Epidemlogical Assessment and Frequency of Cardiovascular Disease in Peshawar KP,

Pakistan, A Cross-Sectional study

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Abstract

Cardiovascular diseases (CVDs) are the leading cause of sudden death. CVDs are a major health problem in Pakistan, and the number of patients is increasing daily. The aim and purpose of the present study was to measure the frequency of CVDs and some of the risk factors and to familiarize people with information on the high rates of mortality and morbidity due to CVDs in the studied areas of Peshawar Kp, Pakistan. This Cross-sectional study was conducted to investigate the prevalence of cardiovascular diseases in the local population of Peshawar Kp, Pakistan. A total of 6351 individuals were contacted to collect data using a questionnaire from

October 2016 to September 2017.Result of this research show that 51.2% (3256/6351) Participant were male and 49.8% (3124/6351) female. The Research result showed that 17.5% (1109/6351) of the population had CVDs with 16.6% (519/3256) being male and 18.3% (590/3124) female. This study concluded that CVDs are a serious problem for both genders and affected 17.5% of the studied population. Diseases are more common in females than males with young age of onset. An inactive lifestyle, low level of activity and family history of disease could be disease risk factors in the study area.

**Keywords:** Cardiovascular disease. Cohort study. Onset age. Peshawar. Kp. Pakistan

Introduction.

A disease related to the circulatory system in humans is known as a cardio vascular disease (CVD). CVDs are a major health problem in Pakistan, and the number of patients is increasing daily. CVDs caused about 16.7 million deaths in 2000 and 17 million in 2008,with more casualties in females (Rosamondetal.2008; WHO2011).This disease causes25% of the total deaths in developed and 80% in middle and low income countries (Yarmohammadian et al. 2012). CVDalso causes 85% of the global disabilities (Alwan et al. 2011). In the USA, 250,000 women die from CVDs annually (Hosseini et al. 2011). On the Asian subcontinent, people are highly susceptible to CADs, which cause many deaths (Joshi et al. 2007). Females are at higher risk of CVDs than males in developing countries (Mosca et al.2011). The risk factors associated with CVD are smoking, poor diet, high blood cholesterol levels, obesity, in sufficient physical activity, physio social stress, diabetes and ethnicity (Finucane et al. 2011; Mosca et al. 2011; Ueshima et al. 2008).In Asian women, high cholesterol levels and increased systolic blood pressure cause CVDs (Barzietal.2007).Due to westernized life styles, the number of young CVD patients is increasing daily in Iran. There are various differences in the mortality and morbidity rates according to gender, age, socioeconomic status, geographical location and ethnicity. The mortality rate due to CVDs is higher at younger ages. Its prevalence is higher in Socio economically poor compared with wealthy areas (Yusuf et al. 2001). Immigrants in developing countries also have a higher risk of CVDs (Joshi et al. 2007). The risk of cardiovascular death was estimated among five immigrant groups and ethnic Norwegians. These groups were from Vietnam, Iran, Turkey, Sri Lanka and Pakistan. Except for the subjects from Vietnam, all other groups had a higher risk of cardiovascular death (Kumar et al. 2009). In the US, about 84 million adults experience CVDs and 33% of deaths result from heart diseases (Golomb et al. 2006). Sweating, dizziness, irregular heartbeat, shortness of breath, nausea and weakness are symptoms of CVD. Diagnosis can be made by physical examination, blood tests, echocardiography, computed tomography scan and angiography. Some of these CVDs are coronary artery dis- ease (CAD), congenital heart defects (CHD), cardiomyopathy (CMP) and myocardial infarction(MI). Coronary artery disease (CAD) is caused by smoking, high levels of hypertension and increased cholesterol levels. The risk of CAD increases at older ages. Globally, CAD causes mortality in both genders (Umbachand Weinberg 1997). It is the Primary cause of mortality and morbidity. Males are at greater risk. However, females are vulnerable after menopause. Other

causative factors are high stress levels, obesity, unhealthy diet and insufficient physical activity. Angina is the most common symptom with heart pain, and the patient feels discomfort. Pain may also be in the back, shoulder, jaw or neck. In the pathogenesis of coronary atherosclerosis, genetic factors play an important role (Umbachand Weinberg 1997). Changes in lifestyle, regular physical activities, quitting tobacco smoking management of stress and healthy diet can decrease the risk of CAD. Nitroglycerin, calcium channel blockers and beta blockers can be used as drugs. Aspirin is also used for the treatment of CAD (Jack 1997) and can cause a 25% reduction in death according to the Antithrombotic Trialist Collaboration's metaanalysis. However, its effects are not equal in all patients. Angioplasty or a coronary artery bypass graft can also be suggested by the doctor depending on the disease severity and symptoms (WHO2008).Worldwide, the burden of congenital heart defects(CHD) is estimated to be 3–7% births with defects (Park 2005). About 8–10 cases per 1000 live births were diagnosed with structural abnormalities of the heart (Kaemmerer and Hess 2005). The occurrences of live births with CHD in China, Bangladesh and Atlanta were 8.2/1000, 25/1000 and 8.1/ 1000, respectively (Yangetal.2009).Few studies reflecting the presentation of CHD are available in Pakistan, where about 40,000 children are born with CHD annually (Farooqui et al. 2010). In Karachi, 4 per 1000 live births in hospitals were affected by CHD. CADs also have a significant relationship with cerebrovascular disease and peripheral arterial disease (PAD), and PAD increases the risk of both (Golomb et al. 2006). The prevalence of PAD is 6–18% in subjects over the age of 55 years in European populations (Diehm et al. 2004). Among adults, its prevalence is 12% (Federman et al. 2004). However, the prevalence increases to 20% in people aged above 70 years (Regensteiner and Hiatt 2002). In 2010, 200 million people were affected by PAD, and 70 % of them belonged to middle-income countries (Fowkes et al.2013). In Pakistan, cardiomyopathy (CMP) is the most common form of CVD (Ahmadetal.2005;Khanetal.2009).CMP is also frequently found in our country. The prevalence of CMP in the USA population is 0.2%, around 1per 4000, showing its wide spread incidence as a genetic disease. In other countries such as Haiti, its occurrence is 1 per 300 and in South Africa 1 per 1000 people (Maron et al. 2004; Morita et al. 2005; Sliwa et al. 2006). Myocardial infarction (MI)is also a leading cause of death. It occurs more often with increasing age.Its prevalence is10% among people older than 75 years (Collins et al. 2005). In Pakistan, the incidence of MI is 19/1000 among females and 192/1000 in males (Samad et al. 1996). Patients with MI, ranging from 63% to 79% in different studies, have smoking as a common factor (Joshietal.2007).In the Pakistani population, the occurrence of stroke is 250 per 100,000,and this number will increase annually (Khatri and Wasay2011).Younger females are affected more than males (Hashmietal.2013).In Pakistan and Afghanistan, its frequency is 4.8% among 45 year olds (Jafar2006).In SriLanka, the incidence Of stroke is 9per 1000 population (Gunaratneetal. 2009), and in Bangladesh, the frequency of stroke is high among those aged 75 years (Mohammad2014). Previously, no absolute data were available on the prevalence of CVD in Pakistan (Jafaretal.2007)

.The purpose of the present study was to measure the frequency of CVDs and some of the risk factors and to familiarize people with information on the high rates of mortality and morbidity due to CVDs in the study areas in Peshawar Kp,Pakistan.
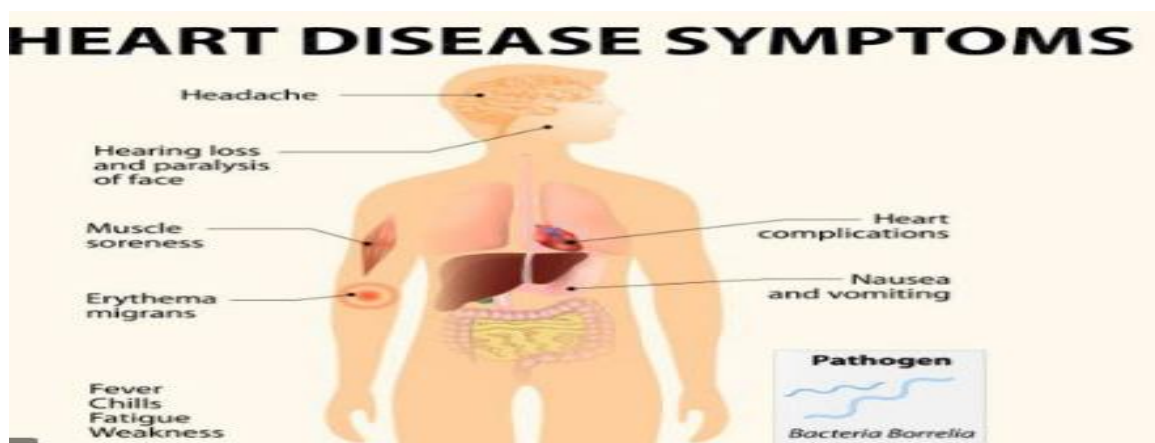
Symptoms and Sign of Heart Disease

Materials and Methods

Sample collection

The study protocol was approved by the Board of Advance Studies and Research, Hazara University Mansehra Kp Pakistan. An observational and cross-sectional study on CVD and its types was conducted in Peshawar Kp, Pakistan; from October 2016 to September 2017 a standard questionnaire was used for collectionof data regarding the objectives of the study. Patients of all age groups diagnosed with heart problems were included in the survey. Clinical data and family histories of all the patients were also studied.

Map of District Peshawar

Selection criteria of the study

Individual of all age groups were included in this study. Deceased individuals were excluded. Healthy family members were also included. People with other diseases than cardiovascular disease were also included.

Statistical analysis

For the statistical analysis, SPSS® software version 20 was used for non-parametric tests. The data were analyzed using ANOVA, the chi-square test and t test. Thefrequency of diseased persons in the total sample population, frequency of diseases in both genders, age of onset of the disease, frequency of treated and non-treated persons and gender-wise distribution of the disease were calculated using this software.

Results

A total of 6351 participants were contacted consisting of 3256(51.2%) male 3124 (49.8%) female individuals. From the total survey population, 1109 (16.5%) subjects were CVD patients including 519 male and 590 female patients.Most patients were from rural areas and had a family history of CVD diseases which show in (Figs. 1 and 2).

Total CVD patients

16%

84%

Fig. 1 Total CVD patients and their gender-baseddistributionin urban and ruralareas
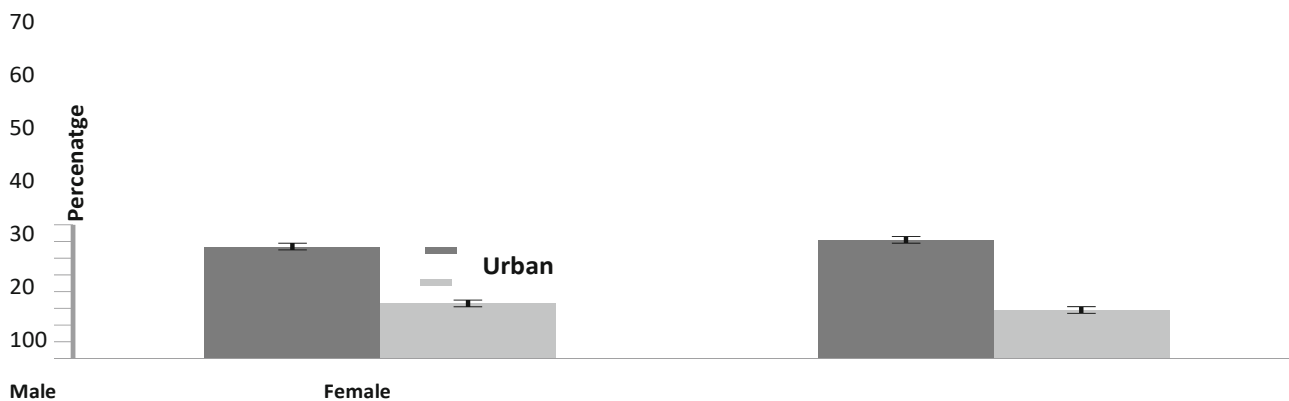

Fig 2. Gender based Distribution

It was noted that 72.9% of males and 79% of females developed the disease because of genetic predisposition, while 27.02% of males and 20.99% of females had CVD without any family history. Most female patients were housewives, unemployed and pensioners, while most males were pensioners, farm workers, trained employs and self- employed (Table 1).

Table1 G e n d e r -based distribution of occupations among CVD patients

Job status	Male frequency (%)	Femalefrequency(%)
Housewife	0	331 (56.10)
Pensioner	307 (59.15)	86 (14.5)
Unemployed	23 (4.43)	101 (17.11)
Farm work	83 (15.99)	33 (5.59)
Trained employee	62 (11.9)	21 (3.55)
Self-employed	38 (7.32)	15 (2.54)
Civil servant studying	05 (0.96)	0
Do not know	0	3 (0.50)
Total	519	590

Only few respondents exercised, and most admitted having no or very little activity (Table2).

Table 2 Exercise status among CVD patients

Exercise status	Male frequency (%)	Femalefrequency(%)
No activity	220 (42.38)	375 (63.56)
Little activity	125 (24.08)	120 (20.33)
Daily morning walk	76 (14.6)	55 (9.32)
Daily extensive exercise	64 (12.33)	25 (4.23)
Gym	34 (6.55)	15 (2.54)
Total	519	590

The onset age was 37.38 years in males and 35.89 years in females. There was a significant difference between the groups according to onset age ($p = 0.03$). The results show that younger females are also at risk of CVDs(Table3).

Table 3 Onset Age in Group by Gender

Gender	Mean (years)	SD
No activity	220 (42.38)	375 (63.56)
Little activity	125 (24.08)	120 (20.33)

T test was used for the comparison of onset age and age between groups.

Tables 4 and 5 present the frequency of different CVDs in both genders. In male patients, two single diseases were more prevalent. Of the male CVD patients, 193 (6.2%) commonly had hypertension, and 118 (3.8%) had suffered heart attacks. The other diseases occurred less frequently. Female patients also had the highest prevalence of HTN [318 (9.9%)] along with the heart attacks. Like in male patients, the frequency of other single CVDs was also less frequent. For combined complications, hypertension + diabetes mellitus showed the highest prevalence in both genders with 68 (2.2%) males and 93 (2.9%) females.

Table4. Frequency of patients with a single CVD in both genders

Serial no.	Cardiovasculardiseases	Male frequency (%)	Femalefrequency(%)
1	Atrial fibrillation(AF)	2 (0.1)	2 (0.1)
2	Angina	3 (0.1)	6 (0.2)
3	Aortic scleroma(AS)	3 (0.1)	4 (0.1)
4	Aortic valve stenosis(AVS)	2 (0.1)	3 (0.1)
5	Coronary artery disease (CAD)	16 (0.5)	11 (0.3)
6	Complete heart block(CHB)	2 (0.1)	0
7	Dilated cardiomyopathy (DCMP)	3(0.1)	3 (0.1)
8	Heart Attack	118(3.8)	74(2.3)
9	Hypertension(HTN)	193(6.2)	318(9.9)

Other diseases such as angina + hypertension occurred in seven (0.2%) males and two (0.1%) females. The prevalence of coronary artery disease + hypertension was 4 (0.1%) in both genders. The other disease combinations are presented in Table 5. It was further observed that cardiovascular attack (CVA)/stroke + diabetes mellitus and dilated cardio- myopathy + left ventricular failure were found in females but not in males; complete heart block (CHB), diabetes mellitus and dilated cardiomyopathy + hypertension dis- eases were found in males but not in females

Table5.Frequency of patients with more than one CVD complication in both genders

Serial no.	Cardiovascular diseases	Male frequency (%)	Female frequency (%)
1	Angina + hypertension	7 (0.2)	2 (0.1)
2	Coronary artery disease + hypertension	4 (0.1)	4 (0.1)
3	Coronary artery disease + ischemic heart disease (IHD) + diabetes Miletus (DM)	3 (0.1)	0
4	Cardiomyopathy +leftventricular Failure(LVF)	1	1
5	Cardiovascular attack (CVA)/stroke +	0	2
6	diabetes mellitus Dilated cardiomyopathy + hypertension	1	0
7	Dilated cardiomyopathy + left ventricular failure	0	1
8	Heart attack + diabetesmellitus	42 (1.3)	17
9	Heart attack +hypertension	33 (1.1)	37
10	Hypertension + diabetesmellitus	68 (2.2)	93
11	Hypertension+diabetesmellitus+ heart attack	9 (0.3)	11
12	Hypertension + left ventricularfailure + diabetesmellitus	1	1

Discussion

CVDs are non-communicable diseases of the circulatory system. The prevalence of any CVD disease causes morbidityandmortalityworldwide.CVDscausedabout16.7 million deaths in 2000 and 17 million deaths in 2008 (WHO 2005). The present study investigated the occurrence of CVDs in the local population of Punjab, Pakistan, including 6351 individuals in the survey (3224 females, 3127 males). Of 6351 participants, 5242 were healthy and the Remaining 17.5% were CVD patients. The prevalence of CVD was higher in females (18.30%) than males (16.60%). Similar prevalence was recorded by Rosamond et al. (2008) in a report presented by the American Heart Association and Statistics Committee. Categories based on the age of onset of diseases were also analyzed in this study, showing that people above the age of 40 years were more susceptible to diseases (Fig. 3).

It was also noted that the age of onset of disease also correlates with an increased risk of other related Pathologies. According to the present study, the mean age of onset of disease among males (37.38 ± 16.91) was higher than among females (35.89 ± 16.764). It was also found that these females were more vulnerable to disease at an earlier age. On the basis of the treatment history, the present study revealed that out of the total population, 78% were being treated but 22% were not. The chances of CVD increase in the presence of risk factors such as diabetes, smoking, high blood pressure, high body mass index, stress, high cholesterol levels, poor nutrition and insufficient physical activity (Ueshima et al. 2008). In the present study, most of the patients demonstrated no or very little activity, whichproved that insufficient activity could also be the cause of their CVDs. In the present study, the prevalence of hypertension (HTN) was highest in both genders. This confirmed that HTN was the major risk factor in the studied population. This disease was also recorded in combination with other diseases such as angina, coronary artery disease, dilated cardiomyopathy, heart attack, diabetes mellitus and left ventricular failure (Table 5). Franklin and Wong (2013) discovered the relationship between hypertension and cardiovascular disease. They stated that hypertension is the main cause of cardiovascular disease and progresses with age, and it could be the leading cause of death globally. Coronary artery disease (CAD) was observed in 16 (0.5%) males and 11 (0.3%) females. Angina was noticed in nine (0.1%) in both genders. The combination of coronary artery disease (CAD) and HTN was frequent in eight (0.1%). It was confirmedthat CAD was more prevalent in patients with HTN. A study from Iran showed a 37% prevalence of HTN among CAD patients (Foroughiet al., 2014).Aortic scleroma was noted in seven (0.1%). The combination of IHD and diabetes mellitus (DM) in coronary artery disease was found in three (0.1%) males. About 59 (0.9%) of patients were identified with heart attack + diabetes mellitus. In southern Pakistan, HTN was prevalent, occurring in 74.55% of the IHD patients (Hussain et al. 2014). Dilated cardiomyopathy (DCMP) was found insix (0.1%) patients. Previously, the prevalence of DCMP in Peshawar was 10.10% (Khan etal., 2009). Of the total subjects, five (0.1%) individuals exhibited symptoms of aortic valve stenosis in this study. Left ventricular failure (LVF) with HTN and diabetes mellitus was found in two (0.1%) individuals. LVF was diagnosed in 24 of 141 patients at Lady Reading Hospital, Peshawar, in a study by Gul et al. (2014). The frequency of AF in Karachi was Documented as 245 cases out of 3766 (Haq and Lip 2009). AF was also observed in 63 patients out of 141 in Peshawar (Gul et al. 2014). About 125 people out of 2000 were also documented with IHD in Islamabad (Abbas et al.2009).

Conclusion

In conclusion, CVDs are the main cardiac problem among people in Peshawar Kp, Pakistan, which 16.5% of the studied population. The survey also revealed other associated CVD diseases. In active lifestyle, in adequate activity and family history of disease could be risk factors of diseases. Affected The prevalence of CVDs was more common

in females than males in the studied area. The onset age of CVDs was lower in females in the studied area. The way forward from these findings is to investigate the reasons for the high susceptibility to CAD in an extended study using modern research techniques. This research establishes a baseline study for future survey projects in this area.

Conflict of interest

All authors declare that they have no conflict of interest

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