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**THE PREVALENCE OF CARDIOVASCULAR DISEASES
RISK FACTOR AND THEIR ASSOCIATIONS WITH
LIFESTYLE PATTERNS AMONG THE ADULT
POPULATION IN ACCRA, GHANA**

**Master Thesis
(Applied Public Health)**

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SUMMARY

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Aim: To assess the prevalence of cardiovascular disease risk factors (high blood pressure, lipid disorders, diabetes, obesity) and their associations with lifestyle patterns (diet, physical activity, smoking, alcohol consumption, illicit drugs) among the adult population in Accra, Ghana.

Objectives: 1. To assess the prevalence of cardiovascular disease (CVD) risk factors (RFs) (high blood pressure, lipid disorders, diabetes mellitus, obesity) among the adult population of Accra. 2. To determine lifestyle patterns (diet, physical activity, smoking, alcohol, and illicit drugs consumption) of the study participants. 3. To compare the prevalence of CVD RFs and lifestyle patterns in different socio demographic study groups. 4. To explore associations of CVD RFs and lifestyle patterns among respondents of the study.

Methods: A cross-sectional study was carried out using an online questionnaire. The questionnaire was used to determine self-reported and rated health, and lifestyle characteristics and behaviours - smoking, physical activity, alcohol use, diet, and illicit drugs among study participants and other factors. For statistical analysis, descriptive quantitative analysis, Chi-square analysis and Correlation Analysis was used.

Results: The study involved 177 participants aged between 30 and 75. An important finding was the significant relationship observed between sociodemographic groups and the prevalence of risk factors and lifestyle patterns. This suggests that certain sociodemographic characteristics may influence the likelihood of individuals exhibiting specific risk factors and lifestyle patterns, highlighting the importance of considering social and demographic factors in understanding health outcomes. The findings reveal significant prevalence rates of cardiovascular risk factors, including high blood pressure, lipid disorders, diabetes mellitus, and obesity, among the surveyed population. Additionally, the study highlights various lifestyle patterns, including alcohol consumption, smoking, illicit drug use, physical activity, and dietary habits. Additionally, it's noted that responses were equally distributed between male and female participants in the study, indicating balanced representation across genders.

Conclusion: The thesis provides a comprehensive understanding of cardiovascular disease risk factors and lifestyle patterns among the population in Accra, Ghana. It highlights the need for targeted interventions and initiatives to address modifiable risk factors, promote healthy lifestyles, and improve access to healthcare services. By addressing the complex interplay of demographic, socioeconomic, and lifestyle factors, policymakers and healthcare professionals can work towards reducing the burden of cardiovascular diseases and improving population health outcomes in Accra, Ghana.

Key words: cardiovascular diseases, risk factors, lifestyle patterns.

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ABBREVIATIONS AND CONCEPTS

ACE - Angiotensin-Converting Enzyme
ACE2 - Angiotensin-Converting Enzyme 2
ACS - Acute Coronary Syndrome
AF - Atrial Fibrillation
ARB - Angiotensin Receptor Blocker
BMI - Body Mass Index
CAD - Coronary Artery Disease
CHF - Congestive Heart Failure
CVD - Cardiovascular Disease
CVRF - Cardiovascular Risk Factors
DVT - Deep Vein Thrombosis Echo - Echocardiogram
ECG - Electrocardiogram
HDL - High-Density Lipoprotein
HBP - High Blood Pressure
HTN - Hypertension
LDL - Low-Density Lipoprotein
LVH - Left Ventricular Hypertrophy
MI - Myocardial Infarction
PVD - Peripheral Vascular Disease
PE - Pulmonary Embolism
PCI - Percutaneous Coronary Intervention
RFs - Risk Factors
RVH - Right Ventricular Hypertrophy
SCD - Sudden Cardiac Death
TIA - Transient Ischemic Attack
VLDL - Very Low-Density Lipoprotein
WHO - World Health Organization

SCIENTIFIC TERMINOLOGY

Cardiovascular diseases (CVDs): Conditions affecting the heart and blood vessels, including coronary heart disease, stroke, and peripheral artery disease.

Cholesterol levels: Levels of cholesterol in the blood, including low-density lipoprotein (LDL), high-density lipoprotein (HDL), and total cholesterol, which can impact cardiovascular health.

Control measures: Interventions or strategies aimed at managing and reducing the impact of cardiovascular risk factors on health outcomes.

Coronary heart disease: A condition where plaque buildup in the coronary arteries reduces blood flow to the heart muscle, leading to chest pain (angina) or heart attack.

Cerebrovascular disease: Disorders affecting blood vessels supplying blood to the brain, potentially leading to stroke or transient ischemic attacks (TIAs).

Early indications: Signs or symptoms that suggest the presence of a disease or health problem, often detected through medical examinations or diagnostic tests.

High blood glucose: Elevated levels of glucose (sugar) in the blood, a characteristic feature of diabetes mellitus.

Hypertension: High blood pressure, a condition where the force of blood against the artery walls is consistently too high.

Lifestyle changes: Modifications to daily habits and behaviors, such as diet, exercise, and stress management, aimed at improving overall health.

Lifestyle modifications: Changes made to daily habits and behaviors to improve health outcomes and reduce disease risk.

Medication therapy: Treatment with pharmaceutical drugs to manage and control various health conditions, including hypertension and dyslipidemia.

Prevalence: Measure of the proportion of individuals in a population who exhibit a specific trait, condition, or disease at a given point in time or within a defined period.

Raised blood lipids: Abnormal levels of fats (lipids) in the blood, including cholesterol and triglycerides, which can contribute to cardiovascular disease risk.

Risk factors: Factors that increase the likelihood of developing a particular disease.

Smoking cessation: Quitting smoking or using tobacco products to reduce the risk of various health problems, including cardiovascular diseases.

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death globally, taking an estimated 17.9 million lives each year. Over three quarters of CVDs deaths take place in low- and middle-income countries. One-third of these deaths occur prematurely in people under 70 years of age(1). CVDs are a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease, and other conditions. More than four out of five CVDs deaths are due to heart attacks and strokes (1).

A variety of risk factors contribute to the onset of CVDs, this includes hypertension, smoking, diabetes, and obesity. These risk factors can be controlled and modified through lifestyle changes such as regular physical activity, healthy eating habits, smoking, and stress management. Blood pressure and cholesterol levels can be controlled with medication or other therapies. The effects of lifestyle risk factors can be seen in individuals as high blood pressure, high blood glucose, raised blood lipids, and overweight and obesity.

According to the World Health Organization, cardiovascular disease is one of the top two causes of death in Ghana after diarrhoea sickness. CVDs were the leading cause of mortality in the country in 2008, accounting for 14.5% of total deaths (2). In Ghana's capital, Accra, CVDs rose from being the seventh and tenth cause of death in 1953 and 1966, respectively to becoming the leading cause of death in 1991 and 2001 (3). Even for a peri-urban district in the eastern region of Ghana, CVDs ranked as the leading cause of death in 2014 (4). In 2011, Stroke and Coronary Heart Disease ranked as the 3rd and 5th leading causes of death in Ghana accounting for 7.34% and 6.97% of all deaths respectively (5). A one-year review of in-patient records at Ghana's second largest tertiary hospital also identified stroke as constituting 9.1% of total medical adult admissions and 13.2% of all medical adult deaths within the period under review (6).

Globally, nearly 13%, 9%, 6% and 5% of CVD related deaths are attributable to hypertension, diabetes, physical inactivity and overweight and obesity respectively (7). However, several CVDs risk factors are interconnected; for example, lack of physical inactivity contributes to obesity, which is a risk factor for developing hypertension. By taking proactive measures to control and change these risk factors, individuals can greatly reduce their chance of developing CVDs.

Individuals must prioritise their cardiovascular health and take bold actions toward lowering their risk factors. Regular medical check-ups are suggested to monitor and manage possible risk factors, as well as to catch any early indicators or signs of CVDs. Ultimately, it is up to people to take ownership of their cardiovascular health and make the required lifestyle changes to mitigate their risk factors for CVDs and improve their overall well-being. By carrying out lifestyle changes

and working with healthcare specialists, individuals can take control of their cardiovascular health and greatly reduce their risk factors for developing CVDs, eventually leading to a healthier and longer life.

Relevance of the work

Addressing the impact of CVDs and associated risk factors on mortality rates in low- and middle-income nations (like Ghana) shows how urgent it is to address these health issues both internationally and in Ghana particularly. It also shows how connected CVD risk factors are and how crucial preventative actions, changes in lifestyle, and routine checkups with the doctor are to controlling and avoiding CVDs.

Scientific novelty

This study offers new data on the connection between CVD and its risk factors in different Ghanaian demographic groups. The research study collected data using both original and standardised questionnaires, offering a unique perspective on the prevalence and impact of cardiovascular diseases in Ghana. Additionally, it adds to the body of information already available on this crucial public health issue by highlighting the need of preventive healthcare measures and individual responsibility in treating CVD risk factors.

AIM AND OBJECTIVES OF THE WORK

Aim: To assess the prevalence of cardiovascular risk factors (high blood pressure, lipid disorders, diabetes, obesity) and their associations with lifestyle patterns (diet, physical activity, harmful habits) among the adult population in Accra, Ghana.

Objectives:

1. To assess the prevalence of cardiovascular disease (CVD) risk factors (RFs) (high blood pressure, lipid disorders, diabetes mellitus, obesity) among the adult population of Accra.
2. To determine lifestyle patterns (alcohol, smoking, physical activity, diet, and illicit drugs consumption) of the study participants.
3. To compare the prevalence of CVD RFs and lifestyle patterns in different socio demographic study groups.
4. To explore associations of CVD RFs and lifestyle patterns among respondents of the study.

1. REVIEW OF LITERATURE

1.1 Risk factors of cardiovascular diseases

1.1.1 High Blood Pressure

WHO defines high blood pressure also known as hypertension, as having a blood pressure that is excessively high (140/90 mmHg greater) (1). It is common but can be serious if not treated. People with high blood pressure may not feel symptoms. The only way to know is to have your blood pressure checked. Primary hypertension is the most common type of hypertension. It is unclear how primary hypertension begins to form. Yet, it appears to be the product of numerous hereditary and environmental factors that interact with one another in the body in intricate ways. Family history, advancing age, obesity, a high-sodium diet, alcohol use, and inactivity are all risk factors for the development of primary hypertension. The phrase "secondary hypertension" is used to describe cases of hypertension for which a particular aetiology has been found. Secondary hypertension has a wide range of probable causes. These factors include kidney illness, some endocrine diseases, certain prescription or over-the-counter drugs, or a substantial constriction of the aorta (8).

HBP is a very common condition affecting up to 40% of adults worldwide. It is one of the most common conditions for which drugs are prescribed the most frequently. Between 2010 and 2030, the global targets for noncommunicable diseases are to reduce the prevalence of HBP by 32%. An estimated 1.28 billion adults aged 30–79 years worldwide have HBP (hypertension), most 2/3 living in low- and middle-income countries. Almost half of adults with hypertension don't know they have the condition (1). According to WHO the prevalence of hypertension varies across regions and country income groups. The WHO African Region has the highest prevalence of hypertension (27%) while the WHO Region of the Americas has the lowest prevalence of hypertension (18%) (9). The number of adults with hypertension increased from 594 million in 1975 to 1.13 billion in 2015, with the increase seen largely in low- and middle-income countries. The rise in hypertension risk factors is the main reason for the increase. This high prevalence can be attributed to population growth, ageing populations, and unhealthy lifestyles (10). Cardiovascular diseases affect approximately a third of the world's adult population and are described as the world's largest-ever pandemic. (11) Hypertension remains an important cause of death in Ghana, according to the Ghana Demographic and Health Survey (GDHS) in 2014, hypertension has a prevalence of 13% amongst adults with 40.5% on treatment and only 23.8% of hypertension under

control. (13) According to a survey by Dosoo et al in the middle belt of Ghana, less than half of hypertensives were aware of their hypertension, with an overall hypertension prevalence of 28.1%. (14).

Persistent HBP increases the risk and potentially life-threatening conditions of heart diseases, heart attacks, strokes, heart failure, aortic aneurysms, kidney diseases to name a few. The only way of knowing whether you have HBP is to have a blood pressure test. If you have HBP, reducing it even a small amount can help lower your risk of these health conditions (15). You can get your BP checked/tested at pharmacies, local clinics, at your workplace or as part of your monthly health check. Also, you can monitor your BP yourself with a home blood pressure monitor daily/weekly.

Most people with HBP have no symptoms. Headaches, blurred vision, chest pain, anxiety, confusion, buzzing in the ears, nosebleeds, abnormal heart rhythm and other symptoms can be caused by HBP. If you have HBP, it's a good idea to check your blood pressure. If HBP is not treated, it can cause other health conditions (9). People with very high blood pressure can experience symptoms. HBP is clearly an important public health problem in Ghana, even in the poorest rural communities. Emerging opportunities such as the national health insurance scheme, a new health policy emphasising health promotion and healthier lifestyles and effective treatment should help prevent and control HBP (16)

Awareness of HBP is better in Ghana than in countries such as Eritrea, Burkina Faso, Cameroon and The Gambia where only 17%-23% of hypertensives were known hypertensives (17). Control of HBP in most parts of Africa is low; a mere 2% or lower in Tanzania (18) and Cameroon (17). Low compliance to treatment and subsequent default from treatment in Ghana is due to high cost of drugs, ready access to herbal treatment, misconceptions that HBP is curable, and inadequate counselling [19, 20, 21]. Basic, practical information can be hard to find for health care workers. There are no major national treatment guidelines for hypertension in Ghana. As part of the management of HBP, lifestyle interventions are not often provided. Noncompliance with therapy and recourse to alternative medicines are a major barrier that could contribute to the persistent poor BP control among hypertensives [21]. Treatment of HBP was defined as self-reported use of any of the followings for management of HBP: use of anti-hypertensive medicines; weight control; reduction in salt intake; exercise; reduction in alcohol intake or smoking cessation, according to the Ghana Health Service treatment guidelines (22).

All things considered, combating high blood pressure in Ghana requires a comprehensive approach that involves expanding healthcare access, increasing public awareness, promoting healthier lifestyles, and making sure that efficient management and treatment plans are in place.

1.1.2 Lipid Disorders

Lipid disorders, also known as dyslipidaemia, are a group of conditions characterised by abnormal levels of lipids (fats) in the blood, including high levels of cholesterol and triglycerides. Dyslipidaemia is a major risk factor for cardiovascular disease, which is the leading cause of death worldwide (32). Globally, the prevalence of lipid disorder has been increasing in recent years, largely due to changes in lifestyle and diet. In some countries, such as India and China, the prevalence of dyslipidaemia has reached epidemic proportions, with estimates of up to 70% of adults affected. The prevalence of lipid disorders varies widely depending on the population and geographic region. In the United States, it is estimated that about 38% of adults have high levels of low-density lipoprotein (LDL) cholesterol, also known as "bad" cholesterol, and 48% have low levels of high-density lipoprotein (HDL) cholesterol, or "good" cholesterol (33). These numbers are even higher in certain subpopulations, such as those with diabetes or a family history of dyslipidaemia.

In Ghana, there is limited data available on the prevalence of lipid disorders in Ghana, but studies suggest that dyslipidaemia is becoming a growing health problem in the country. A study published in 2017 found that the prevalence of dyslipidaemia among a sample of Ghanaian adults was 46.3%, with 28.2% having high total cholesterol, 34.3% having high LDL cholesterol, and 25.1% having low HDL cholesterol. The study also found that dyslipidaemia was more prevalent in urban areas and among older adults. Another study published in 2016 found that dyslipidaemia was a common risk factor for cardiovascular disease among patients attending a primary care clinic in Ghana, with 67% of patients having at least one lipid abnormality. These findings suggest that dyslipidaemia is a growing problem in Ghana, and there is a need for increased awareness, screening, and management of lipid disorders in the country. Promoting healthy lifestyle habits, such as regular exercise and a balanced diet, can help prevent and manage dyslipidaemia, and early detection and treatment of lipid disorders can help reduce the risk of cardiovascular disease.

Early detection and management of dyslipidaemia is crucial for preventing the development of cardiovascular disease. Lifestyle modifications, such as diet and exercise, are often the first line of treatment, but medications may also be necessary to manage lipid levels in some cases. Regular screening for dyslipidaemia is recommended, especially for individuals with risk factors such as obesity, high blood pressure, or a family history of cardiovascular disease.

Globally, lipid diseases represent a substantial health risk due to anomalies in blood lipid levels. These illnesses include hypercholesterolemia, hypertriglyceridemia, and dyslipidaemia, and they have a role in the development of various metabolic disorders as well as (CVDs).

Comprehending the risk factors linked to lipid disorders is crucial for the implementation of preventative measures and efficient management. Dietary factors: Consuming meals that are high in trans, saturated, and cholesterol fats has a significant effect on blood lipid levels. In order to reduce the risk of hypercholesterolemia, the National Heart, Lung, and Blood Institute underlines the importance of consuming fewer trans and saturated fats as well as how dietary choices affect blood cholesterol levels (46). Obesity, lipid disorder and obesity are closely associated. Obesity is characterised by an excess of body weight, particularly in the abdomen. Statistics from the National Institute of Diabetes and Digestive and Kidney illnesses indicate the prevalence of obesity and its link to dyslipidaemia, stressing the need for weight control strategies to address lipid illnesses (47).

Physical inactivity, a sedentary lifestyle and irregular exercise lead to obesity and dyslipidaemia, which exacerbate lipid illnesses. Lipid diseases are mostly influenced by genetic susceptibility, with a family history of lipid disorders raising the likelihood of developing related problems. Type 2 diabetes mellitus and dyslipidaemia are closely associated disorders, with increased triglyceride levels and low HDL cholesterol being prevalent in diabetics. Tobacco smoking alters lipid levels adversely, increasing the risk of atherosclerosis and cardiovascular disease.

Age-related increases in lipid levels have been documented, as has variation in LDL cholesterol levels between genders. Gender and age are important factors in lipid metabolism (48).

Dyslipidaemia can result from the use of certain drugs, such as corticosteroids, diuretics, and some antipsychotics, which can change lipid levels. The American Heart Association emphasises the significance of routine medication management and regular monitoring in people at risk of lipid problems by highlighting the impact of regularly given drugs on lipid metabolism. Hormonal changes, including the menopause in females, might impact lipid metabolism and elevate the likelihood of dyslipidaemia. The association between dyslipidaemia and menopause is examined by Casanova et al., who emphasise the necessity of lifestyle changes and hormone replacement treatment for postmenopausal women to reduce their risk of cardiovascular disease (Casanova et al., 2016) (49). In conclusion, lipid disorders are a serious public health issue that are influenced by several risk factors. The burden of lipid diseases and related cardiovascular consequences can be successfully decreased by addressing modifiable risk factors through lifestyle changes, preventive treatments, and tailored management plans.

1.1.3 Diabetes

Diabetes is a chronic disease that affects how your body regulates blood sugar (glucose). Glucose is an important source of energy for your cells and tissues, but it needs to be tightly regulated to ensure that it doesn't build up to dangerous levels in your bloodstream. There are three main types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes. Type 1 diabetes is an autoimmune disease in which the immune system attacks and destroys the cells in the pancreas that produce insulin, a hormone that helps regulate blood sugar. Type 2 diabetes is a metabolic disorder in which the body becomes resistant to insulin or doesn't produce enough of it. Gestational diabetes occurs during pregnancy and can increase the risk of both the mother and the baby developing type 2 diabetes later in life.

Some common symptoms of diabetes include frequent urination, increased thirst, increased hunger, blurred vision, fatigue, and slow wound healing. If left untreated, diabetes can lead to a range of serious complications, including cardiovascular disease, kidney disease, nerve damage, and blindness. Treatment for diabetes typically involves lifestyle changes, such as eating a healthy diet, getting regular exercise, and monitoring blood sugar levels. Medications like insulin or oral hypoglycaemic drugs may also be prescribed. It's important for people with diabetes to work closely with their healthcare providers to manage their condition and prevent complications.

The prevalence of diabetes has been increasing worldwide in recent decades, making it a major public health concern. According to WHO, the global prevalence of diabetes among adults over 18 years of age was 8.5% in 2014, up from 4.7% in 1980. This represents an increase from 108 million adults with diabetes in 1980 to 422 million adults with diabetes in 2014. The prevalence of diabetes varies by region, with the highest rates in low- and middle-income countries. In Africa, for example, the prevalence of diabetes is estimated to be around 3.9%, although this figure may be an underestimate due to under diagnosis and poor reporting in some countries. In comparison, the prevalence of diabetes in North America and the Caribbean is estimated to be around 12.6%.

Between 3.3% and 6% of the people in Ghana (Fig. 1.1.3.1), according to studies of the overall population, are estimated to have diabetes, with the prevalence rising with age and being higher in urban than rural areas (34, 35). Old age and education are mostly associated with higher risk of diabetes among men while low and moderate levels of physical activity and obesity were associated with higher risk of diabetes among women in Ghana. The prevalence among old adults in Ghana was within the range of the prevalence of diabetes in the general population between 3.8% and 6.3%. However, it was low compared to other African countries which could be due to population size (35)

There are several risk factors that can increase a person's likelihood of developing diabetes. Some of the most common risk factors include: Family history: If you have a family member with diabetes, you may be at a higher risk of developing the condition yourself. Obesity: Being overweight or obese can increase your risk of developing type 2 diabetes, especially if you carry excess weight around your abdomen. Sedentary lifestyle: Lack of physical activity can increase the risk of developing type 2 diabetes. Age: The risk of developing type 2 diabetes increases with age, especially after age 45 (38). Race and ethnicity: People of certain racial and ethnic groups, such as African Americans, Hispanics/Latinos, and Native Americans, have a higher risk of developing diabetes. Gestational diabetes: Women who have had gestational diabetes during pregnancy are at higher risk of developing type 2 diabetes later in life. Polycystic ovary syndrome (PCOS): Women with PCOS, a hormonal disorder that affects the ovaries, are at higher risk of developing type 2 diabetes. High blood pressure: Having high blood pressure, or hypertension, can increase the risk of developing type 2 diabetes. Abnormal cholesterol and triglyceride levels: High levels of "bad" LDL cholesterol and triglycerides and low levels of "good" HDL cholesterol can increase the risk of developing type 2 diabetes.

It's important to note that having one or more risk factors does not necessarily mean that you will develop diabetes. Diabetes can lead to a range of health complications, including heart disease, stroke, kidney disease, blindness, and amputations. However, it's important to be aware of your risk and take steps to reduce it, such as maintaining a healthy weight, staying physically active, and getting regular check-ups with your healthcare provider. Preventing and managing diabetes requires a comprehensive approach, including lifestyle changes such as healthy eating and regular physical activity, as well as access to high-quality healthcare and medications. Early diagnosis and treatment are also critical to prevent or delay the onset of complications associated with diabetes.

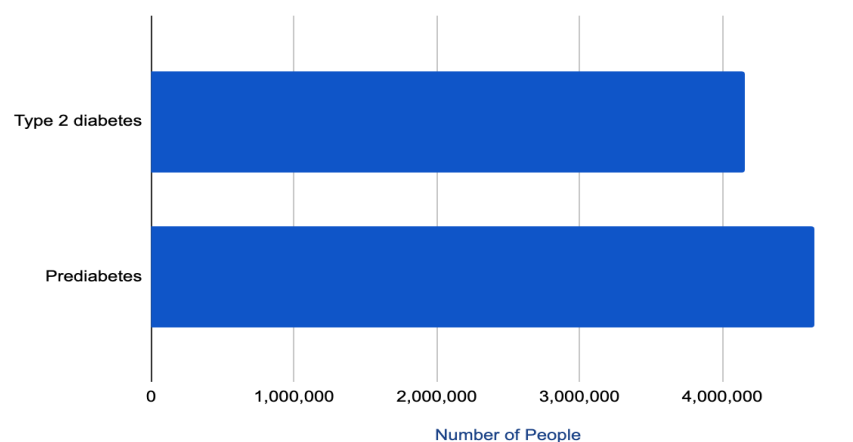


Fig. 1.1.3.1 Diabetic population in Ghana 2019-2022

1.1.4 Obesity

Being Obese or overweight is one of the biggest health issues in the world. The prevalence rate of Obesity over the years changed according to countries. One that is no longer only an issue in developed nations but also developing ones. The World Health Organization (2016) estimates that there are currently over 2 billion overweight persons in the world, of whom 650 million are Obese. That equates (39% of men and 40% of women) of adults aged 18 or over living with overweight and 13% living with obesity (23). Majority of people reside in countries where being overweight or obese increases the likelihood of developing health issues. The World Obesity Federation estimates that by 2020, 770 million adults worldwide will be obese, and by 2030, that number will likely reach one billion, if we don't act immediately.

The WHO did the MONICA study (Multinational Monitoring of trends and determinants in cardiovascular diseases) most importantly comparing all and most countries worldwide. In Ghana, the urban and rural Accra showed that the overall prevalence of overweight and obesity was 23.4% and 14.1% respectively among adults aged 25 years and above (24). In comparison to men, females had higher rates. Obesity increased with age up to 64 years old. Changing lifestyles and diet, as well as reduced physical activity, are leading to a rise in overweight and obese people in the country. Obesity is a risk factor for many chronic diseases, such as diabetes, cardiovascular disease, and certain types of cancer.

To combat the problem of obesity in Ghana, measures include promoting good eating habits, encouraging physical activity, and educating people about the health hazards connected to weight growth. To address the public health concern, more work must be done. In my research, the Pacific Island nations of Nauru, Cook Islands, and Palau have more than 30% of their population classified as obese (25). According to the National Health and Nutrition Examination Survey (NHANES), the obesity prevalence in the USA is very high, exceeding 30% (26). In Europe the prevalence of obesity affects more than half of adults and nearly one in three children (27). It is lower than the USA.

The risk varies from 4% to 28.3% in men and from 6.2% to 26.5% in women. The highest found in Estonia, Latvia, Ireland, Malta, Croatia, and Hungary. Over the past two decades, Asia and the Pacific have experienced rapid growth and a rapid increase in obesity and overweight people. The latest available data indicated that over 40.9% of adults in the region are overweight compared to 34.6% in 1990(28). In China more than 50% of adults and about 20% of children and adolescents are overweight or obese. Over the past 20 years, China has made many efforts in obesity intervention, while obesity rates continued rising (29)

A complex relationship of behavioural, environmental, and biological features leads to obesity, a multifactorial disorder. Because of the bidirectional nature of the interaction between obesity and its risk factors, both the presence of one risk factor and obesity itself can influence the emergence of other risk factors. For instance, if a person is genetically predisposed to fat, their risk of having the condition is further raised if they lead a sedentary lifestyle or eat poorly. A person may experience numerous health issues after being obese, including insulin resistance, type 2 diabetes, high blood pressure, and heart disease, all of which are risk factors for obesity. Like this, environmental elements like a lack of access to healthy food options or secure exercise facilities can cause obesity. Once someone develops obesity, these environmental variables can make it harder for them to exercise or find healthy food options, which can worsen their condition. Consequently, to effectively prevent or treat obesity, it is crucial to address and control all its risk factors. This can entail altering one's lifestyle by engaging in more physical activity, eating a nutritious diet, and lowering stress, as well as, if necessary, seeking out medical care or support.

Methods of Detecting Obesity-Body mass index (BMI), which is computed by dividing one's weight in kilograms by square, is typically used to assess being Obese and Overweight. Although it's not always accurate. BMI is a measure of body fat based on an individual's weight and height (30). It is calculated by dividing the individual's weight in kilograms by the square of their height in metres. A BMI of 30 or higher is considered obese. (31). There are other methods of detecting Obesity: Waist circumference; Skinfold thickness; Dual-energy X-ray absorptiometry (DEXA); Bioelectrical impedance analysis (BIA); Waist-to-hip ratio (WHR). It's crucial to remember that while these techniques can aid in the detection of obesity, they are not always precise and might not account for elements like muscle mass or bone density. It's always preferable to speak with a medical expert to figure out the best detection strategy for a certain person

High blood pressure, lipid disorders, diabetes mellitus, and obesity are all significant public health challenges globally and in Ghana, influenced by lifestyle factors like family history, diet, and physical activity. Reducing the incidence of cardiovascular diseases and managing associated risks requires effective knowledge, management, and preventative strategies. The increasing prevalence of obesity and diabetes, attributed to various factors including heredity, sedentary lifestyles, and urbanisation, highlights the need for complete lifestyle modifications and medical intervention in order to avoid and control these conditions. The identification of obesity is aided by detection techniques such as BMI and waist circumference, which highlight the significance of early intervention and comprehensive ways to treat these associated health issues.

1.2 Lifestyle patterns of cardiovascular diseases

1.2.1 Alcohol

Every year, 3 million people lose their lives because of the harmful use of alcohol. There are 230 distinct diseases that alcohol significantly contributes to. Additionally, it impacts the health and wellbeing of those who are close to the drinker. In 2018, each person aged 15 or older consumed an average of 6.2 litres of pure alcohol across the world. 26% of global consumption is unreported, which is a large percentage (1). About one in five elderly persons in Ghana currently consume alcohol. Like the younger population, older persons in Ghana consume alcohol on a regular basis. Most older adults who are adults take in less Fruits and Vegetables (FnV). Inadequate FnV intake is strongly correlated with alcohol usage (41). A National Alcohol Policy was launched after years of working with key stakeholders to combine the fragmented laws that exist on the production, distribution, sale, advertisement, and consumption of the commodity. The Policy recognizes the most important areas in reducing associated harm, such as increased taxation, regulating availability and marketing, and drink-driving interventions, and identifies major propriety areas for the reduction of alcohol-related harms (40). In the USA between 2009 to 2011, the prevalence of alcohol use among adults was 70.5%, with a high level of alcohol intake at 29.3%, a pattern of binge drinking at 27.4%, and alcohol dependency at 3.5% in the month before the study's publication (39).

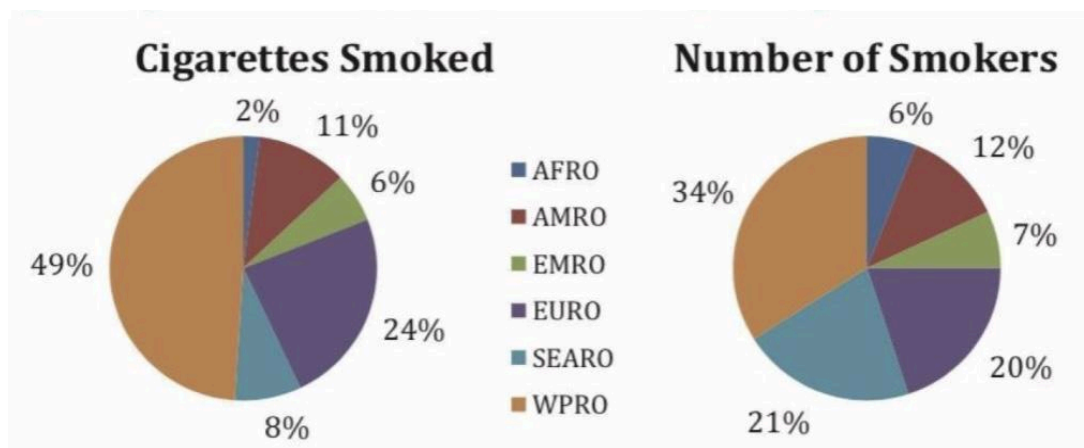
The frequency was higher in men between the ages of 18 and 24. Binge drinking was more prevalent among those with high levels of education, whereas alcohol dependence was more common among those with lower levels of education. From this, we can infer that persons who have completed their undergraduate and graduate degrees are more likely to drink excessively and quickly. Those who have not completed their university or college education are more likely to develop an alcohol mental addiction. Depending on how many standard units of alcohol are taken each day, the relationship between alcohol and health varies. Drinking too much alcohol can cause excessive blood pressure, heart failure, or stroke. Also, a condition that damages the heart muscle called cardiomyopathy can be worsened by excessive drinking. Alcohol can also lead to obesity and several health issues that come with it. Even though studies show that doctors should never promote it to patients due to misunderstanding from patients who may increase their use, 1 or 2 units of the alcohol taken per day have been shown to reduce the incidence of CVD.

1.2.2 Smoking

Overall, Asian nations and the Balkans part of Europe have the highest smoking rates(51). The Americas and Western European nations typically have lower smoking rates; however, this is not always the case; Chile has one of the highest smoking rates in the world (42). Around half of long-term smokers die from tobacco use, which is the biggest avoidable cause of mortality in the world. Tobacco usage killed 100 million people in the 20th century and, if current trends continue, will kill one billion people in the 21st. More than 6 million individuals died from tobacco use in 2011, with almost 80% occurring in LMICs (low- and middle-income countries). More than 8 million people will perish each year from tobacco usage by the year 2030. The disparities between the developed and developing worlds in cigarette use and deaths caused by tobacco use are anticipated to worsen. In high-income countries (HICs), tobacco-related mortality is predicted to decrease by 9% between 2002 and 2030, but they are also predicted to quadruple. For instance, smoking tobacco happens to be the leading cause of mortality in China, accounting for 1.2 million deaths per year. By 2030, that number is projected to increase to 3.5 million.

Africa's tobacco consumption hasn't gotten much attention. A low priority for tobacco control has developed in Africa because of the perceived low smoking rate in the continent, high smoking prevalence in countries that are developing, as well as the more urgent need for actions with infectious diseases. However, the number of smokers and cigarettes smoked in Africa has increased due to better economic growth and health. In Africa, because of gender, where one lives, education level, and other characteristics, tobacco consumption trends might vary from region to region as well as between population subgroups within a region. To develop a cogent plan to prevent tobacco use and to intervene to reduce current tobacco use, it is essential to recognize both the between- and within-region variance in tobacco use as well as variations by gender. (43)

(Figure1.2.2.1) below shows both the number of smokers and the number of cigarettes smoked by region. Only 2% of cigarettes are consumed in Africa, yet 6% of smokers reside there. This indicates that smokers in the United States consume far less cigarettes per smoker than those in other regions of the world. This is most likely a result of lower earnings, but it also demonstrates the enormous potential for market expansion in Africa, which is independent of the rise in smokers.



Source: ERC Group 2010, WHO 2011ⁱⁱⁱ and authors' calculations

Fig. 1.2.2.1 Cigarettes smoked and the number of smokers by WHO region

A global Map of the World Health Organisation WHO Regions;

- AFRO - African Region, AMRO - Americas Region
- EMRO - Eastern Mediterranean Region
- EURO - European Region
- SEARO - South-East Asia Region
- WPRO - Western Pacific Region

There are smoke-free laws that deter new smokers, protect second-hand smokers, and reduce hospitalisation for CVDS and respiratory illnesses. Teachers should also educate students about smoking habits; some studies support fear-based campaigns, while others support the promotion of healthy habits. The cornerstone of reducing smoking prevalence by 10% or more has been a significant tax rise, however this approach is debatable, and major tobacco companies argue that it will only lead to an increase in tobacco being sold illegally. Advertising bans (6%), as well as widespread media campaigns (5 to 10%), are also visible.

Recently, efforts have been made to forecast smoking prevalence by WHO region. 85% of the world's population and 90% of smokers were represented by a sample of 10 countries from each area, which was used to predict smoking prevalence for the following 10 and 20 years. The outcome is a population-weighted smoking prevalence for each region in 2020 and 2030 (Table 1.2.2.2) as well as a sensitivity analysis for both years with a lower bound ("best case") and an upper bound ("worst case").

Table 1.2.2.2 Projection of smoking prevalence by WHO region

	2010	2020		2030	
	Current	No policy interventions	Policy interventions	No policy interventions	Policy interventions
AFRO	15.8%	19.4%	12.1%	21.9%	11.3%
AMRO	20.5%	18.0%	11.6%	16.7%	8.9%
EMRO	22.4%	22.9%	13.9%	23.7%	13.0%
EURO	31.2%	30.2%	17.1%	29.7%	15.1%
SEARO	20.1%	18.7%	13.3%	17.6%	11.7%
WPRO	28.5%	27.6%	19.2%	26.3%	17.0%
Whole world	23.7%	22.7%	15.0%	22.0%	13.2%

Source: Méndez et al., 2012

Ghana has been a world leader in introducing anti-tobacco legislation, having been the first country to prohibit advertising, under a government directive issued as early as 1982 (44). The WHO introduced the MPOWER measures in 2008 which was set up to expedite the delivery of the WHO Framework Convention on Tobacco Control (FCTC) at a country-wide level (i.e. monitoring tobacco use, protecting people from second-hand smoke, help to quit, warnings about dangers of tobacco, enforce ad bans and raise taxes). These measures are practical, cost-effective ways to scale up country-level implementation of effective interventions to reduce the demand for tobacco that is contained in the WHO FCTC. Each MPOWER measure corresponds to at least one provision of the WHO Framework Convention on Tobacco Control. In total there are six measures, Ghana's achievements in advancing each of these measures are now considered (43, 44).

1.2.3 Physical activity

Physical activity can be classified as low, moderate, or high. People of all ages benefit from regular physical activity in terms of their physical and mental wellbeing. But today, 27% of adults and more than 80% of adolescents do not engage in the recommended amounts of physical activity, according to the WHO (1). It has been known that regular exercise helps control and prevent noncommunicable diseases like cardiovascular diseases etc. and several malignancies. Additionally, it lowers blood pressure, maintains a healthy weight, and enhances mental clarity, wellbeing, and quality of life. In 2016, 28% of adults worldwide, including 23% of males and 32% of women,

were not active enough. This indicates that individuals fall short of the global guidelines, which call for at least 150 minutes of moderate-intensity exercise or 75 minutes of intense exercise each week.

Compared to 12% of men and 24% of women in low-income nations, 26% of men and 35% of women in high-income countries were not physically active enough. A high or growing gross national product frequently correlates with low or declining levels of physical activity. The decline in physical activity is partially a result of passive behaviour in free time and sedentary habits at work and home. Similarly, a rise in the usage of "passive" modes of transportation also reduces physical activity levels. Globally, 81% of adolescents aged 11-17 years were insufficiently physically active in 2016. Adolescent girls were less active than adolescent boys, with 85% vs. 78% not meeting WHO recommendations of at least 60 minutes of moderate to vigorous intensity physical activity per day (1).

1.2.4 Diet

Globally, one in five deaths are associated with poor diet. One of the main risk factors for several chronic diseases, such as cancer, diabetes, cardiovascular disease, and other disorders associated with obesity, is poor diet. A healthy diet should emphasise consuming more fruit, vegetables, legumes, nuts, and grains while reducing sodium, sugar, and fat intake. Additionally, choosing unsaturated fats over saturated fats is advised. It's important for society to improve eating practices. A population-based, multisectoral, multidisciplinary, and culturally appropriate strategy is therefore necessary. Ghana experienced a nutrition transition, moving toward meals high in calories, added sugars, bad fats, and sodium yet deficient in critical nutrients, like many other nations undergoing fast urbanisation and modernization.

The prevalence of CVD in the nation is rising because of this food pattern and sedentary lifestyles (45). A study published in the Ghana Medical Journal in 2017 highlighted the link between poor diet and CVD risk factors. The research found that Ghanaians consumed diets high in refined carbohydrates, saturated fats, and sodium, while the intake of fruits, vegetables, and whole grains was inadequate. These dietary patterns were associated with increased obesity, elevated blood pressure, and dyslipidemia, all of which are major risk factors for CVD. The Ghana Demographic and Health Survey (GDHS) conducted in 2014 also reported that dietary factors play a significant role in the prevalence of non-communicable diseases, including CVD, in Ghana.

The survey revealed low consumption of fruits and vegetables, as well as a high intake of salty and sugary foods, among the Ghanaian population. Efforts are being made in Ghana to address this issue through nutrition education, public health campaigns, and policy interventions. The

Ghana National Salt Iodization Program, for example, aims to reduce the salt content in processed foods to combat hypertension and promote heart health. The promotion of locally grown and nutritious foods, along with education on healthy eating habits, is also being emphasized to improve the overall diet quality of Ghanaians.

Diet plays a crucial role in the development and prevention of cardiovascular diseases (CVDS). Certain dietary factors can significantly influence the risk of developing CVD, while others can help reduce this risk. High Saturated Fat Intake: Eating foods high in saturated fat, such as butter, red meat, and full-fat dairy products, can raise LDL cholesterol levels and contribute to the development of atherosclerosis, one of the main risk factors for cardiovascular disease. Consumption of Trans Fats: Trans fats can raise LDL cholesterol levels and lower HDL cholesterol levels, raising the risk of cardiovascular disease.

They are frequently found in processed and fried foods, baked goods and margarine. Excessive salt Intake: Hypertension, or elevated blood pressure, is a major risk factor for heart disease and stroke and can be brought on by diets heavy in salt, which is frequently found in processed and fast foods. Low Fibre Intake: By promoting obesity, elevated cholesterol, and insulin resistance, diets poor in fibre such as those deficient in fruits, vegetables, whole grains, and legumes may raise the risk of CVD. Excessive in Sugar: Diets rich in added sugars, especially those found in processed foods, sweets, and sugary drinks, increase the risk of weight gain, diabetes, and inflammation, all of which are linked to CVD.

Low Fruit and Vegetable Consumption: By encouraging inflammation, oxidative stress, and endothelial dysfunction, a diet deficient in fruits and vegetables which are high in vitamins, minerals, antioxidants, and fibre may raise the risk of CVD. Alcohol Use: Drinking too much alcohol increases the risk of CVD by raising triglyceride levels, blood pressure, and weight gain. However, other research has linked moderate alcohol use especially in red wine to a lower risk of heart disease(50). Unhealthy Food patterns: Inadequate eating habits, such as consuming processed meats, fast food, and high-calorie snacks on a regular basis, together with a diet low in nutrient-dense foods, can raise the risk of obesity, diabetes, hypertension, and dyslipidemia all of which are significant CVD risk factors.

Management and Preventive: The risk of CVDs can be decreased by eating a heart-healthy diet high in fruits, vegetables, whole grains, lean meats, and healthy fats like those in nuts, seeds, and fatty fish. Further supporting heart health can be achieved by reducing intake of alcohol, salt, added sweets, and saturated and trans fats while increasing intake of fibre.

1.2.5 Illicit drugs

The use of illicit drugs is a problem that affects the entire world, including Ghana. There is evidence to imply that drug usage, particularly among the adult population, is a concern, even though specific figures on illicit drug use in Ghana can be difficult to collect due to the nature of the problem. Ghana's most popular illicit substance is cannabis (marijuana). It's domestically grown and illegally imported. In addition to cannabis, there are also other illegal substances including cocaine, heroin, and amphetamines, however their prevalence may be somewhat lower than that of cannabis.

Ghana's drug use is influenced by various factors, including social, economic, and cultural ones. Peer pressure, poverty, high unemployment rates, and easy access to drugs contribute to the problem. Illicit drug usage is more prevalent in urban than rural locations, including Accra and Kumasi. The Ghanaian government is aware of the problem of illegal drug usage and has taken several steps to reduce drug trafficking, strengthen law enforcement, and offer treatment and rehabilitation programs to people who are addicted to drugs. The main government organization in charge of drug prevention and control in the nation is the Narcotics Control Board (NACOB).

The public, particularly young people, are also educated about the dangers and effects of drug use through prevention and awareness campaigns. To address the numerous factors influencing drug use, provide effective prevention, treatment, and education, more comprehensive tactics and rehabilitation services. Risk for Health-The use of illegal drugs puts one's cardiovascular health at serious risk. Addiction to drugs including heroin, cocaine, and methamphetamine can result in a number of CVD problems, such as: HBP: a condition where there is an abrupt rise in BP brought on by illicit drugs. This strain on the heart and blood vessels increases the risk of heart attack, stroke, and other CVD issues.

Arrhythmia: Stimulant drugs such as cocaine can cause the heart's natural rhythm to be disturbed, which can result in palpitations, chest pain, and possibly fatal arrhythmias. Heart Attack: Even in young people without underlying heart disease, drug use, especially cocaine, can narrow blood vessels and lower blood flow to the heart muscle, raising the risk of heart attacks. Stroke: Using illegal drugs can increase blood pressure, burst or obstruct blood vessels, which increases the risk of stroke, especially haemorrhagic stroke, which is brought on by bleeding in the brain.

Long-term drug misuse can damage the heart's muscle and cause CVDs, a disorder that makes the heart grow, thicken, or stiff and affects how well it pumps blood. Endocarditis: When medications are injected intravenously, bacteria may enter the bloodstream and increase the risk of infective endocarditis, which is an infection of the lining or valves of the heart. Peripheral Artery

Disease (PAD): The use of illicit drugs increases the risk of peripheral artery disease, which lowers blood flow to the limbs and can cause pain, ulceration, and tissue death. Illicit drug use can also damage blood arteries throughout the body. Using illicit drugs greatly increases the risk of (CVDs) and can have detrimental effects on heart health that are possibly fatal. Thus, abstaining from drugs completely is essential to keeping the cardiovascular system in good condition.

Alcohol consumption poses significant health risks globally, with 3 million deaths annually and a substantial impact on Ghana's elderly population. Smoking rates vary globally, with high prevalence in Asia and the Balkans, contributing to significant mortality, while tobacco use remains a critical concern in Africa, requiring targeted interventions. Physical inactivity affects over a quarter of adults worldwide, with higher rates in high-income countries, necessitating strategies to promote regular exercise and combat sedentary lifestyles. Poor diet contributes to one in five deaths globally, with Ghana experiencing a nutrition transition toward calorie-dense, nutrient-poor foods, exacerbating cardiovascular disease risk. Illicit drug use, particularly cannabis in Ghana, is influenced by socioeconomic factors and poses serious cardiovascular risks, necessitating comprehensive prevention and rehabilitation efforts to safeguard heart health.

2. RESEARCH METHODOLOGY

2.1 Type of Research

A cross-sectional study was conducted using an online survey. The survey was distributed across multiple websites. 177 individuals who completed the questionnaire were included in the analysis. In total, 89 (50.28%) women and 88(49.72%) men participated in the study.

2.2 Research Contingent

The research contingent for this study consists of adults aged 30 -75 residing in urban areas of Accra, Ghana.

2.3 Sample Size and Design

The prevalence of cardiovascular disease risk factors and their associations with lifestyle patterns were assessed in a total of 150-250 adult Ghanaians using quantitative study approaches. The survey instrument for the cross-sectional quantitative study was a self-made questionnaire on CVD RF and their association with lifestyle patterns. I looked for relevant articles published between 2010-2023 in PubMed, Embase, and Cochrane etc. This study was focused on using quantitative research to get appropriate data on the subject. Because of the time constraints, convenience, and easier access to patients, a quantitative approach was adopted.

2.4 Variables determined using the questionnaire

The questionnaire was used to determine self-reported and rated health, self-rated quality of life, and lifestyle characteristics and behaviours - smoking, physical activity, alcohol use, Diet, and Illicit drugs among study participants in the initial and follow-up surveys. The structured questionnaire asked participants about their age, education, marital and employment status, smoking status, alcohol intake, self-rated health and quality of life, and other factors. The age of study participants in the initial survey was divided into eleven 11 categories: under 30, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, and over 75 years old.

Education was divided into seven 7 categories, some high school or diploma, high school, bachelor's degree, master's degree, PHD, professional/vocational/technical school and no school completed. The smoking status was divided into three categories: never smokers, ex-smokers, and those who currently smoke and passive smokers (at least one cigarette per day). Also, physical

activities were moderate, vigorous and sedentary. Alcohol consumption frequency was classified into six groups: never or former drinkers, drinkers less than once per month, 1-3 times per month, once per week, 2-3 times per week, several times per week or daily. Also, any use of illicit drugs prescribed for medical purposes. Their diet and general knowledge about CVDs. To calculate the FAST score, we need to assign numerical values to each response and then sum them up: Never = 0. Daily or Almost Daily = 4. Weekly = 3. Less than Monthly = 2. Monthly = 1. Self-reported health was classified into four categories: good, fair, bad, and very bad.

2.5 Research Ethics

All participants in the study were provided with details about the study's aims and objectives and the assurance of confidentiality at the beginning of the questionnaire. The collected data was handled with strict confidentiality measures and anonymised to ensure that the identities of the research participants remained protected. The study protocol received approval from the Bioethics Centre of the Lithuanian University of Health Sciences emphasises how the study complies with ethical guidelines and makes sure that participants' rights are protected during the whole research procedure.

2.6 Statistical Analysis

Data analysis was performed using the statistical package IBM SPSS Statistics.

Descriptive statistics were calculated for variables included in the data analysis. The prevalence of lifestyle factors, self-rated health, and quality of life was compared among different gender, age, and other groups. Additionally, inferential statistics were used to determine the significance of differences between these groups, providing deeper insights into the patterns observed.

3. RESULTS

3.1 Study population

The total number of respondents was 177, of whom 89 were female (50.3%) and 87 were male (49.2). Most respondents were in the age range of 30–34, accounting for 17.5%.

Table 3.1.1 Socio demographic profile of the study population

Variable	Characteristics	Frequency (n=177)%	Males (n=88)%	Female (n=89)%	p-value
Age	Below 30-75+	100			
Marital Status	Single	35.8	30.2	41.4	0.264
	Married	54.3	59.3	49.4	
	Divorce	2.3	1.2	3.4	
	Widowed	7.5	9.3	5.7	
	Other/no response	-	-	-	
Employment	Employed full-time	58.0	64.4	51.7	0.075
	Employed part-time	6.8	6.9	6.7	
	Self Employed	15.3	10.3	20.2	
	Seeking opportunities	0.6	0.0	1.1	
	Retired	14.2	17.2	11.2	
	Prefer not to say	4.5	1.1	7.9	
	Other/no response	0.6	0.0	1.1	
Education	Some School/diploma	19.9	13.8	25.8	0.396
	High School	4.0	3.4	4.5	
	Bachelor's Degree	42.6	43.7	41.6	
	Master's Degree	19.9	21.8	18.0	
	PHD Degree	5.1	8.0	2.2	
	Prof./Technical School	4.5	5.7	3.4	
	No Schooling completed	2.8	2.3	3.4	
	Other/no response	1.1	1.1	1.1	
Income	Less than Ghs 5,000	22.7	17.2	28.1	0.448
	Ghs 6,000 - Ghs 10,000	36.4	34.5	38.2	
	Ghs 11,000 - Ghs 20,000	25.6	31.0	20.2	
	Ghs 21,000 - 30,000	8.0	10.3	5.6	
	More than Ghs 31,000	1.1	1.1	1.1	
	Prefer not to say	5.1	4.6	5.6	
	Other/no response	1.1	1.1	1.1	

The demographic breakdown for study participants in Accra, Ghana, reveals that out of 177 respondents 89 (50.3%) are female and 88 (49.2%) are male (Table 3.1.1). This distribution provides a balanced representation in the study, allowing for a comprehensive analysis across genders in the research.

3.2 Prevalence of Cardiovascular Risk Factors

3.2.1 Analysis of High Blood Pressure Data

A total of 166 respondents participated in the survey regarding high blood pressure. Out of this, 60 individuals (33.9%) acknowledged having high blood pressure, while the majority, 106 respondents (59.9%), reported not having the condition. A smaller proportion, 11 individuals (6.2%), expressed uncertainty about their high blood pressure status. In terms of the overall distribution, 93.8% of respondents provided clear responses.

3.2.2 Analysis of Lipid Disorder Check Data

Out of 170 respondents, it was found that 55 individuals, constituting 31.1% of the total, reported having a lipid disorder. Conversely, most of the respondents (n= 115, 65.0%) stated they did not have such a disorder. Remarkably, these figures combine to a total of 96.0%, indicating a high level of clarity in respondents' reports regarding their lipid disorder status.

These findings underscore the prevalence of lipid disorders within the surveyed population, with a notable portion acknowledging the absence of such conditions. This suggests a significant health consideration among the surveyed individuals, with implications for further study and potential interventions aimed at managing lipid disorders.

3.2.3 Analysis of Diabetes Mellitus Data

Out of 176 respondents, the vast majority, comprising 138 individuals or 78.0%, stated that they do not have diabetes. In contrast, 38 people, accounting for 21.5% of the total, acknowledged having diabetes. When these responses are aggregated, it reveals that 99.4% of the participants provided clear information regarding their diabetes status. This high level of clarity underscores the significance of the findings regarding the prevalence of diabetes within the surveyed population.

3.2.4 Analysis of Obesity Check Data

Out of 176 respondents, 38 individuals, representing 21.5% of the total, reported experiencing obesity, highlighting a significant proportion grappling with this health concern. Conversely, the majority of respondents, totaling 138 individuals or 78.0%, indicated that they did not have obesity, reflecting a comparatively lower prevalence within the surveyed group. Notably, the comprehensive nature of responses, totaling 99.4% of participants, underscores the thoroughness of data collection

regarding obesity status. These findings shed light on the prevalence of obesity within the surveyed population, emphasizing the need for continued efforts in addressing and managing this health condition.

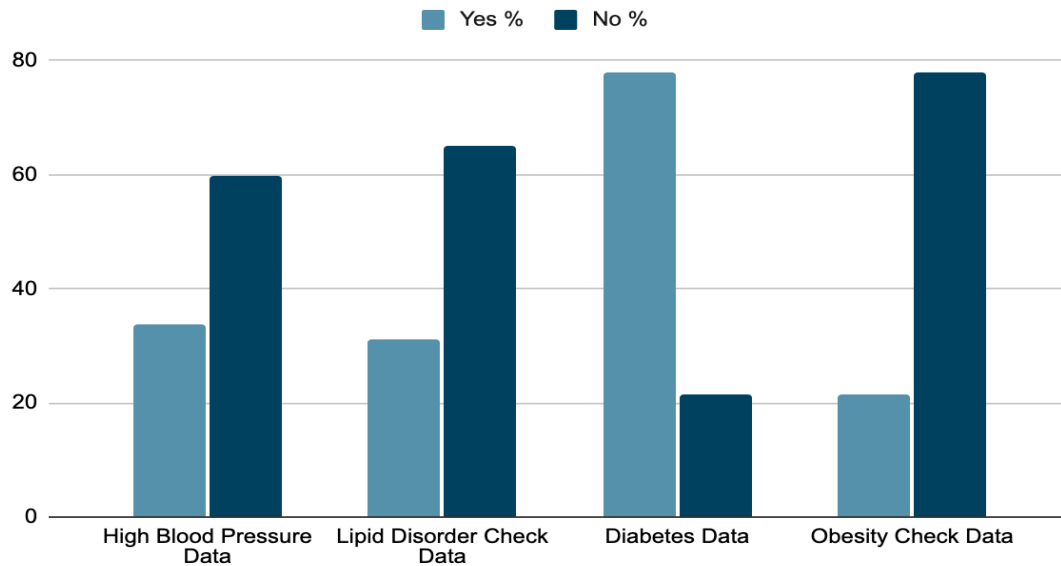


Fig 3.2.1.1 Prevalence of cardiovascular risk factors

The analysis of health data from the survey reveals varying prevalence rates of different conditions among the respondents (Figure 3.2.1.1) above. High blood pressure was acknowledged by 33.9% of the 166 participants, while 31.1% reported having a lipid disorder, and 21.5% admitted to obesity. Conversely, 78.0% indicated they didn't have diabetes. The majority of respondents provided clear responses across all health conditions, highlighting the reliability of the data collected and the prevalence of these health issues within the surveyed population.

3.3 Determining lifestyle patterns of the study participants

3.3.1 Analysis of Alcohol

These findings indicate that a significant portion of the surveyed population engages in alcohol consumption, with nearly 60% reporting affirmative (Table 3.3.1.1).

Table 3.3.1.1 Alcohol Consumption Analysis

Replies	N=177	Percent (%)
Yes	105	59.3
No	72	40.1

These results illustrate varying patterns of heavy alcohol consumption among the surveyed population. While a significant portion reported never engaging in heavy alcohol consumption, a smaller proportion reported more frequent instances, including daily or almost daily consumption (Table 3.3.1.2) below.

Table 3.3.1.2 Frequency of Heavy Alcohol Consumption

Frequency of Heavy Alcohol Consumption	No. of Replies (177)	Percent (%)
Never	137	77.1
Daily or almost daily	13	7.5
Weekly	8	4.1
Monthly	9	5.1
Less than Monthly	10	5.6

Table 3.3.1.3 Average Units of Alcohol Consumed

Average Units of Alcohol Consumed	No. of Replies	Percent (%)
Per Day	128	72.3
Per Week	10	5.6
Per Month	7	4.0
Per Year	17	9.6

Given that 1 unit of alcohol is equivalent to 100ml of 10% ABV, I calculated the average units of alcohol consumed based on the respondents' reported frequency. This data provides insights into the typical alcohol consumption habits of the surveyed population (Table 3.3.1.3) above.

These findings offer insights into the preferred types of alcohol consumed by the surveyed population. With 51.1% respondents reporting that wine was their preferred type of alcohol. (Table 3.3.1.4)

Table 3.3.1.4 Types of Alcohol Consumed

Types of Alcohol Consumed	N=177	Percent (%)
Beer	53	36.1
Wine	102	51.5
Strong alcohol drinks(vodka, whiskey, tequila, gin, rum)	22	12.4

3.3.2 Analysis of Smoking

A total of 136(76%) replies out of 177 stated they had never smoked. This explains the vast majority of responses, indicating the surveyed population under study generally exhibits non-smoking behaviour.(Table 3.3.2.1)

Table 3.3.2.1 Smoking attitude

Smoking attitude	N=177	Percent (%)
Current Smoker	16	9.0
Ex-Smoker	20	11.3
Never Smoked	136	76.0
Passive Smoker	5	2.8

Table 3.3.2.2 Confidence level to quit smoking - On a scale of 1-10 (1=Low, 10=High)

On on scale of 1-10	1	2	3	4	5	6	7	8	9	10
How confident are you that you could give up smoking	1	0	2	9	1	4	7	1	18	134
%	0.6	-	1.28	3.6	0.6	1.8	2.5	0.6	7.8	81.1

The majority of respondents, accounting for 81.1%, expressed high confidence, rating their ability to give up smoking as 10 on the scale (Table 3.3.2.2)

Table 3.3.2.3 Number of Cigarettes Smoked per Day

Number of Cigarettes Smoked per Day	N=177	Percent (%)
0 Cigarettes per day	158	85.3
1-2 Cigarettes per day	15	7.3
3-4 Cigarettes per day	2	1.1
A pack of cigarettes per day	2	1.1

The majority of respondents reported smoking no cigarettes per day, while smaller proportions indicated smoking varying quantities, ranging from 1 to 2 cigarettes, 3 to 4 cigarettes, or a whole pack per day.(Table 3.3.2.3)

3.3.3 Analysis of Illicit Drug Use

This data indicates a low prevalence of illicit drug use among the surveyed population, with the overwhelming majority reporting abstention from such substances (Table 3.3.3.1).

Table 3.3.3.1 Distribution use/medical purposes of illicit drugs

177 (n)	Yes	No
Use of illicit drugs	5 (2.8%)	172 (97.2%)
For medical purposes	13 (7.3%)	164 (92.7%)

Considering the 92.7% respondents who provided a response of No, these findings suggest a very low prevalence of using illicit drugs for medical purposes among the surveyed population (Table 3.3.3.1)

3.3.4 Analysis of Physical Activity Data

177 individuals regarding their engagement in moderate to vigorous intense movement. Among the respondents, 99 individuals, constituting 55.9%, reported engaging in such activities, while 78 individuals, representing 44.1%, did not. This suggests that a majority of the surveyed population participates in moderate to vigorous intense movement, while a notable portion does not.

Table 3.3.4.1 Frequency of moderate/vigorous intense movement

Frequency of moderate/vigorous intense movement	N=177	Percent (%)
1-2 days a week	144	81.4
3-4 days a week	20	11.3
5-6 days a week	5	2.8
7 days a week	8	4.6

This suggests that a significant percentage 81.4% of the surveyed population engages in activities that increase heart rate and promote physical fitness. (Table 3.3.4.2)

Table 3.3.4.2 Time spent on movement

Time spent on moderate/vigorous intense movement	N=177	Percent (%)
30 minutes	138	78
1 hour	27	10.7
2 hours	7	4.5
More than 3 hours	5	2.8

78% indicated at least 30 minutes. This indicates that a considerable proportion of the sample population devotes a considerable amount of time to physical activity (Table 3.3.4.3).

177 individuals regarding their participation in active transportation. Among the respondents, 116 individuals, accounting for 65.5%, reported engaging in active transportation, while 61 individuals, representing 34.4%, did not. This indicates that a significant majority of the surveyed population utilizes active modes of transportation, such as walking or cycling, while a notable portion does not opt for such methods.

Table 3.3.4.3 Sedentary behaviour

Sedentary Behaviour	N=177	Percent (%)
30 minutes	85	48
1 hour	24	13.1
2 hours	41	22
More than 3 hours	27	15.3

These findings indicate that a significant proportion of the surveyed population spends a considerable amount of time sitting or reclining on a typical day, with nearly half reporting 30 minutes or less, and the remaining respondents reporting longer durations (Table 3.3.4.5)

3.3.5 Analysis of Diet

Table 3.3.5.1 Meal frequency

Meal frequency	N=177	Percent (%)
1-2 meals per day	15	6.8
2-3 meals per day	31	17.6
3 or more meals per day	131	74

These findings indicate that most of the surveyed population eats three or more meals per day (Table 3.3.5.1).

Table 3.3.5.2 Fruit and Vegetable Consumption

Fruit/vegetable consumption	N	Percent %
No	98	55.4
Yes	74	41.8
Usually none	2	1.2
No response	3	1.7

These findings indicate that most of the surveyed population does not consume more than 5 portions of fruit and/or vegetables every day (Table 3.3.5.2).

Table 3.3.5.3 Preference for Low-Fat Products

Low fat products (response)	N	Percent %
Yes	139	78.5
No	35	19.8
Missing	3	1.7

These findings indicate that a significant majority of the surveyed population chooses low-fat products when available (Table 3.3.5.3)

Preference for Baked/Steamed/Grilled foods: Out of 177 respondents, 171 provided responses regarding their preference over fried foods when available. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.4)

Table 3.3.5.4 Preference for baked/steamed/grilled foods

Preference over fried foods	N	Percent %
Yes	142	80.2
No	29	16.4
Missing	6	3.4

These findings indicate that the majority of the surveyed population prefers baked, steamed, or grilled options over fried foods when available (Table 3.3.5.4).

Preference for Visible Red Fatty Meat: Out of 177 respondents, 172 provided responses regarding their preference for visible red fatty meat over lean cut meat. The breakdown of responses, along with the corresponding percentages, is as follows (Table 3.3.5.5).

Table 3.3.5.5 Preference for red fatty meat

Preference	N	Percent %
Yes	63	35.5
No	109	61.6
Missing	5	2.8

These findings indicate that the majority of the surveyed population does not prefer visible red fatty meat over lean cut meat.

Inclusion of Beans and Lentils in Diet: Out of 177 respondents, 168 provided responses regarding whether they regularly include beans and lentils in their diet. These findings indicate that the majority of the surveyed population regularly includes beans and lentils in their diet. (Table 3.3.5.6)

Table 3.3.5.6 Beans/lentils diet

Response	N	Percent %
Yes	138	78
No	30	16.9
Missing	9	5.1

Main Meals Based on Starchy Foods: Out of 177 respondents, 174 provided responses regarding whether they base their main meals around starchy foods such as potatoes, pasta, rice, or bread. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.7)

Table 3.3.5.7 Meals based on starchy foods

Response	N	Percent %
Yes	62	35.6
No	111	63.6
Missing	4	2.3

These findings indicate that the majority of the surveyed population does not base their main meals around starchy foods.

Preference for Home-Cooked Meals: Out of 177 respondents, 173 provided responses regarding their preference for home-cooked meals over processed foods or takeaways. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.8).

Table 3.3.5.8 Preference for home cooked meals

Response	N	Percent %
Yes	144	83.2
No	29	16.7
Missing	4	2.3

These findings indicate that the majority of the surveyed population prefers home-cooked meals over processed foods or takeaways.

Water Consumption Habits: Out of 177 respondents, 173 provided responses regarding whether they drink plenty of water at regular intervals in a day. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.9)

Table 3.3.5.9 Water consumption habit

Response	N	Percent %
Yes	151	87.3
No	22	12.7
Missing	4	2.3

These findings indicate that the majority of the surveyed population drinks plenty of water at regular intervals throughout the day.

Coffee Consumption: Out of 177 respondents, 172 provided responses regarding whether they drink more than 2 cups of coffee in a day. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.10)

Table 3.3.5.10 Coffee consumption

Response	N	Percent %
Yes	80	46.5
No	92	53.5
Missing	5	2.9

These findings indicate that a significant proportion of the surveyed population does not drink more than 2 cups of coffee in a day.

Daily Sugar Consumption: out of 177 respondents, 173 provided responses regarding their daily consumption. (Table 3.3.5.11)

Table 3.3.5.11 Sugar consumption

Sugar consumption	N	Percent %
0-3 teaspoons	166	95.9
4-6 teaspoons	6	3.5
7 or more teaspoons	1	0.6
Missing	4	2.3

These findings indicate that the vast majority of the surveyed population consumes 0-3 teaspoons of sugar daily.

Postprandial Energy Levels: Out of 177 respondents, 174 provided responses regarding whether they feel their energy levels drop within an hour of eating. The breakdown of responses, along with the corresponding percentages (Table 3.3.5.12)

Table 3.3.5.12 Postprandial energy

Response	N	Percent %
Yes	54	31
No	120	69
Missing	3	1.7

These findings indicate that a significant proportion of the surveyed population 69.0% does not feel their energy levels drop within an hour of eating. However, a notable portion (approximately 31.0%) reported experiencing a decrease in energy levels after meals.

Headaches or Inability to Concentrate Relieved by Eating: Out of 177 respondents, 173 provided responses regarding whether they experience headaches or an inability to concentrate that is relieved by eating. The breakdown of responses (Table 3.3.5.13)

Table 3.3.5.13 Headaches or an inability to concentrate that is relieved by eating

Response	N	Percent %
Yes	26	15
No	147	84.8
Missing	4	2.3

These findings indicate that a small proportion of the surveyed population (approximately 15.0%) experiences headaches or an inability to concentrate that is relieved by eating. The majority of respondents (approximately 84.8%) either do not experience these symptoms or are unsure if they do.

3.4 The Prevalence of Cardiovascular Diseases Risk Factors and lifestyle Patterns in Different Socio Demographic Study Groups

3.4.1 Prevalence of Risk factors in Different Socio Demographic Study Groups

a) Obesity and Age

From this analysis, it appears that there is a trend of increasing obesity rates with age, with the highest percentage of obese individuals found in the oldest age group (60-75+). This suggests a potential correlation between age and obesity, with older individuals being more likely to struggle with obesity (Figure 3.4.1) The results indicate that there is a statistically significant association between obesity and age, with a (χ^2)= 21.896 and a p=0.001.

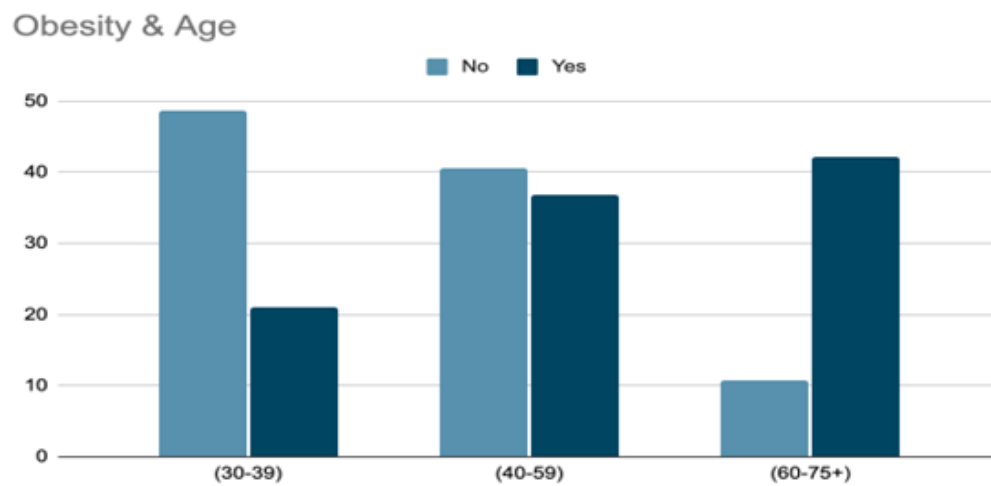


Figure 3.4.1.1 Relationship between Obesity and Age

b) Obesity and Gender

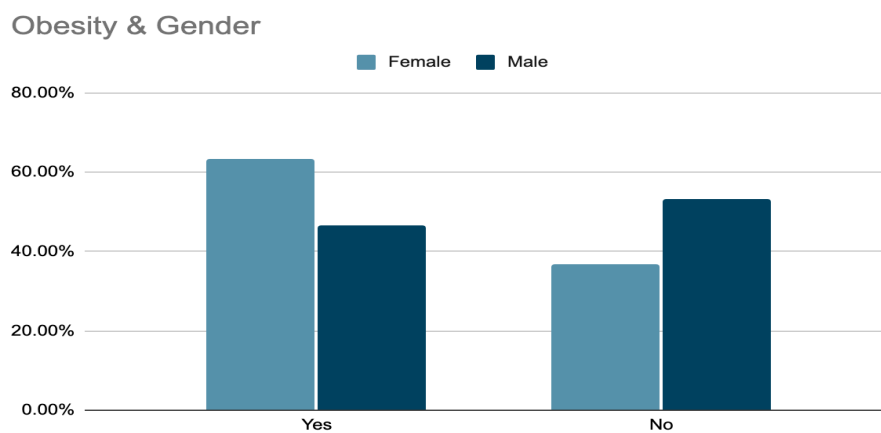


Figure 3.4.1.2 Relationship between Obesity and Gender

The relationship between obesity and gender reveals that among 177 respondents, (50.3%) were female and (49.7%) were male (Figure 3.4.1.2) The percentage of obese individuals among females (27.3%) is higher compared to males (16.1%). Majority of females (72.7%) are not obese and Majority of males (83.9%) are not obese with (Figure 3.4.2) shown above. The results indicate that there is no statistically significant association between obesity and gender, with a (χ^2)=3.217 and p=0.073.

c) Obesity and Marital Status

Table 3.4.1.3 Relationship between obesity and marital status

Marital Status	Obesity Rate (%)	Comparison with Overall Obesity Rate
Single	11.1	Higher
Married	24.5	Higher
Divorced	5.3	Higher
Widowed	46.2	Significantly higher

This (Table 3.4.1.3) above illustrates the obesity rates among different marital statuses and compares them with the overall obesity rate. It indicates a statistically significant association between marital status and obesity (χ^2 =10.989, p=0.012).

d) Obesity (income, employment status, educational level)

The analysis explored how obesity relates to income, educational background, and employment status. Among respondents, fully employed individuals had the highest obesity rates, followed by part-time employees, retirees, and self-employed individuals. Those who didn't disclose their employment status showed an equal split in obesity rates. Regarding income, the highest obesity rates were among those earning between 6,000-10,000, with lower rates for higher income brackets. individuals with bachelor's and master's degrees exhibited lower rates of obesity compared to other educational backgrounds. This suggests a potential association between higher levels of education and lower obesity rates, highlighting the importance of educational attainment in addressing obesity-related issues. Overall, the findings emphasize the complex interplay between socio-economic factors and obesity, calling for tailored interventions across diverse income and employment groups.

e) High blood pressure and Age

The analysis reveals varying proportions of individuals reporting struggles with high blood pressure (HBP) across different age groups. In the age group 30-39, a relatively low number reported HBP (16.7%). For ages 40-59, a higher proportion had HBP (35%). In the oldest group (60-75+), the proportion reporting HBP was notably higher (48.3%). These findings suggest a statistically significant association between HBP and age ($\chi^2= 59.926$, $p= 0.001$).

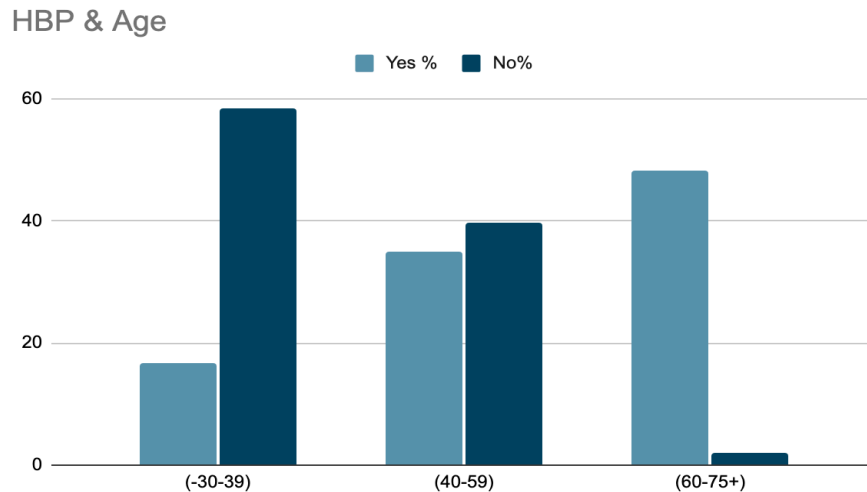


Figure 3.4.1.4 Relationship between HBP & Age

f) High blood pressure and Gender

The analysis of struggles with high blood pressure (HBP) and gender (Figure 3.4.1.5) reveals that among 177 respondents, there were slightly more males (50.3%) than females (49.7%). Overall, the data indicates a fairly balanced distribution of struggles with HBP between genders, with similar proportions of males and females reporting struggles with HBP.

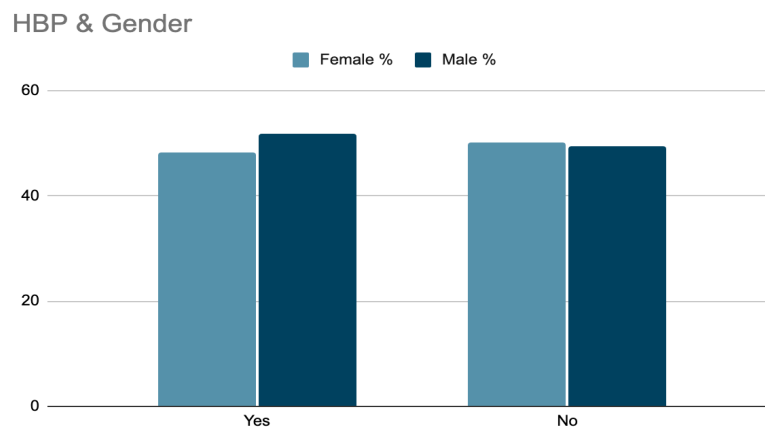


Figure 3.4.1.5 Relationship between HBP & Gender

The results indicate that there is no statistically significant association between struggles with high blood pressure and gender, with a $(\chi^2)=0.070$ and a $p=0.791$.

g) High blood pressure and Marital Status

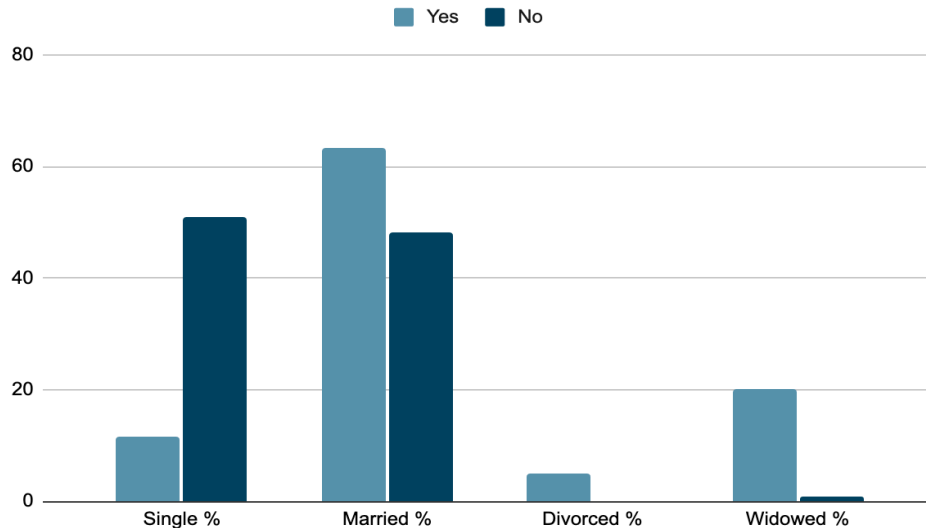


Figure 3.4.1.6 Relationship between HBP and marital status

The analysis of struggles with high blood pressure (HBP) and marital status reveals varying proportions of individuals reporting HBP across different marital statuses (Table 3.4.1.6). Among divorcees, all three respondents reported struggling with HBP, representing a 100% rate among this group. For married individuals, a majority (63.3%) reported struggling with HBP, while the remaining 48.1% did not. Among single individuals, a smaller proportion (11.7%) reported struggling with HBP, while the majority (88.3%) did not. For widowed respondents, the majority (92.3%) reported struggling with HBP, while a single respondent (7.7%) did not.

Overall, the data suggests that marital status may be associated with differences in reported struggles with HBP, with divorcees and widowed individuals showing higher proportions of struggles with HBP compared to married and single individuals. The results indicate that there is a statistically significant association between struggles with high blood pressure and marital status, with a $(\chi^2)=40.307$ and a $p=0.001$.

h) High blood pressure (income, employment status, educational level)

The analysis of struggles with high blood pressure (HBP) across different employment statuses shows varying proportions. Fully employed individuals reported the highest number of

struggles with HBP, followed by retired individuals. Part-time employees and those who preferred not to disclose their employment status also reported struggles with HBP, albeit in smaller numbers. Regarding income, individuals earning between 6,000-10,000 reported the highest number of struggles with HBP, followed by those earning between 11,000-20,000.

Those earning more than 31,000 had the lowest reported struggles with HBP. Those who preferred not to disclose their income also showed a significant number of reported struggles with HBP. In terms of educational background, individuals with a Bachelor’s Degree reported the highest number of struggles with HBP, followed by those with Some high school or diploma. Respondents with a Masters Degree reported fewer struggles with HBP, while those with a PHD or Higher reported the fewest struggles. The trend suggests that higher educational attainment might be associated with lower reported struggles with HBP. In summary, both employment status and educational background show significant associations with struggles with HBP, while the association between income and struggles with HBP is not statistically significant at the conventional significance level.

i) Lipid Disorders & Age

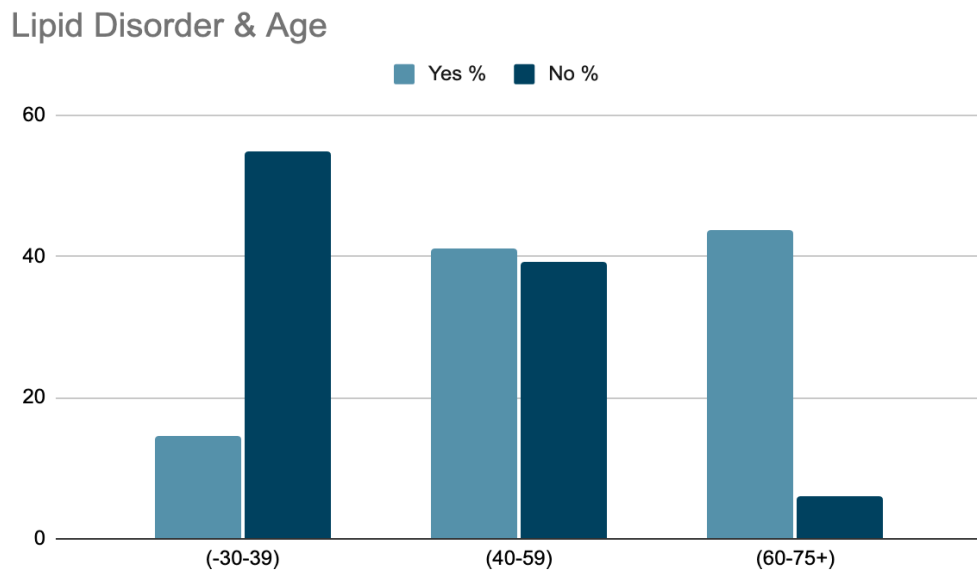


Figure 3.4.1.7 relationship between lipid disorder and Age

The analysis, based on 170 (96.0%) respondents out of a total of 177, shows a trend of increasing reported struggles with lipid disorders with advancing age (Table 3.4.1.7) The highest proportion of individuals reporting lipid disorders is found in the oldest age group 1 (60-75 and

over) with 18.2% replies, followed by the age group 2- (40 to 59) with 40.0% replies, and the lowest proportion is in the youngest age group 3- (below 30 to 39) with 41.8% replies. The results suggest a significant association between age and struggles with lipid disorders, with a $(\chi^2)=43.258$ and a $p=0.001$.

j) Lipid Disorder and Gender

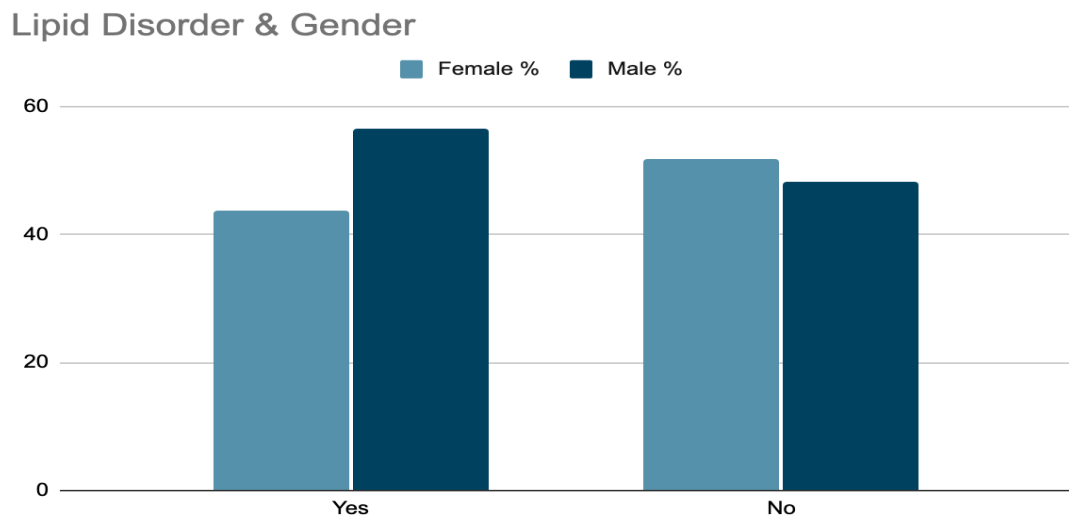


Figure 3.4.1.8 Relationship between lipid disorder and Gender

The analysis of lipid disorder check and gender reveals varying proportions of individuals reporting lipid disorder checks across genders. Female: 43.6% reported undergoing lipid disorder checks, while 51.8% did not. Male: 56.4% reported undergoing lipid disorder checks, while 48.2% did not. Overall, the data suggests a relatively balanced distribution of reported lipid disorder checks between genders, with slightly more males undergoing the check compared to females. The results suggest no statistically significant association between undergoing lipid disorder checks and gender, with a $(\chi^2)=0.978$ and a $p= 0.323$.

k) Lipid Disorders and Marital Status

The analysis of struggles with lipid disorder checks and marital status, based on 95.5% respondents indicates the following: Divorced individuals, 1.8% reported undergoing lipid disorder

checks, while 2.6% did not. Married individuals, 69.1% reported undergoing lipid disorder checks, while 48.2% did not. Single individuals, 12.7% reported undergoing lipid disorder checks, while 45.6% did not. Widowed respondents, 16.4% reported undergoing lipid disorder checks, while 3.5% did not. Overall, the data suggests that married individuals have the highest proportion of reported lipid disorder checks, followed by widowed individuals, while divorced and single individuals have relatively lower proportions. The results suggest a statistically significant association between lipid disorder checks and marital status, with a $(\chi^2) = 22.497$ and a $p = 0.001$.

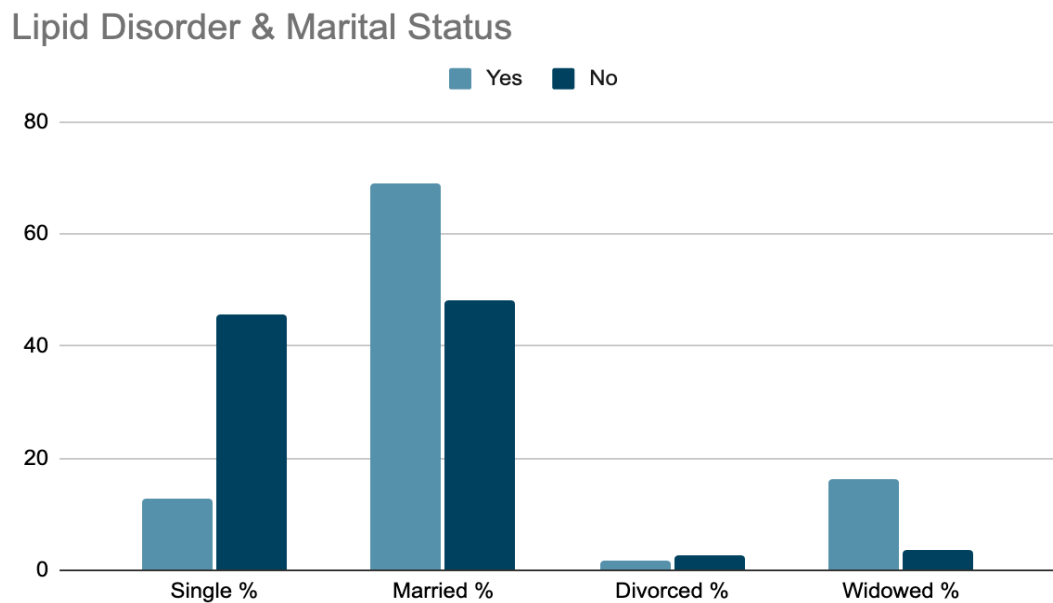


Figure 3.4.1.9 Relationship between lipid disorders and marital status

l) Lipid Disorder (income, educational background, and employment)

The analysis of lipid disorder checks across employment status, income, and educational background revealed the following trends: Employment Status: Fully employed individuals had the highest number of reported lipid disorder checks, followed by retired individuals. Part-time employees and self-employed individuals reported relatively fewer lipid disorder checks. Income: Respondents earning between 11,000-20,000 had the highest number of reported lipid disorder checks. Those earning less than 5,000 and more than 31,000 had relatively fewer reported lipid disorder checks. Educational Background: Individuals with Some high school or diploma and those with a Bachelor’s Degree reported the highest number of lipid disorder checks. Respondents with a PHD or Higher reported the fewest lipid disorder checks. Overall, the data suggests that employment status, income, and educational background are associated with varying proportions of reported lipid disorder checks, with fully employed individuals, those earning between

11,000-20,000, and individuals with Some high school or diploma reporting the highest numbers of checks. The Chi-square tests conducted reveal significant associations between lipid disorder checks and various factors: There is a significant relationship between employment status and lipid disorder checks ($\chi^2 = 22.035$, $p=.001$). A significant association exists between income levels and lipid disorder checks ($\chi^2=23.417$, $p=.001$). There is a notable relationship between educational background and lipid disorder checks ($\chi^2=12.739$, $p=.047$). In summary, the results indicate statistically significant associations between lipid disorder checks and employment status, income, and educational background.

m) Diabetes and Age

The comparison analysis of struggles with diabetes and age, based on 99.4 % respondents, is as follows: Age Group 1 (below 30 to 39): Out of 42.6% respondents , 15.8% reported having diabetes, while 50% reported not having diabetes. Age Group 2 (between 40 to 59): Out of 39.8% respondents, 36.8% reported having diabetes, while 40.6% reported not having diabetes. Age Group 3 (between 60-75 and over): Out of 47.4% respondents, 47.4% reported having diabetes, while 9.4% reported not having diabetes. The proportions of respondents reporting struggles with diabetes across different age groups, indicating higher proportions of reported diabetes in older age groups. The results suggest a statistically significant association between struggles with diabetes and age, with a (χ^2) =32.648 and a $p=.001$.

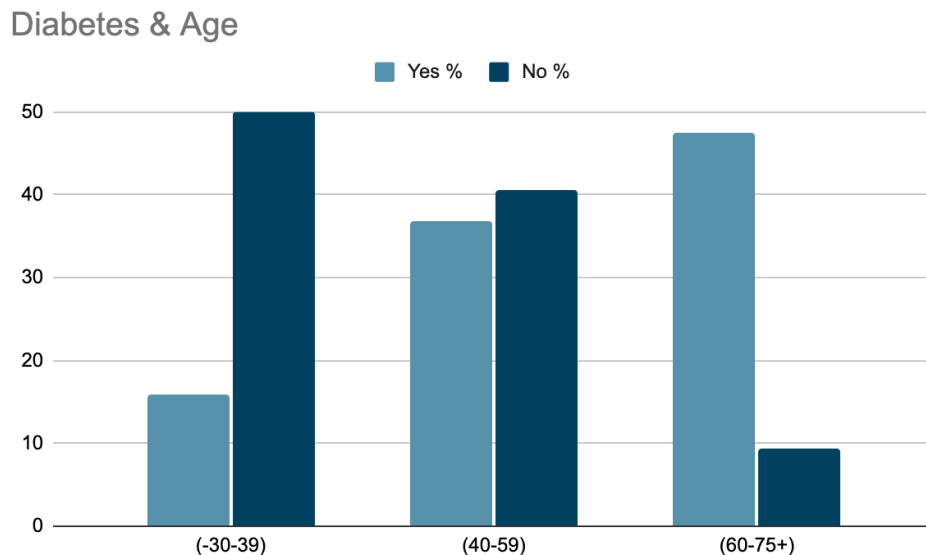


Figure 3.4.1.1.0 Relationship between diabetes and age

n) Diabetes and Gender

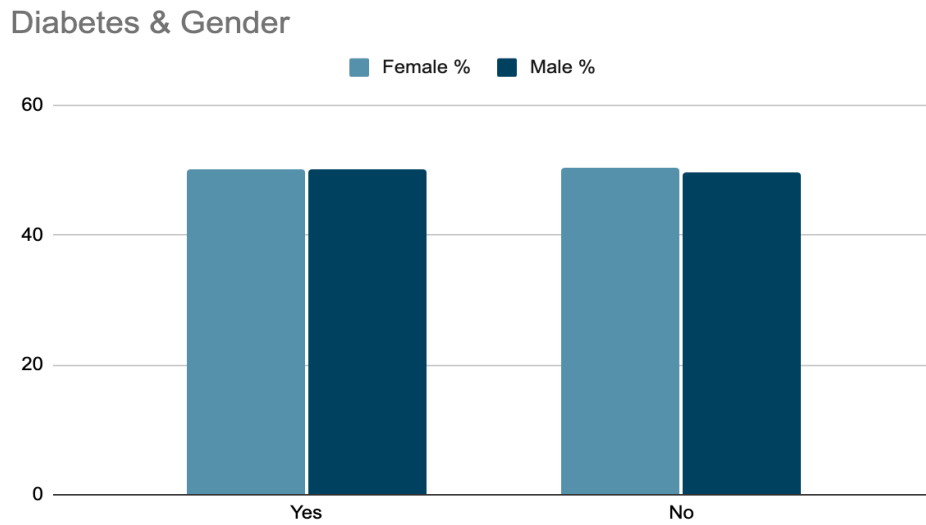


Figure 3.4.1.1.1 Relationship between diabetes and gender

In the comparison analysis of struggles with diabetes and gender, based on (98.9%) respondents: Female respondents: Out of (50.3%), 50% reported having diabetes, while 50% reported not having diabetes. Male respondents: Out (49.7%), 50.4% reported having diabetes, while 49.6% reported not having diabetes. The results suggest no statistically significant association between struggles with diabetes and gender, with a (χ^2)=0.002 and a $p=.968$.

o) Diabetes and Marital Status

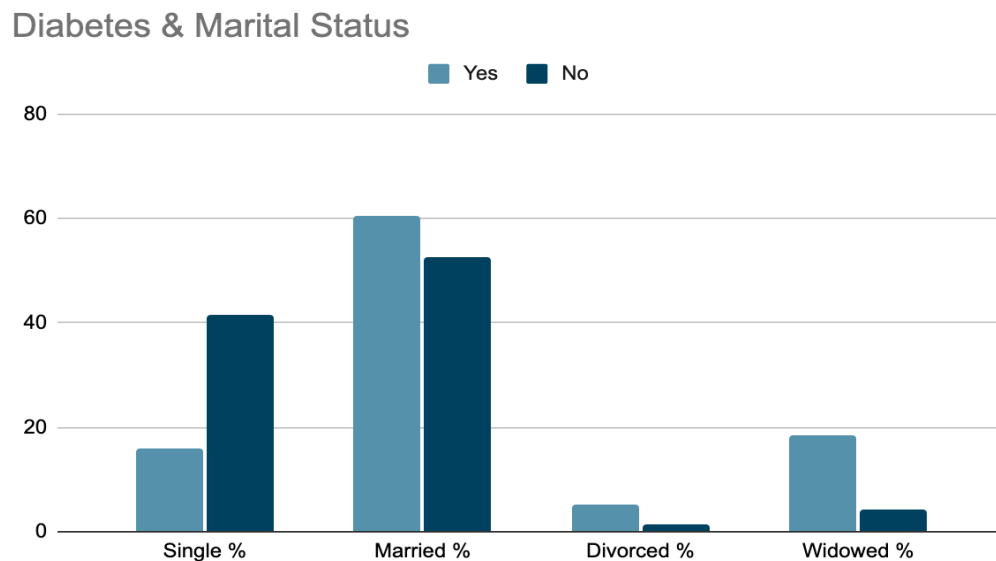


Figure 3.4.1.1.2 Relationship between diabetes and marital status

In the comparison analysis of struggles with diabetes and marital status, based on 97.7% respondents: Divorced individuals: 5.3% reported having diabetes, and 1.5% did not. Married individuals: 60.5% reported having diabetes, while 52.6% did not. Single individuals: 15.8% reported having diabetes, while 41.5% did not. Widowed individuals: 18.4% reported having diabetes, while 4.4% did not. These figures provide a snapshot of the proportions of reported struggles with diabetes across different marital statuses, indicating varying levels of prevalence among different marital status groups. The results suggest a statistically significant association between struggles with diabetes and marital status, with a $(\chi^2) = 15.348$ and a $p = .002$

p) Diabetes (income, educational background, and employment)

Employment Status: Among respondents, fully employed individuals had the highest prevalence of diabetes, followed by retirees and self-employed individuals. Part-time employees and those seeking job offers had relatively lower prevalence. Income: Respondents with lower income levels tended to report higher prevalence of diabetes. Those earning between 6,000-10,000 had the highest prevalence, while those earning more than 31,000 had the lowest. Educational Background: Respondents with lower educational attainment, such as high school or diploma and no schooling completed, tended to report higher prevalence of diabetes compared to those with higher educational degrees, like Bachelor's, Master's, or PHD. However, the differences are not as pronounced as other factors.

The results conducted reveal significant associations between diabetes and various factors: The Chi-square tests reveal significant associations between struggles with diabetes and both employment status ($p = .001$) and educational background ($p = .001$), but not with income ($p = .214$). This suggests that employment status and educational background are likely to influence the prevalence of diabetes among respondents, while income may not have as strong an impact.

3.4.2 Prevalence of Lifestyle Patterns in different Socio-Demographic Group

a) Alcohol and Gender

This table (Table 3.4.2.1) breaks down respondents' alcohol consumption by gender, indicating the number of respondents who answered "Yes" or "No" to the question "Do You Drink Alcohol?"

Table 3.4.2.1 Relationship between alcohol consumption and gender

Gender	Yes	No	Total
Female	24 (27.3%)	64 (72.7%)	88
Male	46 (52.9%)	41 (47.1%)	87
Total	70 (40.0%)	105 (60.0%)	175 -100%

Table 3.4.2.1 indicates that males consume more alcohol compared to females in this study. The results ($\chi^2=11.947$, $p=.001$) demonstrate a strong relationship between gender and alcohol consumption. The low p-value (.001) suggests that this relationship is highly unlikely to be due to chance, indicating that gender influences alcohol consumption significantly.

Table 3.4.2.2 Number of respondents who indicated each "Type of alcohol they drink"

Type of Alcohol	Female	Male
Beer	25-57.9	47-44.6
Wine	61-74.4	21-25.6%
Strong Alcohol (vodka, whiskey, tequila, gin, rum)	2-11.1	19-89.9

More males indicated they drink beer compared to females. On the other hand, more females indicated they drink wine compared to males. Lastly, a higher number of males indicated they drink strong alcoholic drinks compared to females. The chi-square test variables for the type of alcohol consumed are as follows: (χ^2) = 56.392, $p=.001$. This indicates a strong relationship between gender and the type of alcohol consumed. a significance value of .001, it's highly unlikely that this

relationship is due to chance. Therefore, we can confidently say that there is a significant association between gender and the type of alcohol consumed.

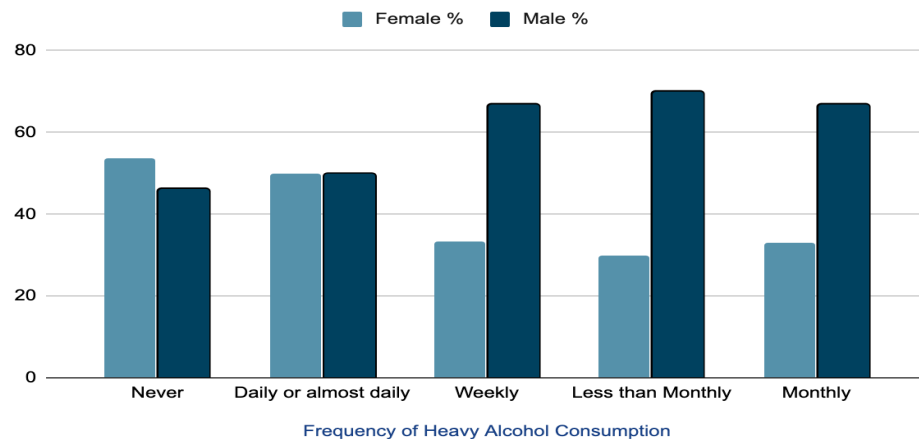


Figure 3.4.2.3 Frequency of Heavy Alcohol Consumption

In the survey, while a significant proportion of both genders abstain from heavy alcohol, males exhibit higher frequencies of consumption. Half of both genders drink heavily on a daily or near-daily basis, with males more prevalent in weekly (66.7%) and less-than-monthly consumption compared to females. Monthly consumption rates are similar between genders. Overall, males demonstrate a higher frequency of heavy alcohol consumption, particularly on a weekly and less-than-monthly basis, compared to females.

A FAST score of 39 for females and 56 for males indicates that, on average, males reported consuming heavier amounts of alcohol with greater frequency compared to females. This could be indicative of a higher risk of alcohol-related health issues among males in the studied population. The chi-square test shows that there's no significant link between how often people drink alcohol and their gender. The $p=0.424$ suggests that any differences in drinking frequency between men and women could just be due to chance. So, we can't say there's a clear relationship between gender and how often someone drinks alcohol.

b) Smoking and Gender

In this analysis of smoking status by gender, we observe the following: This table provides a clear breakdown of smoking status by gender, highlighting the differences in smoking behaviour between females and males.

Table 3.4.2.5 Relationship between smoking and gender

Smoking Status	Female %	Male %	Total (N)
Current Smoker	0	100	16
Ex- Smoker	15	85	20
Never Smoked	61.9	38.1	134
Passive Smoker	40	60	5
Total	50	49.7	175

Overall, there were 88 females and 87 males surveyed, totalling 175 participants. The p-value of 0.001 suggests that the observed differences in smoking status between females and males are unlikely to have occurred by random chance. Therefore, we can infer that there is a significant relationship between gender and smoking status among the respondents.

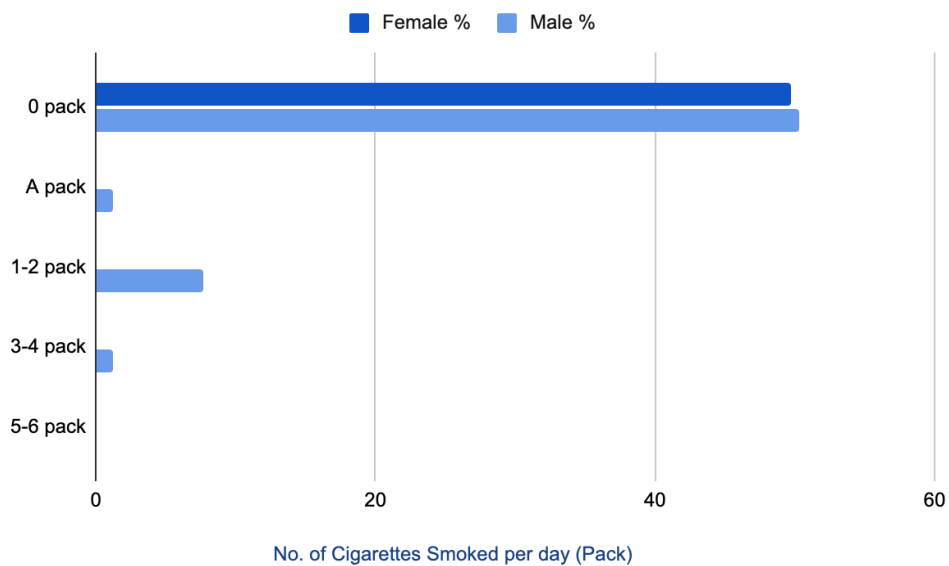


Figure 3.4.2.6 The number of cigarettes smoked per day by gender

The analysis of 168 respondents reveals that among them most of both genders report smoking 0 packs of cigarettes per day, with 49.7% of females and 50.3% of males falling into this category. Notably, no female respondents reported smoking 1-4 packs per day, while a small number of males did. Overall, while there is a similar proportion of males and females reporting no cigarette consumption, a significant association ($\chi^2=18.701$, $p=0.001$) exists between gender and the number of cigarettes smoked per day among respondents.

c) Diet and Gender

Table 3.4.5.7 illustrates the percentage of female and male respondents reporting different numbers of meals per day. The p-value of 0.186 suggests that the observed differences in meal frequencies between genders could be due to random chance rather than a true difference in behaviour.

Table 3.4.5.7 Number of meals per day

Diet	Female(87)	Male(86)
1-2 meals	25.0%	75.0%
2-3 meals	42.9%	57.1%
3 or more meals	53.4%	47.6%

Based on the responses from 174 (97.7%) participants regarding their daily fruit and/or vegetable intake(Figure 3.4.5.8). This indicates that a slightly higher percentage of females reported consuming more than 5 portions of fruits and/or vegetables daily compared to males. With a p-value of 0.384, the observed differences in fruit and vegetable consumption frequencies between genders could be due to random chance rather than a true difference in behaviour.

Table 3.4.5.8 Fruits/vegetable intake

Response	Female	Male
Yes	54.1%	45.9%
No	46.4%	53.6%

Preference for Low-Fat Products between the surveyed gender shown in (Figure 3.4.5.9) below. With $p=0.596$, which suggests that there is no statistically significant association between the choice of low-fat products and gender among the respondents, it could likely be due to random chance rather than a true difference in behaviour.

Table 3.4.5.9 Preference of low fat products

Response	Female	Male
Yes	49.3%	50.7%
No	54.3%	45.7%

Preference for Baked, Steamed, or Grilled Options between the surveyed Gender : With equal distribution among the gender 50% female and 50% male answered choosing baked,steamed or grilled foods and the same applies to not choosing them. Also p-value level of 1.000 indicates that there is no significant association between the choice of cooking options (baked, steamed, or grilled vs. fried foods) and gender among the respondents.

Table 3.4.5.10 Preference for Visible Red Fatty Meat between the surveyed Gender

Gender	Female	Male
Yes	55.6%	44.4%
No	46.3%	53.7%

The survey asked respondents if they prefer visible red fatty meat over lean cut meat. Out of 177 respondents, 49.7% were female and 50.3% were male. Among females, 55.6% preferred visible red fatty meat, while 46.3% did not. Among males, 44.4% preferred visible red fatty meat, while 53.7% did not. $p=0.243$ suggests there is no statistically significant association between gender and the preference for visible red fatty meat over lean cut meat among the respondents.

Out of 177 respondents, 50.3% were female and 49.7% were male. Among females, 51.1% said "Yes" to including beans and lentils in their diet, while 46.7% said "No". Among males, 48.9% said "No", and 53.3% said "Yes". P-value of 0.660 suggests there is no statistically significant association between gender.

Table 3.4.5.11 Beans/lentils among genders

Gender	Yes %	No %
Female	51.1	48.9
Male	53.3	46.7

52% of females and 44% of males included starchy foods in their main meals. Conversely, 48% of females and 56% of males did not. This indicates a slightly greater inclination among females towards starchy foods. While the percentage difference may appear minor, it offers insight

into gender-specific dietary preferences, prompting potential avenues for further exploration into underlying factors influencing food choices.

Table 3.4.5.12 Starchy foods among genders

Gender	Yes %	No %
Female	52	48
Male	44	56

Preference for Home-Cooked meals over Processed foods or Takeaways among surveyed Gender: out of 177 respondents, 49.4% were female, and 50.6% were male. Among females, 51.7% said "Yes" to preferring home-cooked meals, while 49.0% said "No". Among males, 48.3% said "No", and 51.0% said "Yes". Overall, there is a slight preference for home-cooked meals among both genders, with more males indicating a preference for home-cooked meals compared to females. $p=0.785$ suggests there is no statistically significant association between genders.

Table 3.4.5.13 Home/processed food preference

Gender	Yes %	No %
Female	51.7	49.0
Male	51	48.3

The survey assessed respondents' habits regarding drinking plenty of water at regular intervals throughout the day. Out of 177 respondents, 50% were female, and 50% were male. Among females, 54.5% indicated that they drink plenty of water at regular intervals, while 49.3% said "No". Among males, 45.5% said "No", and 50.7% said "Yes". Overall, slightly more females reported drinking plenty of water at regular intervals compared to males. $p=0.648$ suggests there is no statistically significant association between genders.

Table 3.4.5.14 Water consumption

Gender	Yes %	No %
Female	54.5	49.3
Male	50.7	45.5

Coffee Consumption among surveyed Gender: The survey examined whether respondents consume more than 2 cups of coffee per day. Out of 177 respondents, 49.7% were female, and 50.3% were male. Among females, 43.8% said "Yes" to drinking more than 2 cups of coffee per day, while 54.9% said "No". Among males, 45.1% said "No", and 56.3% said "Yes". Overall, there is a slightly higher proportion of males who indicated they consume more than 2 cups of coffee per day compared to females. $p=0.144$ suggests there is no statistically significant association between genders.

Table 3.4.5.15 Coffee consumption

Gender	Yes %	No %
Female	43.8	54.9
Male	56.3	45.1

Daily Sugar Consumption among surveyed Gender : The survey inquired about the daily consumption of teaspoons of sugar, encompassing hot drinks and added to foods; (0-3) (4-6) (7-9) teaspoons: Equal percentages of females and males. P-value of 0.605, suggests that there is no statistically significant association between the daily consumption of sugar and gender, considering an equal distribution of responses across the three

Headaches or Inability to Concentrate Relieved by Eating among surveyed Gender : The survey investigated whether respondents experienced headaches or an inability to concentrate that was relieved by eating, categorized by gender. Out of 173 respondents, 51.2% were female, with 46.2% reporting "Yes" and 52.1% reporting "No". For males (48.8% of respondents), 53.8% reported "No" and 47.9% reported "Yes". This suggests that a slightly higher percentage of females reported experiencing these symptoms compared to males.

d) Physical Activity and Gender

Table 3.4.5.16 Moderate/vigorous intense movement

Response	Female	Male
Yes	56.3%	42.1%
No	42.1%	57.9%

In a survey of 173 respondents, representing 97.7% of the total, 87 were female. Of these women, 42.1% said that they did not engage in moderate/vigorous intense movement, and 56.3% said that they did. However, of the 86 male respondents, 57.9% said that they did not engage in moderate/vigorous intense movement, and 43.8% said that they did.

Table 3.4.5.17 Frequency of moderate/vigorous intense movement

Gender	1-2 days a week	3-4 days a week	5-6 days a week	7 days a week
Female (49.4%)	54.2%	20%	50%	0%
Male (50.6%)	45.8%	80%	50%	100%

The frequency of moderate/vigorous intense movement reported by respondents, broken down by gender, is shown in the table. 54.2% of females participate in moderate/vigorous intense movement 1-2 days per week, 20% 3-4 days per week, and 50% 5-6 days per week. None of them stated they did this every day of the week. In comparison, a considerably higher number 80% of males participate in moderate/vigorous intense movement 3-4 days a week, compared to 45.8% of females who do so just 1-2 days a week. For those who engage in such action 5-6 days a week, the percentages are split evenly (50%) and all of the respondents who engage in such exercise daily are male.

Table 3.4.5.17 Time Spent on Moderate/Vigorous Intense Movement

Time Spent	Female (%)	Male (%)
30 minutes	54.3	45.7
1 hour	21.1	78.9
2 hours	28.6	71.4
More than 3 hours	75	25

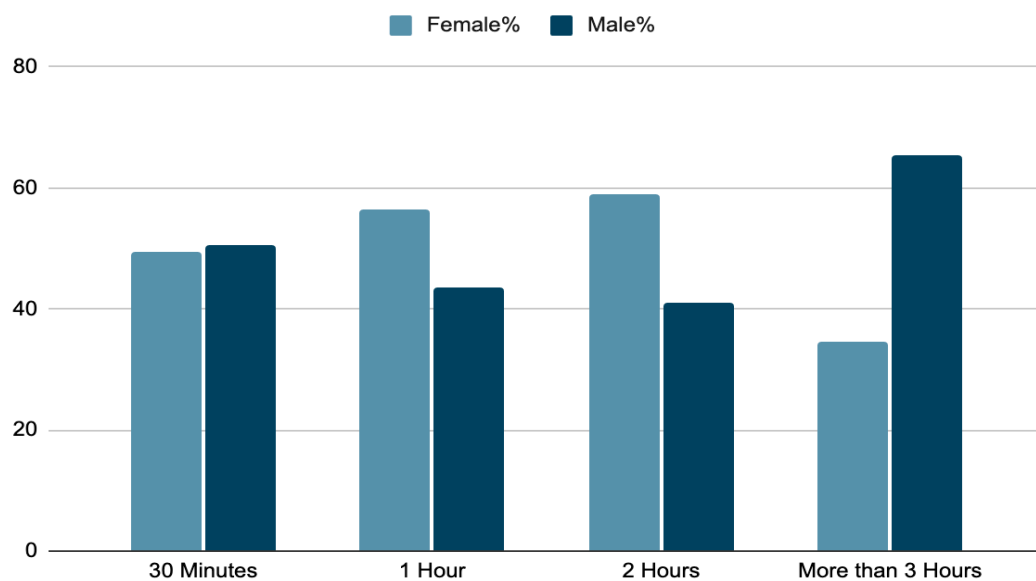
Of the female population, the majority (54.3%) engaged in this activity for 30 minutes, followed by 21.1% for 1 hour and 28.6% for 2 hours. 75% of workers engage in moderate/vigorous intense movement for more than 3 hours each day at work. Males, on the other hand, show a different pattern: 78.9% spend 1 hour and 71.4% spend 2 hours in this type of exercise. A minority 25% spends more than 3 hours, and only 45.7% of people spend 30 minutes.

Table 3.4.5.18 Active Movements/Transportation

	Female (%)	Male (%)
Yes	51.3	50.8
No	49.2	48.7

Regarding active transportation: which involves walking or cycling for a minimum of 10 minutes straight to and from locations, 51.3% of female respondents said they use it, compared to 49.2% who said they don't. 48.7% of male respondents said they use it, whereas 50.8% said they don't. The results suggest that there is no significant association when it comes to gender and active transportation/movement with a (χ^2): 0.072 and a p=0.788

The distribution of sedentary behaviour among gender (Figure 3.4.5.19 shows the percentage of individuals reporting different durations of sedentary activities. In general, men report being more sedentary than women.



Figure

3.4.5.19 Sedentary behaviour

There are no statistically significant differences in sedentary behaviour among the gender groups of the respondents, with a (χ^2) = 5.121 and p = 0.275.

3.5 Associations of Cardiovascular Risk Factors and lifestyle patterns among respondents of the study

3.5.1 Correlations between Risk Factors and Lifestyle patterns

a) High Blood Pressure

Table 3.5.1.1 Correlations between HBP and lifestyle patterns

VARIABLES		Pearson Correlation (r)	Significance (p-value)	Sample Size (N)
High Blood Pressure (HBP)		1	0.004	176
	Alcohol Consumption	0.223**		166
	Smoking	-0.201**	0.010	
	Illicit Drug	0.60**	0.445	
	Physical Activity	-0.121**	0.121	

The analysis suggests a statistically significant weak positive correlation between alcohol consumption and HBP. This means that as alcohol consumption increases, the likelihood of having HBP also increases. The analysis suggests that as smoking behaviour increases, there tends to be a corresponding decrease in the likelihood of having High Blood Pressure, and vice versa. Therefore, reducing or quitting smoking may contribute to better management or prevention of High Blood Pressure.

Also, the analysis indicates a weak positive correlation between HBP and Illicit Drugs, because it is not statistically significant due to the p-value being greater 0.445 than the chosen significance level of 0.05. In other words, there is no strong evidence to suggest a relationship between HBP and illicit drug use based on the data analysed. The correlation between high blood pressure (HBP) and physical activity is statistically not significant, with a Pearson correlation coefficient of -0.121**. This indicates a weak negative correlation, suggesting that as Physical activity increases, HBP tends to decrease slightly. However, the significance level (p-value) of 0.121 suggests that this correlation may not be very strong.

b) Diabetes

Table 3.5.1.2 Correlations between diabetes and lifestyle patterns

VARIABLES		Pearson Correlation (r)	Significance (p-value)	Sample Size (N)
Diabetes		1	.005	176
	Alcohol Consumption	.209**		166
	Smoking	0.083**	0.273	
	Illicit Drug	.040**	.602	
	Physical Activity	-.175**	0.05	

The correlations between diabetes and various lifestyle factors provide valuable insights into potential risk factors and behaviours associated with the disease. A significant positive correlation was observed between diabetes and alcohol consumption, with a p-value of 0.005, suggesting that higher alcohol intake might be linked to an increased risk of diabetes. However, the correlation with smoking was not statistically significant, smoking shows a weak positive correlation with diabetes, but it's not statistically significant, as indicated by a p-value of 0.273, indicating that smoking may not be a strong predictor of diabetes in this context. Similarly, the correlation between diabetes and illicit drug use was not significant.

Illicit drug use has a very weak positive correlation with diabetes and is not statistically significant, with a p-value of 0.602, suggesting that drug use may not directly influence diabetes risk. Interestingly, a negative correlation was found between diabetes and physical activity, indicating that individuals with higher levels of physical activity may have a reduced risk of diabetes, with a p-value of 0.05.

This highlights the importance of regular exercise in diabetes prevention and management. Overall, these findings underscore the multifaceted nature of diabetes risk, influenced by a combination of lifestyle choices and behaviours.

c) *Obesity*

Table 3.5.1.3 Correlations between obesity and lifestyle patterns

VARIABLES		Pearson Correlation (r)	Significance (p-value)	Sample Size (N)
Obesity		1	.006	176
	Alcohol Consumption	.206**		166
	Smoking	-.109**	.150	
	Illicit Drug	.040**	.597	
	Physical Activity	-.048**	.529	

The correlations between obesity and various lifestyle factors suggest interesting patterns. A significant positive correlation was found between obesity and alcohol consumption, with p-value of 0.006, indicating that higher alcohol intake might be associated with increased obesity levels. Conversely, there was a negative correlation between obesity and smoking, p-value of 0.150 suggesting that smokers might have lower obesity levels compared to non-smokers. The correlation between obesity and illicit drug use was not significant, p-value of 0.597, implying that drug use may not directly influence obesity.

Lastly, a slight negative correlation was observed between obesity and physical activity, p-value of 0.529, suggesting that higher levels of physical activity might be associated with lower obesity rates. These findings highlight the complex interplay between lifestyle choices and obesity, emphasizing the importance of promoting healthy behaviors to combat obesity.

In General How is your Health?

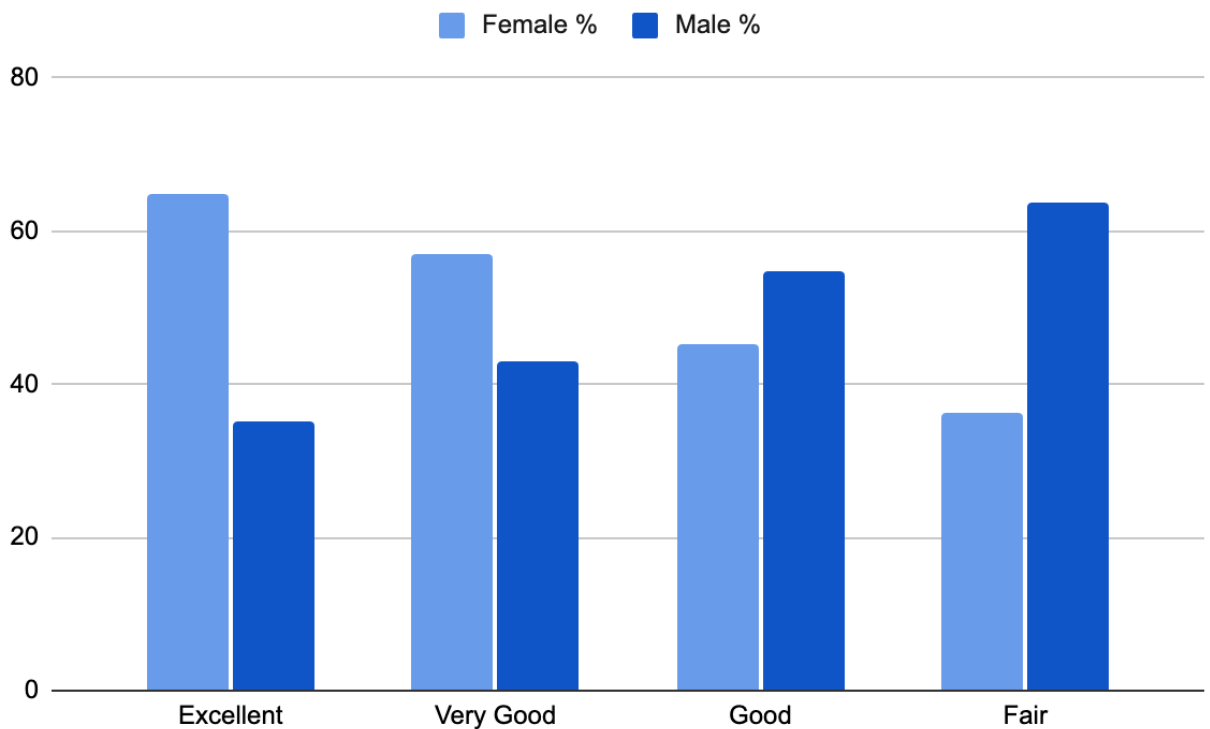


Figure 3.5.1.4 Health status

Out of the 177 respondents: Female : 50.6% and Male : 49.4%

When asked about their general health:

- Excellent: 64.9% females and 35.1% males
- Very Good: 57.1% of females and 42.9% of males
- Good: 45.2% of females and 54.8% of males
- Fair: 36.4% of females and 63.6% of males

In summary, a higher percentage of female respondents rated their health as excellent or very good compared to male respondents. On the other hand, a higher percentage of male respondents rated their health as good or fair compared to female respondents.

4. DISCUSSION

The study achieved a balanced representation across genders, with almost equal proportions of male and female respondents. This balanced distribution is essential for ensuring a comprehensive analysis of CVD prevalence across genders, allowing for a better understanding of potential disparities or differences in risk factors. The significant prevalence of high blood pressure (33.9%), lipid disorders (31.1%), diabetes (21.5%), and obesity (21.5%) among respondents underscores the urgent need for interventions aimed at prevention, early detection, and management within the community.

The prevalence of alcohol consumption, smoking, and illicit drug use among respondents suggests a need for targeted interventions to address harmful behaviors, promote tobacco control efforts, prevent drug abuse, and provide substance use disorder treatment services within the community, while the high percentage of respondents engaging in physical activity reflects a positive attitude towards exercise and highlights opportunities for promoting physical fitness and active living; furthermore, insights into dietary habits indicate a need for interventions to promote healthy eating behaviors, including increasing fruit and vegetable consumption and reducing sugar intake.

The study suggests that older age groups tend to have higher rates of obesity, while gender alone does not significantly impact obesity prevalence, although a slightly higher percentage of females are obese compared to males. Additionally, marital status shows a statistically significant association with obesity, with widowed individuals exhibiting the highest rates, indicating the potential influence of social and lifestyle factors associated with different marital statuses. Moreover, varying obesity rates are observed across different income levels, employment statuses, and educational backgrounds, with higher educational attainment correlating with lower obesity rates, underscoring the importance of education in addressing obesity-related issues.

Similar to obesity, there's a significant association between age and high blood pressure, with older age groups showing higher prevalence, while marital status also plays a role, with divorcees and widowed individuals exhibiting higher rates of high blood pressure. Although there's no significant association between gender and high blood pressure prevalence, the data shows varying proportions across different marital statuses, suggesting the need for targeted interventions. Additionally, employment status, income, and educational background show significant associations with high blood pressure prevalence, highlighting the importance of tailored interventions to address socio-economic disparities and mitigate the burden of high blood pressure.

Similar to obesity and high blood pressure, there's a correlation between age and the prevalence of lipid disorders and diabetes, suggesting that understanding these trends can inform preventive measures and healthcare interventions tailored to different age groups. Additionally, the data suggests variations in lipid disorder and diabetes prevalence across different genders and marital statuses, emphasizing the importance of exploring underlying factors contributing to these differences to inform targeted interventions. Moreover, employment status, income, and educational background show significant associations with the prevalence of lipid disorders and diabetes, highlighting the need to address socio-economic disparities to mitigate the burden of these conditions.

A significant association between gender and alcohol consumption, with males showing higher rates compared to females, underscoring the importance of gender-specific interventions for alcohol-related health issues. Additionally, the data suggests that males are more likely to consume beer and strong alcoholic drinks, while females prefer wine, informing targeted interventions and health education campaigns tailored to specific gender groups. Furthermore, males demonstrate a higher frequency of heavy alcohol consumption compared to females, particularly on a weekly and less-than-monthly basis, indicating a potential higher risk of alcohol-related health issues among males and emphasizing the need for gender-specific interventions targeting heavy alcohol consumption.

The study reveals differences in smoking behaviour between genders, with a significant relationship between gender and smoking status, informing tailored smoking cessation programs and public health campaigns aimed at reducing smoking prevalence among both males and females. While there is a similar proportion of males and females reporting no cigarette consumption, there is a significant association between gender and the number of cigarettes smoked per day, underscoring the importance of gender-specific approaches in smoking cessation interventions. Additionally, the data suggests differences in meal frequencies between genders, although the association is not statistically significant, which can inform dietary interventions and nutritional education programs tailored to specific gender groups.

The data suggests differences in meal frequencies between genders, although the association is not statistically significant, informing dietary interventions and nutritional education programs tailored to specific gender groups. While slightly more females reported consuming more than 5 portions of fruits and/or vegetables daily compared to males, the difference was not statistically significant, highlighting the importance of promoting healthy eating habits regardless of gender. Additionally, the lack of a statistically significant association between gender and the preference for low-fat products indicates that both males and females have similar attitudes towards choosing

low-fat options. Similarly, the equal distribution of preferences for baked, steamed, or grilled options versus fried foods among genders suggests that cooking preferences are not influenced by gender, emphasizing the importance of promoting healthier cooking methods for all individuals. Moreover, the lack of significant associations between gender and dietary preferences for red fatty meat, beans and lentils, starchy foods, and home-cooked meals indicates that these dietary choices are not influenced by gender, but slight differences highlight the need for tailored nutritional education programs. Regarding water and coffee consumption, the findings reveal similar patterns between genders, with slightly more females reporting drinking plenty of water at regular intervals and slightly more males consuming more than 2 cups of coffee per day, although the differences were not statistically significant. Furthermore, the equal distribution of daily sugar consumption across genders suggests that sugar intake patterns are not influenced by gender, but promoting awareness of sugar consumption remains important. Finally, the slight difference in the percentage of females reporting symptoms relieved by eating compared to males indicates potential gender variations in physiological responses to hunger or dietary factors, warranting further research.

While the majority of both genders engage in moderate/vigorous intense movement, differences in frequency and duration exist, with males typically participating more frequently and for longer durations compared to females. These findings underscore the importance of promoting physical activity across genders while considering individual preferences and barriers to exercise. Moreover, the lack of significant associations between gender and active transportation/movement and sedentary behaviour suggests that these behaviours are not influenced by gender. Nonetheless, efforts to promote active transportation and reduce sedentary behaviour remain crucial for enhancing overall health and well-being among all individuals.

The correlations between cardiovascular risk factors and lifestyle patterns among respondents provide valuable insights into the complex interplay between behaviours and health outcomes. High Blood Pressure (HBP) is influenced by various factors. Alcohol Consumption shows a weak positive correlation, suggesting higher alcohol intake may increase HBP risk, while Smoking surprisingly exhibits a negative correlation, implying smoking may decrease HBP risk. However, Illicit Drug Use has no significant correlation with HBP, and Physical Activity shows a weak negative correlation, indicating sedentary behaviour might slightly decrease HBP risk. Regarding Diabetes, Alcohol Consumption shows a positive correlation, indicating higher alcohol intake might increase diabetes risk. Smoking has a weakly positive correlation, but it's not statistically significant, suggesting smoking may not strongly predict diabetes. Illicit Drug Use has no significant correlation with diabetes, while Physical Activity exhibits a negative correlation, highlighting the importance of regular exercise in preventing and managing diabetes.

In terms of Obesity, Alcohol Consumption shows a positive correlation, suggesting higher alcohol intake might contribute to increased obesity levels. Surprisingly, Smoking has a negative correlation, implying smokers might have lower obesity levels. Illicit Drug Use shows no significant correlation with obesity, and Physical Activity exhibits a slight negative correlation, emphasizing the potential role of higher physical activity levels in reducing obesity rates.

Strengths and limitations

The discussion offers a comprehensive analysis of various cardiovascular risk factors and lifestyle patterns, providing valuable insights into their correlations and implications for health outcomes. It acknowledges gender differences in risk factors and behaviours, emphasizing the importance of tailored interventions for specific gender groups. By interpreting the data effectively, the discussion identifies significant correlations between risk factors and lifestyle patterns, offering actionable recommendations for healthcare professionals and policymakers. It takes a holistic approach by considering multiple factors influencing cardiovascular health, including sociodemographic factors, lifestyle behaviours, and dietary habits. Practical implications of the findings, such as the need for interventions addressing high blood pressure, diabetes, obesity, and unhealthy behaviours, are discussed, contributing to the development of public health strategies.

The study's cross-sectional design limits the ability to establish causal relationships between risk factors and health outcomes, as it provides only a snapshot of data at a single point in time. Reliance on self-reported data may introduce bias, as respondents may underreport or overreport certain behaviours or health conditions due to social desirability or recall bias. The sample population, consisting of adults aged 30-75 residing in urban areas of Accra, Ghana, may limit the generalizability of the findings to other populations or geographical regions. Potential confounding variables, such as socioeconomic status, access to healthcare, or genetic predispositions, are not thoroughly addressed, which may influence the observed associations. Lack of Longitudinal Data: Without longitudinal data, the study cannot track changes in cardiovascular risk factors and lifestyle patterns over time, limiting its ability to assess trends and interventions' long-term effectiveness. Longitudinal studies are valuable for understanding the trajectory of CVD development and evaluating the impact of interventions over time, both locally and globally.

Conflict of Interest. The study declares no conflicts of interest that could potentially influence the interpretation or presentation of the results.

CONCLUSIONS

1. The analysis of cardiovascular risk factors among the surveyed population in Accra, Ghana reveals concerning levels of high blood pressure, lipid disorders, diabetes mellitus, and obesity. With significant proportions of respondents reporting these conditions, there is a clear indication of the prevalence and burden of cardiovascular risk factors within the community. These findings underscore the urgent need for targeted interventions aimed at prevention, early detection, and management of these conditions to improve overall heart health outcomes in the region.
2. The findings regarding alcohol consumption, smoking, illicit drug use, physical activity, and dietary habits among the surveyed population highlight both positive trends and areas for improvement in health behaviors within the community. While encouragingly, there is a low prevalence of smoking and illicit drug use, suggesting effective tobacco control and substance abuse prevention efforts, targeted interventions are needed to address harmful drinking behaviors and promote responsible alcohol consumption. Additionally, the high percentage of respondents engaging in physical activity reflects a positive attitude towards exercise, presenting opportunities for further promoting physical fitness and active living. However, there are opportunities for improvement in dietary habits, particularly in increasing fruit and vegetable consumption and reducing sugar intake.
3. The study underscores the significance of understanding cardiovascular risk factors, lifestyle patterns, and health behaviors within the surveyed population. These findings stress the necessity of tailored interventions and public health initiatives to address prevalent health issues and foster healthier lifestyles within the community. Significant correlations between age and cardiovascular risk factors highlight the importance of targeted interventions addressing age-related health concerns. Gender disparities in health behaviors underscore the need for gender-specific interventions aimed at reducing health risks and promoting healthier behaviors among both males and females. Moreover, the influence of marital status and socio-economic factors on health outcomes emphasizes the importance of addressing social determinants to mitigate the burden of cardiovascular risk factors and improve overall community health.
4. The study highlights complex relationships between cardiovascular risk factors and lifestyle behaviors, offering valuable insights for preventive strategies. While alcohol consumption shows significant correlations with high blood pressure, diabetes, and obesity, smoking presents contrasting associations, suggesting nuanced impacts on these conditions. Moreover, the findings underscore the importance of physical activity in mitigating diabetes and obesity risks.

PRACTICAL RECOMMENDATIONS

The following recommendations are suggested:

1. **Implement targeted interventions to address alcohol consumption:** Given the significant correlations between alcohol consumption and high blood pressure, diabetes, and obesity, there is a need for interventions aimed at promoting responsible drinking behaviors and reducing excessive alcohol intake within the community.
2. **Enhance smoking cessation programs:** Despite the negative correlation between smoking and certain cardiovascular risk factors like high blood pressure and obesity, the overall health risks associated with smoking necessitate continued efforts to support smoking cessation initiatives and promote tobacco control efforts.
3. **Encourage regular physical activity:** Given the observed negative correlation between physical activity and diabetes, as well as obesity, promoting regular exercise and active living should be a priority.
4. **Focus on nutrition education and healthy eating behaviors:** Addressing dietary habits, particularly increasing fruit and vegetable consumption while reducing sugar intake, can play a crucial role in preventing and managing cardiovascular risk factors.
5. **Target socio-economic disparities:** Recognizing the associations between socio-economic factors such as income, education, and employment status with cardiovascular risk factors, interventions addressing socio-economic disparities are essential. Access to healthcare services, education on healthy lifestyle choices, and opportunities for economic empowerment can help mitigate the burden of cardiovascular diseases
6. **Promote gender-specific interventions:** Tailored interventions that consider gender differences in alcohol consumption, smoking behavior, and dietary patterns can effectively address cardiovascular risk factors among both males and females. Gender-sensitive approaches in healthcare delivery and public health initiatives are crucial for achieving equitable health outcomes.
7. **Foster community engagement and empowerment:** Engaging community members in decision-making processes and empowering them to take ownership of their health can lead to sustainable changes in health behaviors. Collaborative efforts involving healthcare providers, policymakers, community leaders, and individuals themselves are essential for implementing effective interventions and promoting cardiovascular health within the community.

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ANNEXES

Annex 1: Questionnaire

DEMOGRAPHIC INFORMATION

1. How old are you? (Tick ✓ the correct age you fall under)

Under 30	
30 - 34	
35 - 39	
40 - 44	
45 - 49	
50 - 54	
55 - 59	
60 - 64	
65 - 69	
70 - 74	
75 and over	

2. What is your gender? (Tick ✓ the correct answer)

Female	
Male	

3. What is your highest form of education? (Tick ✓ the correct answer)

Some high school or diploma	
High School	
Bachelor's Degree	
Masters Degree	
PHD or Higher	
Professional/vocational/Technical School	
No Schooling completed	

4. What is your marital status? (Tick ✓ the correct answer)

Single	
Married	
Divorce	
Widowed	

5. What is your current employment status? (Tick ✓ the correct answer)

Employed full-time	
Employed part-time	
Self Employed	
Seeking Opportunities	
Retired	
Prefer not to say	

6. What is your income per month? (Tick ✓ the correct answer)

Less than Ghs 5,000	
Ghs 6,000 - Ghs 10,000	
Ghs 11,000 - Ghs 20,000	
Ghs 21,000 - 30,000	
More than Ghs 31,000	
Prefer not to say	

MEDICAL HISTORY (Please, tick ✓ or insert the correct answers)

1. Do you go for regular medical check ups?

() Yes () No

2. Do you have diabetes (diagnosis of Diabetes mellitus type 1 or type 2)?

() Yes () No () Unsure

3. Do you have high blood pressure (diagnosis of Hypertension)?

() Yes () No () Unsure

4. Please, indicate how often do you check your blood pressure at home:

Insert the number: _____ times a week

every day

never

5. Do you check your lipid (Cholesterol) levels?

Yes No

6. Do you know your Body Mass Index (BMI)

Yes No

7. Have you experienced angina (heart pain) before?

Yes No Unsure

8. Do you have any history of rheumatic fever?

Yes No Unsure

9. Do you struggle with Overweight or Obesity?

Yes No

10. Have either or both of your parents been diagnosed with cardiovascular disease, atherosclerosis, previous heart attack, and/or stroke before?

Yes No Unsure

11. Any history of overweight or obesity in your family?

Yes No

12. How many hours do you sleep at night?

2-3 hours 4-5 hours 5-6 hours 7-8 hours

13. Do you have any diagnosed chronic disease (-es)?

Yes No

14. Have you been diagnosed with COVID-19?

Yes No Unsure

LIFESTYLE

1. Exercise (Tick ✓ which fits best to your attitude)

Note : Moderate - Vigorous exercise is brisk walking, jogging, cycling, swimming, playing sports or any exercise that increases breathing and heart rate continuously for at least 20 minutes.

1.1. Activity at Work

-Moderate

•Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking or carrying light loads for at least 10 minutes continuously?

Yes No

•In a typical week, on how many days do you do moderate- intensity activities as part of your work?

1-2 days a week 3-4 days a week

5-6 days a week 7 days

• How much time do you spend doing moderate-intensity activities at work on a typical day?

30 minutes 1 hour

2 hours more than 3 hours

-Vigorous

•Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like (carrying or lifting heavy loads, digging or construction work) for at least 10 minutes continuously?

Yes No

•In a typical week, on how many days do you do vigorous activities as part of your work?

1-2 days a week 3-4 days a week

5-6 days a week 7 days

• How much time do you spend doing vigorous-intensity activities at work on a typical day?

30 minutes 1 hour

2 hours more than 3 hours

1.2.Travel to and from places [To work, for shopping, to the market ,place of worship etc.]

•Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?

Yes No

•In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?

1-2 days 3-4 days 5 days or more

•How much time do you spend walking or bicycling for travel on a typical day?

30 minutes 1 hour

2 hours more than 3 hours

analyse these....1.3.Recreational Activities [about sports, fitness and recreational activities (leisure) etc.]

-Moderate

•Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking,(cycling, swimming, volleyball)for at least 10 minutes continuously?

Yes No

•In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?

1-2 days 3-4 days 5 days or more

•How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?

30 minutes 1 hour
 2 hours more than 3 hours

-Vigorous

•Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football,] for at least 10 minutes continuously?

Yes No

•In a typical week, on how many days do you do vigorous- intensity sports, fitness or recreational (leisure) activities?

1-2 days 3-4 days 5 days or more

• How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?

30 minutes 1 hour
 2 hours more than 3 hours

1.4.Sedentary Behaviour

sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.

• How much time do you usually spend sitting or reclining on a typical day?

30 minutes 1 hour 2 hours more than 3 hours

2.Smoking (Tick which fits best to your attitude)

•2.1. Indicate, please, your smoking status:

Never Smoked	
Ex-Smoker	

Current smoker	
A passive smoker (a non-smoker exposed to smoke most days at home or work)	

•2.2. On a scale of 1-10 (1=Low, 10=High)

	1	2	3	4	5	6	7	8	9	10
How confident are you that you could give up smoking?										
How motivating are you to stop smoking?										

•2.3. How many cigarettes do you smoke per day?

1-2 3-4 5-6 a pack

3. Alcohol Use (Tick which fits best to your attitude)

3•1• Do you drink alcohol?

Yes No

3.2. If yes, indicate which type of alcohol you drink?

beer

wine

strong alcohol drinks (vodka, whiskey, tequila, gin, rum)

3.3. (Scoring System)

	0	1	2	3	4	Your Score
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?	Never	Less than Monthly	Monthly	Weekly	Daily or almost daily	

Only answer the following questions if the answer above is Less than monthly (1) or Monthly (2).

Stop here if the answer is Never (0), Weekly (3) or Daily (4).

	0	1	2	3	4	Your Score

How often during the last year have you failed to do what was normally expected from you because of your drinking?	Never	Less than Monthly	Monthly	Weekly	Daily or almost daily	
How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Never	Less than Monthly	Monthly	Weekly	Daily or almost daily	
Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?	No		Yes, but not in the last year		Yes, during the last year	

FAST Score	
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An overall total score of 3 or more on the first or all 4 questions is FAST positive













3.4. If yes, how many units of alcohol do you drink on average?

	Per Day	Per Week	Per Month	Per Year
Averagely I drink 1-2 units of alcohol				
Averagely I drink 2-3 units of alcohol				
Averagely I drink 4-6 units of alcohol				
Averagely I drink more than 6 units of alcohol				

***NOTE** : 1 unit of alcohol equals 0,5 litre of beer, 200 ml of wine or 50 ml of strong alcohol drinks (vodka, whiskey, tequila, gin, rum).

1 unit of alcohol is equivalent to 100ml of 10% of alcohol by volume (ABV)

Alcohol unit reference

One unit of alcohol	 Half pint of "regular" beer, lager or cider	 Half a small glass of wine	 1 single measure of spirits	 1 small glass of sherry	 1 single measure of aperitifs		
Drinks more than a single unit	 2	 3	 1.5	 2	 4	 3	 9
	Pint of "regular" beer, lager or cider	Pint of "strong" or "premium" beer, lager or cider	Alcopop or a 275ml bottle of regular lager	440ml can of "regular" lager or cider	440ml can of "super strength" lager	250ml glass of wine (12%)	75cl Bottle of wine (12%)

4. Illicit Drugs use

4.1. Do you take any illicit drug (Heroin, Cocaine, Methamphetamine etc.)?

Yes No

4.2. If yes, do you take illicit drugs for medical purposes (prescription medication)?

Yes No

5. DIET (Tick which fits best to your attitude)

5.1. How many meals per day do you eat?

1 to 2 meals 2 to 3 meals 3 or more meals

5.2. Do you eat more than 5 portions of fruit and/or vegetables every day?

Yes No

5.3. Do you choose low-fat products when available?

Yes No

5.4. Do you choose baked, steamed or grilled options when available, rather than fried foods (such as crisps and snacks, or fish and chips)?

Yes No

5.5. Do you prefer visible red fatty meat over lean cut meat?

Yes. No

5.6. Do you regularly include beans and lentils in your diet?

Yes. No

5.7. Do you base your main meals around starchy foods?

For example, potatoes, pasta, rice or bread.

Yes. No

5.8. Do you prefer home cooked meals over processed/takeaways?

Yes. No

5.9. Do you drink plenty of water at regular intervals in a day?

Yes. No

5.10. Do you avoid sugary drinks (fizzy drinks)?

Yes No

5.11. Do you drink more than 2 cups of coffee in a day

Yes. No

5.12. How many teaspoons of sugar do you consume daily (in hot drinks, added to foods etc.)?

0-3 4-6 7-6 10 or more

5.13. How many servings of sweet foods like cakes, biscuits, lollipops and/or chocolate do you consume a day?

Usually none 1-2 serves more than 2 servings

5.14. Do you feel your energy levels drop within an hour of eating?

Yes. No or unsure

5.15. Do you experience cravings for sweets or chocolate?

Yes. No or unsure

5.16. Do you have headaches or an inability to concentrate which is relieved by eating?

Yes. No or unsure

6. KNOWLEDGE ABOUT CARDIOVASCULAR DISEASES

•Do you have any idea about Cardiovascular Diseases and their risk factors?

Yes. No

•How common are Cardiovascular Diseases in Ghana compared to other African Countries or the Western World?

More common Similarly common Less common I do not know

•Do you know Cardiovascular diseases are one of the top two causes of death in Ghana?

True False Don't know

•Do you know high blood pressure is the root cause of the major risk factor of Cardiovascular Diseases

Yes. No

•Eating a lot of red meat increases heart attack and stroke risk.

True False Don't Know

•Most people can tell whether or not they have high blood pressure.

True False Don't Know

•You can reduce your risk of heart attack or stroke by being physically active.

True False Don't Know

• 'High' blood pressure is defined as 110/80 (systolic/diastolic) or higher.

True False Don't Know

•Dietary fiber lowers blood cholesterol.

True False Don't Know

•The most important cause of heart attack and stroke is stress.

True False Don't Know

•Trans-fats are healthier for the heart than most other kinds of fats.

True False Don't Know

•Walking and gardening are considered types of exercise that can lower the risk of having a heart attack or stroke.

True False Don't Know

• Moderate physical activity of 150 minutes a week will reduce your chances of developing a heart attack or stroke.

True False Don't Know

• People who quit smoking by 60 add five years to their life.

True False Don't Know

• People who have diabetes are at higher risk having a heart attack or stroke.

True False Don't Know

• Managing your stress levels will help you to manage your blood pressure.

True False Don't Know

• HDL refers to 'good' cholesterol, and LDL refers to 'bad' cholesterol.

True False Don't Know

• The healthiest exercise for the heart involves rapid breathing for a sustained period of time.

True False Don't Know

• Many vegetables are high in cholesterol.

True False Don't Know

• You are more likely to have a heart attack or stroke if you're overweight or obese.

True False Don't Know

• Drinking alcohol has nothing to do with reducing the risk of heart attack or stroke.

True False Don't Know

7. Perceived Risk and Vulnerability of CVD

	Agree	strongly Agree	Disagree	Strongly Disagree
1. The causes of a heart attack or stroke are unknown				
2. My lifestyle habits do not put me at risk for having a heart attack or stroke				
3. People my age do not have a heart attack or stroke				
4. I am not worried that I might have a heart attack				

or stroke				
5. I am very healthy so I will not have a heart attack or stroke				
6. A person who gets a heart attack or stroke has no chance of recoverin				
7. Healthy lifestyle habits are unattainable				
8. There is a good chance I will experience a heart attack or stroke during the next 10 years				
9. I have a high chance of getting a heart attack or stroke because of my past behaviors				
10. I am not doing anything now that is unhealthy to my heart				
11. A person who gets a heart attack or stroke has no chance of recovering				

In general, how is your health?

- very good
- good
- fair
- bad
- very bad

Annex 2: Bioethics Approval



LIETUVOS SVEIKATOS MOKSLŲ UNIVERSITETAS
BIOETIKOS CENTRAS

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Medicinos akademija (MA) Magistrantūros studijų programa – Taikomoji visuomenės sveikata (studijos užsienio kalba) I k. magistrantui Elsie Darkowah Okai Darbo vadovė lekt. Lolita Šileikienė LSMU Profilaktinės medicinos katedra	2023.05.12	Nr.	BEC-TV(S(M)-138
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DĖL PRITARIMO TYRIMUI

LSMU Bioetikos centras, įvertinęs Elsie Darkowah Okai pateiktus dokumentus, magistranto tiriamajam darbui tema „Prevalence of cardiovascular risk factors and their associations with lifestyle patterns among the adult population in Accra, Ghana“ pritaria*.

dr. Eimantas PAŽALINSKAS

* Pastaba: šis pritarimas neatleidžia tiriamąjį mokslinį darbą vykdančių asmenų nuo prievolės laikytis Bendrojo duomenų apsaugos reglamento nuostatų ir nuo atsakomybės gauti nacionalinio arba regioninio bioetikos komiteto leidimą, jei toks leidimas būtinas pagal LR Biomedicininį tyrimų etikos įstatyme numatytus reikalavimus.