*Original Article*

# COMPARISON OF CARDIOVASCULAR DISEASE PATTERNS IN TWO DATA SETS OF PATIENTS ADMITTED AT A TERTIARY CARE PUBLIC HOSPITAL IN KARACHI FIVE YEARS APART

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## ABSTRACT

*Objective:* To compare the disease patterns in two data sets of patients, five years apart, at the National Institute of Cardiovascular Diseases (NICVD), a tertiary care cardiac hospital in Karachi. The underlying objective was to determine any changes in cardiovascular disease patterns at an acute cardiac unit over a period of five years.

*Methodology:* A retrospective descriptive study was conducted on patients admitted in West Ward, National Institute of Cardiovascular Diseases (NICVD), Karachi in September, 2000 and September, 2005. Patient's record files were reviewed and the relevant information was recorded on a pro forma designed for the purpose.

*Results:* In September, 2000, a total of 414 patients were admitted. Of these 71.25% were males. Majority of patients (72.92%) were in the fifth decade of life or beyond. Acute coronary syndrome (ACS) was the commonest presentation, present in 39.8% of the patients. 27.3% had myocardial infarction (MI) while 10.34% were diagnosed with heart muscle diseases. The overall mortality was 3.4%. In September, 2005, a total of 446 patients were admitted. Of these, 63% were males. 71.29% were in the fifth, sixth, and seventh decades of life. 43.04% patients were admitted with acute coronary syndromes (ACS), 26% with myocardial infarction (MI) and 13.45% with heart muscle diseases. The overall mortality was 1.34%.

*Conclusion:* The almost similar results in two data sets of patients five years apart suggests that the cardiovascular disease burden and pattern has not changed significantly at this center. There is a preponderance of cardiovascular illnesses in males and older age groups. ACS and MI account for majority of admissions.

KEY WORDS: Cardiovascular disease patterns, Tertiary Care Public Hospital.

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## INTRODUCTION

Cardiovascular diseases (CVDs) are an important medical and public health issue throughout the world.[1] This is an even bigger a problem for developing countries like Pakistan which face the dual menace of still prevalent communicable diseases as well as an increasing burden of non-communi-

cable diseases like cardiovascular illnesses.[2] The rise in prevalence of cardiovascular diseases in developing countries is mostly related to demographic changes, urbanization, lifestyle modifications and higher risk factor levels such as obesity, dyslipidemia, diabetes and hypertension.[3] From 1990 to 2020, the rise in mortality due to ischemic heart disease (IHD) in developing countries (137% in men and 120% in women) is predicted to be much higher than that in the developed countries (48% in men and 29% in women).[4] Even these figures are underestimates because they take into account only the changes in population dynamics and do not include the potential increases in risk factor levels.[5,6] It is expected that in the next fifteen years, cardiovascular diseases will become the leading cause of death in developing countries.[1] Exact population based data on the burden and patterns of CVDs in Pakistan is lacking. According to National Health Survey of Pakistan,[7] CVDs result in more than one hundred thousand deaths per year in the country, which is 12% of all- cause mortality. This mortality data alone does not tell the true state of affairs because many more are living with CVD related disabilities.[8] Rheumatic heart disease which has largely been eradicated from the developed world is still prevalent in Pakistan.[9,10] Despite the high occurrence of CVDs in the country, there is a lack of reliable data available about the exact prevalence and incidence of various cardiovascular illnesses separately. We analyzed the patients admitted with CVDs in NICVD, Karachi during one month (September, 2005) and compared this data with that of patients admitted during a month, five years back (September, 2000). Our objective was to determine the disease burden of various cardiovascular illnesses at the major acute cardiac unit in Karachi and to analyze the changes, if any, in the cardiovascular disease patterns over the past five years.

## METHODOLOGY

A retrospective descriptive study was conducted on the patients admitted in the West ward, National Institute of Cardiovascular Diseases (NICVD) in September 2000 and September 2005. Patient's record files were obtained from our archives and reviewed. The information regarding the patient's age, sex, address, date of admission, date of discharge / expiry, duration of stay, primary diagnosis and outcome was collected. The above-mentioned information was recorded on a pro forma, which was specifically designed for the purpose. The pro forma was coded for entry in Statistical Package for Social Sciences (SPSS) Version 13.0 for Windows. All data was entered and checked by the same as well as an additional investigator. Data analysis included simple frequency determination and calculation of P-values using chi - square test.

## RESULTS

Table-I depicts the basic characteristics of study population. Fig-1 compares the number of patients admitted with various CVDs in the two data sets, while Table-II elaborates subcategories within each diagnosis. Table-III summarizes the outcome of patients in two data sets.
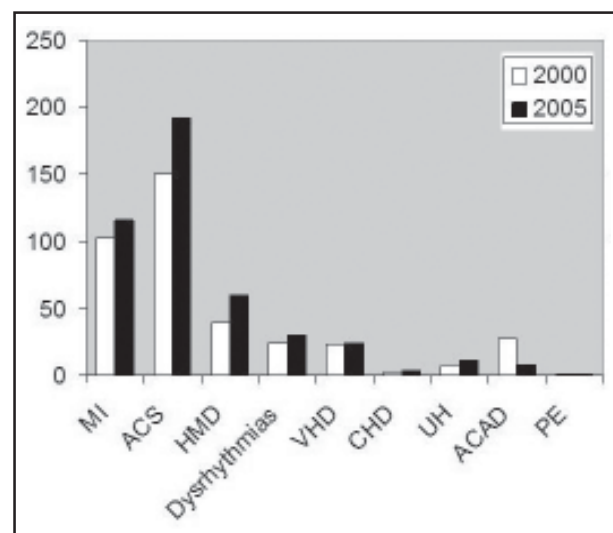


Fig-1: Cardiovascular disease patterns at NICVD, Karachi in September 2000 and September 2005.

Table-I: Characteristics of the study population

| Parameter | Sept 2000 n (%) | Sept 2005 n (%) |
|---|---|---|
| Total | 414 | 446 |
| *Sex* | | |
| Male | 295 (71.3) | 281 (63) |
| Female | 119 (28.7) | 165 (27) |
| *Address* | | |
| From Karachi | 368 (88.8) | 399 (89.5) |
| Outside Karachi | 46 (11.2) | 47 (10.5) |
| *Age distribution* | | |
| < 26 | 21 (5) | 20 (4.5) |
| 26-35 | 26 (6.2) | 18 (4) |
| 36-45 | 79 (19) | 83 (18.6) |
| 46-55 | 109 (26.3) | 132 (29.6) |
| 56-65 | 82 (19.8) | 103 (23.1) |
| 66-75 | 31 (7.5) | 57 (12.8) |
| 75+ | 14 (3.4) | 33 (7.4) |

MI = Myocardial infarction, ACS = Acute coronary syndrome, VHD = Valvular heart disease, CHD = congenital heart disease, UH = Uncontrolled hypertension, ACAD = Angiographic coronary artery disease, PE = Pericardial effusionNote : The numbers on y-axis show the number of patients admitted with a specific condition.

A total of 414 patients were admitted in West ward, NICVD in September 2000. Majority of the patients were males (71.25%). The age distribution analysis showed 12 patients in the second decade (3.31%), while the greatest proportion was of the patients in their sixth decade (29.2%). Three hundred sixty eight patients were from Karachi (90.9%) and 37 were from outside Karachi (9.1%). Out of a total of 414 patients, 103 (27.3%) were admitted with myocardial infarction (MI). Among those who were diagnosed with myocardial infarction, anterior wall MI was the major presentation occurring in 47.5% of the patients, followed by inferior wall MI, which was the major presentation in 39% of the cases. A total of 150 patients (39.8%) were admitted with acute coronary syndromes (ACS), with a great majority (93.3%) having unstable angina (USA). Heart muscle diseases comprised 10.34% of the total data set of 2000, with 22 (56%) presenting with left ventricular failure. Twenty four

(6.4%) patients presented with dysrhythmias. Complete heart block was the major arrhythmia comprising 33.3% of the patients in this category. Bundle branch blocks combined constituted 50% of the arrhythmias, with equal percentages for right and left bundle branch blocks. Twenty three (6.1%) patients came with valvular heart disease.Mixed lesions formed the bulk of these, being the presentation in 13 (56%) patients. Other disorders in this category included mitral stenosis (MS; n = 3, 13%) and mitral regurgitation (MR; n = 3, 13%). 2 (0.5%) patients presented with congenital heart disease, both being diagnosed to have atrial septal defect (ASD). Seven (1.9%) patients were admitted with uncontrolled hypertension. Coronary artery disease was found on an elective procedure (cardiac catheterization) in 27 (6.5%) patients.

A total of 14 patients (3.4%) expired in September 2000, three hundred ninety seven (95.9%) were discharged, and three patients (0.7%) left hospital against medical advice. The expiries were due to anterior wall MI (n=4, 28.6%), acute coronary syndrome (n=3, 21.4%), heart muscle disease (n=2, 14.3%), dysrhythmia (n=2, 14.3%), valvular heart disease (n=2, 14.3%), and angiographic CAD (n=1, 7.1%).

A total of 446 patients were admitted in West ward in September 2005. There were 281 males (63%) and 165 females (37%). The age distribution analysis revealed that the majority of the population fell in the sixth decade (30%). A total of 116 patients (26%) were admitted with myocardial infarction (MI), with 75 (64.6%) presenting with anterior wall MI. A total of 192 patients (43%) were admitted with ACS, with the majority (n=170, 88.5%) with unstable angina. Heart muscle diseases accounted for 60 (13.5%) admissions. Out of these 60 patients, 45 (10.1%) came with left ventricular failure, seven (1.6%) with congestive heart failure, four (0.9%) with cardiomyopathy, and four (0.9%) with cardiogenic shock. Thirty patients (6.7%) were admitted with

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Table-II: Major presentations in September 2000 and September 2005

| Primary Diagnosis | Sept 2000 Cases n (%)* | Sept 2005 Cases n (%)* | P-value |
|---|---|---|---|
| Myocardial Infarction (MI) | 103 (28) | 116 (26) | 0.451 |
| Anterior Wall MI | 49 (47.6) | 75 (64.7) | 0.081 |
| Inferior Wall MI | 40 (38.8) | 31 (26.7) | 0.180 |
| Lateral Wall MI | 3 (2.9) | 1 (0.8) | 0.124 |
| Others | 11 (10.7) | 7 (6) | 0.101 |
| Acute Coronary Syndromes | 150 (39.8) | 192 (43) | 0.342 |
| Unstable Angina | 140 (93.3) | 170 (88.5) | 0.091 |
| NSTEMI | 10 (6.7) | 22 (11.5) | 0.082 |
| Heart Muscle Disease | 39 (10.3) | 60 (13.5) | 0.240 |
| LVF | 22 (56.4) | 45 (75) | 0.062 |
| Cardiomyopathy | 11 (28.2) | 4 (6.7) | 0.051 |
| CHF | 6 (15.8) | 7 (11.6) | 0.090 |
| Cardiogenic shock | 1 (2.6) | 4 (6.7) | 0.100 |
| Dysrhythmias | 24 (6.4) | 30 (6.7) | 0.192 |
| CHB | 8 (33.3) | 10 (33.3) | 0.622 |
| RBBB | 6 (25) | 3 (10) | 0.121 |
| LBBB | 6 (25) | 4 (13.3) | 0.071 |
| Atrial Fibrillation/Flutter | 2 (8.3) | 5 (16.7) | 0.132 |
| Others | 2 (8.3) | 8 (26.7) | 0.099 |
| Valvular Heart Disease | 23 (6.1) | 24 (5.4) | 0.423 |
| Mixed Lesion | 13 (56.5) | 6 (25) | 0.042 |
| MS | 3 (13) | 4 (16.7) | 0.301 |
| MR | 3 (13) | 4 ( 16.7) | 0.232 |
| SBE | 1 (4.3) | 7 (29.1) | 0.001 |
| Others | 3 (13) | 3 (12.5) | 0.452 |
| Congenital Heart Disease | 2 (0.5) | 4 (0.8) | 0.320 |
| Uncontrolled Hypertension | 7 (1.9) | 11 (2.5) | 0.161 |
| Coronary artery disease** | 27 (6.52) | 8 (1.7) | 0.098 |
| Pericardial Effusion | 1 (0.24) | 1 (0.2) | 0.641 |
| Pericarditis | 1 (0.24) | 0 (0) | N/A |

* The parentheses in bold represent a percentage of total** These were diagnosed on an elective cardiac catheterization NSTEMI= Non ST-elevation Myocardial infarction, LVF = Left ventricular failure, CHF = Congestive Heart Failure, CHB = Complete Heart Block, RBBB = Right bundle branch block, LBBB = Left bundle branch block, MS = Mitral Stenosis, MR = Mitral Regurgitation.

dysrhythmias. Complete heart block constituted the majority with 33.3% of the cases. A total of twenty four (5.4%) patients came with valvular heart diseases, among whom four (16.6%) had mitral regurgitation (MR), four (16.6%) had mitral stenosis, while seven (29.2%) patients were diagnosed with subacute bacterial endocarditis (SBE). Other common presentations included uncontrolled hypertension (n=11, 2.5%) and congenital heart disease (n=4, 0.8 %). Coronary artery disease was found in 8 patients (1.7%) who underwent elective cardiac catheterization.

A total of six patients (1.34%) expired in September 2005, 436 (97.75%) were discharged, and four patients (0.89%) left hospital against medical advice. The expiries were due to inferior wall MI (n=2, 33.3%), anterior wall MI (n=2, 33.3%) and congestive heart failure (n=2, 33.3%).

## DISCUSSION

NICVD is an acute cardiac care facility in Karachi. It caters to patients with cardiovascular illnesses not only from Karachi but also receives patients from interior Sindh

Table-III: Outcome of patients admitted in
September 2000 and September 2005

|  | SEPT.2000 | SEPT.2005 |
|---|---|---|
| Outcome |  |  |
| Discharged | 397(95.9%) | 436(97.75%) |
| Expired | 14 (3.4%) | 6 (1.3%) |
| LAMA | 3(0.7%) | 4(0.95%) |

LAMA = Leave against medical advice

and other parts of the country . The results of our study show that the total number of admissions is almost the same in two data sets five years apart. The majority of patients admitted were males, pointing towards a preponderance of cardiovascular illnesses in male gender. It has been established by previous studies that male gender is a risk factor for CVDs.[11,12] But our results also show that cardiovascular disease frequency in females is higher now as compared to five years back. Jafar TH[13] has reported a higher burden of multiple CVD risk factors in women as compared to men in Pakistan. It can thus be envisioned that the burden of CVDs in female gender in Pakistan is on rise, highlighting the need for targeting this segment of Pakistani population in CVD prevention programs emphatically. The higher number of male patients also reflect the fact that males get preference in seeking treatment in our male dominated society.

The age distribution of patients in both data sets is weighed towards older age groups with majority of patients in their 40s, 50s and 60s. The largest proportion of patients was in the sixth decade of life. The social implications of having a cardiovascular illness in an economically active age group (fifth and sixth decade of life) can well be imagined. Acute coronary syndromes (ACS) which includes both unstable angina and NSTEMI accounted for the largest proportion of patient admissions both in September 2000 and September 2005. The majority of patients were males. The age distribution of patients with this condition was weighed towards a younger age group as compared to patients with other cardiovascular events. Shahid M et al[14] have

reported that majority of patients presenting with ACS during their study period were males and belonged to a younger age group. This is in concurrence with our findings. The greater number of patients with ACS now as compared to five years back reflects the increasing incidence of this condition.

Anterior and inferior wall MI were found to be most common in MI patients. The majority of patients were in the fifth and sixth decade of life. Saleheen D et al[15] in their study conducted at AKUH, Karachi have reported the majority of patients (83.9%) with acute MI to be above 45 years of age. This is in agreement with our results. There is a considerable increase in patients presenting with heart muscle diseases over the past five years. The total number of patients with left ventricular failure is 45 in September 2005 as compared to 22 in September 2000. This points towards the increased incidence of this fatal condition in our population.

The patients with dysrhythmias were the ones with the highest mean age i.e. majority of patients were above 55. Almas A et al[16] reported the mean age of the patients with ventricular tachycardia to be 57.06+/-11.84 years. This is consistent with our findings.

Valvular heart disease patients are the ones with lowest mean age. The male to female ratio is weighed more towards female sex. More importantly the total number of patients with valvular heart diseases is almost the same now as compared to five years back and in fact the number of patients with sub acute bacterial endocarditis has increased from one in September 2000 to six in September 2005. Interestingly five out of these six patients were females reflecting the higher preponderance of this condition in females in our country.

Overall there exists a difference in hospital based mortality due to cardiovascular illnesses now as compared to five years back. Fourteen patients died in September 2000 and six patients in September 2005. This difference in mortality may be due to

better management of acute cardiac events available now as compared to five years back.

## CONCLUSION

Our study concludes that cardiovascular disease burden and patterns have not changed significantly at our center over the past five years. Infact the spectrum of incidence of various cardiovascular diseases is on rise underlining the need for effective prevention strategies at public health level. There is a real need of well planned epidemiological surveys to determine the actual incidence of various cardiovascular diseases in our country. It is high time that measures be undertaken to evaluate and deal effectively with this ever growing menace.

*Limitation of the study:* This comparison of CVD disease pattern covers just one month. Ideally the study should have compared at least six months data to give any conclusive evidence.

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