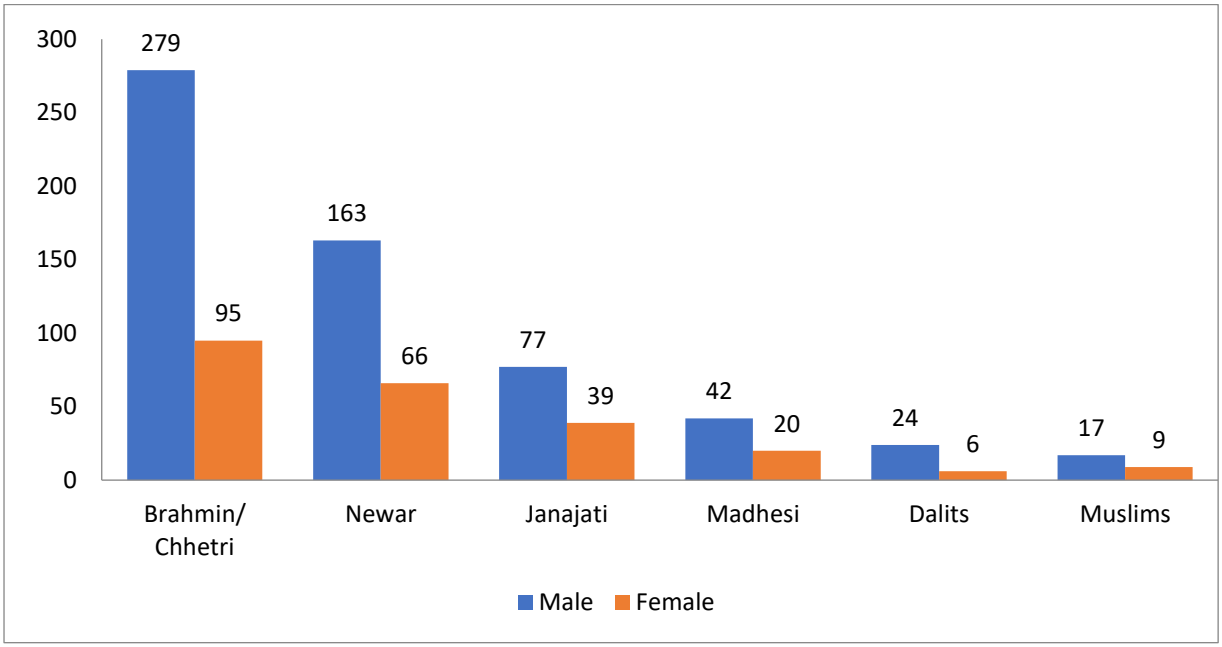

Figure 1. 1 Distribution of patients by ethnicity and Gender

Table 1. 2 Clinical findings of Study Population

Clinical Findings	Mean±SD n=837	n(%)	P Value
Systolic Blood Pressure (mmHg)	114.43±10.87		0.903
≤140		774(92.5)	
>140		59(7)	
Diastolic Blood Pressure (mmHg)	73.61±12.62		0.800
≤90		787(94)	
>90		46(5.5)	
Total Cholesterol (mmol/L)	4.13±1.01		0.153
≤5.1		480(57.3)	
>5.1		81(9.7)	
Missing		276	
Triglyceride (mmol/L)	1.70±0.88		0.104
≤2.2		457(54.6)	
>2.2		104(12.4)	
Missing		276	
LDL (mmol/L)	2.25±0.85		0.201
≤3.3		514(61.4)	
>3.3		49(5.9)	
Missing		274	
HDL (mmol/L)	1.05±0.34		0.708
≤1.4		548(65.5)	
>1.4		13(1.6)	
Missing		276	
Fasting Blood Glucose (mmol/L)	7.36±3.20		0.463
≤11.1		670(80)	
>11.1		87 (10.4)	
Missing		80	

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

LVEF (%)	47.97±12.68		0.148
≤30		112(13.4)	
31-50		381(45.5)	
>50		265(31.7)	
Missing		79	

Table 1. 3 Clinical findings of Study Population by Ethnicity

Clinical Findings	**Ethnicity**						**P-Value**
	Brahmin/ Chhetri	**Newar**	**Janajati**	**Madhesi**	**Dalits**	**Muslim**	
Systolic Blood Pressure (Mean ± SD) (mmHg)	114.7±20.6	113.8±18.0	113.9±19.1	113.6±73.1	121.5±24.5	111.1±15.6	0.519
≤140 n(%)	344(44.4)	215(27.8)	108(14)	55(7.1)	26(3.4)	26(3.4)	
>140 n(%)	28 (47.5)	6(10.2)	14(23.7)	7(11.9)	4(6.8)	0	
Diastolic Blood Pressure (Mean ± SD) (mmHg)	73.8±13.0	73.3±12.0	73.8±12.6	73.1±13.7	76.3±12.2	70.8±12.0	0.667
≤90 n (%)	350(44.5)	219(27.8)	107(13.6)	57(7.2)	28(3.6)	26(3.3)	
>90 n (%)	22(47.8)	10(21.7)	8(17.4)	4(8.7)	2(4.3)	0	
Total Cholesterol (Mean ± SD) (mmol/L)	4.0±1.0	4.3±1.1	4.0±0.9	4.08±0.84	4.08±0.93	4.06±0.72	0.588
≤5.1 n (%)	220(45.8)	127(26.5)	73(15.2)	31(6.5)	14(2.9)	15(3.1)	
>5.1 n (%)	31(38.3)	30(37)	8(9.9)	7(8.6)	3(3.7)	2(2.5)	
Triglyceride (Mean ± SD) (mmol/L)	1.67±0.84	1.81±0.98	1.56±0.91	1.81±0.8	1.49±0.34	1.79±0.86	0.569
≤2.2 n (%)	203(44.4)	124(27.1)	69(15.1)	32(7)	17(3.7)	12(2.6)	
>2.2 n (%)	48(46.2)	33(31.7)	12(11.5)	6(5.8)	0	5(4.8)	
LDL (Mean ± SD) (mmol/L)	2.16±0.79	2.42±0.96	2.26±0.83	2.13±0.74	2.26±0.97	2.13±0.74	0.648

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

≤3.3	233(45.3)	138(26.8)	77(15)	35(6.8)	14(2.7)	17(3.3)	
>3.3	19(38.8)	19(38.8)	5(10.2)	3(6.1)	3(6.1)	0	
HDL (Mean ± SD) (mmol/L)	1.06±0.35	1.06±0.41	1.04±0.23	1.04±0.16	1.09±0.23	1.05±0.26	0.751
≤1.4	245(44.7)	155(28.3)	79(14.4)	37(6.8)	16(2.9)	16(2.9)	
>1.4	6(46.2)	2(15.4)	2(15.4)	1(7.7)	1(7.7)	1(7.7)	
Fasting Blood Glucose (Mean ± SD) (mmol/L)	7.42±3.28	7.40±3.08	7.08±2.75	6.93±2.64	7.58±3.64	8.30±5.3	0.782
≤11.1	298(44.5)	181(27)	96(14.3)	49(7.3)	25(3.7)	21(3.1)	
>11.1	37(42.5)	26(29.9)	12(13.8)	6(6.9)	2(2.3)	4(4.6)	
LVEF (Mean ± SD) (%)	47.97±12.68	47.23±11.63	47±12.57	44.63±12.50	49.37±11.04	45.24±12.19	0.148
≤30	56(50)	24(21.4)	14(12.5)	12(10.7)	3(2.7)	3(2.7)	
31-50	158(41.5)	112(29.4)	59(15.5)	29(7/6)	12(3.1)	11(2.9)	
>50	129(48.7)	68(25.7)	34(12.8)	15(5.7)	12(4.5)	7(2.6)	

Table 1. 2 and Table 1. 3 illustrate about the clinical findings of the study population. Data are recorded as continuous variables so; they are presented as Mean ± Standard Deviation, number and percentages. Among the study population, Highest SBP was 200 and lowest was 60 with mean of 114.43±10.87 mmHg SD. 93% of patients had SBP ≤140 mmHg which might be due to use of antihypertensive drugs or deteriorated disease condition during admission. Dalit population had the highest recorded mean SBP (121.53±24.53mmHg) among the entire ethnic group whereas; Brahmin/Chhetri (47.5%) had the highest number of people with SBP >140mmHg than other ethnic groups. Muslim population had the lowest recorded mean SBP (111.15±15.58 mmHg) among the entire ethnic groups whereas; Brahmin/Chhetri and Madhesi people had the lowest minimum SBP (60 mmHg) than other ethnic groups.

DBP was 130 at highest and 0 (inaudible up to 0) at lowest with mean of 73.61±12.62 mmHg SD. 94% of patients had DBP ≤ 90 mmHg which might be due to use of antihypertensive drugs or deteriorated disease condition during admission. Dalit population had the highest recorded mean DBP (76.33±12.17 mmHg) among the entire ethnic group whereas; Brahmin/Chhetri people had the highest maximum DBP (130mmHg) than other ethnic groups. Muslim population had the lowest recorded mean DBP (70.77±11.97 mmHg) and again Brahmin/Chhetri (47.8%) had the highest number of people with DBP >90 mmHg than other ethnic groups. among the entire ethnic groups whereas; Brahmin/Chhetri and Madhesi people had the lowest minimum DBP (0 and 20 mmHg respectively) than other ethnic groups.

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

Highest Total Cholesterol level was 9.1 and lowest was 2.1 with the mean of 4.13±1.01 mmol/L SD among the study population. 58% of patients had TC <5.1 mmol/L, which might be due to use of drugs or any other cause during admission. Newar population had the highest mean Total Cholesterol level (4.33±1.08 mmol/L) among the entire ethnic group whereas, Brahmin/Chhetri and Newar people had the significantly higher maximum Total Cholesterol level (9.1 and 8.7 mmol/L respectively) than other ethnic groups and Brahmin/Chhetri (38.8%) had the highest number of people with TC >5.1 mmol/L than other ethnic groups but again Newar people had also the lowest minimum Total Cholesterol level (2.1mmol/L) than other ethnic groups. Janajati people had the lowest mean minimum Total Cholesterol level (4.04±0.94 mmol/L) other ethnic groups. We can say that there is variation in Total Cholesterol level within the Newar ethnic group itself but there is no significant difference in mean Cholesterol level among other ethnic population.

Highest level of Triglyceride was 7 and lower level was 0.8 with the mean of 1.70±0.88 mmol/L SD. x Again Newar population had the highest mean Triglyceride (1.81±0.98mmol/L) followed by Madhesi people (1.81±0.79mmol/L) whereas, Newar people had the higher maximum Triglyceride (7 mmol/L) than other ethnic groups and Brahmin/Chhetri (46.2%) had the highest number of people with TG >2.2 mmol/L but again Newar people had also the lowest minimum Triglyceride level (2.1mmol/L) but again Newar and Brahmin/Chhetri people had also the lowest minimum Triglyceride (0.8 mmol/L) than other ethnic groups. Dalit people had the lowest mean minimum Triglyceride (1.49±0.34mmol/L) compared to other ethnic group.

LDL level was 6.7 at highest and 0.8 at lowest level with the mean of 2.25±0.85 mmol/L SD. 62% of patients had LDL <3.3 mmol/L, which is good and might be due to use of drugs or any other cause during admission. Newar population had the highest mean LDL level (2.42±0.96mmol/L) and highest maximum LDL level (6.7 mmol/L) and Brahmin/Chhetri and Newars (38.8%) had the highest number of people with LDL >3.3 mmol/L among the entire ethnic groups. Brahmin/Chhetri people had the lowest minimum LDL level (0.8 mmol/L) than other ethnic groups. Madhesi people and Muslim people had the lowest mean minimum LDL level (2.13±0.74mmol/L) than other ethnic groups.

Highest HDL level was 5.8 and lowest level was 0.8 with the mean of 1.05±0.34 mmol/L SD. 66% of patients had LDL <1.4 mmol/L, which is not good. Madhesi and Janajati population had the lowest mean HDL level (1.04±0.16 and 1.04±0.23mmol/L respectively) among the entire ethnic group whereas, all ethnic group had lowest minimum HDL level (0.8 mmol/L), and Newar people had highest maximum HDL level (5.8mmol/L) than other ethnic groups. Brahmin/Chhetri and Newars (44.7%) had the highest number of people with HDL <1.4 mmol/L Dalit people had the highest mean maximum HDL level (1.09±0.23) in comparison with other ethnic groups.

Highest FBS level was 24 and lowest level was 3.2 with the mean of 7.36±3.2 mmol/L SD. 66% 80% of patients had FBS <11.1 mmol/L. Muslim population had the highest mean RBS level (8.30±5.3 mmol/L) among the entire ethnic group and again Muslim people themselves had the higher maximum RBS level (24 mmol/L) than other ethnic groups. Madhesi people

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

had the lowest minimum RBS level (3.2 mmol/L) and also the lowest mean minimum RBS level (6.93±2.64mmol/L) than other ethnic groups. Brahmin/Chhetri (42.5%) had the highest number of people with FBS >11.1 mmol/L.

Highest LVEF was 70 and lowest level was 15 with the mean of 47.97±12.68% SD. Only 14% of patients had low LVEF (<30%) during admission..1Dalit population had the highest mean LVEF (49.37±11.04%) among the entire ethnic group whereas, patients from all five ethnic groups except Muslims had the highest maximum LVEF (70%). Brahmin/Chhetri and Newar people had the lowest minimum LVEF (15%) than other ethnic groups. Madhesi people had the lowest mean minimum LVEF (44.63±12.50%) compared to other ethnic groups. Brahmin/Chhetri (50%) had the highest number of people with low EF% among all groups having low EF%. The Relation among the Individual Clinical findings variables and Ethnicity were not statistically significant.

1.4 Discussion

In our study, The mean age was 58.6 ±13.7 years and of the total number of patients included in the study, 602 (71.9%) were male and 235 (28.1%) were female which has been found similar with previous studies conducted in similar sample population and same place (Adhikari et al., 2014; Tamrakar et al., 2014). Male sex predominance was consistent with report of previous studies (Adhikari et al., 2014; Amin et al., 2009). we demonstrate that the majority of cases belonged to upper castes such as Brahmin/ Chhetris, whereas one study had quite similar finding regarding the number of people from each ethnic groups and in that study, Brahmin/ Chhetri group had the highest number of patients(R. Shrestha, 2015). However, findings of other previous studies done in Nepal contradict with the findings of our study; they had shown that majority of cases were from relatively advantaged Janajati ethnic groups (Bhandari et al., 2014; Sharma, Badhu, Shah, Rodriguez-Fernandez, & Niraula, 2017), which included Newars and in our study Newar population was the second major ethnic group after Brahmin/ Chhetris. Most of the cases were from Central region of the country and residence of the study population had the significant relationship with ethnicity. In our study, CAD was present as acute ST elevation myocardial infarction in more than half of cases (62.8%), which was similar with the previous study (Adhikari et al., 2014; Gautam et al., 2013; Tamrakar et al., 2014). CAG findings were different in our and a previous study (Tamrakar et al., 2014). In clinical findings of the patients, mean Total Cholesterol level was 4.13±1.01 mmol/L, mean HDL level was 1.05±0.34 mmol/L SD, Mean LDL level was 2.25±0.85 mmol/L SD, all of these three findings were found similar with the previous study done in the same hospital. (Adhikari et al., 2014)

Conclusion

The study analyzed 837 patients diagnosed with Coronary Artery Disease (CAD) discharged from a hospital. The majority were Brahmin/Chhetris (44.7%), followed by Newars, Janajatis, Madhesi, Dalits, and Muslims. The average age was 58.6 years, with the 41-60 age group being the most represented. Males constituted 71.9% of the sample. Most patients (72.2%) were from

the Central Region of Nepal. Acute ST Elevation Myocardial Infarction (STEMI) was the most prevalent diagnosis, particularly among Newars, while NSTEMI and Angina Pectoris were more common in Dalits. Single vessel disease was the most frequently observed, especially among Muslims, whereas Dalits had higher rates of triple vessel disease. The study highlights the demographic and regional variations in CAD presentation and severity among different ethnic groups in Nepal.

Recommendation

These findings emphasize the importance of considering ethnic and regional factors in CAD diagnosis and treatment strategies. Tailoring healthcare interventions to address these variations could improve patient outcomes and enhance the effectiveness of cardiovascular care in Nepal.

Author Contribution

By Expertise

1. Literature Review & Background Research: Ms. Mamta Bista, **Ms. Sunita Dhakal**
2. Conceptualization & Research Question: Ms. Mamta Bista, Mr. Saroj Prasad Gaudel
3. Methodology & Data Collection: Ms. Mamta Bista, Mr. Saroj Prasad Gaudel
4. Data Analysis & Interpretation: Mr. Kshitij Gartoulla, Ms. Mamta Bista
5. Writing Drafts: Ms. Mamta Bista, Mr. Kshitij Gartoulla
6. Editing & Proofreading: Mr. Saroj Prasad Gaudel, **Ms. Sunita Dhakal,** Mr. Kshitij Gartoulla
7. Management & Communication: Ms. Mamta Bista, **Ms. Sunita Dhakal**

Conflict of interest

1. The authors declare that they have no conflicts of interest to declare.

References

Adhikari, C. M., Prajapati, D., Baniya, B., Regmi, S., Bogati, A., & Thapaliya, S. (2014). Prevalence of Conventional Risk Factors in ST Segment Elevation Myocardial Infarction Patients in Shahid Gangalal National Heart Centre, Nepal. *JNMA J Nepal Med Assoc, 52*(195), 914-919.

Ahmad, N., & Bhopal, R. (2005). Is coronary heart disease rising in India? A systematic review based on ECG defined coronary heart disease. *Heart, 91*(6), 719-725.

Al-Nozha, M. M., Arafah, M. R., Al-Mazrou, Y. Y., Al-Maatouq, M. A., Khan, N. B., Khalil, M. Z., . . . Al-Harthi, S. S. (2004). Coronary artery disease in Saudi Arabia. *Saudi medical journal, 25*(9), 1165-1171.

Amin, A. P., Nathan, S., Evans, A. T., Attanasio, S., Mukhopadhyay, E., Mehta, V., & Kelly, R. F. (2009). The effect of ethnicity on the relationship between premature coronary artery disease and traditional cardiac risk factors among uninsured young adults. *Preventive cardiology, 12*(3), 128-135. doi:https://doi.org/10.1111/j.1751-7141.2009.00025.x

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

Babusik, P., & Duris, I. (2010). Comparison of obesity and its relationship to some metabolic risk factors of atherosclerosis in Arabs and South Asians in Kuwait. *Medical Principles and Practice, 19*(4), 275-280.

Bennett, L., Dahal, D. R., & Govindasamy, P. (2008). Caste ethnic and regional identity in Nepal: Further analysis of the 2006 Nepal Demographic and Health Survey.

Bhandari, G. P., Angdembe, M. R., Dhimal, M., Neupane, S., & Bhusal, C. (2014). State of non-communicable diseases in Nepal. *BMC Public Health, 14*(1), 23. doi:10.1186/1471-2458-14-23

Budoff, M. J., Nasir, K., Mao, S., Tseng, P. H., Chau, A., Liu, S. T., . . . Blumenthal, R. S. (2006). Ethnic differences of the presence and severity of coronary atherosclerosis. *Atherosclerosis, 187*(2), 343-350.

Collaborators, G. R. F. (2016). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet, 388*(10053), 1659 - 1724.

Dalton, A. R., Bottle, A., Soljak, M., Majeed, A., & Millett, C. (2014). Ethnic group differences in cardiovascular risk assessment scores: national cross-sectional study. *Ethnicity & health, 19*(4), 367-384.

Francis, D. K., Bennett, N. R., Ferguson, T. S., Hennis, A. J., Wilks, R. J., Harris, E. N., . . . Sullivan, L. W. (2015). Disparities in cardiovascular disease among Caribbean populations: a systematic literature review. *BMC public health, 15*(1), 828.

Gautam, M. P., Sogunuru, G., Subramanyam, G., Thapa, L. J., Paudel, R., Ghimire, M., . . . Silpakar, R. (2013). Acute coronary syndrome in an intensive care unit of a tertiary care centre: the spectrum and coronary risk factors. *Journal of the Nepal Medical Association, 52*(190).

Gurung, H. B. (2003). *Trident and Thunderbolt Cultural Dynamics in Nepalese Politics*: Social Science Baha.

Hussain, M., Khan, N., Uddin, M., & Al Nozha, M. M. (2014). Chest Pain, Coronary Artery Disease and Risk Factors: A Global Snapshot. *Journal of Dow University of Health Sciences, 8*(2).

Jafar, T. H., Jafary, F. H., Jessani, S., & Chaturvedi, N. (2005). Heart disease epidemic in Pakistan: women and men at equal risk. *American heart journal, 150*(2), 221-226.

Jousilahti, P., Vartiainen, E., Tuomilehto, J., & Puska, P. (1999). Sex, age, cardiovascular risk factors, and coronary heart disease: a prospective follow-up study of 14 786 middle-aged men and women in Finland. *Circulation, 99*(9), 1165-1172.

Kurian, A. K., & Cardarelli, K. M. (2007). Racial and ethnic differences in cardiovascular disease risk factors: a systematic review. *Ethnicity and Disease, 17*(1), 143.

Li, Z., Yang, R., Xu, G., & Xia, T. (2005). Serum lipid concentrations and prevalence of dyslipidemia in a large professional population in Beijing. *Clinical chemistry, 51*(1), 144-150.

NPRC Journal of Multidisciplinary Research
Vol. 1, No. 2, July 2024. Pages: 94-109
ISSN: 3059-9148 (Online)
DOI: https://doi.org/10.3126/nprcjmr.v1i2.69331

Mackay, J., Mensah, G. A., & Greenlund, K. (2004). *The atlas of heart disease and stroke*: World Health Organization.

Misra, A., & Khurana, L. (2009). The metabolic syndrome in South Asians: epidemiology, determinants, and prevention. *Metabolic syndrome and related disorders, 7*(6), 497-514.

Mosca, L., Benjamin, E. J., Berra, K., Bezanson, J. L., Dolor, R. J., Lloyd-Jones, D. M., . . . Shaw, L. J. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 update: a guideline from the American Heart Association. *Circulation*, CIR. 0b013e31820faaf31828.

Organization, W. H. (2015). Global Health Observatory(GHO) data. Geneva;.

Programme, U. N. D. (2017). Human Development Report.

R. Shrestha, S. S. (2015). Health - related Quality of Life of Patients with CoronaryHeart Disease Attending a Cardiac Care Centre in Kathmandu. *Journal of Institute of Medicine, 37*(1), 4-10.

Reddy, K. S. (2004). Cardiovascular disease in non-Western countries. *New England Journal of Medicine, 350*(24), 2438-2440.

Reddy, K. S., & Yusuf, S. (1998). Emerging epidemic of cardiovascular disease in developing countries. *Circulation, 97*(6), 596-601.

Shaha, R. (1992). Ancient and Medieval Nepal. 1.

Sharma, S., Badhu, A., Shah, T., Rodriguez-Fernandez, R., & Niraula, S. (2017). Coronary Artery Disease Risk Factors among Females in a Tertiary Cardiac Centre in Nepal: A Case Control Study. *Int J Cardiovasc Res 6: 4. doi: 10.4172/2324, 8602*, 2.

Tamrakar, R., Bhatt, Y. D., Kansakar, S., Bhattarai, M., Shaha, K. B., & Tuladhar, E. (2014). Acute myocardial infarction in young adults: Study of risk factors, angiographic features and clinical outcome. *Nepalese Heart Journal, 10*(1), 12-16.

Yang, Z.-J., Liu, J., Ge, J.-P., Chen, L., Zhao, Z.-G., & Yang, W.-Y. (2011). Prevalence of cardiovascular disease risk factor in the Chinese population: the 2007–2008 China National Diabetes and Metabolic Disorders Study. *European heart journal, 33*(2), 213-220.

Yeo, K., Tai, B., Heng, D., Lee, J., Ma, S., Hughes, K., . . . Tai, E. (2006). Ethnicity modifies the association between diabetes mellitus and ischaemic heart disease in Chinese, Malays and Asian Indians living in Singapore. *Diabetologia, 49*(12), 2866-2873.

Yusuf, S., Reddy, S., Ôunpuu, S., & Anand, S. (2001). Global burden of cardiovascular diseases: Part II: variations in cardiovascular disease by specific ethnic groups and geographic regions and prevention strategies. *Circulation, 104*(23), 2855-2864.