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MAGNITUDE OF CARDIOVASCULAR DISEASE AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN SELECTED PUBLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA 2023

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Magnitude of Cardiovascular Disease and Associated Factors among Pregnant Women attending Antenatal Care in Selected Public Hospitals in Addis Ababa, Ethiopia 2023

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by Helen Berta is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters of science in Cardiovascular Nursing.

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Abbreviations and acronyms

BP	Blood Pressure
CO	Cardiac Output
CRVHD	Chronic Rheumatic Valvular Heart Disease
CVD	Cardiovascular Disease
CVS	Cardiovascular System
DBP	Diastolic blood pressure
GDM	Gestational Diabetes Mellitus
MS	Mitral Stenosis
PPCMP	Peri-partum Cardiomyopathy
RHD	Rheumatic Heart Disease

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ABSTRACT

Background: Numerous conditions, including adult congenital heart disease, ischemic heart disease, pulmonary hypertension, cardiomyopathies, and cardiac arrhythmias, can result in pregnancy-related heart illness. Of these, mitral stenosis (MS) is the primary lesion among all presentations, and rheumatic heart disease (RHD) is more prevalent in underdeveloped countries.

Objective: To assess the magnitude of cardiovascular diseases and associated factors among pregnant women who had antenatal care follow-ups at selected tertiary hospitals in Addis Ababa, Ethiopia.

Material and Methods: an institution-based cross-sectional study design was conducted in selected two tertiary hospitals located in Addis Ababa, Ethiopia. All pregnant women attending antenatal follow-up unit in the selected study setting w enrolled. The sample size for the study was determined by using the single population proportion formula. A pre-test was done in 5% of the samples at different hospitals from the study setting, and appropriate corrections was made to the data collection tool accordingly. Both primary (face to face interview) and secondary data (chart review) was done to collect the data.

Result: A total of 215 pregnant women were included (response rate: 95.5%) and 26% were identified with cardiovascular disease. Significant factors associated with cardiovascular disease include primary education or read and write (AOR=1.48; 95% CI:1.33-1.66), urban residence (AOR=1.78; 95% CI:1.63-1.95), anemia during pregnancy (AOR=28.5; 95% CI:4.85-.215), family history of hypertension ($p < 0.001$). gravidity and coffee consumption also showed strong statistically significant association with cardiovascular disease ($p < 0.001$).

Conclusion & recommendation: Comparing the findings of this study with previous literature from Ethiopia, Sub-Saharan Africa, and worldwide revealed both consistencies and disparities in maternal health profiles and risk factors. Policy makers and program planners in Ethiopia should prioritize maternal health initiatives that address the multifaceted determinants of maternal health identified in this study.

Keywords: Cardiovascular diseases, pregnancy, electrocardiography, echocardiography, Ethiopia

CHAPTER I: INTRODUCTION

1.1 Background

Heart failure, stroke, peripheral artery disease, coronary artery disease, and other disorders affecting the heart and blood vessels are all included in the category of cardiovascular disease (CVD) (1). It is a leading cause of morbidity and mortality globally, responsible for millions of deaths each year. CVD can manifest in various forms, from acute events like heart attacks and strokes to chronic conditions that impair heart function and circulation (2). The development of cardiovascular disease is often multifactorial, with a complex interplay of genetic, environmental, and lifestyle factors contributing to its onset and progression Risk factors for CVD include hypertension, high cholesterol, diabetes, smoking, physical inactivity, and unhealthy diet. Additionally, age, gender, family history, and socioeconomic status can influence an individual's susceptibility to developing cardiovascular disease (3).

Cardiovascular diseases are the primary cause of death for pregnant women, which is responsible for many deaths in both high- and low-income countries. It is increasingly recognized as a significant health concern among pregnant women. (4). Ten to fifteen percent of maternal deaths are caused by maternal CVD, which complicates one to four percent of pregnancies (5). Pregnancy itself is a physiologically demanding process that places added stress on the cardiovascular system, making women more vulnerable to developing or exacerbating existing heart conditions.

Several factors contribute to the increased risk of CVD among pregnant women. These include pre-existing conditions such as hypertension and diabetes which can complicate pregnancy and increase the likelihood of developing cardiovascular complications. Additionally, pregnancy-related conditions such as preeclampsia and gestational diabetes can further strain the cardiovascular system and increase the risk of developing CVD both during and after pregnancy (6).

Antenatal care plays a crucial role in identifying and managing cardiovascular risk factors in pregnant women. Regular monitoring of blood pressure, blood glucose levels, and weight, as

well as screening for conditions such as preeclampsia, can help healthcare providers identify women at risk and intervene early to prevent or mitigate the development of CVD. However, disparities in access to antenatal care and quality of care can contribute to differences in CVD outcomes among pregnant women from different socioeconomic and demographic backgrounds (7).

Understanding the magnitude of cardiovascular disease among women attending antenatal care is essential for developing targeted interventions and improving maternal health outcomes By identifying the factors associated with CVD in this population, healthcare providers can tailor their approach to screening, prevention, and management to better meet the needs of pregnant women at risk for cardiovascular complications (8).

Numerous research investigations have documented correlations between difficulties associated to pregnancy and additional postpartum cardiovascular risk factors, including elevated cholesterol levels, insulin resistance, elevated inflammatory marker levels, increased metabolic syndrome prevalence, and vascular dysfunction (9).

1.2 Statement of the problem

While the burden of CVD among the general population is well-documented, there is a gap in understanding the magnitude of cardiovascular disease and associated factors among pregnant women attending antenatal care. Pregnancy is a unique physiological state that can impact cardiovascular health, and certain conditions such as Preeclampsia, intrauterine growth retardation, gestational diabetes mellitus (GDM), premature delivery, and other frequent pregnancy-related problems can increase the risk of developing cardiovascular disease later in life (10).

Cardiac output increases by 30 to 50% throughout pregnancy and even more during labour and delivery. Pregnancy causes a number of homeostatic changes, including decreased fibrinolysis and increased amounts of coagulation factors, fibrinogen, and platelet adhesiveness (11). These alterations result in hypercoagulability and increase the risk of thrombo-embolic events. Furthermore, the growing uterus obstructs venous return, which results in stasis and an increased

risk of thromboembolism (12). These additional haemodynamic demands of pregnancy are intolerable for women with underlying cardiac disease, which may exacerbate the underlying condition and increase morbidity and mortality for the mother, foetus, or both. Women with underlying heart disease cannot tolerate these additional hemodynamic burdens of pregnancy which may exaggerate the underlying disease, resulting in increased morbidity and mortality to the mother, fetus or both (13).

The inability of pregnant women with underlying CVD to tolerate the physiological changes associated with pregnancy puts them at higher risk for unfavorable outcomes for both the mother and the fetus (14). One-to-four percent of pregnancies are complicated by cardiac disease, and 5–10% of pregnant women worldwide suffer from hypertensive disorders of pregnancy, which hurt both the mother and the fetus (15). The most prevalent cardiac condition among pregnant women with heart disease in underdeveloped nations is rheumatic heart disease (16).

The circulatory system alters throughout pregnancy to accommodate the fetus's and mothers higher metabolic needs. They consist of decreases in blood pressure (BP) and systemic vascular resistance as well as increases in blood volume and cardiac output (CO). Dilatation is one of the reasons why the heart can enlarge by up to 30% (17).

About 32% of all fatalities worldwide in 2019 were attributed to CVDs, with an estimated 17.9 million deaths. Heart attacks and strokes were the cause of 85% of these fatalities (18). More than 75% of deaths from CVD occur in low- and middle-income nations (19). In 2019 alone 17 million premature deaths from non-communicable diseases occurred, with CVD accounting for 38% of those deaths (20).

However, there are still difficulties in managing pregnant women with cardiac disease. Also there is limited research on the prevalence of CVD among pregnant women, as well as the factors that may contribute to its development during pregnancy. Understanding the extent of cardiovascular disease in the population and identifying associated risk factors are crucial for improving maternal and fetal health outcomes. Therefore, this study aims to investigate the magnitude of cardiovascular disease and associated factors among pregnant women attending antenatal care, with the goal of informing preventive strategies and interventions to promote cardiovascular health during pregnancy and beyond.

1.3 Rational and Significance

Pregnancy-related heart issues are becoming more common in patients. However, the quantity of these individuals who see a single doctor is minimal. Nonetheless, educating people before to pregnancy about the dangers of cardiovascular disease (CVD) and how to treat them is crucial.

The burden of CVDs during pregnancy is not sufficiently addressed by Ethiopian national policy, and despite this, there are very few published findings about CVDs during pregnancy in Ethiopia. To close this gap, this study examines the prevalence of cardiovascular illnesses in pregnant patients in a few Addis Ababa, Ethiopia, federal hospitals. Therefore, when assessing health policy at the regional and national levels, the study's findings was taken into consideration. Additionally, the results will serve as a resource for students and future researchers who wish to investigate this topic. Additionally, the outcome will serve as an input for local guidelines for long-term warfarin patients' care by policy makers and HCPs.

2 CHAPTER II: LITERATURE REVIEW

2.1 Introduction

Three elements were included in the literature review section includes overview of CVD, it’s magnitude, risk factors of CVD, CVD among pregnant women, and causes of CVD among pregnant women.

2.2 Cardiovascular Disease

Cardiovascular diseases are the main cause of death worldwide, accounting for an estimated 17.9 million deaths per year. Cardiovascular diseases (CVDs) include rheumatic heart disease, coronary heart disease, cerebrovascular disease, and other conditions. More than four out of five deaths from CVD are caused by heart attacks and strokes, and one-third of these deaths occur too soon in people under 70 (21).

The industrialization of the economy and the consequent shift from physically demanding to sedentary jobs, along with today's consumerism and technology-driven culture, which is linked

to longer work hours, longer commutes, and less free time for recreational activities, may all contribute to the noticeable and consistent rise in CVD rates over the past few decades. Specifically, atherosclerosis and other metabolic diseases like metabolic syndrome, diabetes mellitus, and hypertension all of which are common in people with cardiovascular disease (CVD) are associated with a high-calorie diet high in saturated fats and carbohydrates (22).

As rheumatic fever is a common denominator in the pathophysiology of CVD, treating risk factors associated with atherosclerosis development is important, even though it can also cause emboli in a patient with atrial fibrillation or valvular heart disease, among other etiologies that can directly cause CVD (23).

With 633,842 deaths, or 1 in every 4 deaths, cardiovascular diseases (CVD) continue to rank among the top 2 causes of death in the US since 1975. In 2015, heart disease was the leading cause of death, followed by 595,930 deaths from cancer (24). With 22.9 million DALYs, CVDs account for the majority of the NCD burden in Africa. In contrast to a number of high-income countries (HIC) where cardiovascular death rates have decreased, the burden of CVDs in Africa has increased by about 50% over the past three decades. In addition to rising primary risk factors, population growth and aging have been blamed for the continent's rising CVD burden, as seen by a general decline in age-standardized mortality rates (25). Ethiopia is experiencing an epidemiologic shift from primarily infectious to non-communicable diseases, and cardiovascular disease (CVD) is a significant public health concern. Significant morbidity and death were caused by the prevalence of cardiovascular illnesses in the research area. 30.3% of people had cardiovascular disorders (CVD). Advanced congestive heart failure of various sources affected about 60% of the patients (26).

2.3Cardio Vascular Disease in pregnancy

While CVD is commonly associated with older adults, emerging research has highlighted the importance of understanding cardiovascular health in specific populations, including pregnant women (27). Pregnancy is a unique physiological state characterized by significant changes in cardiovascular function to support the growing fetus. These changes include increased blood volume, cardiac output, and heart rate, as well as alterations in vascular resistance. While these

adaptations are necessary for a healthy pregnancy, they can also unmask underlying cardiovascular risk factors or predispose women to develop pregnancy-specific conditions such as gestational hypertension and preeclampsia (28).

Gestational hypertension is a common complication of pregnancy characterized by elevated blood pressure after 20 weeks of gestation. Preeclampsia, a more severe form of gestational hypertension is defined by hypertension and proteinuria and can lead to serious maternal and fetal complications. Both conditions have been associated with an increased risk of developing cardiovascular disease later in life, highlighting the importance of early identification and management during pregnancy (15).

In addition to gestational hypertension and preeclampsia, gestational diabetes is another condition that can impact cardiovascular health in pregnant women. Gestational diabetes is characterized by high blood sugar levels that develop during pregnancy and is associated with an increased risk of developing type 2 diabetes and cardiovascular disease in the future (29).

Several studies have investigated the prevalence of cardiovascular disease among pregnant women. A systematic review found that the prevalence of hypertensive disorders of pregnancy, including gestational hypertension and preeclampsia, varied across different populations, with higher rates reported in low- and middle-income countries. The authors emphasized the need for improved screening and management of these conditions to reduce antenatal and fetal morbidity and mortality (30).

Furthermore, a study examined the association between gestational diabetes and subsequent cardiovascular disease risk in a large cohort of women The results indicated that women with a history of gestational diabetes had a significantly higher risk of developing cardiovascular disease compared to those without gestational diabetes, underscoring the long-term implications of this condition on cardiovascular health (31).

Most people with a heart condition can safely become pregnant and have a healthy baby. But cardiovascular disease during pregnancy sometimes leads to serious complications. In fact, it’s the leading cause of death among pregnant people in the U.S (32). According to a systematic review, the prevalence of prenatal cardiac illness in South Africa was 0.6%. In contrast to the

pattern of CVD in pregnancy in developed countries, which is mostly composed of congenital heart disease, the spectrum of antenatal heart disease in Africa is dominated by RHD (accounting for 88–90% and primarily of mitral valve disease), followed by cardiomyopathies and congenital heart diseases. Mitral stenosis, artificial valves, and cardiomyopathies all predict poor outcomes. Per partum cardiomyopathy (PPCMP), which has a high maternal fatality rate, is reported to affect 17.4% of mothers who come with heart failure during the peripartum period (33). The frequency of PPCMP varies significantly throughout the continent; in Nigeria, 1 in 96 deliveries were observed; in South Africa, the rate of 1 in 1,000 deliveries was more than ten times lower (34).

2.4Magnitude of CVDs among pregnant women

An estimated 1-4% of pregnant women globally suffer from cardiovascular disease, which accounts for 10–15% of maternal deaths (35). It is currently the world's top cause of maternal mortality. Age, pre-existing medical issues, lifestyle choices, and access to healthcare are some of the variables that can affect this. Cardiovascular issues during pregnancy are more likely to occur in women who already have heart disorders. To protect the health and safety of both the mother and the unborn child, it is critical that pregnant women receive appropriate prenatal care and that medical professionals monitor and treat any cardiovascular conditions that may be present (36).

According to a study conducted in US the magnitude of CVDs among pregnant women is about 1 in 3 pregnancy-related deaths due to cardiovascular problems, Cardiovascular disease complicates up to 4 in 100 pregnancies, People who are Black have a much higher risk of dying during pregnancy or soon afterward. Their risk is tripled compared with people who are Hispanic or white, Risk factors for pregnancy-related death include having high blood pressure and being over age 40 (37).

It is estimated that between one and two percent of pregnancies in England involve cardiovascular illness. Preeclampsia, gestational hypertension, pre-existing heart disease, hypertension, and other cardiovascular problems fall under this category. Depending on variables including maternal age, ethnicity, socioeconomic level, and access to healthcare, the rates may

differ slightly. Guidelines for managing cardiovascular disease during pregnancy are provided by the National Institute for Health and Care Excellence (NICE) in England. These guidelines emphasize the significance of early detection, risk assessment, and multidisciplinary care to guarantee the best results for both mother and baby (38).

Cardiovascular disease (CVD) is a major concern in Sub-Saharan Africa and has a substantial impact on pregnant women. Due to a variety of factors, including access to healthcare, socioeconomic level, lifestyle choices, and underlying medical disorders, the prevalence of cardiovascular disease among pregnant women in Sub-Saharan Africa varies by country and area. In Kenya, maternal mortality among cardiac cases was about ten times greater than all-cause death among pregnant women (39).

Numerous studies have demonstrated the prevalence of cardiovascular illness during pregnancy in Sub-Saharan Africa, where problems include pre-existing cardiac conditions, gestational diabetes, and hypertension disorders are prevalent. Pregnancy-related hypertensive illnesses, including as preeclampsia and eclampsia, are very common in the area and increase morbidity and mortality rates for both mothers and fetuses. The likelihood that a pregnant woman's surviving children will flourish may be negatively impacted by her death. Pregnancy problems claim the lives of almost 1,600 women in South Africa each year (40). Pregnant women in Nigeria are particularly vulnerable to cardiovascular disease (CVD), which includes pre-existing cardiac diseases, gestational diabetes, and hypertensive illnesses. The pooled prevalence of pregnancy-related hypertension in Ethiopia in 2020 was 6.82% (41). Another Ethiopian study found that the prevalence was 16.7%, of which 10.3% had pregnancy-related hypertensive disorders and 6.4% had cardiac disease. Preeclampsia accounted for 6.4% of instances, with gestational hypertension coming in second at 2.6% and chronic hypertension at 1.3%. Chronic rheumatic heart disease was present in 3.2% of cases. Atrial septal aneurysm (1.9%) and hypertensive cardiac disease (1.3%) (42).

2.5Factors associated with cardiovascular disease among pregnant women

There are so many risk factors that may contribute to the occurrence of cardiovascular disease during pregnancy. Here are some of them listed below.

2.5.1 **Socio-demographic factors**

A study done in Southern Nepal showed that socio-demographic factors play a crucial role in influencing the occurrence of cardiovascular disease (CVD) in pregnant women (43). According to a systematic review done in the US, those socio-demographic factors encompass various aspects of an individual's social and demographic characteristics, including age, education, income, race/ethnicity and etc. Advanced maternal age is associated with an increased risk of cardiovascular complications during pregnancy (44). Women who put off having children until later in life may be more likely to develop cardiovascular disease risk factors like diabetes and hypertension. Cardiovascular problems might arise during pregnancy and later in life as a result of these risk factors. Depending on personal health characteristics and lifestyle decisions, the precise degree of this link may differ. According to a different US study, older women may have age-related variables or pre-existing cardiovascular diseases that increase their risk of getting CVD during pregnancy (45). The group of women with a low perceived risk of CVD was considerably younger than the groups of women with both intermediate and high perceived risk ($p<0.0001$), according to an Italian study that found a direct association between perceived risk rise and age increase. An increased risk of CVD during pregnancy is linked to older mothers. Chronic diseases that can lead to cardiovascular problems are more common in older mothers (46). A systematic review done in Africa countries low-income individuals may face barriers to accessing quality healthcare, including prenatal care. Limited access to healthcare services can lead to undiagnosed or poorly managed cardiovascular conditions during pregnancy. Socioeconomic status is a broader measure that includes income, education, and occupation. Lower SES has been associated with an increased risk of cardiovascular diseases. Pregnant women with lower SES may experience higher stress levels, limited resources, and adverse living conditions, which can contribute to CVD risk (47). A review done in South Africa showed that women with lower educational attainment and socioeconomic status may face barriers in accessing quality healthcare. Limited resources can hinder preventive measures, timely screenings, and appropriate management of cardiovascular risk factors, leading to an elevated risk of CVD (48). A study done in Ethiopia revealed sometimes sociodemographic factors also influence lifestyle choices. Women with lower socioeconomic status may be more prone to unhealthy behaviors, such as poor nutrition, lack of physical activity, and smoking all of which contribute to an increased risk of cardiovascular complications during pregnancy (49). The

prevalence of cardiovascular risk factors varies across regions. Women residing in areas with limited access to healthcare facilities or facing environmental challenges may experience higher rates of CVD during pregnancy.

The burden of cardiovascular disease (CVD) among pregnant women is influenced by various clinical factors. It is important to note that pregnancy itself poses unique physiological changes and stress on the cardiovascular system. Pre-existing cardiovascular conditions and other clinical factors can exacerbate the risk and impact maternal health (50).

Women with pre-existing heart conditions, such as congenital heart disease, cardiomyopathy, may face an increased burden of CVD during pregnancy. These conditions can be exacerbated by the hemodynamic changes associated with pregnancy (51). Chronic hypertension or gestational hypertension can contribute to the burden of CVD during pregnancy. Hypertensive disorders, such as preeclampsia, can have serious implications for both maternal and fetal health, increasing the risk of cardiovascular complications (52). Pre-existing diabetes or gestational diabetes can impact cardiovascular health during pregnancy. Diabetes is a risk factor for atherosclerosis and can contribute to vascular complications. Women with a history of thromboembolic disorders are at an increased risk of complications during pregnancy, as pregnancy itself is a hypercoagulable state. Conditions such as deep vein thrombosis and pulmonary embolism can further contribute to the burden of CVD (53).

The incidence of cardiovascular disease in pregnant women may be influenced by the number of pregnancies. A higher risk of cardiovascular illness, including disorders including hypertension, preeclampsia, gestational diabetes, and cardiovascular problems during pregnancy, has been linked to multiple pregnancies (high gravidity) (7).Parity is linked to a higher risk of cardiovascular illness both during pregnancy and in later life, according to research. Pregnant women with high parity, or several pregnancies, may be more susceptible to cardiovascular problems such hypertension, preeclampsia, gestational diabetes, and heart diseases (54).

2.5.2 **Pregnancy-related factors**

Pregnancy-related factors can have various effects on the burden of cardiovascular disease (CVD) among pregnant women. It's important to note that pregnancy itself is generally not considered a risk factor for CVD (51). A study done in China revealed that gestational diabetes, a

form of diabetes that develops during pregnancy, has been associated with an increased risk of developing type 2 diabetes later in life. Type 2 diabetes is a known risk factor for cardiovascular disease (55). A study in Japan revealed that women carrying multiple fetuses (twins, triplets) may experience an increased burden on their cardiovascular system due to higher blood volume and increased cardiac output. Women carrying multiple fetuses (e.g., twins or triplets) may experience increased strain on the cardiovascular system. This can contribute to conditions such as hypertension and preeclampsia (56). Also, a study done in Tanzania showed the relationship between contraceptive use and the risk of cardiovascular disease (CVD) among pregnant women is a complex and multifaceted topic. It's essential to note that pregnancy itself is associated with changes in cardiovascular function and an increased risk of certain cardiovascular conditions. Research on the specific impact of contraceptive type on the burden of cardiovascular disease among pregnant women is limited and may vary depending on the specific contraceptive method (57). According to a study done in Mizan Tepi, Ethiopia, preexisting conditions are characterized by high blood pressure during pregnancy and can significantly impact cardiovascular health. Women who experience gestational hypertension or preeclampsia may have an increased risk of developing cardiovascular issues later in life (38). Until now there is no evidence of studies that can reveal there is a direct and widely established connection between antenatal care visits and the burden of cardiovascular disease among pregnant women. Antenatal care primarily focuses on monitoring the health of the mother and the developing fetus during pregnancy, addressing any potential complications, and providing education and support.

2.5.3 **Behavioral factors**

Behavioral factors can have a significant impact on the presence of hypertension in pregnant women (18). Some of the key behavioral factors that can contribute to the development or exacerbation of hypertension during pregnancy include: Diet: Poor dietary habits, such as excessive salt intake, high consumption of processed foods, and low intake of fruits and vegetables, can increase the risk of hypertension in pregnant women (8). In addition to this lack of regular physical activity or sedentary lifestyle can contribute to weight gain and increase the risk of hypertension during pregnancy (13).

Smoking during pregnancy is a known risk factor for hypertension and other complications. Nicotine and other chemicals in cigarettes can constrict blood vessels and increase blood

pressure (9). Excessive alcohol consumption during pregnancy can lead to hypertension and other serious health problems for both the mother and the baby (24). Overall, addressing these behavioral factors through lifestyle modifications, such as adopting a healthy diet, engaging in regular physical activity, quitting smoking, avoiding alcohol, managing stress and improving sleep habits, can help reduce the risk of hypertension in pregnant women and improve maternal and fetal outcomes.

2.6Conceptual framework

The conceptual framework tries to show the effects of those independent variables like socio-demographic factors, clinical factors and pregnancy related factors towards the dependent variable which is cardiovascular disease during pregnancy. In clinical factors there are some variables like the presence of cardiovascular cases before the pregnancy, the presence of diabetic mellitus before the pregnancy and the presence of hypertension before the occurrence of pregnancy. Those independent variables under pregnancy related factors are; antenatal care visit, types of contraceptive methods, gravidity and parity. Finally, age, monthly income, educational status and so on are socio-demographic variable of the study.

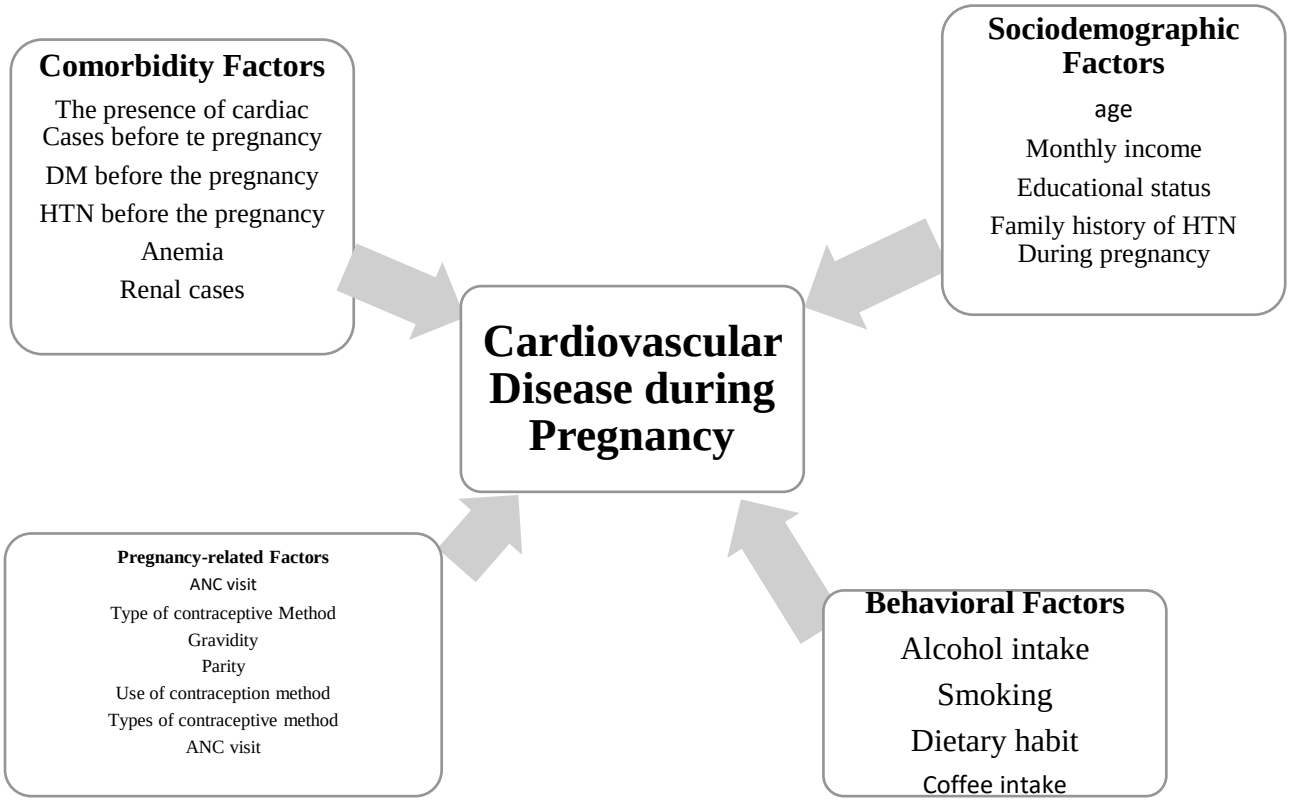


Fig 1: Conceptual frame work designed to assess magnitude of cardiovascular disease and associated factors among pregnant women attending antenatal care in a healthcare institution in Addis Ababa Ethiopia 2023

2.7 Objective of the study

2.7.1 General objective

The study aims to assess the magnitude of cardiovascular diseases and associated factors among pregnant women who had antenatal care follow-ups at selected tertiary hospitals in Addis Ababa, Ethiopia.

2.7.2 Specific objective

- To determine the magnitude of cardiovascular disease among pregnant women at selected tertiary hospitals in Addis Ababa, Ethiopia.
- To identify factors associated with CVD among pregnant women who had antenatal care follow-ups at selected tertiary hospitals in Addis Ababa, Ethiopia.

3 CHAPTER III: MATERIALS AND METHODS

3.1 Study Setting

The study was conducted in selected two tertiary hospitals located in Addis Ababa, Ethiopia. These two federal hospitals were selected by simple random method from those six federal hospitals found in Addis Ababa. The selected hospitals are St. Paul Hospital Millennium Medical College and Tikur Anbessa Specialized Hospital. Since these two hospitals are federal and huge tertiary hospitals in the capital city of Ethiopia receiving referral cases from all regional health care institutes found in different parts of our country. So, these two hospitals are assumed to represent the total population with different backgrounds. SPHMMC is one of the largest tertiary referral government hospitals with 400 beds. The hospital gives diagnostic and treatment services to more than 400,000 patients per year (OPD; 366265, Emergency; 36187, Inpatients; 18814) (58).

TASH is the largest tertiary care referral hospital in Ethiopia, with 700 beds. Various healthcare workers (HCWs), including general practitioners and specialists, nurses, medical laboratory technologists, and pharmacists, are part of the TASH working force serving the community wholesomely. The hospital has 3021 active staff. TASH annually serves around 589,020 patients. From these, 41,220 patients receive emergency services, around 525,888 patients attend OPD, 21, 912 inpatients and 8067 of them are cardiac patients (59).

3.2 Study Design and Period

An institution-based cross-sectional study design was employed. The study was commenced from February 15 to March 19 2024.

3.3 Population

3.3.1 Source Population

All pregnant women attending antenatal follow-up unit in the selected study setting was the source population.

3.3.2 Study Population

A pregnant woman who would be in the 2nd and 3rd trimester of pregnancy and who were attending antenatal care follow-up at selected tertiary hospitals during the study period were recruited.

3.4 Eligibility Criteria

3.4.1 Inclusion criteria

All women with confirmed 2nd and 3rd trimester pregnancy and willing to participate in the study were included in the study.

3.4.2 Exclusion criteria

Those who have been in the first trimester of pregnancy; and those who are in 2nd and 3rd trimester of pregnancy but were not willing to give their verbal consent were excluded from the study.

3.5 Sample Size Determination

The sample size for the study was determined by using the single population proportion formula. Since there is a previous study conducted at Jimma University Medical Center (42) the prevalence of CVD among pregnant women was 16.7%. then, the proportion was taken as 16.7%, and accordingly, the sample size was calculated to be 225 from. The study participants were selected from the above-listed sampling frame by simple random method since there is a short period to gain enough participants to reach the sample size.

$$n = \frac{(Za_{/2})^{2}\, p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2\,(0.167)(1-0.167)}{(0.05)^2} = \frac{0.534}{0.0025}$$

$$= 213.73 \sim 214$$

Where;

n - Is the estimated sample size

p - Is the proportion of patients

d - Is the margin of error

By adding a 5% non-response rate the final sample size was 225

3.6 Sampling Techniques

A simple random sampling technique was used to select the study populations. The sample of 225 was allocated to two randomly selected hospitals proportionally. The total population of pregnant women attending their healthcare in the selected hospital ANC clinic monthly is estimated 1082 and the proportional allocation of samples to each hospital was calculated based on the total number of women whom they have follow-up in the respective clinic of antenatal care and come up with the final proportional sample.

The proportional value will be calculated with the

$$\frac{Total\ sample\ x\ total\ population\ of\ specific\ area}{\text{Total population}}$$

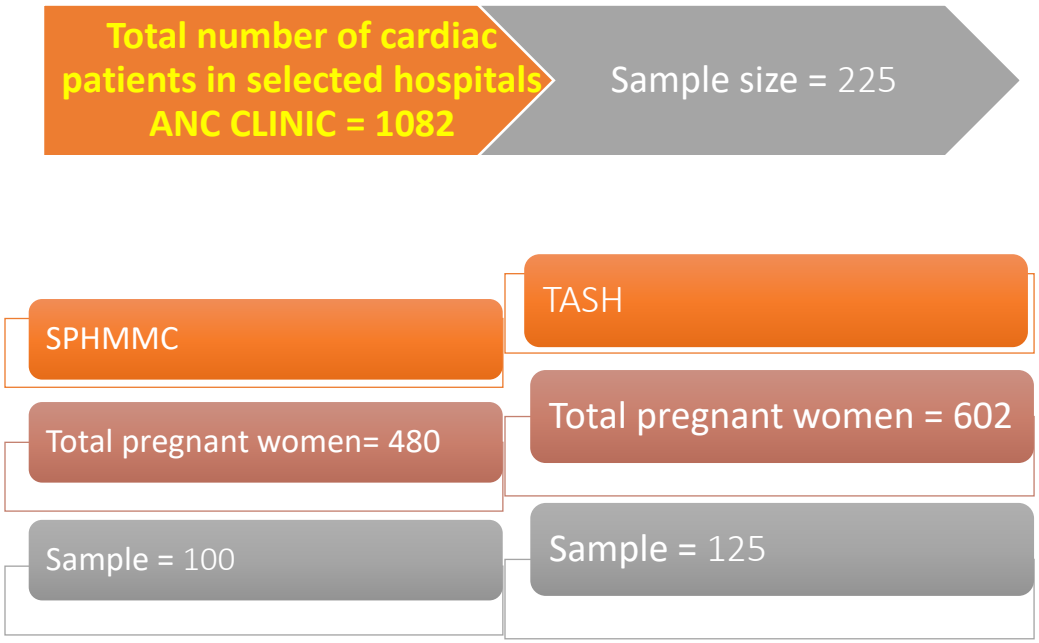


Fig 2; Proportional allocation of the sample to those two selected hospitals

3.7 Operational Definitions

Cardiovascular disease in pregnancy:- According to WHO it is a **group of disorders of the heart and blood vessels** and include coronary heart disease, cerebrovascular disease, rheumatic

heart disease, hypertension and other conditions that can occur during pregnancy (60).Individual pregnant women were categorized as having a cardiovascular disease by reviewing the medical chart.

3.8 Study variables

Dependent variable:

- Magnitude of Cardiovascular Diseases among pregnant women

Independent variables:

Socio-demographic variables: (Age, Monthly income, Educational status, Family history of hypertension during pregnancy

Comorbid variables: (the presence of cardiac cases before the pregnancy, DM before the pregnancy, HTN before the pregnancy)

Pregnancy related variables: (ANC visit, use of contraceptive, Type of contraceptive Method previously used, Gravidity, parity,

behavioral factors: (alcohol intake, smoking habit, dietary habit, Data Collection instrument and procedure)

Data collection instrument and process

Data was collected using a structured questionnaire which was adapted and modified from the previous published literature then it was translated into the respondent's local language, which is Amharic by professional translators (42). The questionnaire had taken a maximum of 15 minutes. Two nurses will be involved as a data collector and one as a supervisor. A pre-test will be done in 5% of the samples at different hospitals from the study setting, and appropriate corrections were made to the DC tool accordingly. Both primary (face-to-face interview) and secondary data (chart review) will be done to collect the data. The questionnaire's reliability and validity will be assessed through the calculation of Cronbach's alpha. Generally, a Cronbach's

alpha value of 0.80 or above is deemed indicative of good reliability, although some sources propose that a value of 0.67 or higher is also acceptable.

3.9 Statistical Analysis

Data was collected by Kobo toolbox and exported to SPSS version 26.0 for cleaning and analysis. A descriptive and inferential statistics analysis was done. In descriptive statistical analysis, the data was summarized in percentage, frequency and/or mean and standard deviation then the results is described and presented using frequency tables, figures and charts. Variables with P-value less than 0.25 were included for bivariate logistic regressions. Odds ratio was used to assess strength of association between the factors and summary scores. To check for significance level, 95% CI and a statistical significance at P value of <0.05 will be considered. SPSS version 27 will be used for data analysis.

3.10 Data quality measurement

Before data collection, the primary investigators were ensured and choose an appropriate study design, and study participants, and organize the tools accordingly. The data collection was performed by nurses. The data collectors and the supervisor was trained for one day. Data collectors collect the data from patients accordingly. The questionnaire was translated into Amharic, the national language of Ethiopia by legally accepted translators, as the data collection will be done in Addis Ababa and back-translated to English for its consistency. A pretest was conducted on 5% of the samples at St. Peter Hospital. Finally, the validity of the tool has checked and necessary modification will be made. The data was checked for its completeness before entry to SPSS software for analysis. It was checked for the completeness in every data collection day then if there is any incomplete data, it has replaced.

3.11 Ethical Considerations

Ethical approval was obtained from the Ethical Review Board of the School of Nursing, College of Health Sciences (CHS), and Addis Ababa University (AAU) with a reference number. Then a letter was written by the Dean's Office of the School of Nursing to obtain permission from SPHMMC and TASH to conduct the study. After gaining the approval letter from the study area the data was collected starting from the month of February to March by face to face interview after getting an agreement from each study unit through written informed consent. An individual does have a full right to refuse the study not to participate. Those who refused to participate in

the study was excluded from the study. Being a participant of this study was not offer anything for the study participant. Confidentiality was maintained by omitting study participants' using anonymized code and giving code numbers.

3.12 Dissemination of Results

The findings of this study will be disseminated to AAU, and the School of Nursing and the two hospitals will receive a copy of the final thesis report.

CHAPTER IV: RESULTS

5.1 Sociodemographic Characteristics of pregnant women attending antenatal care in selected public hospitals in Addis Ababa, Ethiopia 2024

From the total sample size calculated, a total of 215 sample was collected, with the response rate of 95.5%. Table 1 below presents the distribution of sociodemographic characteristics among the study population. Categories include: age groups, educational status, marital status, religion, employment status, residence status, occupational status, and family history of hypertension during pregnancy. The data is represented as counts and percentages, providing insights into the demographic composition of the study participants. Notable findings include a predominance of individuals aged less than 35 years, primarily with secondary education or above 142 (66.05%), married 184 (90.2%), and residing in urban areas 118 (54.9%). Additionally, a significant proportion are housewives 111 (51.6%), with a notable prevalence of Orthodox Christians 79 (36.7%) (Table 1).

Table 1: Sociodemographic Characteristics of pregnant women attending antenatal care in a healthcare institution in Addis Ababa Ethiopia 2024 (N = 215). Don't break tables unnecessarily.

Sociodemographic Characteristics	**Category**	**N**	**(%)**
Age (In Years)	Less than 35	176	81.86
	Greater than 35	39	18.14
Educational Status	Read / Write and Primary (1-8)	73	33.95
	Secondary education or above	142	66.05
Marital Status	Single	9	4.2
	Married	194	90.2
	Divorced	11	5.1
	Widowed	1	0.5
Religion	Catholic	7	3.3
	Muslim	53	24.7
	Orthodox	79	36.7
	Protestant	70	32.6
	Other	6	2.8
Employment Status	Not Employed	128	59.5
	Employed	87	40.5
Residence Status	Urban	118	54.9
	Rural	97	45.1

Occupational Status	Farmer	1	0.5
	Government	30	14.0
	House Wife	111	51.6
	Merchant	5	2.3
	Private	44	20.5
	Student	3	1.4
	Others	21	9.8
Family History of Hypertension during Pregnancy	**No**	**157**	**73.0**
	Yes	58	27.0

5.2 the magnitude of cardiovascular disease pregnant women attending antenatal care in health care institutions in Addis Ababa, Ethiopia 2024

The pie chart illustrates the distribution of pregnant women based on their cardiac health status. Among the total population of pregnant women surveyed, 56 individuals were identified with cardiac cases, representing approximately 26% of the study.

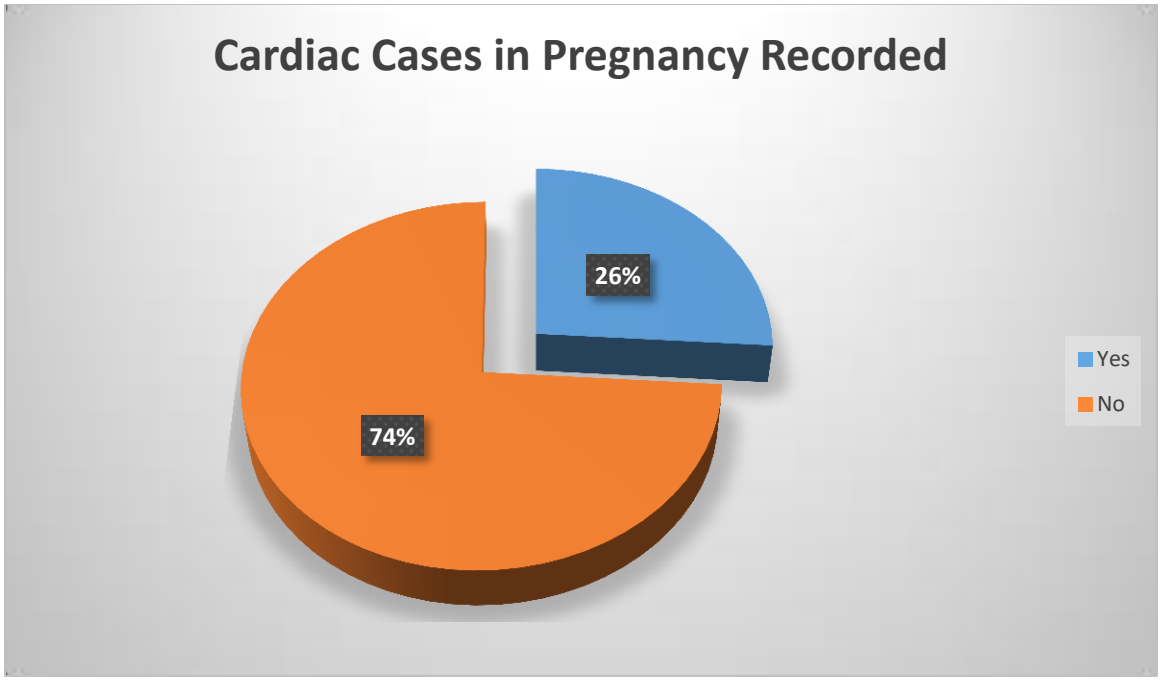


Figure 3: The magnitude of cardiovascular disease among pregnant women attending antenatal care in a healthcare institution in Addis Ababa, Ethiopia 2024 (N = 215).

5.2 Clinical Characteristics of Participants

The table below presents the clinical characteristics of the study participants, detailing key variables such as gravidity, parity, past ANC visit, number of ANC visits, past contraception method use, and type of contraceptive method. The data is represented as number (N), percent (%) for each category within these variables. For gravidity, 61 (28.4%) participants had a Gravidity of 1 and 154 (71.5%) had a gravidity of 2 or more. In terms of parity, 29.3% participants had a parity of 0 and 67.0% had a Parity of 1-4. Additionally, 168 (78.1%) participants had at least three or more ANC visits. Furthermore, 88.8% participants reported past contraception method use.

Table 2: Clinical Characteristics of pregnant women attending antenatal care in a healthcare institution in Addis Ababa Ethiopia 2024 (N = 215)

Clinical Characteristics	**Category**	**(n=215)**	**%**
Gravidity	1	61	28.4
	≥2	154	71.6
Parity	0-1	63	29.3
	≥2	152	707
Past ANC Visit	No	63	29.3
	Yes	152	70.7
Number of ANC Visits	1-2	47	21.8
	≥3	168	78.1
Past Contraception Method Use	No	24	11.2
	Yes	191	88.8
Type of Contraceptive Method	Depo Provera	70	32.6
	Implant	61	28.4
	IUCD	34	15.8
	OCD	50	23.3
Pregnancy Type	Unplanned	56	26.0
	Planned	159	74.0

5.3 Behavioral Characteristics of Participants

The table provides insight into the behavioral characteristics of pregnant women attending antenatal care in a healthcare institution in Addis Ababa, Ethiopia in 2024. Out of the 215 participants, the majority (94.9%) reported abstaining from alcohol consumption during pregnancy, while a small percentage (5.1%) admitted to consuming alcohol. Additionally, almost

all pregnant women (99.1%) reported not smoking cigarettes, with only a minimal portion (0.9%) reporting cigarette smoking.

Concerning diet during pregnancy, 27.0% of the women followed a balanced diet with fruits and vegetables, while 71.2% consumed whatever was available to them. A small proportion (1.9%) reported a preference for foods with higher fat and oils content, 175 (81.4%) reported they consume coffee once or more every day (Table 3).

Table 3: Behavioral Characteristics of pregnant women attending antenatal care in a healthcare institution in Addis Ababa Ethiopia 2024 (N = 215)

Behavioral factors	**Category**	**(n=215)**	**%**
Alcohol Consumption	Yes	11	5.1
Cigarette Smoking	Yes	2	0.9
Diet During Pregnancy (Balanced Diet with Fruits and Vegetables)	Yes	58	27.0
A cup of Coffee Consumption per Day	Not at all	40	18.6
	≥ 1	175	81.4

5.4 Comorbidity Profile of Study Participants

The table below provides a comprehensive overview of the comorbidities present among pregnant women receiving antenatal care. Out of the 215 participants about 19.5% of women disclosed having diabetes mellitus (DM) before pregnancy, with the majority (80.5%) having no history of DM prior to conception. Hypertension (HTN) was found in 16.7% of the pregnant women before pregnancy, while 83.3% did not have a pre-pregnancy hypertension diagnosis.

Furthermore, 34.4% of participants reported anemia before pregnancy, with 65.6% not having preexisting anemia. Only 9.8% of women had renal cases before pregnancy, while the vast majority (90.2%) did not have any prior renal issues.

Table 4: Comorbidities of pregnant women attending antenatal care in a healthcare institution in Addis Ababa Ethiopia 2024 (N = 215)

Comorbidities	(n=215)	%
DM Before Pregnancy	42	19.5
HTN Before Pregnancy	36	16.7
Anemia Before Pregnancy	74	34.4
Renal Cases Before Pregnancy	21	9.8

5.5 Factors Associated with CVS in Pregnancy

5.5.1 Bivariate logistic regression analysis

Bivariate logistic regression analysis was carried out to see the relationship between independent variables and the outcome, variables with p-value less than 0.25 in the bivariate logistic regression model were candidates for multivariate regression model. Accordingly, various variables such as age, educational level, residency and anemia, were significantly associated with CVD, other variables such as gravidity, parity, taking balanced diet including fruits and vegetable, daily coffee consumption, and family history of hypertension fail to fit model due to complete separation presence of zero value in one or more cells. To resolve this, recategorization and use of chi-square and Fisher's Exact tests were employed.

In the multivariate regression analysis, pregnant women were categorized into two groups: less than 35 years and 35years or older. Women aged 35 years and above had nearly two-fold higher crude odds of cardiovascular disease in pregnancy compared to those younger than 35 years (COR=2.1; 95% CI:0.98-4.48); however, tis association did not reach statistical significance (p=0.051). Educational status showed a significant association with CVD during pregnancy. Women with read and write/primary education had 48% higher odds of CVD compared with those with higher educational attainment (AOR=1.48; 95% CI: 1.33-1.66; p<0.001). Residence status was also significantly associated with CVD during pregnancy. Participants from urban had 78% higher odds of CVD among pregnant women compared to their counterparts (AOR=1.78; 95% CI: 1.63-1.95; p < 0.001). in addition, anemia during pregnancy demonstrated a strong association with CVD. Pregnant women with anemia were approximately 28 times more likely to

develop CVD compared with non-anemic women. (AOR=28.5; 95% CI:4.85-215; p< 0.001). the wide confidence interval indicates uncertainty in the estimates, likely attributable to the small number of non-anemia cases.

Table 4: **Factors associated with Cardiovascular disease among pregnant women in selected public hospitals in Addis Ababa (n=215)**

Variables	Cardiovascular disease in pregnancy					
	Category	**Yes**	**No**	**COR/95% CI**	**AOR/ 95% CI**	**p-value**
Age in years	Less than 35	41	135	1	1	
	Greater than 35	15	24	2.06 (0.99-4.29)	2.1 (0.98-4.48)	0.051
Educational status	Read & write/ primary	26	81	1.49 (0.82-2.70)	1.48 (1.33 – 1.66)	< **0.001**
	Secondary or above	35	73	1	1	
Residency	Urban	37	71	1.80 (0.98-3.29)	1.78 (1.63-1.95)	
	Rural	24	83	1	1	< **0.001**
Anemia	Yes	55	96	36.1 (4.85-255.1)	28.5 (3.8-215)	< **0.001**
	No	1	63	1	1	

C.I; Confidence Interval, AOR; Adjusted Odds ratio,

The association between selected reproductive and lifestyle factors and cardiovascular disease in pregnancy was examined using chi-square and Fisher's Exact tests as appropriate. Gravidity showed a strong and statistically significant association with cardiovascular disease (Fisher's Exact Test, P <0.001), the results showed none of the women with no prior gravidity developed CVD. Similarly, coffee consumption demonstrated a statistically significant association with cardiovascular disease. Fisher's Exact Test indicated that none of the women who did not consume coffee developed CVD (p <0.001), suggesting a strong relationship between coffee intake and CVD. Additionally, there is a very strong statistically significant association between hypertension in pregnancy and CVD (Fisher's Exact Test, P <0.001). in the analysis of lifestyle factors, consumption of a balanced diet including fruits and vegetables was not significantly associated with cardiovascular disease (X^2 =0.71, p=0.399).

Table 5: Association between selected reproductive and lifestyle factors and cardiovascular disease before and during pregnancy among pregnant women (n = 215)

Variables	**Cardiovascular in pregnancy**			**X^2- square**	**p-value**
		No	**yes**		
Gravidity	No	60	0		**< 0.001**
	Yes	99	56		
Parity	1	61	0		**< 0.001**
	≥ 2	98	56		
Taking balanced diet Fruits & Vegetables	No	13	151	0.71	0.399
	Yes	6	45		
Daily Coffee consumption	Not at all	40	0		**< 0.001**
	≥ 1	159	56		
Family history of HTN	No	159	20		**< 0.001**
	Yes	0	36		

HTN: Hypertension

Chapter V: Discussion

This study assessed the magnitude of cardiovascular disease (CVD) and its associated factors among pregnant women attending antenatal care (ANC) in selected public hospitals in Addis Ababa, Ethiopia. The findings are discussed in light of existing evidences

The present study revealed that 26% of pregnant women attending antenatal carehad cardiovascular disease, indicating a substantial burden of CVD. This finding is higher than the globally reported estimates of 1-4% of pregnancies complicated by CVD, which accounts for 10-15% of maternal deaths (5,35). However, it is within the broader range reported in some studies from developed settings, where pregnancy related cardiac related complications have been documented to range between 20% and 30%, particularly when hypertensive disorders and other cardiovascular conditions are included (59).

Compared with Sub Saharan Africa, where reported prevalence generally ranges from 10-20%, the higher magnitude observed in this study may reflect improved detections during ANC follow-up, increased awareness, or a higher prevalence of underline risk factors such as hypertension, anemia, and diabetes among urban populations (39,40,60). In Ethiopia, previous studies have reported prevalence's ranging from 16.7%, including 10.3% hypertensive disorders and 6.4% cardiac disease, which although lower than the current findings, still demonstrate a significant and growing burden of CVD among pregnant women (42). The relatively higher prevalence in this study may also be influenced by the urban setting of Addis Ababa, where lifestyle changes, delayed childbearing, and higher detection rates during ANC are more common (25.26).

Age has consistently been identified as an important determinant of CVD risk during pregnancy. In this study, women aged 35 years or above had nearly two-fold higher odds of developing CVD compared with younger women, although the association narrowly missed statistical significance (p=0.051). this finding aligns with previous studies showing that advanced maternal age is associated with increased cardiovascular risk due to a higher prevalence of chronic conditions such as hypertension and diabetes (44-46). The borderline significance observed may be related to the relatively small sample size, suggesting that age remains an important clinical consideration even when statistical threshold is not met.

Educational status showed a significant association with CVD, with women who had secondary education or higher exhibiting higher odds of cardiovascular disease. While higher education is often considered protective, similar findings have been reported in urban African settings, where educated women may delay pregnancy, adopt sedentary lifestyle, or experience occupational stress, all of which are linked to cardiovascular risk (47,49). This highlights the complex and context-specific relationship between education and health outcomes.

Residence was also significantly associated CVD, with urban residents having higher odds of cardiovascular disease in pregnancy. This finding is consistent with literature indicating that urbanization is associate with lifestyle-related risk factors such as reduced physical activity, dietary changes, increased exposure to non-communicable diseases (22,25). Urban women may also be more likely to be diagnosed due to better access to health services, contributing to higher reported prevalence.

The comorbidity profile of participants revealed a considerable burden of pre-existing conditions, including anemia (34.4%), diabetes mellitus (19.5%), and hypertension 16.7%) prior to pregnancy. These findings are consistent with reports from Ethiopia and other Sub-Saharan African countries, where anemia and hypertensive disorders remain highly prevalent among pregnant women (41,42,62).

Anemia demonstrated a particularly strong association with cardiovascular disease, with anemic women being significantly more likely to develop CVD during pregnancy. Although the confidence interval was wide, likely due to small cell sizes, this finding is biologically plausible. Anemia increases cardiac workload by reducing oxygen-caring capacity, thereby exacerbating underlying or subclinical cardiac conditions during the hemodynamic stress of pregnancy (11,17). Similar associations have been reported globally, emphasizing anemia as a critical and modifiable risk factor in maternal cardiovascular health (63,64).

Hypertension during pregnancy showed a very strong and statistically significant association with CVD, consistent with extensive evidence linking hypertensive disorders of pregnancy, including preeclampsia, to booth short and long-term cardiovascular complications (5,15,52). This reinforces the role of blood pressure screening and management as a cornerstone of ANC services.

Gravidity was significant associated with cardiovascular disease, with none of the primigravida women developing CVD in this study. This finding reports existing evidence that higher gravidity and parity are associated with cumulative cardiovascular stress and increased risk of hypertensive disorders and metabolic complications (7,54). Repeated exposure to pregnancy-related hemodynamic changes may predispose women to cardiovascular dysfunction over time.

Although ANC attendance was generally high in this study, consistent with previous Ethiopian findings on improved service utilization in urban settings (61), no direct association between the number of ANC visits and CVD was established. This aligns with existing literature indicating that ANC primarily serves as a platform for detection and management rather than a direct determinant of cardiovascular disease occurrence.

Behavioral risk factors such as alcohol consumption and smoking were uncommon among participants, which is consistent with findings from other Ethiopian studies and may reflect effective health education during ANC visits (18). However, dietary practices were suboptimal, with the majority of women consuming whatever food was available rather than a balanced diet. Despite this, no statistically significant association was found between balanced diet consumption and CVD, possibly due to limited dietary diversity measurement or short-term dietary assessment.

Coffee consumption showed a strong and statistically significant association with cardiovascular disease, with none of the women who did not consume coffee developing CVD. While moderate coffee intake has been reported as cardio protective in non-pregnant populations, excessive consumptions may increase sympathetic activity in blood pressure, particularly during pregnancy (9). This finding suggests the need for context-specific dietary counseling during ANC, although further studies are required t clarify causality.

Implications for maternal health care

Overall, the findings of this study underscore the high burden of cardiovascular disease among pregnant women attending ANC in Addis Ababa and highlight the multifactorial nature of cardiovascular risk during pregnancy. The strong associations observed with anemia, hypertension, urban residence, and reproductive factors emphasize the importance of integrated risk-based antenatal care, with particular attention to early screening and management of comorbid conditions.

These results are consistent with global and regional evidence indicating that pregnancy serves as a critical window for identifying women at increased risk of future cardiovascular disease (9,15,31). Strengthening ANC services to include comprehensive cardiovascular risk assessment may contribute significantly to improving both maternal and long-term cardiovascular health outcomes in Ethiopia

Conclusion

This study found that cardiovascular disease affects a substantial proportion of pregnant women attending antenatal care in Addis Ababa, indicating a significant maternal health concern. The magnitude observed highlights pregnancy as a critical period for identifying cardiovascular vulnerability.

Key factors associated with cardiovascular disease included advanced maternal age, urban residence, lower educational status, anemia, family history of hypertension, higher gravidity, and coffee consumption. Among these, anemia and family history of hypertension showed the strongest associations, emphasizing the importance of early detection and management of these conditions during antenatal care

Overall, the findings underscore the need to strengthen antenatal care services with integrated cardiovascular risk screening and targeted preventive interventions. Early identification and management of cardiovascular risk factors during pregnancy may reduce adverse maternal outcomes and improve long-term cardiovascular health.

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ANNEXES

APPENDIX-A: Information Sheet

Addis Ababa University, College of health Sciences

My name is ……I am working as a data collector for the study being conducted by Addis Ababa University, College of health Sciences. I kindly request you to give me your attention to explain about the study.

Title of the study: Magnitude of Cardiovascular Disease and associated factors Among Pregnant Women Attending Antenatal Care In health care institutions In Addis Ababa Ethiopia 2023

Objective of the study: To assess the Magnitude Of Cardiovascular disease and associated factors Among Pregnant Women Attending Antenatal Care In Health Care Institutions In Addis Ababa Ethiopia 2023

The purpose/Aim of the Study: The findings of this study will provide base line information for hospital manager and health care providers to strengthen the cardiac care service towards pregnant women, in antenatal care unit.

Procedure and Duration: The data collectors will do interview with the participants in their first language using an interview guides and it will take 25-30 minutes.

Risk and Benefit: The participants will not have any risk being participating in this study. There is no direct benefit given being participated in this study, but your participation will help to generate base line information for strengthening the cancer service.

Confidentiality: Participant's information will be confidential. Your name and other personal identifiers will not be recorded on data collection format and the information that you give us will be kept confidential and will be used for this study purpose alone.

Rights: The participants will have the right to refuse the participation or to answer any questions that they feel uncomfortable. And if you have any questions about the conducted study you can ask the principal investigators with the following address. Phone -

Are you volunteer to participate in this research as a participant?

1. Yes 2. No

APPENDIX-B: የመረጃወረቀትእናበመረጃላይየተመሰረተስምምነት (የአማርኛቅጂ)

የኔስም _____. በአዲስአበባዩኒቨርሲቲ፣ጤናሳይንስኮሌጅ፣ ነርሲንግእናአዋላጅትምህርትቤትበካዲዮቫስኩላርነርሲንግየሁለተኛዲግሪ ተማሪበሆነችውበሃለንእየተካሄደላለውጥናትመረጃሰብሳቢሆኜእየሰራሁነው። ስለጥናቱእናየጥናቱተካፋይሆኖመመረጡንለእርስዎለማስረዳትትኩረትዎንእንዲሰጡኝበአክብሮትእጠይቃለሁ።

1. የምርምርርዕስ፡-በቅድመወሊድህክምና በነፍሰጡርእናቶችላይያለውንየልብ፣የደምቧንቧና ተያያዝ ችግሮችየህመምመጠንበአዲስአበባጤናአጠባበቅተቋማት 2023 ማትናት ነው።

2. የጥናቱዓላማ፡-

በቅድመወሊድክብካቤከሚካፈሉነፍሰጡርእናቶችመካከልየልብናየደምቧንቧህመምመጠንእናተያያዥምክንያቶችንለመገምገም

3. ተሳትፎ

ጥናቱንለመቀላቀልከተስማሙበመረጃሰብሳቢውየሚጠየቁትንጥያቄዎችበሙሉእንዲመልሱበአክብሮትይ ጠየቃሉ።

4. ምስጢራዊነት፡-

ከእርስዎየተገኘመረጃበሚስጥርይያዛልእናምከዚህጥናትውጭለማንኛውምዓላማፈጽሞጥቅምላይአይውል ም።

5. ስጋት፡-

በዚህጥናትውስጥበሚሳተፍማንኛውምሰውላይምንምአይነትጉዳትአይደርስምተብሎይጠበቃል።

6. ጥቅም

በዚህጥናትውስጥያለዎትተሳትፎበቅድመወሊድክብካቤ

ክሚከታትሉነፍሰጡርእናቶችመካከልየልብናየደምቧንቧህመምመጠንእናተያያዥምክንያቶችንለመገምገም አዲስ አበባ ኢትዮጵያበተመረጡ የህዝብ ሆስፒታሎች የሚጠና ነው፣ በመሆኑም የዚ ጥናት ውጡት ይህንን ለማሻሻል የሚረዱ መንገዶችን ለመጠቆም ያግዛል ።

ከላይ የተገለፀውን መረጃ ካነበቡ እና ከተረዱ በኋላ;በዚህጥናትለመሳተፍከተስማሙ፣ በተዘጋጀውሳጥንውስጥምልክትበማድረግአዎየሚለውንይምረጡ። አዎአይ

APPENDIX-C

Section-1: Socio-demographic characteristics

SN	Characteristics	Possible responses	Skipping	Code
1.	Age in year	_____		
2.	highest level of education you have attained	1. Read and write 2. Primary (1-8) 3. Secondary (9-12) 4. College diploma/certificate 5. Degree and above		
4	Marital status	1. Married 2. Divorcé 3. Widowed		
5	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Other		

6	Employment status	1. Not employed 2. Employed		
7	Residence	1. Urban 2. Rural		
8	Occupational status	1. Government 2. private 3. house wife 4. student 5. merchant 6. Farmer 7. Retired 8. Others		
9	Monthly income			
10	Is there family history of HTN in your family during pregnancy	1, Yes 2, No		
Section Two: Clinical characteristics of cardiac pregnant women/chart review				
10	Gravidity	1. 1 2. 2-4 3.≥5		
11	Parity	1. 0 2. 1-4 3. ≥5		
12.	ANC visit in the past	Yes		

		No		
13	Number of -ANC visits	1 2 3 4 >4		
14	Use of contraception method before the current one	No Yes		
15	Type of contraceptive Method	OCP Implanon Depo provera IUCD		
16	Pregnancy	Planned Unplanned		
17	The presence of any cardiac case	1, Yes 2, No		
18	The presence of DM before the pregnancy	1, Yes 2, No		
19	The presence of HTN before the pregnancy	1, Yes 2, No		
20	The presence of Anemia before the pregnancy	1, Yes 2, No		
21	The precense of Renal case before the pregnancy	1, Yes		

		2, No

<u>Section Three</u>: Behavioural characteristics of cardiac pregnant women

Do you drink Alcohol?	1. **Yes** 2. **No**		
Do you Smoke Cigarettes?	**1. Yes** **No**		
What type of diet do you follow during your pregnancy?	1, balanced diet with fruits and vegetables 2, more fat and oils reached foods 3, I consume what I get to eat		
How many cups of coffee do you consume per day			

APPENDIX-D: Amharic version

ተ.ቁ	ባህሪያት	ሊሆኑየሚችሉምላሾች	መዝለል	ኮድ
1	ዕድሜበዓመት			
2	ያገኙትንከፍተኛየትምህርትደረጃ	1. ማንበብእናመጻፍየሚችል 2. የመጀመሪያደረጃትምህርት (1-8) 3. ሁለተኛደረጃ (9-12) 4. የኮሌጅዲፕሎማ / የምስክርወረቀት 5. ዲግሪእናከዚያበላይ		
3	የጋብቻሁኔታ	1. ያገባ 2. የፍቺ 3. ባል የሞተባት		
4	ሃይማኖት	ኦርቶዶክስ ሙስሊም		

		ፕሮቴስታንት ሎሎችም
5	የቅጥርሁኔታ	የማይሰራ የተቀጠረ
6	ወርሃዊገቢበኢትዮጵያብር	
7	መኖሪያ	ከተማ ገጠር
8	የሙያደረጃ	የመንግስት የግል የቤትሚስት ተማሪ ነጋዴ ገበሬ ሎሎችም
9	ወርሃዊገቢ	በቂ በቂአይደለም ምንምገቢየለም

ክፍልሁለት:የልብሀመም ያለባቸው እርጉዝሴቶችክሊኒካዊባህሪያት

ተ.ቁ	ባህሪያት	ሊሆኑየሚችሉምላሾች	መዝለል	ኮድ
1	የእርግዝና ብዛት	1 2-4 ≥5		

2	የወሊድ ብዛት	0 1-4 ≥5
3	የቅድመ ወሊደ ክትትል	Yes No
4	እስካሁን ያረጉት የቅድመ ወሊደ ክትትል ብዛት	1 2 3 4 >4
5	የወሊድመከላከያ ዘዴ ይጠቀሙ ነበር	No Yes
6	የእርግዝናመከላከያዘዴዓይነት	OCP Implanon Depo provera IUCD
7	የእርግዝና ሁኔታ	Planned Unplanned
8	የታችናው የአይን ቆብ መገረታት	
9	የታይሮይድእጢመጨመር	
10	Displace PMI	
11	MR ኩሩርታ	Moderate Severe
12	Mitral regurgitation	መለስተኛ

		መጠነኛ ከባድ
13	Aortic regurgitation	መለስተኛ መጠነኛ ከባድ
14	Tricuspid regurgitation	መለስተኛ መጠነኛ ከባድ
15	የ *pulmonic* regurgitation	መለስተኛ መጠነኛ ከባድ