

# Risk Factors for Coronary Artery Diseases: A Study Among Patients with Atherosclerosis in Jalal-Abad

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## ABSTRACT

Background: Cardiovascular Disease (CVD) became threat to the world-wide populations. In our day-to-day life my people are losing their life just because of Cardiovascular problems. Cardiovascular diseases (CVDs) are the leading cause of death globally, taking an estimated 17.9 million lives each year [1]. It causes the most significant rate of mortality among the population. Unhealthy lifestyle and some other factors have been found the leading causes for death due to cardiovascular disease in the Kyrgyzstan. This research is done to find out the main causes of coronary artery disease (CAD) among the population. The Main objective of the research is to study the risk factors coronary artery diseases and amount of the effects each factor contributes towards the disease.

**Method:** The cross-sectional survey was conducted in the cardiology hospital located in Jalalabad, Kyrgystan, during the time period of one and half month. The hospital provided a proportionate amount of the total sample size (106). Using a systematic sampling procedure, study participants were chosen. A p-value of less than 0.05 was deemed statistically noteworthy.

**Result:** Totally 106 patients' data has been collected. Smoking, drinking alcohol, family history, diabetes, hypertension and hypercholesterolemia are the six risk factors. Among these risk factors, hypertension (30.3%) was major cause for coronary diseases. Hypercholesterolemia (26.8%) comes the second major risk factor. Family history of heart disease (12.7%), Diabetes (11.3%), smoking (10.6%) and drinking alcohol (8.5%) are the factors in the next four places.

**Conclusion:** The major risk factor was found to be the Hypertension and Hyperlipidemia. Along with these, smoking, drinking alcohol, diabetes obesity and family history also contributes in causing the CAD. Lifestyle and food habits modifications are must advisable to prevent the CAD.

**Keywords:** Coronary artery disease, risk factors, Kyrgyzstan, Chronic ischemic heart disease.

## INTRODUCTION

The most significant cause of mortality is Cardiac Diseases. One among such diseases is the Coronary artery disease (CAD). Coronary artery disease (CAD) is a condition that develops due to accumulation

of atherosclerotic plaque in the epicardial coronary artery, leading to myocardial ischemia [2]. Although the risk factors of this disease are well known, the strength of these factors varies in different populations and needs to be investigated. Cardiovascular diseases are the most common cause of death in the world and the most important cause of disability and decreased the quality of life. According to the latest statistics, cardiac problems became alarming condition in the Modern society.

Millions of individuals worldwide, in both industrialized and developing nations, suffer from cardiovascular disease. Even though the disease's death rate has decreased in industrialized nations over the last several decades, it is still the world's top cause of death and has a significant negative social and economic impact. The percentage of the population that is unwell and has a medium to low income has sharply grown.

According to statistics, about 50% of deaths (5 million out of 12 million deaths) in developed countries are caused by cardiovascular diseases [3]. There have been many risk factors introduced for cardiovascular diseases, especially CAD. The major risk factors are linked with changes of lifestyle from normal traditional life to the modern Machinery life, nutrition, occupation, industrialization. In general, change in the life format became one of the major causes to the Cardiac Diseases.

Cardiovascular disease is the main cause of mortality in Kyrgyzstan, accounting for more than 50 percent of all deaths. More than 18,000 people die of cardiovascular conditions every year, equivalent to 50 deaths a day [4]. About 25% of these deaths occur in people under 64 years of age; most of these deaths are considered avoidable. Other contributing factors include a high prevalence of tobacco and alcohol use, physical inactivity, and unhealthy dietary choices. This underscores the need for strong primary care and prevention services, coupled with effective patient education and outreach programs particularly for children and adolescents.

The food habit of human race plays a major role in the Coronary artery disease (CAD). The dietary factors imposing cardiovascular diseases or related risk factors include high-fat diets, high-sodium foods, foods with saturated fats, refined carbohydrates, low levels of fatty acids, processed foods, fast foods, and fried foods as well as low consumption of fruits, vegetables, and high-fiber foods [5]. CAD is closely related to lifestyle and modifiable physiological factors, and risk factor modification has been shown to reduce cardiovascular morbidity and mortality.

The aim of the present study was to assess risk factors for coronary artery disease (CAD) among the population of Jalal-Abad, a state in the Kyrgyzstan. Results from this study could elucidate the contribution of modifiable lifestyle factors to the burden of CAD, and hence pave the road for effective preventive measures relevant to the region.

## **METHOD AND METHODOLOGY**

The cross-sectional study was conducted at the Cardiology Centre, a tertiary Hospital in Jalal-Abad, state located in the southwestern part of the country Kyrgyzstan. The hospitals were selected from the other hospitals due to their high frequent visits and it is the government hospital, where in-patients' flows were quiet high for the research to be done. Ethical clearance was obtained from the Institutional Ethics Committee.

The convenience sampling technique was used to collect the total sample size (106) patients, admitted to the Department of Cardiology in the hospital during the time period of one and half months (January-February). SPSS software version 27 was used to do the analysis of the result from the data they were collected. P value less than 0.05 was considered as statistically significant.

The study met the inclusion and exclusion criteria.

The inclusion criteria were:

- Patient with Acute coronary syndrome (diagnosed with CAD currently or years ago).
- Patients with suspicion of coronary artery disease (stable angina, ischemia heart disease, chest pain, Abnormal ECG, suspicion in the Electrocardiogram, etc.,)
- Chronic ischemic heart disease - evidence from coronary angiogram or from a positive stress test.
- Post-myocardial infarction state - with history of coronary bypass graft or percutaneous coronary intervention with or without stenting or with history of medical management either with fibrinolytics or with heparins.

The Exclusion criteria were:

- Out patients came for general check-up was not included in the research.
- Patients who came for test such as ECG and Echocardiogram tests were not included in the research.

The study group consisted of all patients admitted in the Cardiology Department of hospitals, and who met the Inclusion criteria. The data for the study was collected from the patients and their past medical history from the medical center with proper concern. The Socio-demographic data were collected from individual patient. Patient’s addiction like smoking such as cigarettes, hookah, vapors and alcoholic habits were also included in the data.

**RESULTS:**

A total of 106 patients admitted to the Cardiac Specialty hospital during the study period were analyzed according to the study parameter. The results are displayed in the tabular format.

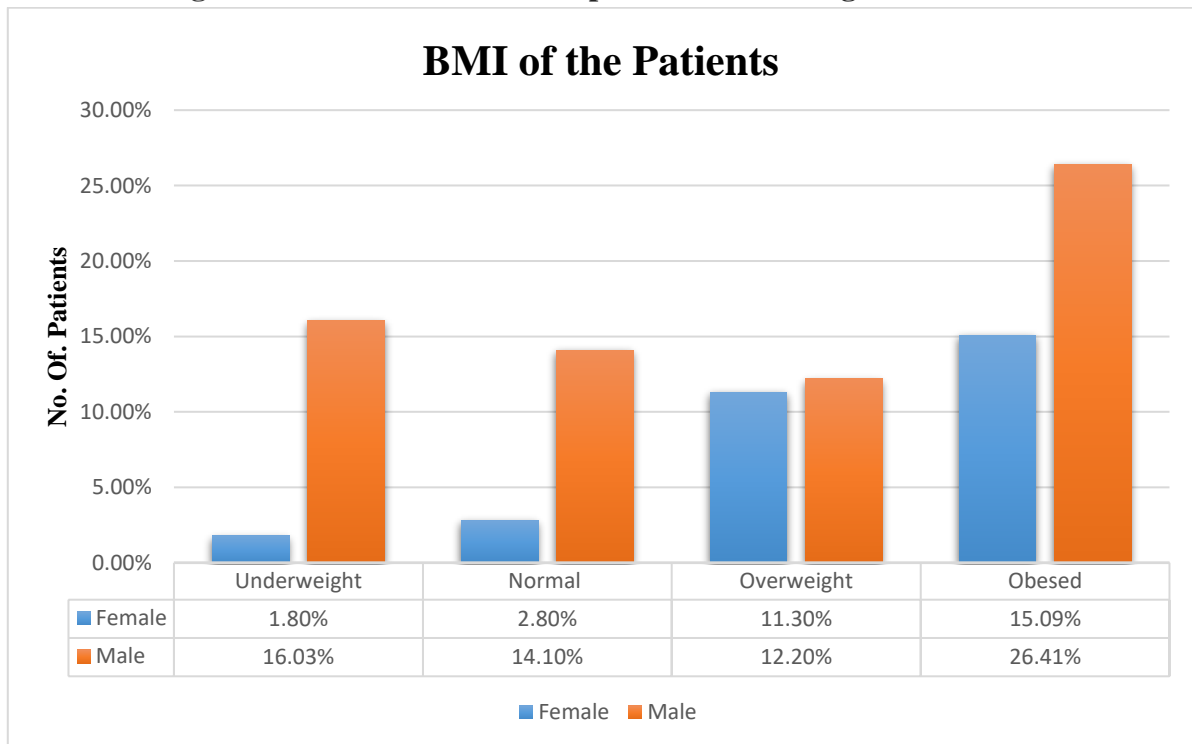
**Table 1: Distribution of respondents according to their socio demographic information**

Responses	Frequency	Percentage
<b>Respondent’s Gender</b>		
Female	33	31.1
Male	73	68.9
<b>Respondent’s Age</b>		
35-45 year	16	15.1
46-55	53	50.0
56-65	17	16.0
Above 65	20	18.9
<b>Respondent’s Marital Status</b>		
Married	58	54.7
Unmarried	40	37.7
Widow	8	7.5
<b>Respondent’s Educational Status</b>		
Illiterate	14	13.2
Primary	43	40.6
Secondary	40	37.7
Degree	9	8.5
<b>Respondent’s Occupation</b>		
Unemployed	40	37.7

Private sector	58	54.7
Public sector	7	6.6
Self-employment	1	0.9
Respondent's Income		
Below 1,00,000 Soms	32	30.2
1,00,000-4,00,000 Soms	70	66.0

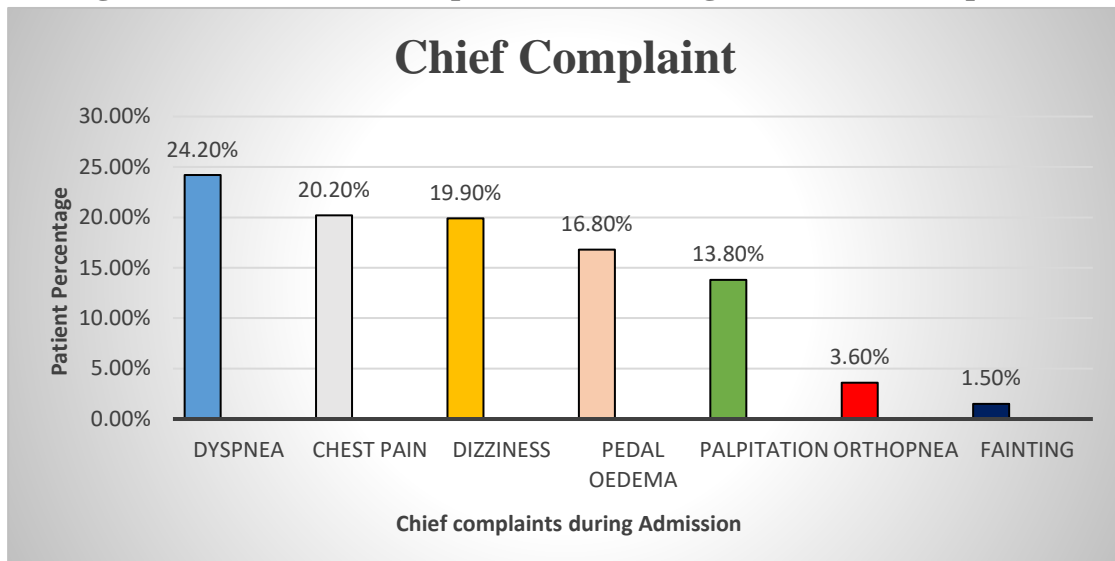
Of the total number of patients included in the study, 73 (68.9%) were males and 33 (31.1%) were females. The above table shows the percentage of married (54.7%), unmarried (37.7%) and widower (7.5%) patient admitted in the hospital. The frequency of married and unmarried were higher comparing to widower category. The data shows that out of 106 patients, 13.3% patients were illiterate, 40.6% patients completed their primary schooling, 37.7% patients completed their higher secondary and 8.5% patients completed Degree. From the above data it shows, 54.7% were employed in private sector, 37.7% were unemployed, 6.6% works under public sector and 0.9% were self-employed. When looking into patients' economic status, most of patients falls under lower- and middle-class level of economic status. Of the patients age group, 16(15.1%) were under the age group of 35-45, 53(50%) were in the age group 46-55, 17(16%) were in the age group 56-65 and 20(18.9%) were above the age of 65. (Table 1)

**Figure1: Distribution of the respondents according to their BMI.**



When patients BMI was taken into the account, four categories were categorized such as underweight ( $\leq 18.4$ ), Normal (18.5-24.9), Overweight (25.0-39.9) and Obese ( $\geq 40.0$ ). Majority (65.1%) of the patients falls under the category overweight (23.6%) and obese (41.5%). (Figure 1)

**Figure 2: Distribution of respondents according to their chief complaints.**



Above figure shows that the chief complaints for admitting into the hospital were chest pain, dyspnea, palpitation, Orthopnea, Pedal oedema, Dizziness and Fainting. Dyspnea (Shortness of Breath) was the chief complaint for the majority of the patients. 24.2% of patients have experienced Dyspnea. Out of 106 patients 20.2% experienced chest pain. Many have chest pain accompanied by dyspnea and palpitations (13.8%). Others experienced complaints such as Dizziness (19.9%) and pedal oedema (16.8%). And few patients have fainted (1.5%) during the chest pain. Few patients, 3.6% had Orthopnea (Shortness of breath while lying down). Many patients have combinations of complaints.

**Table 2: This table contains the information regarding patient’s Past medical Condition.**

Medical condition	Frequency	Percent
Arrhythmia	53	20.2%
Stenting	48	18.3%
Pacemaker	45	17.1%
Surgery	34	12.9%
Post MI patient	32	12.2%
Chronic Ischemic Heart Failure	29	11.0%
Acute Coronary Syndrome	22	8.4%

\*Multiple responses

The Past medical conditions differ from patient to patient. This category includes Arrhythmias, Stenting, Pacemaker, Surgery, Post MI, Chronic Ischemic Heart Failure and Acute Coronary Syndrome. Many had the condition called Arrhythmia (irregular heartbeat and problem in the rhythm of heartbeat). Nearly 20.2% of patients had Arrhythmia. Some patients got it treated with installation of Artificial Pacemaker (17.1%). Of the total number of patients, 18.3% have experienced stenting procedure done. 12.9% experienced Surgery such as By-pass surgery, Mitral valve replacement and Artificial pacemaker fixation. 12.2% had Myocardial Infarction in their past. Chronic Ischemic Heart failure (11%) and Acute coronary syndrome (8.4%) patients who had such disease in their past were also treated. (Table 2)

**Table 3: This table shows the Drugs administered to the patient during their treatment in past as well as present.**

Drugs	Frequency	Percent
Anti-coagulant	96	30.8%
Diuretics	62	19.9%
Beta-blockers	60	19.2%
ACE-i	30	9.6%
Ca <sup>2+</sup> channel blocker	30	9.6%
Statins	20	6.4%
Warfarin	14	4.5%

*\*Multiple responses*

Of the total number of patients, 30.8% were administered with anti-coagulant to prevent the blood clots. 19.9% were given Diuretics to prevent excess accumulation of unwanted water and salt which helps in hypertension patient to prevent heart failure. 19.2% were administered with Beta-blockers to control the irregular heart rhythm in patients with atrial fibrillation. 9.6% were treated with ACE-i to decrease the formation of angiotensin II, thereby decreasing both arteriolar and venous resistance. 9.6% were administered with ca<sup>2+</sup> channel blockers to treat with hypertension. 6.4% patients took Statin to reduce the levels of blood cholesterol. 4.5% were given Warfarin which is also an anti-coagulant that helps in reduction of blood clots.

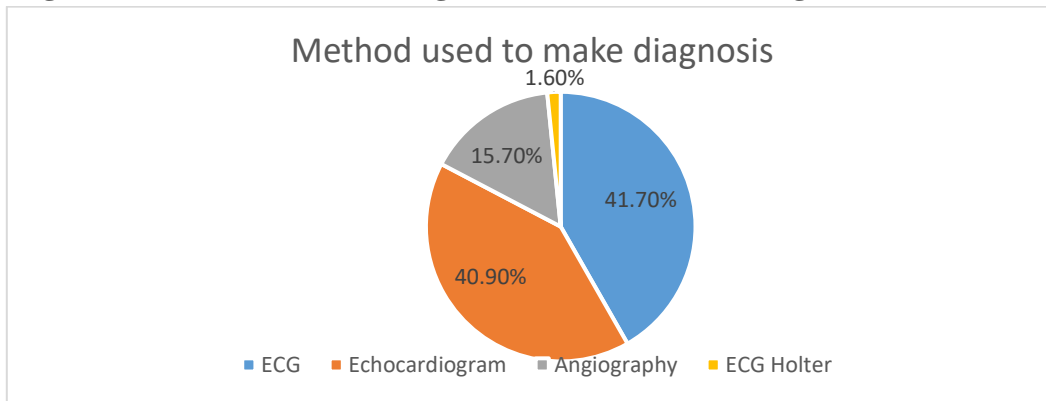
**Table 4: Distribution of respondent according to their family history**

Family History	Frequency	Percent
Hypertension patient	86	50.0%
Diabetic Patient	32	18.6%
Heart disease at young age	26	15.1%
Genetic condition	24	14.0%
Sudden cardiac death	4	2.3%

*\*Multiple responses*

When we look into patient’s Family History, Hypertension (50.0%) plays a major role. Out of 106 data 86 patient’s family had a history of Hypertension. Next comes Diabetes with 18.6%. Heart disease at young age (15.1%), Genetic condition (14.0%) and Sudden cardiac death (2.3%) were other conditions that patient’s Family suffer from.

**Figure 3: This table shows diagnosis method used during the examination.**



*\*Multiple responses*

Above figure shows the diagnosis method used by respondents, majorly used ECG 106(41.7%) and Echocardiogram 104(40.9%) in the hospital to make the diagnosis, whereas 15.70% cases were diagnosed with the help of Angiography. Only few cases 4(1.6%) were monitored using the ECG Holter.

**Table 5: This table contains information regarding the treatment given to the patients.**

Treatment	Frequency	Percent
Medications	100	44.6%
Life style change	96	42.9%
Surgery procedure	24	10.7%
Devices installed	4	1.8%

*\*Multiple responses*

Regarding management given to the patients who came for the treatment were, Medication 100(44.6%) patient were given certain types of medicine and 96 (42.9%) of the patient were suggested for the changes in their life style modification. On severe cases 24(10.7%) surgery was done as a management. Device Installation (1.8%) such as artificial pacemaker installation and stenting was done on needful conditions.

**Table 6: Distribution risk factors according to the patient’s response.**

Risk Factors	Frequency	Percentage
Hypertension Patient	86	30.3%
Hyperlipidemia Patient	76	26.8%
Family history of cardiac disease	36	12.7%
Diabetes Patient	32	11.3%
Habit of Smoking	30	10.6%
Habit of Drinking Alcohol	24	8.5%

*\*Multiple responses*

Hypertension is found to be highly diagnosed disease among the patients. Majority of the patients (30.3%) were found to have Hypertension. Men had a higher prevalence of hypertension (62 out of 106 patients) than women (24 out of 106 patients). Hyperlipidemia comes as the second major risk causing

factor with 26.8% prevalence. We included all the 3 sub-categories (hypercholesterolemia, combined hyperlipidemia and hypertriglyceridemia) under hyperlipidemia and data were collected. When the family history of the patients was collected, we see that 12.7% of patient’s family previous or present cardiac related problems. Diabetes Mellitus have the prevalence percentage of 11.3% under the risk factors. Habit of smoking and drinking have 10.6% and 8.5% of prevalence respectively and stand least among the other risk factors.

**Table 7: Correlation between different socio-demographic information among respondents**

Characteristics	Age				P-Value
	35-45 year	46-55 year	56-65 year	Above 65 years	
Occupation					
Unemployed	3	8	12	17	<b>&lt;.001*</b>
Private	11	43	2	2	
Public	1	2	3	1	
Self-employment	1	0	0	0	
Income status					
Below 1,00,000 soms	4	20	6	2	<b>0.013*</b>
1,00,000-4,00,000 soms	12	32	8	18	
Above 4,00,000 soms	0	1	1	0	
BMI					
Underweight	3	16	0	0	<b>0.003*</b>
Normal weight	4	7	2	5	
Over weight	3	7	7	8	
Obesity	6	23	8	7	

\* Statistically Significant

Based on the provided data there is a statistically significant association was found between age and occupation of the patients (p = <.001). The age under 46-55 years group with the private occupation status were found to statistically significant. Similarly the association between the respondents age group 46-55 years were found to be significant with patient who had the annual income ranging from 1,00,0000-4,00,000 soms. There is a statistically significant association between age 46-55years and among patients whose BMI was found to be obesity (p=0.003)

**DISCUSSION:**

When we conducted the research to know risk factors causing CAD, we came across lots of information regarding the CAD. The gender of the patients has significant role in the causes of CAD. In our research, out of the total patient counts, male (68.9%) was affected, which is more comparing to the female (31.1%) patients. When we look into the similar researches done in the different countries, we are almost getting the similar results. In the research done in Jazan Region, Saudi



Arabia, out of the 498 patients with CAD, 100 (20.1%) were female and 398 (79.9%) were male [6]. In the research done in India, the incidence of CAD in males was higher as compared to that in females in the age group 35-45 [7]. This because that Men prone to develop heart disease earlier than women, and this may be due to the fact that women are somewhat protected by estrogen and progesterone until they pass through menopause. While these hormones are largely responsible for reproductive duties, they also strengthen blood vessel health [8]. The age group getting affected more is between 46-55 years old. Half of the total number of patient's count i.e., 50% of the patients were (39.62% males and 10.37% females) affected in our study. Similarly in a country like Jordan also similar results was obtained where the majority of the people getting affected who were between the age group of 45-54 years old with the percentage of 32.9% [9]. There are several facts why heart diseases are more common in some age groups than others. Genetic predisposition, Lifestyle Modifications, and Underlying Health Conditions Play a Significant Role in determining an individual's risk of experiencing a heart disease. Other reasons for the heart diseases maybe even family and social status of an individual. In our research we found that unemployed and private sector worker are more prone to the diseases. The reason behind this is found be the stress that leads to the heart disease. Due to stress, the hormone Cortisol is released in the body. Studies suggest that the high levels of cortisol from long-term stress can increase blood cholesterol, triglycerides, blood sugar, and blood pressure. These are common risk factors for heart disease. This stress can also cause changes that promote the buildup of plaque deposits in the arteries [10]. The poor economic status also shows a linked relation between the stress and CHD. The research shows that people on the below and middle level of income range have been affected more. Hypertension is considered to be the most common and higher percentage of risk factor causing Cardiac Problems in the population. The overall prevalence of hypertension for all years was 30.30% in our study. From a study found that hypertension prevalence was highest throughout central and eastern Europe, central Asia, Oceania, Southern Africa, and some countries in Latin America and the Caribbean [11].

Hyperlipidemia is found to be the second most affecting risk factor 26.8% of CAD patient. Similar studies done in Columbia shows that 33.8% of the population presented any of the forms of hyperlipidemias, being more frequent in men (50.6%) than in women (28.8%) [12]. Likewise, our results also shows that 50% and 21.69% of men and women respectively are affected by hyperlipidemia.

The third most prevalent risk factor is family history related to heart diseases with 12.7%. Many cardiac disorders can be inherited, including arrhythmias, congenital heart disease, cardiomyopathy and high blood cholesterol. In the results of the research, we found majority of patients with such conditions. Some studies indicate that positive family history is a predictor of impaired endothelium-dependent coronary blood flow regulation in humans [13]. Intricate interactions of genes and environment dictate the outcomes of CAD [14]. The prevalence is higher in male as compared to female. 21.6% and 12.26% respectively.

Morbidity and mortality are increased in patients with myocardial infarction that also have co-existing diabetes mellitus (DM) making it an important risk factor for coronary artery disease (CAD) [15]. According to the Ministry of Health, about 75 000 people in country suffer from diabetes and there has been an increase in the incidence; the number of Kyrgyz with diabetes has increased twofold in 10 years [16]. Likewise, in the past decade, the number of people with diabetes in India increased from 32 million to 50 million [17].

The prevalence of smoking among the other risk factor is 10.6%. In 1960, results of the Framingham Heart Study proved that smoking increases the risk of heart disease [18]. From there onwards, smoking has been considered a major risk factor for CAD. The smoking prevalence among the female is 0%, whereas for male it is 28.3%. For males, age-standardized smoking prevalence was almost 50% in the Southeast Asia, East Asia, and Oceania region, with the next highest levels in the Central Europe, Eastern Europe, and Central Asia region (39.5%), and the lowest observed in the Sub-Saharan Africa region (17.5%) and Latin America and Caribbean region (17.1%) [19]. Smoking increases the risk factor of getting CAD and decreases the life span by causing early death. Carbon monoxide, nicotine, and other substances in tobacco smoke promotes the Atherosclerosis and causes CAD.

In a review of five case-control studies, seven prospective studies, two international comparisons, and one time-trend report published in 1984, it was concluded that moderate alcohol intake was associated with lower risks of CHD mortality, but that heavy drinking was associated with higher mortality compared with non-drinkers [20]. The prevalence of drinking alcohol is 8.5% in our study which is considered to be least prevalence risk factor among others. The distribution of habit of drinking alcohol among the male and female is 20.75% and 1.88% respectively. In 97% of countries (198 out of 204) males consumed more alcohol per day than females [21]. Likewise, we get similar ratios with neighboring countries such as Kazakhstan, Tajikistan, Uzbekistan and Turkmenistan [22] which shows the statistical data of alcohol consumption among some of the Central Asian countries. Excessive consumption of alcohol has association with cardiovascular disorders, including coronary artery disease, cardiomyopathy, hypertension, and stroke. However, studies on the recent day suggests that moderate amount of alcohol intake can actually improve the cardio protection, particularly against ischemia-reperfusion injury and coronary heart disease.

## CONCLUSION AND RECOMMENDATIONS:

In conclusion, the primary risk factors identified for coronary artery disease (CAD) include hypertension and hyperlipidemia. In addition to these factors, behaviors such as smoking and alcohol consumption, as well as conditions like diabetes, obesity, and a family history of CAD, also play significant roles in the development of the disease. Lifestyle modification along with the healthy habit are the major step to be taken to prevent the CAD in the earlier stages of diagnosis.

## REFERENCES:

1. Kopelman P. Health risks associated with overweight and obesity. *Obesity Reviews* [Internet]. 2007 Mar;8(s1):13–7. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1467-789X.2007.00311.x>
2. Khajedaluae M, Dadgar Moghaddam M, Khajedaluae A, Sharebiani H, Bahrami Taghanaki H, Ziadi Lotfabadi M, et al. Comparison of Framingham Risk Score and Native Model of Cardiovascular Risk Prediction Among Residents of Mashhad Metropolis, Iran, 2015. *Iranian Journal of Epidemiology*
3. Kydyralieva RB. The State of Cardiovascular Disease in the Kyrgyz Republic. *Central Asian Journal of Global Health* [Internet]. 2013 May 21 [cited 2021 Apr 18];2(1).
4. Mendy V, Vargas R, Cannon-Smith G, Payton M, Enkhmaa B, Zhang L. Food Insecurity and Cardiovascular Disease Risk Factors among Mississippi Adults. *International Journal of Environmental Research and Public Health* [Internet]. 2018 Sep 15;15(9):2016

5. Cureus.2022 Oct; 14(10): e30239. Published online 2022 Oct 12. doi: 10.7759/cureus.30239  
PMCID: PMC9652277 Gender Differences in Coronary Artery Disease, Clinical Characteristics, and  
Angiographic Features in the Jazan Region, Saudi Arabia Monitoring Editor: Alexander Muacevic  
and John R Adler
6. James C, Attacheril TV, Balakrishnan N, Gaydarova DK, Stancheva NY, Gerchev IP, et al. Risk  
Factors for Coronary Artery Diseases: A Study Among Patients With Ischemic Heart Disease in  
India (Kerala). *Journal of Biomedical & Clinical Research*. 2013 Dec 1;6(2):118–24.
7. WHO. World Health Statistics 2012. Global health statistics 2012. [cited 2013 Jan 27]. Available  
from: [http://www.who.int/gho/publications/world\\_health\\_statistics/2012/en](http://www.who.int/gho/publications/world_health_statistics/2012/en)
8. Al-Shudifat AE, Johannessen A, Azab M, Al-Shdaifat A, AbuMweis SS, Agraib LM, et al. Risk  
factors for coronary artery disease in patients undergoing elective coronary angiography in Jordan.  
*BMC Cardiovascular Disorders*. 2017 Jul 11;17(1).
9. <https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=2171>
10. NCD Risk Factor Collaboration (NCD-RisC). Trends in adult body-mass index in 200 countries  
from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2  
million participants. *The Lancet* [Internet]. 2016 Apr;387(10026):1377–96.
11. Álvarez Ramírez AA, Peláez JL, Bermúdez IM, Gordon Botero JY. Prevalence of hyperlipidemia  
and its associated factors in university students in Colombia. *Heliyon*. 2020 Nov;6(11):e05417.
12. Schachinger V, Britten MB, Elsner M, Walter DH, Scharrer I, Zeiher AM. A Positive Family History  
of Premature Coronary Artery Disease Is Associated With Impaired Endothelium-Dependent  
Coronary Blood Flow Regulation. *Circulation*. 1999 Oct 5;100(14):1502–8.
13. Sasidhar MV, Reddy S, Naik A, Naik S. Genetics of coronary artery disease – A clinician’s  
perspective. *Indian Heart Journal*. 2014 Nov;66(6):663–71
14. Diakonikolaou S, Styliou T, Christou V, Eid O, Eid R, Karataraki F, et al. Diabetes mellitus in  
coronary artery disease. *European Journal of Preventive Cardiology*. 2022 May 1;29
15. Improving the care for patients with diabetic retinopathy in Kyrgyzstan [Internet]. [www.who.int](http://www.who.int).
16. Mohan V, Sandeep S, Deepa R, Shah B, Varghese C. Epidemiology of type 2 diabetes: Indian  
scenario. *The Indian Journal of Medical Research* [Internet]. 2007 Mar 1;125(3):217–30.
17. KANNEL WB. Risk Factors in Coronary Heart Disease: An Evaluation of Several Serum Lipids as  
Predictors of Coronary Heart Disease: The Framingham Study. *Annals of Internal Medicine*. 1964  
Nov 1;61(5\_Part\_1):888
18. World Heart Federation. WORLD HEART REPORT 2023 CONFRONTING THE WORLD’S  
NUMBER ONE KILLER [Internet]. 2023. Available from: <https://world-heart-federation.org/wp-content/uploads/World-Heart-Report-2023.pdf>
19. Emberson JR, Bennett DA. Effect of alcohol on risk of coronary heart disease and stroke: causality,  
bias, or a bit of both? *Vascular Health and Risk Management* [Internet]. 2006 Aug [cited 2019 Nov  
12];2(3):239–49.
20. World heart report 2023 — Part 2: Global Burden of Cardiovascular Diseases Mortality – Health  
Transformation Journal [Internet]. [cited 2024 Apr 29].
21. Paulone S, Ivlevs A. Emigration and alcohol consumption among migrant household members  
staying behind: Evidence from Kyrgyzstan. *Social Science & Medicine*. 2019 Jan;221:40–8