# FREQUENCY OF RISK FACTORS OF CORONARY ARTERY DISEASE IN TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objectives:** To determine the frequency of risk factors of coronary artery disease (CAD) in cardiology department, Lady Reading Hospital (LRH) Peshawar.

**Materials and Methods:** In this hospital based descriptive study, patients admitted to cardiology department of Lady Reading Hospital Peshawar with established diagnosis of coronary artery disease (CAD) were included from July 2009 to September 2009. Patients were interviewed according to a pre-designed questionnaire. BMI (Body Mass Index) and blood pressure of the patients were obtained on examination. Diabetic state, blood pressure and smoking history of patients were also recorded.

**Results:** A total of 100 patients of CAD were included. Out of 100 patients, 56 (56%) were males and 44 (44%) were females. The range was from 20 to 90 years with mean age of 61.08 + 13.13 years. Risk factors distribution was: hypertension (49%), diabetes (33%), obesity (24%) and smokers (22%). Hypertension (Males: 55.10%, Females: 44.89%) and smoking (Males: 100%, Females: 0%) were more common in males while diabetes (Males: 42.42%, Females: 57.57%) and obesity (Males: 25%, Females: 75%) were common in females.

**Conclusion:** Hypertension, diabetes, obesity and smoking are major predisposing risk factors of coronary artery disease in patients presenting with CAD at cardiology department, Lady Reading Hospital (LRH) Peshawar.

**Keywords:** Risk Factors, Hypertension, Diabetes, Smoking, Obesity, BMI, Coronary artery disease.

## INTRODUCTION

Coronary artery disease (CAD) is the most common manifestation of cardiovascular disease. Although the prognosis of patients with CAD has been greatly improved by advances in cardiovascular treatment, it is still the first cause of death and the World Health Organization (WHO) predicts it will remain as such for the next 20 years.[1]

CAD occurs to some degree as a natural result of aging, but the innermost layer of the artery incurs damage linked to certain risk factors, such as smoking, high blood pressure, diabetes, high blood levels of cholesterol, obesity, and other factors including sex, ethnic background and family history of CAD. The coronary arteries harden and shrink and this leads to a diminished blood flow and reduces oxygen supply to the heart muscle (ischemia). This lack of oxygen supply to the heart muscle may cause angina (heart pain). If the coronary artery becomes completely blocked, a whole section of the heart muscle is deprived of oxygen and dies, resulting in a myocardial infarction (MI) or heart attack. The key problem however, is that CAD is a progressive and silent disease which still very often goes unobserved until the first symptoms of ischemia or MI occur.[2]

Cardiovascular disease (CVD) is considered to be leading cause of death in the world, accounting for 30% of deaths globally. The estimated number of deaths due to CVD worldwide was 17.5 million in 2005 and by 2015 it will become 20million.[3]

Cardiovascular disease is usually considered to be the curse of wealthy countries. Recently World health report, highlighted the increasing importance of cardiovascular disease in developing countries[4].

With increasing urbanization and adoption of a "western" lifestyle contributed to the rising burden of cardiovascular disease (CVD) in the developing world.[5,7] One of the many reasons the disease got worse in developing countries are poor resources, low literacy rates as well as lack of awareness of disease symptoms[8]. As a result there is an increase in the rates of hospital admissions and mortality from CVD at an early age[9,11] which ultimately blow up the disability adjusted life year (DALYs).[9,12]

South Asians are reported to have one of the highest rates of coronary heart disease (CHD). This trend has been seen in South Asian immigrants as well as in those residing in their native countries,[13,14] which is higher than Chinese and European descent.[15]

The South Asian countries of India, Pakistan, Bangladesh, Sri Lanka, and Nepal make about a quarter of the world's population and this region has highest rate of the cardiovascular diseases compared with any other region globally,[16,17] and is therefore the leading cause of death in the Indo-Pak subcontinent.[18,19]

Pakistan, a developing nation, has a population of over 130 million.[20] According to the National Health

Survey of Pakistan (NHSP), mortality increases due to CHD. The overall prevalence of hypertension was 17.9 %, with a higher rate for the urban population i.e. 21.9 %. Diabetes was recorded 10.6 %. Furthermore, only 25 % of hypertensive and 36% of diabetics were aware of their condition. The highest incidence of diabetes was among urban women aged 45–64 years at 18 %. Forty per cent of the same group was also found to be overweight. 12.6 % of the overall population and 24 % of urban males were suffering from high cholesterol while 29 % of men were smokers.[21]

The available knowledge is insufficient and inadequate, for the population, which limits the assessment of the true magnitude of the issue. This leads to an inability to debate and appropriately assess the priorities in illness prevention and health promotion on the basis of NHSP knowledge. It is essential to understand that appropriate knowledge of particular CVD risk factors and risk behaviors, will help in guiding policy owner making for their effective control in the community.

## METHODS AND MATERIALS

This hospital based descriptive study was conducted in cardiology department, Postgraduate Medical Institute, Government Lady Reading Hospital Peshawar, from July-2009 to September-2009.

Inclusion criteria: Inclusion criteria were all the patients, irrespective of age and sex, with established diagnosis of coronary artery disease.

Exclusion criteria: were all patient with diseases like hypertension, diabetes, obesity and smokers who had not yet developed coronary artery disease. A total of 100 patients, 44 (44%) females and 56 (56%) males, age ranging from 21 to 90 years with mean age of 61.08 + 13.13 years were selected.

### DATA COLLECTION PROCEDURE

A questionnaire was designed in accordance with the objectives of the study. A detailed history of patients was taken. History of hypertension, diabetes, and smoking was recorded from patients. The Diabetic and smoking conditions of the patients were confirmed from the patient chart and BMI of the patients were calculated by using formula Weight in Kilograms/ Height in Meter Square. Height and weight measurements were taken using standard procedures. Weight was measured using a portable scale that was repeatedly calibrated against a balance beam scale. Body mass index (BMI) was then calculated. Blood pressure was measured using a mercury manometer. An average of two readings 5 minutes apart was recorded. Risk factors were defined according to the international definitions. Table1.

## RESULTS

A total of 100 patients of Coronary Artery Disease (CAD) were selected and risk factors of Hypertension, Diabetes Mellitus, Smoking and Obesity were recorded.

The age range of patients was from 20—90 years with mean age of 61.08 $\pm$ 13.13 years. Coronary artery disease (CAD) was found to be more common in males ranging from 51—60 years in age.

The patients reporting to our study has the following distribution of the corresponding risk factors as; hypertension in 49(49%), diabetes in 33 (33%), smokers 22 (22%) and Obesity in 24 (24%). Table 2 shows the distribution of socio-demographic characteristics among the study subjects.

Prevalence of CVD risk factors and behaviors on history and examination are presented in Tables 3 and 4.

Out of 100 patients the majority were males 56 (56%). The high frequency of hypertension 27 (55.10%) and smoking 22 (100%) were in males. While the frequency of diabetes 19 (57.57%), hypertension + diabetes 12(70.58%) and obesity 18 (75%) were high in females Table 5.

## TABLE # 1 CRITERIA FOR RISK FACTORS USED IN STUDY

| Variable | Definition |
|---|---|
| Hypertension[22] (JNC VI classification) | A systolic blood pressure of ≥140 mm Hg and/or a diastolic Blood pressure ≥ 90 mm Hg on examination. |
| BMI[23] BMI weight (kg)/height (m2) | In accordance with the WHO expert consultation on appropriate BMI for Asian population, patients with BMI ≤ 24.9 kg/m2 were classified into the "non-obese" group, while those with BMI ≥ 25 kg/m2 into "obese" group. |
| Smoking[24] Current regular smoker | Smoke one or more cigarette per day, everyday |
| Ex-smoker | Does not smoke at the present but has smoked daily in the past |
| Never smoked | Does not smoke at present time and never smoked in the past |
| Diabetes mellitus[25] | Two fasting plasma glucose levels of ≥126 mg/dL (≥7.0 mmol/L) or patients on oral hypoglycemic drugs and/or taking insulin |

BMI = body mass index

**TABLE 2 DISTRIBUTION OF SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG STUDY SUBJECTS.**

| VARIABLES | n | % |
|---|---|---|
| AGE RANGE | | |
| 21—30 | 02 | 02 |
| 31—40 | 04 | 04 |
| 41—50 | 17 | 17 |
| 51—60 | 29 | 29 |
| 61—70 | 27 | 27 |
| 71—80 | 15 | 15 |
| 81—90 | 06 | 06 |
| GENDER | | |
| Male | 56 | 56 |
| Female | 44 | 44 |
| EDUCATION | | |
| Illiterate | 81 | 81 |
| Primary or less* | 06 | 06 |
| Some secondary† | 11 | 11 |
| Intermediate‡ 151 13.2 | 1 | 1 |
| Graduation/post-graduation§ | 1 | 1 |
| OCCUPATION | | |
| Farmer | 12 | 12 |
| Unemployed | 03 | 03 |
| Business | 09 | 09 |
| Labour | 16 | 16 |
| House Wife | 44 | 44 |
| Driver | 02 | 02 |
| Government Servant | 14 | 14 |

*_Six years of formal education.
†Seven to 10 years of formal education.
‡12 years of formal education.
§_14 years of formal education

**TABLE 3 PREVALENCE OF RISK VARIABLES AMONG THE STUDY SUBJECTS (ON QUESTIONNAIRE)**

| Variables | n | (%) |
|---|---|---|
| Hypertension | | |
| Yes | 42 | (42) |
| No | 58 | (58) |
| Diabetes | | |
| Yes | 33 | (33) |
| No | 67 | (67) |
| Smoking | | |
| Yes | 22 | (22) |
| No | 88 | (88) |

**TABLE 4 PREVALENCE OF RISK VARIABLES AMONG THE STUDY SUBJECTS (ON EXAMINATION)**

| Variables | n | (%) |
|---|---|---|
| Hypertension | | |
| Yes | 49 | (49) |
| No | 51 | (51) |
| **BMI** | | |
| <25 | 51 | (51) |
| 25-29.9 | 25 | (25) |
| 30-34.9 | 14 | (14) |
| 35-39.9 | 8 | (8) |
| $\geq$40 | 2 | (2) |

*Body mass index.

**Table 5 Distribution of Risk Factors on Gender Basis**

| Gender | No of Patients | Hypertension | Diabetic | Hypertension +Diabetic | Smoker | Obese |
|---|---|---|---|---|---|---|
| Males | 56  (56%) | 27 (55.10%) | 14 (42.42%) | 5 (29.41%) | 22 (100%) | 6 (25%) |
| Females | 44  (44%) | 22 (44.89%) | 19 (57.57%) | 12 (70.58%) | 0 | 18 (75%) |
| Total | 100 | 49 | 33 | 17 | 22 | 24 |

## DISCUSSION

Extensive clinical and epidemiological studies have identified several factors that increase the risk of CVD. Some of these factors cannot be modified and are called non modifiable risk factors, like age, male sex, relatives' history of CAD, and Asian ethnicity. While the modifiable risk factors are diabetes mellitus, hypertension, hypercholesterolemia, Obesity, smoking, physical inactivity and high fat diet. The inter heart study highlighted the importance of treating the corset of risk factors (hypertension, diabetes hypercholesterolemia, tobacco use, and obesity).[32]

In our study the majority patients were males (56%) thus our result were consistent with the result of Kazim S F[26] that exposed that (71.25%) male patients had admitted at a Tertiary Care Public Hospital in Karachi. It has been established by earlier studies that male gender is a risk factor for CVDs[27,28]. But in the study by Khan H et al[29] in the same hospital showed that the majority were females (55.84%). In the study of Jafary M H.[30] Hafeez S et al[36] and Noeman A et al[31] the males preponderance was (68%) ,(78%) and (81.9%) respectively similar to our study.

In our study we demonstrated that (49%) patients had hypertension as in the study by Jafary M H et al [30] hypertension (55.2%). In other local studies by Khan H et al [29] hypertension (59.16%) and Fawad A et al [37] hypertension (34%) was found to be a major risk factor. The study by Noeman A et al[31] hypertension (51.4%) also showed similar results. In this study Hypertension was more common in males (55.10%) While in Khan H et al[29] study it was more common in

females (59.25%) in contrast to our study. In another study by Mahmood-ul-Hassan et al[38] hypertension was (38%) of total population in which majority were females (Females: 41.1%, Males: 32.8%) also different from our study. The study completed by Iqbal S P[34] showed that (19%) had hypertension majority of them (Males: 70%, Females: 30%) were males similar to our study.

In our study overall diabetics patients were (33%) and was found to be the second most common risk factor for coronary artery disease majority of them were females (57.57%) which is similar to Khan H et al[29] study in which diabetes (32.59%) was also greater in females (53.6 %). In studies completed by Iqbal S P et al[34], Noeman A et al[31] and Mahmood-ul-Hassan et al[38] diabetes was seen in (15%), (7.14%) and (8.1%) cases respectively more common in females.

Obesity (24%) was the third important risk factor in our study. In another study by Iqbal S P et al[34], Ali J et al[32] and Mahmood-ul-Hassan et al [38] the CAD patients had high obesity (24%), (47.07%0 and (64.3%) respectively which is consistent to our study. The Durban Study showed the prevalence of obesity as (3.7%) and (22.6%) was in males and females respectively. Rates of (8.3%) for males and (35.7%) for females have also been reported from Nigeria. The Tanzanian adolescent study reported that (0.4%) of men and (4.6%) of females were found to be obese[39] which is similar to our study in which (75%) of females were found to be obese.

Cigarette smoking is also a significant risk factor for CVD[33]. In our study (22) out of (100) patients were smokers and all were males. In Khan H et al[29] and Iqbal S P et al[34] the smoking was (14.02%) and (21%)

respectively and was in males which is similar to our study. In contrast to our study Noeman A et al[31], Safdar M H K et al[40] and Hafeez S et al[36] showed that smoking (63.04%), ( 64.2%) and (46%) respectively was the major risk factor in their studies and present more in males.

## CONCLUSION

Hypertension, diabetes, obesity and smoking are major predisposing risk factors of coronary artery disease in patients presenting with CAD at cardiology department, Lady Reading Hospital (LRH) Peshawar. Modification of risk factors has a beneficial effect on subsequent mortality and morbidity, include control of hypertension, glycemic control in diabetes mellitus, maintaining ideal body weight, regular exercise and smoking cessation.

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