

## PATTERNS OF CARDIOTHORACIC DISEASES AND PROCEDURES IN A TERTIARY CARE HOSPITAL OF PESHAWAR

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### Contribution

ON and MKH conceived the idea and designed the study. Data collection and manuscript writing was done by ON, MKH and ZR. All the authors contributed equally to the submitted manuscript.

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## ABSTRACT

**Objectives:** To determine the common cardiovascular and congenital heart diseases that required admission and surgical intervention in a tertiary care hospital of Peshawar.

**Methodology:** This was a retrospective study at the cardiothoracic surgery ward of Rehman Medical Institute (RMI). All the admissions over the period of 9 years from 2005 to 2014 into the cardiothoracic surgery ward were reviewed. The data acquired was put into Microsoft Excel 2013 and analyzed using pivot tables for frequencies of different procedures and diagnosis.

**Results:** A total of 9343 patients were admitted during the 9-year period. There were 6516 (69.7%) males and 2827 (30.3%) females. The male to female ratio was 2.30:1. The ages ranged from 1 year to 99 years. Mean age was  $41.32 \pm 20.56$  years. The highest proportion of admissions was in the 50-59 years' age group followed by 60-69 years and 40-49 years. Coronary Artery Bypass Graft (4617) was the most common procedure performed. Triple Vessel Disease (37%) was the most commonly presented disease to the RMI Cardiology Unit.

**Conclusion:** Majority of patients presented with triple vessel disease and male outnumbered female. CABG was the commonest procedure performed at RMI Cardiac Surgery Unit, Peshawar.

**Key words:** Cardiovascular Diseases, Heart Valves, Coronary Diseases

## INTRODUCTION:

Cardiovascular, heart valve and congenital heart diseases (CHD) constitute a major part of adult and pediatric diseases. In Pakistan, 17% of the adult population suffer from cardiovascular diseases while in the United States of America, Coronary heart disease accounts for one-third of adult deaths.<sup>1,2</sup> The overall mortality rates from cardiovascular diseases have dropped dramatically in developed countries.<sup>3</sup>

This reduction in mortality rate is attributed to the improvements in therapy such as preventive measures after Myocardial Infarction (MI), percutaneous interventions (PCI), heart failure therapy and lifestyle modifications such as decreasing risk factors like reduction in total cholesterol, systolic blood pressure, smoking and physical inactivity.<sup>4,5</sup> However, contrary to the data from developed countries, cardiovascular mortality rates in countries like the Middle East, India, Pakistan, Latin America, amongst other developing countries, is expected to be high. Likely due to the socioeconomic changes, sedentary lifestyles, increased cigarette smoking, hypertension and adaptation of

westernized diets in these countries.<sup>6,7</sup>

CHD by definition is the structural or functional heart defect present at birth. CHD is the most common of all congenital lesions<sup>8</sup> and occurs roughly in 8 out of every 1000 live births<sup>9</sup> Cardiac anomalies account for around 11% of all the neonatal mortality in Pakistan.<sup>10</sup> Early diagnosis of CHD and its appropriate management can reduce the mortality and morbidity rates associated with CHD.<sup>11</sup>

This is a retrospective study carried out to review the common heart diseases that required admission and surgical intervention in a tertiary care hospital of Peshawar. Analyzing the pattern of medical admissions in the same hospital will provide a comparative analysis of the disease trends over the period and will serve as a basis for research and will facilitate in formulating health policies.

## METHODOLOGY:

This was a retrospective study at the cardiothoracic surgery ward of Rehman Medical Institute (RMI). All the admissions over the period of 9 years from 2005 to 2014 into the cardiothoracic surgery ward were reviewed. The data

**Table 1: Distribution of Procedures across Gender with Age Range**

Procedure	Male, n (%) (n = 6516)	Female, n (%) (n = 2827)	Age range (Mean) in Years	Median IQR (in years)
Abdominal Aortic Aneurysm Repair	3 (0.05)	3 (0.11)	30 – 66 (49.5)	50.5
Aortic valve replacement	421 (6.46)	96 (3.40)	5 – 82 (38.5)	36
ASD Repair	246 (3.78)	282 (9.98)	1 – 60 (23.9)	24
AV fistula correction	49 (0.75)	21 (0.74)	2 – 75 (49.1)	52
CABG	3742 (57.43)	875 (30.95)	1 – 115 (55.9)	55
CABG+AVR	63 (0.97)	21 (0.74)	35 – 90 (59.0)	60
CABG+DVR	5 (0.08)	1 (0.04)	32 – 60 (47.2)	50.5
CABG+MVR	35 (0.54)	17 (0.60)	30 – 74 (56.6)	59
CABG+VSD	20 (0.31)	3 (0.11)	25 – 76 (60.1)	61
Cardiac Cyst Excision	15 (0.23)	17 (0.60)	2 – 65 (30.4)	30
Double valve repair	192 (2.95)	93 (3.29)	12 – 67 (35.5)	35
Pulmonary Embolectomy	42 (0.64)	44 (1.56)	25 – 88 (54.6)	55
Exploratory thoracotomy	14 (0.21)	8 (0.28)	1 – 75 (37.8)	37.5
Mitral valvotomy	114 (1.75)	182 (6.44)	9 – 80 (32.1)	32
Mitral valve replacement	405 (6.22)	482 (17.05)	3 – 80 (36.9)	36
PDA ligation	200 (3.07)	302 (10.68)	1 – 50 (9.53)	7
Pulmonary artery banding	54 (0.83)	30 (1.06)	1 – 21 (5.60)	4
Shunt procedures	151 (2.32)	58 (2.05)	1 – 60 (9.37)	7
Tetralogy of Fallot correction	365 (5.60)	150 (5.31)	1 – 74 (11.5)	10
VSD repair	227 (3.48)	91 (3.22)	1 – 74 (12.5)	10
Aortic root replacement	31 (0.48)	9 (0.32)	14 – 65 (37.9)	35
Pericardiectomy	41 (0.63)	12 (0.42)	1 – 70 (33.1)	30
Coarctation of Aorta (CoA) - Repair	64 (0.98)	22 (0.78)	1 – 47 (20.9)	20
Sub Aortic Membrane Resection	17 (0.26)	8 (0.28)	3 – 65 (17.1)	14

\*CABG = Coronary artery bypass grafting, ASD = atrial septal defect, PDA = Patent ductus arteriosus, VSD = Ventricular septal defect, AV = arteriovenous fistula

obtained from these records contained age, gender, diagnosis, procedures performed, date of admission and discharge of the patients. Ethical review was obtained from Rehman Medical Institute's Ethics Committee. The data acquired was put into Microsoft Excel 2013 and analyzed using pivot tables.

## RESULTS:

A total of 9343 patients were admitted during the 9-year period. There were 6516 (69.7%) males and 2827 (30.3%) females. The male to female ratio was 2.30:1. The ages ranged from 1 year to 99 years. Mean age was 41.32 ± 20.56 years. The highest proportion of admissions was in the 50-59 years age group followed by 60-69 years and

40-49 years.

Different cardiothoracic procedures performed along with gender and age range are shown in Table 1. Coronary Artery Bypass Graft (4617) was the most common procedure performed and accounted for 49.4% of the total procedures performed. This was followed by Mitral Valve Replacement (887) which made up around 9.5% of the total admissions.

Table 2 summarizes the different diagnosis found and the procedures performed among patients presenting to the cardiothoracic surgery ward. Triple vessel coronary artery disease (3458) was the most common diagnosis, accounting for 37% of the total diagnosis. This was followed by Patent Ductus Arteriosus (461) which made up 4.9% of the total diagnosis. The least common cases presented to

**Table 2: Distribution of Cardiac Surgical Procedures across most Common Diagnosis**

Procedure	Diagnosis (N = 6726)	
	Diagnosis for procedure	N (%)
Abdominal Aorta Aneurysm Repair	Abdominal Aortic Aneurysm	5 (0.07)
Aortic Valve Replacement	Aortic Stenosis	168 (2.50)
	Aortic Regurgitation	105 (1.56)
ASD Repair	Atrial Septal Defect I & II	441 (6.56)
AV Fistula Correction	Chronic Renal Failure	25 (0.37)
CABG	Triple Vessel Coronary Artery Disease	3468 (51.6)
	Double Vessel Coronary Artery Disease	344 (5.11)
CABG+AVR (Aortic Valve Replacement)	Triple Vessel Cad/Aortic Stenosis	22 (0.33)
	Single Vessel Cad/Aortic Stenosis	12 (0.18)
CABG+DVR (Double Valve Repair)	Mitral Stenosis	3 (0.04)
	Aortic Stenosis	2 (0.03)
CABG+MVR (Mitral Valve Repair)	Triple Vessel Cad/Mitral Stenosis	7 (0.10)
	Mitral Regurgitation	5 (0.07)
CABG+VSD (Ventricle Septal Defect)	Triple Vessel Cad/VSD	6 (0.09)
	Double Vessel Cad/VSD	4 (0.06)
Cardiac Cyst Excision	Atrial Myxoma	25 (0.37)
Double Valve Repair (DVR)	Mitral Stenosis	83 (1.23)
	Mitral Regurgitation	31 (0.46)
Pulmonary Embolectomy	Pulmonary Embolism/Thromboembolism	3 (0.04)
Exploratory Thoracotomy	Lung Cancer	5 (0.07)
	Emphysema	3 (0.04)
Mitral Valvotomy	Mitral Stenosis	201 (2.99)
Mitral Valve Replacement	Mitral Stenosis	269 (3.99)
	Mitral Regurgitation	112 (1.67)
PDA Ligation	Patent Ductus Arteriosus	461 (6.85)
Pulmonary Artery Banding	Ventricular Septal Defect	47 (0.70)
	Tetralogy Of Fallot	100 (1.49)
Shunt Procedures	Ventricular Septal Defect	12 (0.18)
	Tetralogy Of Fallot	425 (6.32)
VSD Repair	Ventricular Septal Defect	195 (2.90)
Aortic Root Replacement	Aortic Regurgitation	11 (0.16)
	Aortic Root Aneurysm	6 (0.09)
Pericardiectomy	Pericarditis	32 (0.48)
	Pericardial Effusion	6 (0.09)
Coarctation Of Aorta (COA) - Repair	Coarctation Of Aorta	75 (1.12)
Sub Aortic Membrane Resection	Sub Aortic Membrane Stenosis	17 (0.25)

\*CABG = Coronary artery bypass grafting, ASD = atrial septal defect, PDA = Patent ductus arteriosus, VSD = Ventricular septal defect

the ward were emphysema (3), lung cancer (5) and pericardial effusion (6) which accounted for less than 0.5% of the total diagnosis.

## DISCUSSION:

Analyzing patterns of medical admissions in a hospital is important as it highlights the trends in diseases and serves as a basis for guiding research and important policies. Our study reports the frequency and patterns of cardiovascular diseases presenting to the cardiothoracic ward which require surgical intervention. So far, no study in the Khyber Pakhtunkhwa has been done which focuses on analyzing these trends and frequencies.

Our study reports higher frequency of cardiothoracic/ cardiovascular diseases in males and these findings are consistent with other local studies.<sup>12</sup> A study conducted in Karachi to determine the burden of Ischemic Heart Disease (IHD) also found a higher proportion of males suffering from cardiovascular diseases.<sup>13</sup> However, a study done in order to determine the ECG evidence of cardiac ischemia found a higher number of females suffering from IHD.<sup>14</sup> Males are considered to be more at risk for cardiovascular diseases because they are more prone to risk factors such as smoking and alcohol consumption. Yet, the World Health Organization's statistics on the global burden of diseases and related health problems showed increased prevalence among females.<sup>15</sup> Increased prevalence of cardiovascular diseases among women in some parts of the world can be explained by the variability and differences in risk factors. Females have a higher level of physical inactivity and live a more sedentary lifestyle, these behaviors might explain the differences among prevalence of cardiovascular diseases in some parts around the globe.<sup>16</sup> Cultural practices or norms where women aren't allowed to make decisions about their own health and require permission from their guardian may explain why females present less frequently to the hospitals in this country.

The most common diagnosis found in our study was triple vessel coronary artery disease which constitutes IHD. The common surgical procedure performed for this disease is coronary artery bypass graft and this procedure constituted a major portion of all the cardiothoracic surgical procedures performed at the hospital. In our study, coronary artery diseases were most common in the age groups of 50-59 with the mean age being 55.89 years. These findings are consistent with another study.<sup>17</sup>

Tetralogy of Fallot (TOF) made up the major portion of cyanotic congenital heart diseases which required invasive surgical procedures in our study. Patent Ductus Arteriosus (PDA) was the most common acyanotic lesion followed by Atrial Septal Defects (ASD) and Ventricular Septal Defects (VSD). However, other studies done on frequency of

congenital heart diseases found VSD and ASD as the most common acyanotic cardiac abnormality and TOF as the most common cyanotic abnormality among neonates.<sup>18,19</sup>

Among valvular lesions, mitral stenosis was the predominant one followed by aortic stenosis. Mitral regurgitation was also seen in patients with existing valvular lesions but these findings were uncommon. A study was done in a public sector hospital in Peshawar to determine to the most common valvular lesion in Rheumatic Heart Disease also found mitral stenosis to be most common lesion followed by mitral regurgitation.<sup>20</sup> Mitral valve is the most predominant valve affected by rheumatic heart disease as shown by a study done in Nepal.<sup>21</sup>

## Conclusion:

In this study majority of patients presented were male and had triple vessel disease. CABG was the commonest procedure performed at RMI Cardiology Unit, Peshawar. Furthermore, more studies are recommended to analyze the trends in cardiovascular and congenital heart diseases so to devise strategies for targeted interventions more effectively in order to cut down the morbidities and mortalities and to raise the quality of life in such cases.

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