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Factor Affecting Coronary Artery Disease: Dietary Assessment and Mental Health Status

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfilment of
B.Sc. in Nutrition and Food Engineering

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APPROVAL

This project titled "**Factor Affecting Coronary Artery Disease: Dietary Assessment and Mental Health Status**", submitted by Most. Tamanna Haque to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to its style and contents. The presentation has been held on *date*.

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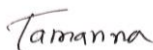
We hereby declare that, this project has been done by us under the supervision of **Md. Nawal Sarwer, Lecturer, Department of NFE**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Coronary artery disease (CAD) is a growing medical and public health concern and is the top cause of death in Bangladesh. Bangladeshis, like other South Asians, are predisposed to develop CAD, which typically begins prematurely, progresses swiftly, and is angiographically more severe. The underlying pathophysiology is unknown. Genetic predisposition, the high frequency of metabolic syndrome, and traditional risk factors all play a role. Poor dietary habits increased saturated and trans-fat, high salt consumption, and a lack of physical exercise are all possible risk factors. Some emerging risk factors, including hypovitaminosis D, arsenic poisoning in water and food, and particulate matter air pollution, may play an important role. We know very little about our actual circumstances at the turn of the millennium. Large-scale epidemiological, genetic, and clinical studies are required to investigate the many features of CAD in Bangladesh. In this thesis paper, factors affecting coronary artery disease have been tried to figure out through a questionnaire survey method. The result showed that in Bangladesh most people affected by CAD live in the extremely polluted area with a percentage of 30%. The income level of CAD patient is moderate and around 66% lives in stress and depression. CAD patients that are round 76.67% have a high blood pressure rate. Besides, there are other aspects regarding CAD which has been elaborated in the report.

Keywords: Coronary artery disease, Bangladesh, Arsenic, Vitamin D deficiency, Air pollution

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CHAPTER - 1 **INTRODUCTION**

1.1 Background

Coronary artery disease (CAD) is a major medical and public health concern because it is a common and leading cause of death worldwide. Bangladesh is seeing an epidemiological shift from communicable disease to non-communicable diseases (NCD). The general mortality rate has dropped considerably in recent decades. Nonetheless, chronic illness mortality, particularly the "fatal four" of cardiovascular disease (CVD), cancer, chronic lung disease, and diabetes, is increasing at an alarming rate. CAD is a major contributor to one of the four, CVD. Despite having the highest CVD incidence of any South Asian country, Bangladesh is "missing in action" in the worldwide fight against CVD ^[1]. In addition to epidemiological change, common environmental toxins such as arsenic in groundwater or particulate matter in the air, as well as particular vulnerabilities in the genetic or metabolic make-up, may be crucial factors in the etiopathogenesis of CAD in this population ^[2].

There are several known risk factors for cardiovascular diseases, including CAD. The majority of these risk factors are influenced by culture, the move from a traditional to contemporary lifestyle, food, industrialization, employment, and, more broadly, changes in lifestyle ^[3] ^[4]. Modifiable and non-modifiable risk factors for CAD are the two broad groups into which they fall. Age, menopause, and a history of the illness in the family are risk factors that cannot be changed. ^[5] Smoking, inactivity, alcohol use, poor socioeconomic level, medications, oral contraceptives, and illnesses, including obesity, particularly abdominal obesity, diabetes, hyperlipidemia, hypertension, stress, and depression, are modifiable risk factors for CAD. ^[6] ^[7] ^[8]

Poor consumption of fruits, vegetables, high-fiber foods, high-fat meals, high-sodium foods, saturated fat foods, refined carbs, low levels of fatty acids, processed foods, fast foods, and fried foods are all risk factors for cardiovascular disease. ^[9] Despite the identification of these risk factors, CAD prevalence is still increasing. Risk factors for cardiovascular disease include diabetes, smoking, hypertension, hyperlipidemia, and a favorable family history, however, it is unclear how much of an impact they have on different populations.

Rapid urbanization and the accompanying lifestyle changes, such as altered diets, decreased physical activity, and increased use of drugs and alcohol, as well as an increase in the prevalence of DM, are likely to promote an increase in the incidence of CAD ^[10]. The population's risk

factor prevalence affects future healthcare costs and the number of years a person will be unable to work. Risk factors put an individual's health at risk and tax the economy as a whole.

It is important to note that military personnel work and live in quite different environments than civilians, and these differences may potentially affect CAD risk factors. ^[11] Considering these situations, the current study aimed to determine the relative weight of each traditional risk factor for CAD among Naval employees. The results would open the door for sound planning to avoid primary risk variables that are more likely to result in CAD and to cut back on the company's funding for secondary risk factors, improving employee health while reducing additional costs in the organization.

1.2 Literature Review

Many comprehensive studies have been conducted on cardiovascular disease in Bangladesh. Additionally, many reasons and factors were studied elaborately. Some of the study results have been discussed below

1.2.1 Cardiovascular Disease and Ethnicity in Bangladesh

The excessive sensitivity of the South Asian population to CAD has been attributed to ethnicity. In South Asians, CAD manifests prematurely, clinically aggressively, and angiographically extensively. South Asian ethnicity was linked to higher morbidity and death rates following CABG [11] and in-stent restenosis, but not mortality following PCI ^[12]. According to studies including foreign-born immigrants, Bangladeshis are significantly more likely to develop CAD than other South Asians and are linked to increased CAD-related morbidity and mortality.

Bangladeshis appear to be equally susceptible to CAD as other South Asian ethnicities, however the possibility of an even more vulnerable 'Bangladeshi ethnicity' does exist. This 'Bangladeshi ethnicity' may result from a complex interaction between genetic makeup and environmental variables. More research is required to fully understand the significance of ethnicity in the etiopathogenesis of CAD in the Bangladeshi population.

1.2.2 Epidemiology

South Asians are disproportionately susceptible to CAD.4 Extreme prematurity and severity, 2-4-fold higher prevalence, incidence, hospitalization, and mortality, 5–10 years the earlier onset

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of first myocardial infarction (MI), and 5–10–fold higher risks of MI and death before the age of 40 are the most prominent characteristics of CAD in this population. Unknown is the precise prevalence of CAD in Bangladesh. There are very few small-scale epidemiological studies out there. IHD prevalence was probably first noted in 1976 when it was 0.33%. According to more current data, the prevalence of CAD ranges from 1.85%⁶ to 3.4%⁷ in rural areas and from 19.6% in an urban working professional population.^{8,9} Despite stark differences in values, the prevalence of CAD is increasing in Bangladesh.

A recent study from rural Bangladesh found a significant increase of CVD between 1986 and 2006. Age-standardized CVD mortality rates increased 30-fold in men (from 16 deaths per 100,000 to 483 deaths per 100,000) and 47-fold in women (from 7 deaths per 100,000 to 330 deaths per 100,000). A nationwide survey is required to determine the current epidemiological aspects of CAD in the country.

1.2.3 Genetic risk factors

From a genetic standpoint, South Asians may be more susceptible to CAD due to three mechanisms: a) disease-related mutations peculiar to South Asian populations, b) greater prevalence of susceptibility alleles, and c) deleterious gene-environment interactions [13]. First, there is minimal epidemiological or genetic evidence to suggest the existence of gene variations unique to South Asians that increase their risk of CAD. Second, polymorphisms in genes regulating angiotensin-converting enzyme (ACE), apolipoprotein A (apoA), apolipoprotein B (apoB), apolipoprotein E (apoE), adipokine, homocysteine, plasminogen activator inhibitor-1, and fibrinogen may be more common in South Asians than in other ethnic groups [12]. The third component, gene-environment interactions, eventually defines CAD risk; this is especially relevant where the frequency of CAD is high.

The frequency of risk alleles of single-nucleotide polymorphisms (SNPs) that mediate susceptibility to cardiovascular illnesses varies between populations. The identification of genetic variables that predispose to CAD in South Asians is critical to gaining a better understanding of the epidemic and the role of gene-environment interactions in the etiopathogenesis of CAD, and this is also true for CAD in Bangladesh. Future studies will

presumably uncover new genetic elements that explain why South Asians, particularly Bangladeshis, are predisposed to CAD.

1.2.4 Environmental risk factors

1.2.4.1 Hypertension

A high frequency of metabolic syndrome, lifestyle-related factors like obesity, a high salt intake, and a lack of physical activity may all play key roles in the pathophysiology of hypertension in Bangladesh, where about 20% of adults and 40–65% of elderly persons suffer from the condition.

1.2.4.2 Diabetes mellitus

Unknown is the precise prevalence of DM in Bangladesh. The prevalence of self-reported or documented DM is 3.9%, according to the (NCD) Risk Factor Survey 2010/37 (men 4.3% and women 3.6%). According to a recent study, the prevalence of DM in the rural population was 7.2%. The prevalence and incidence of type 2 DM are rising in Bangladesh, just like in other industrialized and developing nations. According to estimates from the International Diabetes Federation (IDF), 5.7 million (6.1%) and 6.7 million (7.1%) people in Bangladesh have impaired glucose tolerance (IGT), and by 2030, that number is projected to increase to 11.1 million. Bangladesh will be one of the top seven countries with the highest prevalence of diabetes due to this boom of the disease.

1.2.4.3 Smoking and smokeless tobacco use

Bangladesh has a high prevalence of tobacco use: 51.0% for all forms, 26.2% for smoking, and 31.7% for smokeless tobacco. Bangladesh is one of the top ten countries, accounting for two-thirds of the world's smokers.

The link between smokeless tobacco usage and coronary artery disease is uncertain. Studies showed no statistically significant positive link between the two in a newly published systematic review, while studies did discover a favorable association. A case-control study of nonsmoking Bangladeshi adults aged 40-75 years conducted in 2010 discovered no statistically significant link between smokeless tobacco use in general and CAD in nonsmoking adults.

1.2.4.4 Air pollution

In recent years, it has been proposed that air pollution contributes to cardiovascular disease. The research suggests a link between exposure to particulate matter with a diameter of 2.5 m (PM2.5) and cardiovascular morbidity and mortality. Air pollution is a major issue in Bangladesh, particularly in urban areas. A study of emissions and air quality in megacities discovered that Dhaka has the worst air quality in terms of total suspended particles (TSP), sulfur dioxide (SO₂), and nitrogen dioxide (NO₂) among the megacities, with pollutant levels substantially exceeding the WHO threshold. Rural air pollution is less well-known. Indoor air pollution caused by the combustion of conventional biomass fuels is a major public health issue, particularly among the poor.

1.2.5 Present status of cardiovascular care facilities

Bangladesh suffers from both communicable and non-communicable diseases. In the context of socioeconomic transformation, communicable diseases are being controlled, whereas non-communicable diseases and associated risk factors are on the rise. The Health, Nutrition, and Population Sector Program (HNPS) is currently in place to address the growing need for NCD prevention and management. The government has developed a National Non-communicable Disease Strategy and Action Plan.

1.3 Objectives

The objectives of this study are

- To find out the current situation in Bangladesh regarding Cardiovascular Disease
- To identify the reasons behind the increase in Cardiovascular Disease in Bangladesh

CHAPTER - 2
METHODOLOGY

2.1 Study Design

The Factor Affecting Coronary Artery Disease is the focal point of this research. The research was carried out using a mixed-method technique. Data from both quantitative and qualitative sources have been collected and analyzed.

Since this research study is based on the factors that influence CAD, it had a broad population of responders. Furthermore, the requested data for this study is sensitive because it refers to a person suffering from CAD, where the majority of persons are older. To begin the research, a convenient sampling strategy was adopted, which is a method in which researchers collect data from a readily available group of interviewees.

2.2 Area of the study

Patients between the ages of 40 and over 70 participated in the study. Cardiology ward 82 of BIRDEM General Hospital patients were the subjects of the questionnaire. Only those patients were taken into account for analysis who had consented to the sharing of their data.

2.3 Population of the study

People suffering with CAD were included in this study. People were allowed to be between the ages of 40 and above 70. People who declined to provide data were left out of the analysis.

2.4 Data Collection

For the purpose of gathering data, a standardized questionnaire was initially established. The respondents then subsequently filled out the questionnaire during face-to-face interviews. The required information was obtained from cardiology ward 82 BIRDEM General Hospital using a face-to-face interviewing technique.

2.5 Study Period

October 2022 to November 2022

2.6 Data Analysis Method

SPSS software was used to analyze the data. It is simple to use; it provides advanced statistical analysis, a large library of machine learning algorithms, text analysis, open-source extensibility, interaction with big data, and smooth installation into apps.

CHAPTER – 3 **RESULT AND DISCUSSION**

3.1 Findings

This report provides an elaborate answer to the questionnaire. The questionnaires provided questions regarding CAD, and the result of the survey are discussed below:

3.1.1 The socio-demographic features of CAD patients

Age distribution of the patients: This research had 30 participants. CAD has an impact on all of them. According to the table, 40.0% of patients with CAD are between the ages of 61 and 70. 36.67% of patients are between the ages of 40 and 50. Around 20.0% of patients aged 51-60 and 3.33% of patients aged 71 and more were affected. Considering this data, we may conclude that most CAD patients are between the ages of 61 and 70.

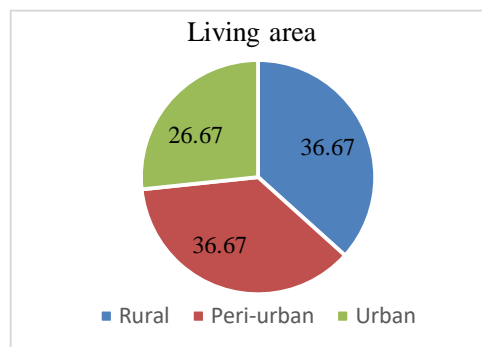
Age	%
40-50	36.67%
51-60	20.00%
61-70	40.00%
71 and above	3.33%

Professions of the patients affected by CAD: During the interview, 30 individuals with CAD provided information on their occupations. According to this data, 33% of the patients were housewives. The table stated that just 3.33% of patients are farmers, day labourers, or unemployed, and 6.67% of patients worked as shopkeepers. This data also indicates that 10.0% of patients chose teaching and government service as their career. The remaining patients, or around 30%, were businessmen. According to the state of our country, financially reliant women are frequently overlooked in terms of voicing thoughts, keeping a healthy lifestyle, and a variety of other things.

Occupation of the patients	%
House-wife	33.33
Teacher	10.00
Businessman	30.00
Govt. Service	10.00
Shopkeeper	6.67
Farmer	3.33

No work	3.33
Day labor	3.33

Living Area during the illness period (patient): This research also reveals patients with CAD residing in rural, urban, and suburban areas, respectively. According to this data, the vast majority of patients (36.67%) live in rural and peri-urban regions. About 26.67% of patients reside in urban.



Educational level of the patients affected by CAD:

This survey had 30 participants. They are all patients aged 40 and up diagnosed with CAD. The majority of the patients appear to be well-educated. According to the table, 36.67% of patients have a primary degree or a degree higher than a master's degree. We may also deduce that the majority of respondents were educated. 26.67% of patients completed secondary school, and 20.0% completed upper secondary school. Furthermore, around 13.33% of patients received master's degrees, and approximately 3.33% received honors degrees. Considering this conclusion, it can be stated that, despite being well well-educated, many patients are unaware of the need to live a healthy lifestyle and follow a correct eating pattern.

Educational level	%
Primary	36.67
Secondary	26.67
Higher Secondary	20.00
Honors	3.33
Masters	13.33
Above	36.67

Household expenditure bearer: The survey revealed that around is most of the time family and one self is the expenditure bearer of the household with a percent of 46.67%. This means the expenditure is usually bearded by the family or him/herself.

Table 5: Household expenditure bearer during illness	
Household expenditure bearer	%
Family	46.67
Self	46.67
others	6.67

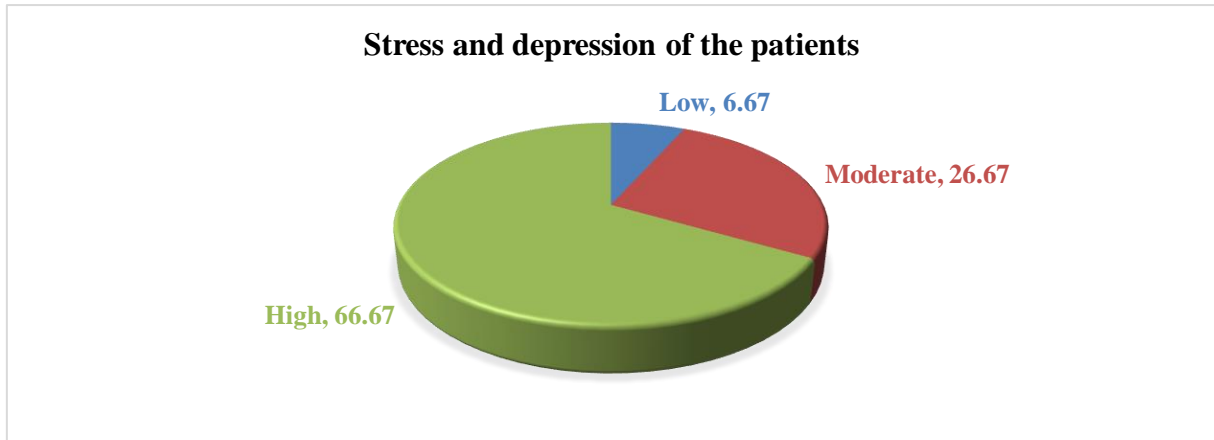
Vulnerability of patients living area near industry/tannery/polluted area: The study exposes the living area of 30 respondents. This table demonstrates that almost 30% of patients' locations were in extremely polluted areas, and approximately 20% of patients said they lived close to industrial areas. 10% of patients resided close to a tannery.

Table 6: Living areas at the bank of the river/near industry/extremely polluted area	
Living areas at the bank of the river/near industry/extremely polluted area	%
Bank of river	20.00
Near Industry	10.00
Extremely polluted area	30.00
Tannery	10.00
Others	30.00

Patients' income was questioned to assess the respondents' financial situation because most of the patients were housewives, and their households only depended on the father's salary. According to their statement, the survey reveals that 23.33% of patients' earnings ranged from extremely low to extremely high, and that 56.67% of patients' earnings may be categorized as moderate. However, 20% of patients' income is considered to be high.

Table 7: Income level of the patient	
Income level	%
Low	23.33
Moderate	56.67
High	20.00
Very high	23.33

Stress and depression about the family of the patient: The table state that about 66% of patients are highly stressed and depressed, and about 26.67% and 6.67% of patients are moderately and lowly stressed and depressed, respectively.



Financial Crisis of the patients: The table demonstrates that out of 30 responders, 60% of patients had financial difficulty, whereas 40% experienced no such issue.

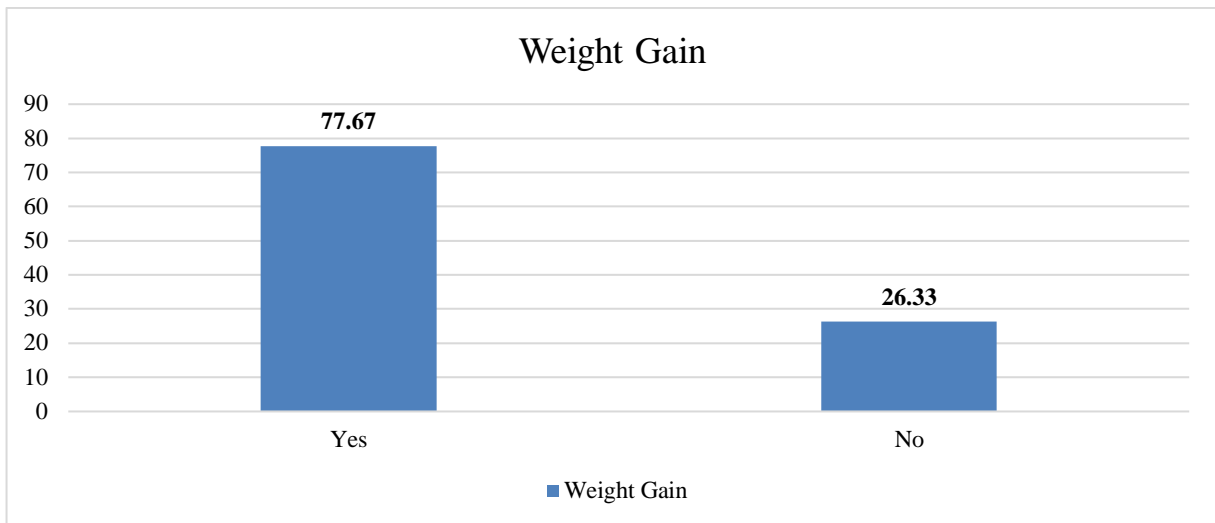
Family crisis	%
Yes	60.00
No	40.00

3.1.2 Medical history and health issues of CAD patients

Body Mass Index (BMI) of the patients: The table clearly showed that around 60% of the surveyed patients are under weight. This means there is a possibility of them being malnutrition. About 23.33% of patients suffer from normal weight and about 10% suffer from overweight. The surprising result was when the obesity level was found. The result showed about 6.67% patients have obesity. This survey showed the food consumption of the patients diagnosed with CAD.

BMI	%
Underweight	60.00
Normal weight	23.33
Overweight	10.00
Obesity	6.67

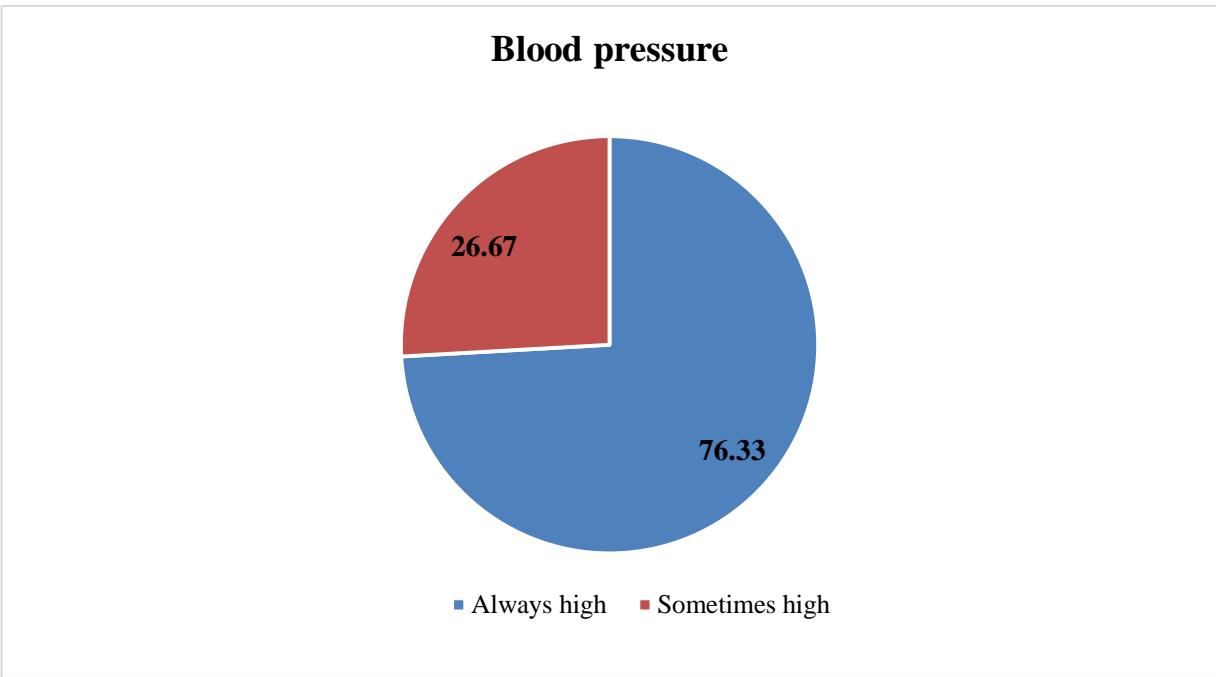
Weight gain during the illness: The result stated that about 73.33% patients have gained weight during illness whereas 26.67% patients 'didn't gain any weight.



Patients' everyday activities during illness: The data showed that patients were just active with a percentage of 43.33%. Furthermore, it showed that around 36.67% of patients were moderate workers and 16.67% were sedentary workers. It also stated that around 3.33% patients were highly active as well as ambulatory workers.

Daily activity	%
Very active	3.33
Active	43.33
Moderate worker	36.67
Sedentary worker	16.67
Ambulatory worker	3.33

Blood pressure level of the patients: The study found that patients diagnosed with CAD always had high blood pressure where around 26.67% sometimes had high blood pressure. Having high blood pressure is a very dangerous thing especially among older people.

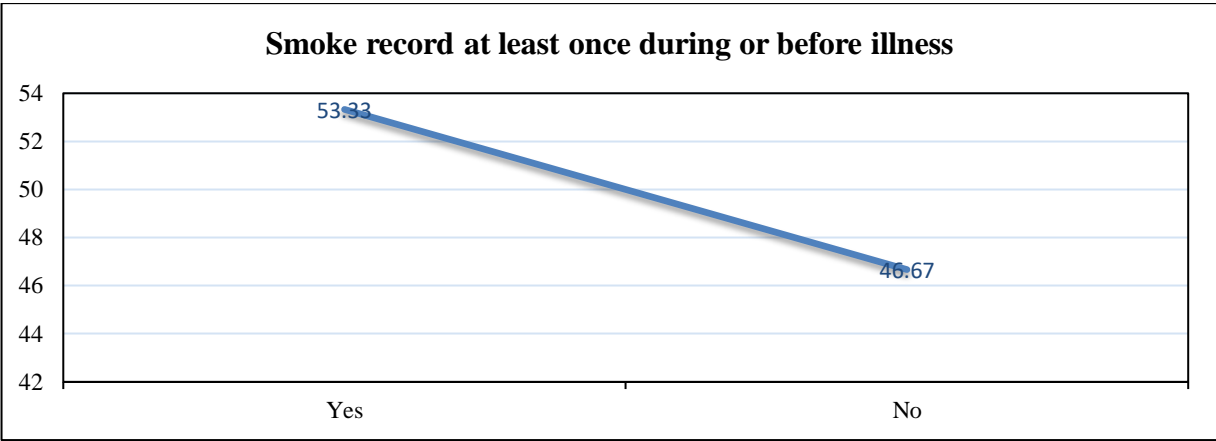


Patients with diabetic history before illness: Among the surveyed patients around 73.33% did have diabetes beforehand and about 26.67% didn't have diabetes.

Table 11: Diabetic before the illness

Diabetic	%
Yes	73.33
No	26.67

Smoking record of the patients: The study found that 53.33% people smoked at least once during or before illness and about 46.67% didn't even once smoke during or before illness. Smoking is considered as one of the major reasons behind CAD.



History of hypertension of patients: It was figured that around 96.67% of patients had hypertension and 3.33% of patients didn't suffer from it. Hypertension raises the risk of a number of cardiovascular diseases, including stroke, coronary artery disease, heart failure, atrial fibrillation, abdominal aortic aneurysm, and peripheral vascular disease.

Table 12: History of hypertension of the patient	
Hypertension history	%
Yes	96.67
No	3.33

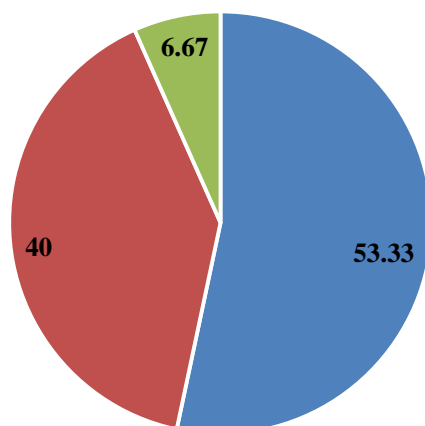
Common symptoms in the patients of the illness: The 30 patients who were interviewed showed some common symptoms of the illness. About 56.67% of patients showed Pain or discomfort in the arms or shoulder and about 16.67% showed weakness. Furthermore, around 10% patients showed Light-headedness, nausea (feeling sick to the stomach) or a cold sweat and Shortness of breath. Additionally, 6.67% patients suffer chest pain or discomfort(angina).

Table 13: Most common symptoms in the patient	
Most common symptom	%
Chest pain or discomfort(angina)	6.67
Weakness	16.67
Light-headedness, nausea (feeling sick to the stomach) or a cold sweat	10.00
Pain or discomfort in the arms or shoulder	56.67
Shortness of breath	10.00

3.1.3 Mental health conditions of CAD Patients

Interest or pleasure in doing anything during this illness: During the study it was found that patients who have been affected by CAD which was around 53.33% did not find any interest in doing anything. About 40% patients did some activities on several days and 6.67% patients did something more than the days.

Interest or pleasure in doing anything during this illness:



■ Not at all ■ Several days ■ More than the days

Suffering from depression during the illness: Depression is a very serious health condition and 'patients' needs to be in a constant care. From the 30 surveyed respondent it was found that about 60% patients felt down, depressed or hopeless several days. 23.33% patients felt down, depressed and hopeless more than the days. Furthermore, 13.33% of patients felt depressed every day and 3.33% patients 'didn't go through any depression.

Table 14: Feeling down, depressed or hopeless during this illness

Feeling down, depressed or hopeless	%
Not at all	3.33
Several days	60.00
More than the days	23.33
Nearly everyday	13.33

The energy level of patients during work time: In this study, the respondent mothers stated that around 36.67% not at all felt tired or have less energy. 26.67% felt tired or have less energy several days. 20% patients felt tired or have less energy more than a day and around 16.67% patients felt tired or have less energy nearly every day.

Table 15: Feeling tired or little energy for every work	
Feeling tired or have little energy	%
Not at all	36.67
Several days	26.67
More than the days	20.00
Nearly everyday	16.67

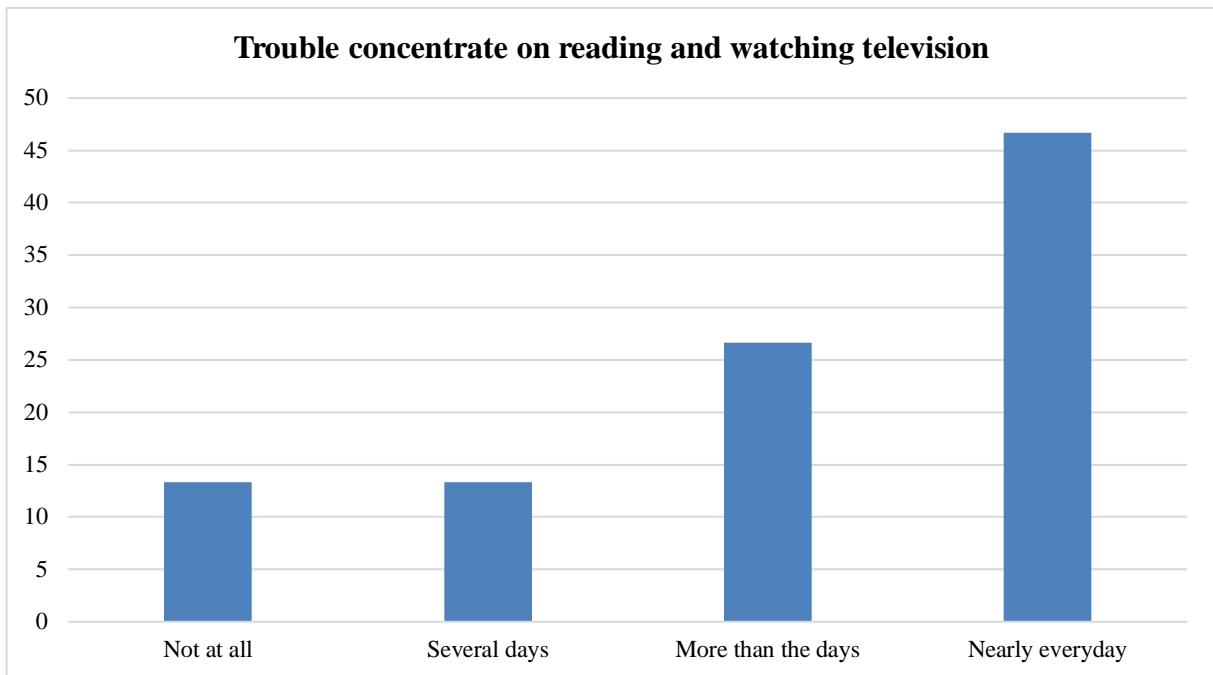
Food appetite of the patients during illness: The survey showed that around 56.67% patients 'didn't have poor appetite. About 20% of people have poor appetite several days and 13.33% have more than the days. Nearly every day 10% patients have poor appetite.

Table 16: Poor appetite	
Poor appetite	%
Not at all	56.67
Several days	20.00
More than the days	13.33
Nearly everyday	10.00

Feeling down during the illness: The study states that about most % of people that is 40% felt down on several days. Further almost 33.33% patients felt own more than days. About 13.33% people felt down either nearly every day or never. This result clearly shows that this illness brings the darkest fear of people and it became hard for the patients to cope up with people around them.

Table 17: Feeling bad or down about own self	
Feeling bad or down about own self	%
Not at all	13.33
Several days	40.00
More than the days	33.33
Nearly everyday	13.33

Struggling of patients to concentrate: Due to this illness it becomes very hard for the patients to concentrate even the smallest things in life become very hard to grasp. The result states that most people, about 46.67%, cannot concentrate on reading and watching television and other things every day. 13.33% patients cannot concentrate on reading and watching television several days or ever. Around 26.67% patients cannot concentrate on reading and watching television more than the days.



Speaking slowly so that other people could have noticed or attention: It was found that 33.33% patients speak slowly several days so that other people could have noticed or attention. About 26.67% of patients speak slowly every day so that other people could have noticed or attention and 23.33% doesn't speak slowly at all. Lastly, 16.67% of patients speak slowly so that others could have noticed or paid attention.

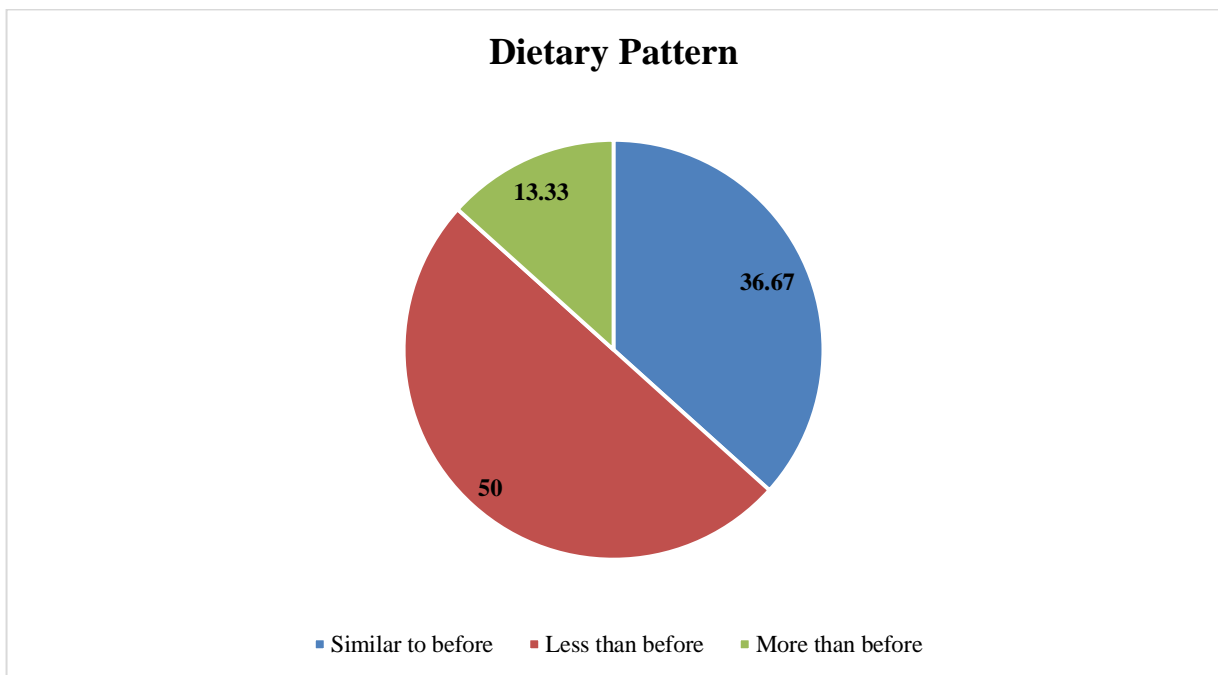
Table 18: Speaking slowly so that other people could have noticed or attention	
Speaking slowly so that other people could have noticed or attention	%
Not at all	23.33
Several days	33.33
More than the days	16.67
Nearly everyday	26.67

Suicidal thought of patients during illness: This is one of the terrible parts of this illness is the constant thought of hurting own self. From the respondent it was found that almost half of the patients that is 50% wanted to hurt themselves several days. 10%, 16.67%, 23.33% patients wanted to hurt themselves nearly every day, more than the days and not at all respectively.

Table 19: Thought of hurting own self in some way	
Thought of hurting own self in some way	%
Not at all	23.33
Several days	50.00
More than the days	16.67
Nearly everyday	10.00

3.1.4 Dietary pattern of CAD patients

Comparison of the dietary pattern of the patients before and during illness: Half of the 30 patients that is 50% who responded said they ate less during their sickness than they did previously. 36% of patients said that their eating pattern during sickness was comparable to before, whereas 13.33% reported that their eating pattern during illness was greater than before. Diet is a risk factor for coronary artery disease that can be modified to lower the risk of the condition.



Preparation of meal during illness: According to the survey, 56.67% of respondents consumed freshly prepared home-cooked meals throughout their sickness. 10% of patients enjoyed restaurant meals regularly during their illness. Pre-cooked food was consumed by 13.33% of patients while microwave food was consumed by 20% of patients.

Table 20: Preparation of meal for the patient	
Main meal	%
Freshly home-cooked produce	56.67
Restaurant meal	10.00
Pre-cooked	13.33
Microwave	20.00
Others	56.67

Frequency of meat and meat Based food consumption during illness: According to this table, 70% of patients consumed meat or meat-based foods every day while unwell. 36.67% of respondents ate meat and meat-based dishes on occasion. Only 3.33% of participants in the study ate meat or meat-based meals once a week. Proteins such as fish, beans, chicken, nuts, and low-fat dairy can help decrease cholesterol and blood pressure while also aiding in weight maintenance. You can lower your risk of heart attack and stroke by choosing these proteins over high-fat meat choices.

Frequency of vegetables and non-animal food consumption during illness: According to the study, 90% of the 30 patients ate vegetables or non-animal food every day during their sickness. 6.67% of patients have eaten non-animal cuisine or veggies on occasion. Only 3.33% of those polled said they had eaten veggies or non-animal cuisine once while unwell.

Habit of junk Food Consumption during illness: 43.33% of the patients who responded had consumed junk food daily and sometimes. 10% have eaten junk food at least once a week.

Frequency of deep-fried food consumption during illness: Deep fried meals was consumed by 93.33% of the patients who responded. Approximately 6.67% had eaten different forms of meals.

Frequency of meat food product	%
Everyday	70.00
Occasionally	26.67
Once a week	3.33
Frequency of vegetable and non-animal food products	
Everyday	90.00
Occasionally	6.67
Once a week	3.33
Frequency of junk food consume	
Everyday	43.33

Occasionally	43.33
Once a week	10.00
Others	3.33
Deep-fried food consumes	
Everyday	93.33
Others	6.67

Frequency of sleep deprive of the patient during illness: The study stated that around 86.67% patients experienced sleep apnea during their illness and 10% 'didn't experienced sleep apnea.

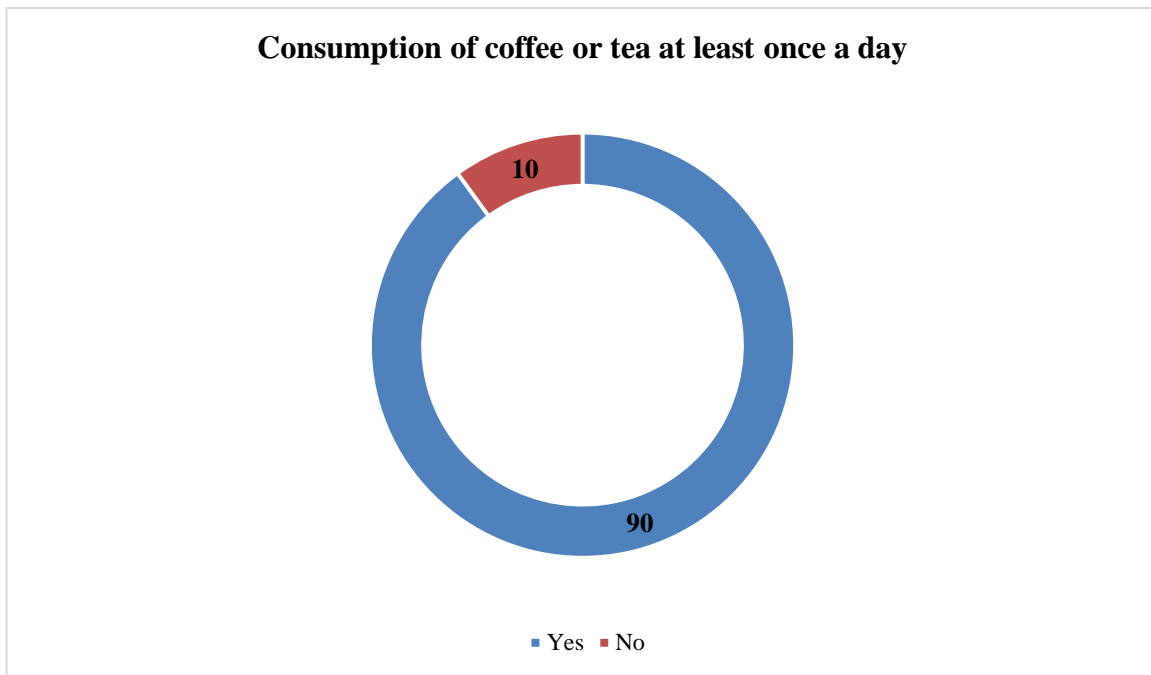
Table 21: sleeping apnea	
Sleeping apnea	%
Yes	86.67
No	10.00
Bio-chemical tests in medical	
Everyday	6.67
occasionally	70.00
Once a week	3.33
Once a month	16.67
Once a year	3.33
Treatment by nutritionist	
Yes	46.67
No	53.33

Frequency of Bio-chemical test in medical of the patient during illness: 70% of patients did bio-chemical tests occasionally whereas 6.67% did bio-chemical tests daily. 3.33%, 16.67%, 3.33% patients did bio-chemical tests once a week, once a month and once a year respectively.

Frequency of treatment by nutritionist of the patient during illness: The study stated that around 46.67% patients took treatment by nutritionist during their illness and 53.33% 'didn't took treatment by nutritionist.

3.1.5 Other necessary periods of CAD patients

Frequency of coffee or tea consumption at least once a day: The research states that about 90% of patients consumed coffee or tea at least once a day whereas 10% didn't consume any of it.



Frequency of patients with alcohol addiction: The survey measured that around 66.67% of patients were not addicted to alcohol whereas 33.33% patients were addicted to alcohol.

Frequency of 'patient's operation history once in life: The survey stated that around 56.67% of patients had an operation history, and 43.33% didn't have an operation history.

Frequency of patients with smoking history: The research said that around 76.67% of patients smoked whereas 23.33% of patients didn't smoke.

Frequency of patients who exercise: The survey measured that around 90% of patients didn't exercise at all and 20% of patients exercised.

Frequency of patients with a history of being affected by CAD: According to survey, 76.67% patients had a history of being affected by CAD and 23.33% patients didn't have a history of being affected by CAD.

Table 22: Others	
Variables	%
Patient alcoholic addiction	
Yes	33.33
No	66.67

Patient lifetime operation in once a life	
Yes	56.67
No	43.33
Family smoking history	
Yes	76.67
No	23.33
Regular exercise frequency	
Yes	20.00
No	80.00
Family history of being affected by CAD	
Yes	76.67
No	23.33

3.2 Discussion

A total of 30 CAD patients participated in this trial. Through the research, some important results were discovered. The responses' information allowed us to understand the eating habits of those individuals with CAD. Through the research, it was discovered that crucial information on eating patterns as well as age, smoking history, typical symptoms, correlations between living areas, financial situation, and other factors had been discovered. The study's main goals included identifying the risk factors that cause CAD in patients, as well as the relationships between their dietary habits and their health status (such as obesity before and during illness, a history of diabetes, and hypertension).

The survey revealed that out of 30 respondents, roughly 36.67% had advanced degrees. However, not all patients knew the need to follow a healthy diet when unwell, take necessary supplements, exercise, and avoid junk food and smoking. We may conclude from this result that many patients—despite their high levels of education—do not understand the value of leading a healthy lifestyle and following a balanced diet while they are unwell. Lack of knowledge not only contributes to the problem, but it also has a significant impact on heart health. It was discovered that 33.33% of responders, or the majority, were housewives. According to our nation, it has been observed that the majority of housewives lack the financial independence to make crucial decisions or to voice their thoughts. In addition, the father's salary determines the total cost of the household. It was found that 60% of the respondents had experienced financial hardship. Overall, it can be concluded that women in financial hardship were unable to maintain

a healthy eating pattern when they were unwell when the household's expenses depended only on that individual. Another important finding of the study was that the majority of respondents who were patients resided in metropolitan areas, close to factories, or in polluted areas. The bodies of the patients have an inflammatory reaction when exposed to airborne particles such nitrates, sulfates, heavy metals, dirt, and dust. Thus, further research should be done on this.

According to the research, a fair number of the response patients had obesity when they were unwell. The study found that % of the patients had obesity-related diagnoses. Patients who are overweight run the risk of developing diabetes, hypertension, and high blood pressure. However, % of the respondents did not have obesity but still had CAD, thus those people may have been affected by other health issues, an unhealthy diet, or hereditary factors.

As can be seen from the explanation above, many nutrients are necessary. This study's focus was on the respondents' eating habits, and it was discovered that the majority of respondents were deficient in the necessary nutrients when they were unwell. For example, an analysis revealed that 70% of the patients ate foods high in protein daily. Vegetables and non-animal food are crucial for a patient with CAD because they provide essential minerals and vitamins, support healthy maternal weight growth, lower the risk of anemia development, regulate blood pressure levels, and many other things.

However, this study indicated that 90% of the patients eat veggies every day, whereas 3.33 % did so just seldom or once a week. Even while they regularly consume vegetables, it's possible that they aren't doing so in a way that lowers their risk for health problems.

There were other lifestyle-related concerns; the study found that roughly 53.33% of patients had a history of smoking and that 80% did not engage in any physical activity while unwell. These lifestyle-related variables may potentially contribute to the development of CAD risk. This demonstrates that, in order to lead a healthy life, all living circumstances may have an impact on what causes CAD.

CHAPTER – 4
CONCLUSIONS

5. Conclusion

In Bangladesh, CAD is rather typical. We are unaware about the actual situation as we enter the new millennium. Genetic makeup and environmental factors may be unique to our population in addition to the conventional risk factors. There is no more time to waste. A comprehensive survey that is ideally conducted across the entire country and clinical research should be conducted to identify the different aspects of CAD in Bangladesh. The information gathered would be useful in developing future national measures to combat the lethal illness more successfully. According to the survey, 90% of patients consume vegetables daily, with 56.67% of patients preferring freshly prepared fruit. Despite this excellent outcome, CAD is still a diagnosis for the individuals who underwent interviews. This is due to the fact that 76.67% of patients had smoked in the past and 93.33% of patients regularly consume fried foods. This demonstrates the necessity to consider all factors while trying to treat CAD patients. All aspects of a patient's related life need to be balanced, whether related to nutrition, smoking, exercise, or living arrangements. A person can only lead a long, healthy life thereafter that.

Recommendations

- Diet plays a big part in lowering the risk of coronary artery disease. CAD patient must follow a strict and healthy diet to maintain a risk-free life.
- The risk of CAD can be reduced via physical exercise as well. Doctors advise engaging in at least 150 minutes of moderate-intensity exercise each week and more than 75 minutes of vigorous-intensity exercise per week.
- Smoking and drinking must be stopped
- Need to maintain overweight

Limitations

While conducting this study, various restrictions existed. First, sensitive data was needed for the study because it is based on individuals diagnosed with CAD. Patients occasionally don't comply due to the state of our nation. Data collection for this survey was extremely difficult because it was performed in a hospital. Thus, a relatively small sample size of 30 respondents was used for this investigation. Numerous facts on CAD and the eating regimens individuals followed while they were unwell may be found in this study.

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References

- [1] Brister S.J., Hamdulay Z., Verma S. Ethnic diversity: south Asian ethnicity is associated with increased coronary artery bypass grafting mortality. *J Thorac Cardiovasc Surg.* 2007;133:150–154.
- [2] Department of Public Health and Primary Care, University of Cambridge. High-risk Hearts: A South Asian Epidemic. [homepage on the Internet] c2013 [cited 2013 Jul 3]. Available from: <http://www.phpc.cam.ac.uk/blog/high-risk-hearts-a-south-asian-epidemic>.
- [3] Gharasi-Manshadi M, Meskarpour-Amiri M, Mehdizadeh P. Lost productivity among military personnel with cardiovascular disease. *J R Army Med Corps.* 2018;164:235–9.
- [4] Janati A, Matlabi H, Allahverdipour H, Gholizadeh M, Abdollahi L. Socioeconomic status and coronary heart disease. *Health Promot Perspect.* 2011;1:105–10.
- [5] Jones D.A., Rathod K.S., Sekhri N. Case fatality rates for South Asian and Caucasian patients show no difference 2.5 years after percutaneous coronary intervention. *Heart.* 2012;98:414–419.
- [6] McPhee PG, Claridge EA, Noorduyn SG, Gorter JW. Cardiovascular disease and related risk factors in adults with cerebral palsy: A systematic review. *Dev Med Child Neurol.* 2018 doi: 10.1111/dmcn.14028.
- [7] Mendy VL, Vargas R, Cannon-Smith G, Payton M, Enkhmaa B, Zhang L. Food insecurity and cardiovascular disease risk factors among Mississippi adults? *Int J Environ Res Public Health.* 2018;15. doi: 10.3390/ijerph15092016.
- [8] Nekouei ZK, Doost HT, Yousefy A, Manshaee G, Sadeghei M. The relationship of alexithymia with anxiety-depression-stress, quality of life, and social support in Coronary Heart Disease (A psychological model) *J Educ Health Promot.* 2014;3:68.

- [9] Radmerikhi S, Tabatabaei SVA, Jahani Y, Mohseni M. Predicting effective factors on eating behaviors in the prevention of cardiovascular disease based on the PRECEDE model. *Electron Physician*. 2017;9:5894–901.
- [10] Samani N.J., Sharma P. Coronary heart disease in south Asian populations - the role of genetics. In: Patel K.C.R., Bhopal R.S., editors. *The Epidemic of Coronary Heart Disease in South Asian Populations: Causes and Consequences*. 1st ed. The South Asian Health Foundation; Birmingham: 2004.
- [11] Shah A., Hernandez A., Mathur D. Adipokines and body fat composition in south Asians: results of the Metabolic Syndrome and Atherosclerosis in South Asians Living in America (MASALA) study. *Int J Obes (Lond)* 2012;36:810–816.
- [12] Silbiger J.J., Ashtiani R., Attari M. Atherosclerotic heart disease in Bangladeshi immigrants: risk factors and angiographic findings. *Int J Cardiol*. 2011;146:e38–40.
- [13] *Strategic Plan for Surveillance and Prevention of Non-communicable Diseases in Bangladesh 2011–2015*. Directorate General of Health Services, Ministry of Health and Family Welfare; Dhaka: August 2011.

Annex

ID

191-34-928

Factor affecting Coronary Artery Disease: Dietary assessment and mental health status

Questionnaire

Most. Tamanna Haque

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Daffodil International University (DIU)

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{ 1 }

Informed Consent.....

Factor affecting Coronary Artery Disease: Dietary assessment and mental health status

Principal Investigator:

Department of NFE, Daffodil International University, Dhaka, Bangladesh

E-mail: tamanna34-928@diu.edu.bd

Dear Participant

Assalamualaikum,

This letter is an invitation to consider participating in a study we are conducting on behalf of the Department of NFE under Daffodil International University (DIU).

Aim:

The study's primary goal is to examine factors affecting identity with dietary and mental health status for coronary artery disease patients.

Risk & Benefit: A participant in this study must not be exposed to any type of danger or risk.

Anonymity & Confidentiality:

All given information is treated in the strictest of confidence. No one project or report resulting from this study will include the participant's identity; however, anonymous quotations may be used with consent. The data that has been gathered will only be accessible to academics working on this project.

Time: This study will take approximately 5-10 minutes of participants' time.

Your rights as research participants: Participation in this study is voluntary. Participants have the option to discontinue participating altogether or at any point throughout the project. If participants would like, participants can choose not to respond to any of the interview questions.

Compensation & Payment:

There are no costs for participation in this study. There is no monetary compensation to you for participation in this study.

Query regarding the study: You are welcome to contact me if you have any queries about the study's questionnaire or would like further details to help you decide whether or not to participate.

Future use of Information: We guarantee that the information from this study will only be used for project reporting.

Participant's consent: My queries and worries regarding this study have all been answered. I willingly decide to take part in this research project.

Section: A (personal issue)

Serial no:	Questions	coding Categories	code
1.	Name of patient: a) Age: b) Sex: 1=Male 2=Female 98=others.....	
2.	Occupation	1=	
3.	Living place	1 = Rural 2 = Urban 3 = Peri-urban	
4.	Educational Level of patient	1 = Primary 2 = Secondary 3 = Higher Secondary 4 = Honors 5 = Masters.... 98 = Others	
5.	How many members of the family?	
6.	Who bearer of household expenditure?	1 = Family 2 = Self 98 = Others	
7.	Did the patient's living area at the bank of the river, near industry or an extremely polluted area, a tannery?	1 = Bank of the river 2 = Near Industry 3 = Extremely Polluted Area 4 = Tannery 98 = Others	
8.	Define the income level of the patient:	1 = Low 2 = Moderate 3 = High 4 = Very High	

9.	Did any stress and depression about your family?	1 = Low 2 = Moderate 3 = High 4 = Very high	
10.	Have any family crises?	1 = Yes 2 = No	

Section: B (Medical history/Health issue)

Serial no	Questions	coding Categories	Comments
11.	a) Height: b) Weight:	
12.	BMI		Underweight Normal weight Overweight Obesity class I Obesity class II Obesity class III
13.	Recent weight gain,	1 = Yes 2 = No	○ Intentional ○ Unintentional
14.	Daily activity level;	1 = Very active 2 = Active 3 = Moderate worker 4 = Sedentary worker 5 = Ambulatory bed rest	

15.	Blood pressure	1 = Always low 2 = Sometimes low 3 = Always high 4 = Sometimes high 5 = Always normal	
16.	Was the patient diabetic beforeCAD?	1 = Yes 2 = No	
17.	Did the patient smoke at least once in his/her whole life?	1 = Yes 2 = No	
18.	Was there any such patient in the family before or at present?	1 = Yes 2 = No	
19.	Did the patient have a history of hypertension?	1 = Yes 2 = No	
20.	Which symptom was most common in the CAD patient?	1 = Chest pain or discomfort (angina) 2 = Weakness, 3 = light-headedness, nausea (feeling sick to your stomach), or a cold sweat 4 = Pain or discomfort in the arms or shoulder 5 = Shortness of breath	

Section: C (Mental condition)

Serial no	Questions	coding Categories	comments
21.	Little interest or pleasure in doing things?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	

22.	Feeling down, depressed, or hopeless?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
23.	Trouble falling or staying asleep, or sleeping too much?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
24.	Feeling tired or having little energy?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
25.	Poor appetite or overeating?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
26.	Feeling bad about yourself — or that you are a failure or have let yourself or your family down?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
27.	Trouble concentrating on things, such as reading the newspaper or watching television?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
28.	Moving or speaking so slowly that other people could have noticed? Or so fidgety or restless that you have been moving a lot more than usual?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	
29.	Thoughts that you would be better off dead, or thoughts of hurting yourself in some way?	0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day	

Section: D (Dietary Patterns)

Serial no	Questions	Coding Categories	Comments
30.	How do compare the diet of the patient during CAD present with non-CAD?	1 = Similar to before 2 = Less than before 3 = More than before	
31.	What does the main meal consist of and how is it prepared?	1 = Freshly home-cooked produce 2 = Restaurant meal 3 = Pre-cooked 4 = Microwave 98 = Others.....	
32.	What was the frequency of meat and meat products consumption?	1 = Everyday 2 = Occasionally 3 = Once a week 98 = Others.....	
33.	What was the frequency of vegetable and non-animal food product consumption?	1 = Everyday 2 = Occasionally 3 = Once a week 98 = Others.....	
34.	What was the frequency of consumption of eggs, meat, pulses, nuts, fish, and dairy products?	1 = Everyday 2 = Occasionally 3 = Once a week 98 = Others.....	
35.	How many times does he/she smoke?	1 = Everyday 2 = Occasionally 3 = Once a week 98 = Others.....	
36.	What was the frequency of unhealthy or junk food consumption?	1 = Everyday 2 = Occasionally 3 = Once a week 98 = Others.....	

37.	How many times a day eat deep-fried food in extra oil?	1 = One time 2 = Two time 3 = More than two 4 = Everytime.....	
38.	Did the patient have sleeping apnea?	1 = Yes 2 = No	
39.	How many times does the patient do the medical or biochemical tests?	1 = Everyday 2 = Occasionally 3 = Once a week 4 = Once a month 5 = Once a year...	
40.	Was the patient under any dietician or nutritionist?	1 = Yes 2 = No	

Section: E (others)

Serial no	Questions	coding Categories	Comments
41.	Does the patient drink coffee or tea at least once a day?	1 = Yes 2 = No	Time:
42.	Was the patient addicted to alcohol or alcoholic products?	1 = Yes 2 = No	
43.	Did the patient need once in a lifetime operation?	1 = Yes 2 = No	<input type="checkbox"/> Cardiac related <input type="checkbox"/> others

44.	Was there anyone in the family who smoked in the past?	1 = Yes 2 = No	Who? Ans:
45.	Did the patient exercise regularly or occasionally?	1 = Yes 2 = No	
46.	Was any of the other family members affected by CAD?	1 = Yes 2 = No	

.....
Name & Signature of the
Interviewer

.....
Signature of the
Supervisor