

DOI: <https://doi.org/10.33314/jnhrc.v18i1.2156>

# Pattern of Cardiovascular Disease among Admitted Patients in Tertiary Care Teaching Hospital

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## ABSTRACT

**Background:** Cardiovascular diseases are the dominant cause of morbidity and mortality worldwide. In 2008, cardiovascular deaths represented 30% of all global deaths, with more than 80% of deaths in developing countries. There is increase in incidence of hypertension, atherosclerosis, stroke, chronic heart failure and atrial fibrillation. The objective of this study is to find the pattern of cardiovascular diseases among patients admitted in cardiac ward.

**Methods:** A retrospective analysis of records of admitted patients from 1<sup>st</sup> January 2016 – 30<sup>th</sup> December 2017 was conducted in Cardiology ward of Manipal Teaching Hospital, Pokhara, Nepal. A total of 2268 patients' data were taken from the ward register. The data was collected and analyzed with descriptive and inferential statistics using SPSS 18.0 version during the period from 1<sup>st</sup> June to 30<sup>th</sup> August 2018.

**Results:** The age ranged between 12 to 95 years with a mean (SD) is 61.23(16.34 years). More than half (51%) of the patients were female gender. Forty-six percentages of the patients were in the age group of 56 – 75 years. More than 1/3<sup>rd</sup> (35%) were diagnosed with Ischemic heart disease (IHD) followed by hypertension (22.8%) and arrhythmia(13.4%). There was a significant association between age and gender with the pattern of cardiovascular disease.

**Conclusions:** Ischemic heart disease, hypertension and arrhythmia were the major causes of hospitalization. Preventive measures at community and personal level focusing on the risk factors management of ischemic heart disease will alleviate the burden of ischemic heart disease.

**Keywords:** Cardiovascular disease; mortality; pattern; prevalence.

## INTRODUCTION

Cardiovascular diseases (CVD) are the dominant cause of morbidity and mortality worldwide. In 2008, cardiovascular deaths represented 30% of all global deaths, with more than 80% of deaths in developing countries.<sup>1</sup> Coronary artery disease(CAD) and stroke account for 80% of CVD deaths in males and 75% in females.<sup>2</sup> Acute Coronary Syndrome (ACS) entitled as a Global non communicable epidemic. In India, the prevalence of CAD in 2015, was more than double as compared to 2005 data.<sup>3</sup>

There is also increase in incidence of hypertension, atherosclerosis, stroke, chronic heart failure and atrial fibrillation.<sup>4</sup> A study from National heart Centre of Nepal showed that rheumatic heart disease was the commonest (27.3%), followed by coronary heart disease (21.7%) and

hypertension (20.7%) respectively.<sup>5</sup> The national annual health report of Nepal revealed significant increase in the prevalence of hypertension.<sup>6</sup>

Various studies showed that the prevalence of CVD is in increasing trend but very few studies have been conducted showing the pattern of cardiovascular disease. So, this study was conducted to identify the pattern of cardiovascular disease so that preventive measures can be focused in specific disease.

## METHODS

A retrospective hospital based study conducted in admitted patients of cardiac ward of Manipal Teaching Hospital, Pokhara, Nepal. All admitted patients with the diagnosis of cardiovascular diseases between January 2016 to December 2017 were taken using ward admission

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and discharge register. Manipal Teaching Hospital is tertiary centre with referral cardiac service. The total sample during study period of 2 years cumulates to be 2268.

Patients who were admitted for observation but not having cardiovascular disease on evaluation were excluded from the study. Patient transferred to the coronary care unit (CCU) and not shifted back to cardiac ward were also not included in the study. Only the first-time diagnosis of each patient was included for the study to avoid repetition bias. The heart disease was classified according to ICD -10.<sup>7</sup>

The data details were noted down as per the proforma from the ward register during the period from 1<sup>st</sup> June to 30<sup>th</sup> August 2018. The information regarding the patient's age, gender, primary diagnosis, duration of stay, outcome of the patient, comorbid conditions were collected. Collected data were checked thoroughly for completeness and validated and coded first. The data entered into a master chart prepared in the Microsoft Excel 2007 was imported to SPSS 18.0 version for statistical analysis. Descriptive statistics like frequency, percentage, mean, median standard deviation was computed. Inferential statistics like chi square test was applied to find the significant difference between age and gender with the cardiovascular disease pattern.

The ethical clearance was obtained from IRC (Institutional Review Committee) of Manipal teaching hospital, Pokhara, Nepal to access the patient information from the medical record department. The information of the patient was kept confidential and was used only for the purpose of study.

**RESULTS**

Age of the patients ranged from 12 -95 years with mean (SD) is 61.23 (16.34 years). Among 2268 respondents, 46% of the patients were in the age group of 56 - 75 years. More than half (51%) of the patients were female gender(Table 1).

More than 1/3<sup>rd</sup> (35%) of the patients were diagnosed with Ischemic heart disease(IHD) followed by hypertension(22.8%), arrhythmia(13.4%), heart failure(7.5%) and rheumatic heart disease(7%)(Table 2).

The most frequently encountered comorbidities were diabetes (25.1%), community acquired pneumonia(CAP) (19.78%), anemia(11.11%), acute kidney injury (AKI) (10.22%) and chronic obstructive pulmonary disease (COPD)(10%) (Figure1).

There is a significant association between age and pattern of cardiovascular disease among the admitted patients with p value <0.001 (Table 3).

**Table 1. Socio demographic characteristics of the patients (n = 2268).**

Characteristics	Frequency(f)	Percentage(%)
<b>Age (years)</b>		
< 35	156	6.9
35 - 55	616	27.2
56 - 75	1044	46.0
> 75	452	19.9
Mean ± S.D = 61.23 ± 16.34		
<b>Gender</b>		
Male	1122	49.5
Female	1146	50.5

SD - Standard deviation

**Table 2. Pattern of Cardiovascular diseases among the patients (n = 2268).**

Characteristics	Frequency (f)	Percentage (%)
<b>Diagnosis</b>		
Ischemic heart disease(IHD)	794	35.0
Hypertension	516	22.8
Arrhythmia	304	13.4
Heart failure	170	7.5
Rheumatic heart diseases	158	7.0
Valvular heart disease(Deg)	124	5.5
Cerebrovascular accident	92	4.1
Cardiomyopathy	70	3.1
Other CVD pattern( CHD, heart block, MVP, MVR, PE, Shock, Syncope)	40	1.8
<b>Length of hospitalization (days)</b>		
< 4	906	39.9
4 - 7	1224	53.9
> 7	138	6.1
Median ± SD	5.0 ± 2.6	
Range	1- 26	
<b>Outcome of the patient</b>		
Discharge	2214	97.6
Death	28	1.2
Referred	16	0.7
LAMA	12	0.5
<b>Comorbid status</b>		
Present	900	39.7
Absent	1368	60.3

CVD - Cardiovascular diseases, CHD - Congenital heart disease, Deg- Degenerative, MVP - Mitral Valve, Prolapse, MVR - Mitral Valve Replacement, PE - Pericardial effusion, LAMA - Left out against medical advice, SD - Standard Deviation

There is a significant association between gender and pattern of cardiovascular diseases. With reference to other cardiovascular diseases like cardiomyopathy, congenital heart disease(CHD), heart block, etc.

rheumatic heart disease was more than 2 times more likely to occur in females as compared to males at CI; 2.633(1.594-4.350) with p value < 0.001(Table 4).

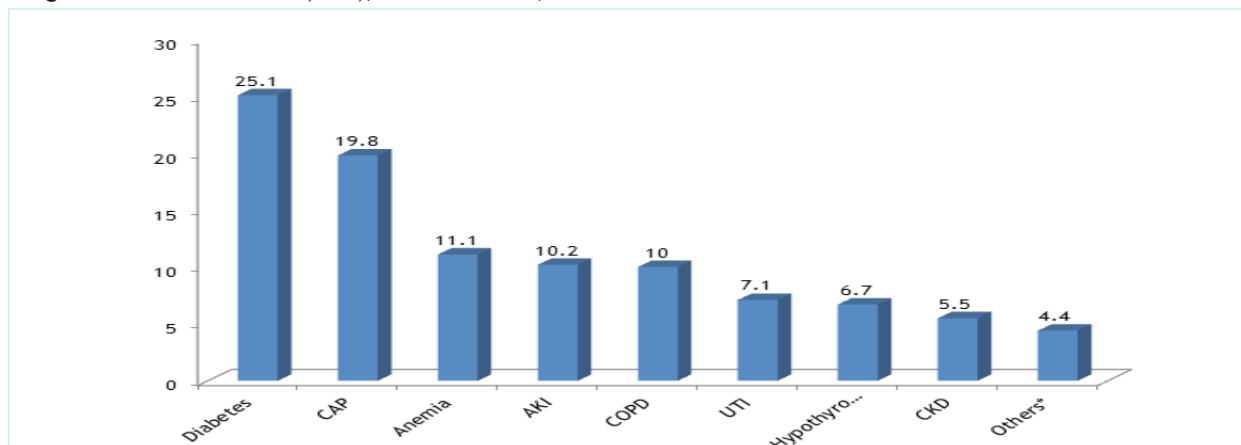


Figure 1. Comorbid assessment of the patients with CVD.

CAP-Community acquired pneumonia, AKI- Acute kidney injury, COPD-Chronic obstructive pulmonary disease, UTI- Urinary tract infection, CKD-Chronic kidney disease

Table 3. Association between pattern of the cardiovascular disease with patient of different age using chi-square test (n = 2268).

Disease	Age of the patients in different category(%)				Total	p value
	< 35	35 - 55	56 - 75	>75		
IHD	22(2.8)	190(23.9)	424(53.4)	158(19.9)	794	<0.001
Hypertension	30(5.8)	188(36.4)	224(43.4)	74(14.3)	516	
Arrhythmia	16(5.3)	70(23.0)	134(44.1)	84(27.6)	304	
Heart failure	8(4.7)	14(8.2)	94(55.3)	54(31.8)	170	
RHD	46(29.1)	92(58.2)	16(10.1)	4(2.5)	158	
VHD(Deg.)	8(6.5)	22(17.7)	62(50.0)	32(25.8)	124	
CVA	6(6.5)	18(19.6)	36(39.1)	32(34.8)	92	
Other <sup>#</sup>	20(18.2)	22(20.0)	54(49.1)	14(12.7)	110	

IHD - Ischemic heart disease, RHD - Rheumatic heart disease, VHD - Valvular heart disease, CVA - Cerebrovascular accident  
 Others<sup>#</sup> - Cardiomyopathy, CHD, heart block, MVP(Mitral valve prolapse), MVR(Mitral valve replacement, PE(Pericardial effusion), Shock, Syncope. p value < 0.05 - Significance

Table 4. Association between cardiovascular diseases and gender (n = 2268).

Disease	Frequency (%)		COR(95% CI)	p value
	Male(%)	Female(%)		
Ischemic heart disease	400(50.4)	394(49.6)	1.272(0.851-1.901)	0.240
Hypertension	278(53.9)	238(46.1)	1.106(0.730-1.674)	0.634
Arrhythmia	158(52.0)	146(48.0)	1.194(0.770-1.851)	0.429
Heart failure	76(44.7)	94(55.3)	1.598(0.985-2.590)	0.057
Rheumatic heart disease	52(32.9)	106(67.1)	2.633(1.594-4.350)	0.000
Valvular heart disease(Deg.)	56(45.2)	68(54.8)	1.568(0.935-2.630)	0.088
Cerebrovascular accident	40(43.5)	52(56.5)	1.679(0.961-2.935)	0.069
Others <sup>#</sup>	62(56.4)	48(43.6)	Ref.	

COR - Crude Odd Ratio, CI - Confidence Interval, COR in bold indicates significance i.e. p value <0.05. Others<sup>#</sup> - Cardiomyopathy, CHD, heart block, MVP(Mitral valve prolapse), MVR(Mitral valve replacement), PE(Pericardial effusion), Shock, Syncope

## DISCUSSION

The present study observed the different pattern of cardiovascular diseases among 2286 patients admitted in the cardiac ward.

Current study showed that age of the patient with CVD ranged from 12 -95 years with mean (SD) is 61.23 years (16.34) which is similar to the study conducted in Nigeria where mean (SD) is 60.7 years (15.9) with a range of 18 to 110 years.<sup>8</sup> Most of the patient were in the age group 56-75 years which is in line with study by Rathod PS<sup>9</sup> and Serafi AS.<sup>10</sup> The gender distribution among CVD patients is female (51%) and male(49%) which corresponds to study by Hadiza S<sup>11</sup> and Nwafor<sup>12</sup> et al showing 51.6% and 55% respectively for female gender. Whereas study conducted in Sudan showed comparatively lesser percentage i.e. 42.7% for female.<sup>13</sup>

Ischemic heart disease was the most prevalent disease in our study. Study conducted in Telangana showed similar findings with IHD being the first leading heart disease.<sup>14</sup> Whereas prior study conducted in Nepal showed different findings with the rheumatic heart disease & coronary heart disease as the first and second most common heart disease respectively in Nepal.<sup>5</sup> The increasing trend of non-communicable diseases even in developing countries with changing lifestyle, food habits and behavioral pattern could have played a major role for high prevalence. IHD constitutes more than 1/3<sup>rd</sup> (35%) of the heart disease which correspond to the finding from India with 41.59%<sup>9</sup> but higher than the study conducted in Bangladesh(21%)<sup>15</sup> and lower than the study conducted in Western Maharashtra (50%).<sup>16</sup>

The study conducted in Malawi and Ethiopia showed hypertension is the 2<sup>nd</sup> leading heart disease both constituting 24%<sup>17-18</sup> which is similar to the current study. However, a study conducted by Rathod PS and Kumar M revealed divergent outcome with hypertension as 1<sup>st</sup> and Ischemic heart disease as the 2<sup>nd</sup> leading heart disease.<sup>9,19</sup> Studies from Nigeria<sup>20</sup> and Tanzania<sup>21</sup> showed hypertension as the highest occurring heart disease. The present study showed that hypertension constitutes 22.8% which coincides with the findings from various studies i.e. Sudan(28%),<sup>13</sup> Malawi(28%),<sup>17</sup> Nigeria(20.5%)<sup>8</sup> and Ethiopia(20.2%).<sup>18</sup> Although, study conducted in Southeast Nigeria showed contrary results with hypertension and its complications (86.36%).<sup>22</sup>

The current study revealed the length of stay from 1-26 days with average hospital stay of  $5 \pm 2.66$  days, analogous to the result obtained by Vakade et al.<sup>16</sup>

Conversely study conducted by Hadiza S showed that the length of stay in the hospital ranged between 1 and 109 days with a mean of  $11.33 \pm 9.74$  days and median of 9 days.<sup>11</sup> The study from Saudi Arabia showed that most patients (n=105, 52%) stayed for 1 to 3 days while only 37 (18%) stayed for more than a week<sup>10</sup> which is dissimilar with present study with more than half (53.96%) stayed for 4-7 days and only 6.08% stayed for > 7 days.

Among them, 96.7% were discharged, 1.23% expired, 0.70% referred and 0.52% Left against medical advice from the ward which is similar to study conducted in Karachi where 97.75% were discharged 1.3% expired, and 0.95% left hospital against medical advice.<sup>23</sup> The study conducted by Serafi et al also revealed the comparable findings.<sup>10</sup> However, distinguish result was obtained from the study conducted in Nigeria where 65.2% were discharged, 32.9% expired, 1.2% were discharged against medical advice and 0.7% were referred to other facilities.<sup>11</sup> This may be due to the fact that the record was obtained from only cardiac ward and not from coronary care unit, so the death rate was less as compared to other studies.

A study conducted in India<sup>19</sup> found that most frequently encountered comorbidities were diabetes, anemia and asthma which coincide with the present study. Major comorbidity encountered is diabetes(25.1%) which is similar to the study conducted by Vakade et al. (19.51%)<sup>16</sup> and Kisenge PR(20.5%)<sup>21</sup> of the cardiovascular patients were diabetic.

More number of cases of CVD was seen between the age of 56-75 years which is statistically significant which is in line with the study conducted by Oguanobi et al.<sup>22</sup> and George et al.<sup>24</sup> While, significant association was not found in a study from Saudi Arabia.<sup>25</sup> The significant association between pattern of cardiovascular disease and gender ( $p < 0.05$ ) of current study was similar to study conducted by Oguanobi et al<sup>22</sup>, Hadiza et al.<sup>11</sup> and Habte B et al.<sup>18</sup> Whereas no significant association was obtained from the study conducted in Nigeria<sup>12</sup> between gender and pattern of cardiovascular disease ( $p > 0.05$ ).

This study has few limitations. First, it is a retrospective study based on the previous medical records and the data obtained might be inadequate which result in the overestimation or underestimation of the outcome of study. The patients transferred to CCU were excluded from the study which may have affected death rate. Also, the other different characteristics like education, occupation, monthly family income, type, size of family, and family history of CVD could not be assessed.

## CONCLUSIONS

Among all cardiovascular diseases, the most common admitting diagnosis was ischemic heart disease (35%) followed by hypertension (22.8%), arrhythmia(13.4%), heart failure(7.5%) and rheumatic heart disease(7%). Preventive measures at community and personal level focusing on the risk factors management of ischemic heart disease like smoking, dyslipidemia, diabetes, obesity and hypertension will alleviate the burden of ischemic heart disease admission in future.

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