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TRENDS OF CORONARY ARTERY DISEASE IN KHYBER PAKHTUNKHWA, PAKISTAN: A RETROSPECTIVE STUDY

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ABSTRACT

OBJECTIVE: To determine the frequency of new coronary artery disease (CAD) cases during the years 2015, 2016 and 2017 in patients presenting to a cardiology clinic and to look for its current trends in Khyber Pakhtunkhwa (KP), Pakistan.

METHODS: This descriptive study was conducted in a private clinic of interventional cardiologist, based in Lady Reading Hospital, Peshawar, Pakistan from January to March 2018. We retrospectively analyzed the echocardiography data and reviewed clinical records from January 2015 to December 2017 and identified cases of incident CAD based on regional wall motion abnormalities on echo. SPSS V20.0 was used for analysis. We applied the unpaired t-test to look for an increasing trend in CAD between 2015-2016, 2016-2017 and 2015 through 2017.

RESULTS: A total of 3865 patients of incident coronary artery disease were identified from January 2015 to December 2017. The number of incident CAD patients was 998 in 2015, 1362 in 2016 and 1505 in 2017. We applied the unpaired t-test on the number of post myocardial infarction patients for an increasing trend in 2015 vs 2016, 2016 vs 2017 and 2015 vs 2017 which showed a p-value of <0.001, 0.961 and <0.001 respectively.

CONCLUSION: CAD is on the rise in KP over the past 3 years and attention needs to be paid to risk factor control and health education in addition to improvement in the health system to prevent this trend from getting out of control among the population of KP.

KEY WORDS: Coronary Artery Disease (MeSH); Regional wall motion abnormality (Non-MeSH); Echocardiography (MeSH); Myocardial Infarction (MeSH), Khyber Pakhtunkhwa (Non-MeSH); Pakistan (MeSH).

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INTRODUCTION

Ischemic heart disease is a global epidemic and is a major cause of death and disability around the world.[1] Once considered a disease of the developed world, changing world demographics have placed it as a major concern in the developing countries at the turn of the century.[2] Globally, the prevalence of coronary artery disease (CAD) is showing a declining trend in high-income countries due to higher government spending on awareness programs, educational activities, better understanding of disease processes and eventually treatment strategies.[3] Conversely, we have seen a rise in the global burden of CAD in South Asia, Eastern Europe and Southeast Asia.[4] Although the reasons for this rise are complex and multifactorial, we have ample evidence to believe that urban migration, a growing middle class and better income lead to adoption of an unhealthy lifestyle which is leading to a rising number of diabetics, hypertensives and smokers in these countries.[5,6] With a growing trend towards urban migration and a growing middle-class population, it is not surprising that the incidence of CAD is increasing in Pakistan and the situation is said to get worse in the coming decades.

We planned this study to determine frequency of new CAD cases during the years 2015, 2016 and 2017 in patients presenting to a cardiology clinic and to look for its current trends in Khyber Pakhtunkhwa (KP), Pakistan.

METHODS

This retrospective descriptive study conducted from January 2018 to March 2018. We retrosepctively analyzed the clinical records, history and echocardiography data of a private cardiology clinic of an interventional cardiologist based in Lady Reading Hospital, Peshawar, Pakistan from January 2015 to December 2017. While selecting patients who had a new myocardial infarction (MI) retrospectively, we reviewed past records of history, ECG and cardiac enzymes where available (NOT available in all cases). But in all cases, history of recent MI and detailed echo records were present in our computer database. Therefore, we confirmed the history of MI with regional wall motion abnormalities on echo to identify new cases of MI. After a careful evaluation of history, clinical records and echo data, cases of newly diagnosed CAD were identified on the basis of history and regional wall motion abnormalities seen on echo in patients who recently had an MI. Regional wall motion abnormalities (RWMA) on echocardiography were

TABLE I: BASELINE CHARACTERISITICS OF THE STUDY POPULATION

Variable		Year 2015	Year 2016	Year 2017
Age (years)		58.2±11.05	55.7±15.9	66.6±16.4
No. of patients (n)		998	1362	1505
Gender		279 (28%)	476 (35%)	617 (41%)
Dyspnea	NYHA III	169 (17%)	177 (13%)	165 (11%)
	NYHA IV	230 (23%)	490 (36%)	286 (19%)
Chest pain		878 (88%)	1239 (91%)	1339 (89%)
Orthopnea		349 (35%)	531 (39%)	557 (37%)
Paroxysmal Nocturnal Dyspnea		99 (10%)	191 (14%)	466 (31%)

NYHA = New York Heart Association,

TABLE II: ECHOCARDIOGRAPHY PARAMETERS OF THE STUDY POPULATION

Variable		Year 2015 (n: 998)	Year 2016 (n: 1362)	Year 2017 (n: 1505)
LVED (cm)		4.8±1.7	5.1±1.5	5.0±1.1
LVESD (cm)		3.7±0.6	3.1±1.1	2.9±1.6
FS (%)		21.9±5.4	28.1±8.1	30.7±7.7
EF (%)		44.3±9.4	54.3±12.04	58.1±15.7
RWMA	Anterior	439 (44%)	626 (46%)	767 (51%)
	Inferior	79 (8%)	136 (10%)	105 (7%)
	Lateral	229 (23%)	231 (17%)	346 (23%)
	Mixed	249(25%)	367 (27%)	286 (19%)
VSD		20 (2%)	21 (1.6%)	13 (0.9%)

LVED = Left Ventricular End Diastolic Diameter, LVESD = Left Ventricular end systolic diameter, FS = Fractional Shortening, EF = Ejection Fraction, RWMA = Regional Wall Motion Abnormality, VSD = Ventricular Septal Defect.

described as either hypokinesia (reduced endocardial inward movement and systolic wall thickening), akinesia (absence of endocardial inward movement and systolic wall thickening) or dyskinesia (outward wall movement in systole with absent wall thickening). Cases were excluded if they had a previous history of MI at least a year before presenting to the clinic to avoid doubling the same patient in two consecutive years in our eventual analysis. All analysis was done with SPSS V20.0. Continuous and categorical variables were described as mean±SD and frequencies/percentages respectively. We applied the unpaired t test to look for an increasing trend in CAD in 2015 vs 2016, 2016 vs 2017 and 2015 vs 2017.

RESULTS

A total of 3865 patients of incident coronary artery disease were identified from January 2015 to December 2017 with a mean age of 58.2±11.05 in 2015, 55.7±15.9 in 2016 and 66.6±16.4 years in 2017. The number of incident CAD patients was 998 in 2015, 1362 in 2016 and 1505 in 2017 with an increasing trend seen in the female population which rose from 279 (28%) in 2015, 476 (35%) in 2016 to 617 (41%) in 2017. Mean Left Ventricular Ejection Fraction (LVEF) was 44.3±9.4 in 2015, 54.3±12.04 in 2016 and 58.1±15.7 in 2017. The predominant RWMA was seen in anterior region with 44% in 2015, 46% in 2016 and 51% in 2017. VSR was seen in 2% patients in 2015, 1.6% in 2016 and 0.9% in 2017. All baseline characteristics are given in Table I. Echo parameters of included patients are given in Table II. We applied the unpaired t test on the number of new MI patients for an increasing trend between 2015-2016, 2016-2017 and 2015-2017 the p value turned out to be <0.001, 0.961 and <0.001 respectively.

DISCUSSION

In this study, the number of CAD patients was steadily increasing from 2015 (n=998) to 2016 (n=1362) and 2017 (n=1505) in Khyber Pakhtunkhwa province of Pakistan.

In the developed high-income countries, we have seen a decline in CAD mortality in the period since 19807 due to better government spending on risk factor control, educational activities for mass awareness, campaigns on the media, discouraging smoking by heavily taxing the cigarette industry, improvements in medical care and treatment strategies.[7-11] In addition, high-income countries are spending more money on rehabilitation programs for established CAD patients. Conversely, developing countries and countries in the low- to middle-income economic regions including South Asia have experienced a paradigm shift as far as incidence and mortality of CAD is concerned over the past 20 years.[2,3,7,12,13]

Some of the major factors responsible for this trend in South Asia are a lack of health awareness, an adoption of lifestyles that are unhealthy, poor and suboptimal dietary habits, higher prevalence of such factors as DM and hypertension and most importantly, poor health infrastructure in the region.[14-17] Particularly, poor dietary habits such as consumption of high trans-fat diet, lack of whole grains and fruits in daily diet and a poor vegetable intake have been found responsible for worsening CAD trends in Pakistan.[5] Pakistan also has the highest proportion of outdoor air pollution, particularly in urban regions in whole of South Asia.[18]

In our study, we found that the incidence of CAD was on the rise in Khyber Pakhtunkhwa province of Pakistan from 2015 through 2017. Unsurprisingly, we also noted a rising trend of CAD among women of Khyber Pakhtunkhwa Pakistan with 28% in 2015, 35% in 2016 and 41% in 2017. Whether this was because of a decreasing trend in males is not clear. However, even if we analyze the absolute numbers, there is an increase in the number of female patients presenting with new CAD.

We believe it must have been due to a rising trend in females because global investigators have reported a rising trend of CAD in the female population.[3,6] Some novel risk factors have been shown to be responsible for this rise in addition to the traditional risk

factors. Jibran MS, et al. reported a positive correlation between NAFLD and incident CAD in our population.[19]

The population of Khyber Pakhtunkhwa has increased from 2015 to 2017. Indeed, this could influence the incidence of CAD in our population. But, we did not take the increase in population into account because it was not a study on the "incidence" of CAD. Our study shows an increasing trend in CAD over the years. Therefore, our data only shows an increasing trend. It is not obvious whether this trend was because of an increase in population of the province or any other demographic variable, which needs to be determined in large scale epidemiological studies. In light of this evidence, we need more government spending and attention for mass awareness, promotion of positive lifestyle, promotion of risk factor control and eventually rehabilitation of CAD patients before it's too late.

CONCLUSION

Coronary artery disease is on the rise in Khyber Pakhtunkhwa, Pakistan over the past three years and attention needs to be paid to risk factor control and health education in addition to improvement in the health system to prevent this trend from getting out of control among the population of KP, Pakistan.

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AUTHORS' CONTRIBUTIONS

Following authors have made substantial contributions to the manuscript as under:

SBK & SAH: Conception and study design, drafting the manuscript, critical review, final approval of the version to be published

MSJ & IA: Acquisition, analysis and interpretation of data, drafting the manuscript, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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