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PROFILE OF PATIENTS PRESENTING TO ADDIS CARDIAC HOSPITAL, ADDIS ABABA, ETHIOPIA, FROM MAY 2007 TO DECEMBER 2011

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## PROFILE OF PATIENTS PRESENTING TO ADDIS CARDIAC HOSPITAL, ADDIS ABABA, ETHIOPIA, FROM MAY 2007 TO DECEMBER 2011

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### ABSTRACT

**Background:** Cardiovascular disease, principally, ischemic heart disease and stroke, constitute the leading cause of global mortality, accounting for 422.2 million cases of cardiovascular disease and 17.92 million deaths worldwide in 2015. In Ethiopia, no countrywide studies done on cardiovascular disease, except for some hospital-based studies and a few community based research showing the problem as an important cause of morbidity and mortality.

**Method:** This is a facility-based study at the first private cardiac specialized hospital in Ethiopia. Systematic sampling was applied to select the study subjects through retrieval of every 10<sup>th</sup> medical record and data were exported to STATA version 14 software for cleaning and analysis. Frequency distribution of the outcome variables, risk factors, clinical presentations and treatment categories were presented.

**Results:** The most frequent age range at presentation was 21 to 30 years. The most frequent presenting complaints are dyspnea and/or orthopnea occurring in 1282 (41.44%) followed by fatigue in 1122 (36.26%) and chest pain in 843 (27.25%). The two most frequent risk factors of cardiovascular disease are hypertension and dyslipidemia present in 1040 (33.61 %) and 831 (26.86%) patients respectively followed by diabetes in 508 (16.42%). Hypertension with hypertensive heart disease accounts for 1040 (49.31%) followed by ischemic heart disease in 219 (10.38 %) and cardiomyopathy in 133 (6.31%) patients.

**Conclusion:** Hypertension, dyslipidemia, diabetes and overweight/obesity are important risk factors of cardiovascular disease among subjects. The use of guideline recommended primary and secondary prevention medications in primary care settings was very low.

## INTRODUCTION

Cardiovascular disease (CVD), principally, coronary heart disease (CHD) and stroke, constitute the leading cause of global mortality, accounting for 422.2 million cases of CVD and 17.92 million deaths worldwide in 2015 (1). In high-income, developed countries, CVD has been the leading cause of death throughout most of the last century. In the United States, heart disease has been the leading cause of death every year since 1918 (2). Currently, however, most CVD deaths occur in low- and middle-income countries (LMIC) and there is growing concern that an epidemic of CVD is emerging in these countries that must be prevented (3).

In sub-Saharan Africa (SSA), where all countries are part of the developing world, the magnitude of and trends in CVD deaths remain incompletely understood. The prevalence of communicable diseases still exceeds those of chronic diseases in the sub-continent where a high proportion of citizens are younger than 65. The onset of CVD occurs among ever-younger people, posing a threat to economic and social development (4). The rates of death and disability attributable to CVD in the labor force will be much greater than in western nations, now or even in the past. The average age of patients with coronary artery disease (CAD) and heart failure is determined to be much younger than their western counterparts (5,6).

In Ethiopia, no countrywide studies have been done on CVD, except for some hospital-based studies and a few community based research showing CVD as an important cause of morbidity and mortality. In studies done in the late 1960s and 1970s, CVD accounted for 4-13% of the medical admissions to the hospitals in Addis Ababa (7, 8). From September 1975 to August 1979, a total of 5667 patients were

admitted to the medical wards of the Tikur Anbessa Specialized Hospital (TASH), the largest teaching hospital in the country, where 381 (6.7%) admissions were due to CVD (8). More recent studies, however, indicated increasing number of CVD cases.

Clinical analysis done in the 1990s documented acute myocardial infarction (MI) as a cause for 8.8 % of admissions to the medical intensive care unit of the same hospital making it the third commonest cause of admission after severe malaria and diabetic ketoacidosis (9). We also reported that among patients who have undergone coronary angiography at Addis Cardiac Hospital, 76% had evidence of CAD (5).

This retrospective analysis was thus undertaken to assess the ensuing frequency of CVD at Addis Cardiac Hospital with the objective of determining its pattern in a private setting with better record keeping. Clinical characteristics and associated risk factors were analyzed to understand the disease distribution among patients seeking primarily cardiovascular care.

## METHOD

This is a facility-based study conducted at Addis Cardiac Hospital, the first private cardiac specialized hospital in Ethiopia. The study considers the entire group of adults that presented to the hospital from May 2007 to December 2011. Systematic sampling was applied to select the study subjects through retrieval of every 10<sup>th</sup> medical record. Structured data extraction form was which was used by physicians working in the hospital. Data entry template was also developed using EPI data software. The template has an inter-consistency check to minimize anomalies in data entry. Data were exported to STATA version 14 software for

cleaning and analysis. Data cleaning was done by running frequencies and cross tabulation with outcome variable of interest. Frequency distribution of the outcome variables, risk factors, clinical presentations and treatment categories were presented.

## RESULTS

From May 2007 to December 2011, a total of 30940 subjects visited Addis Cardiac Hospital, of whom documents of 3094 were retrieved for analysis using systematic sampling. Out of the

3094 individuals, males constituted 1569 (50.71%) while 1525 (49.29%) were females with male to female ratio of 1.03. The great majority were in the age range of 21 to 70, the most frequent age range at presentation being 21 to 30. The most frequent presenting complaints were dyspnea and/or orthopnea occurring in 1282 (41.44%) followed by fatigue in 1122 (36.26%) and chest pain in 843 (27.25%). Typical chest pain was the main presenting complaint in 337 (10.89%). Syncope was the least frequent presenting condition occurring only in 116 (3.75%).

**Table 1**

*Distribution of the most frequent presenting symptoms*

<b>Manifestation</b>	No	Percent
Typical chest pain	337	10.9
Atypical chest pain	371	12.0
Non anginal pain	135	4.4
Dyspnea and /or orthopnea	1282	41.4
Palpitation	794	25.7
Syncope	116	3.7
Fatigue	1122	36.3
Others	280	9.0

Among the total number of people who visited the hospital, the two most frequent risk factors of CVD are hypertension and dyslipidemia existing in 1040 (33.61 %) and in 831 (26.86%) respectively followed by diabetes in 508 (16.42%). Smoking is the least frequent standard risk factor, present in only 122

(3.94%) individuals. Totally, 2319 (74.95%) subjects had proper determination of body mass index (BMI). Of these, 989 (42.65%) had optimal weight, 1116 (48.12%) were either overweight or obese with 505 (21.78%) of them residing in the obesity range.

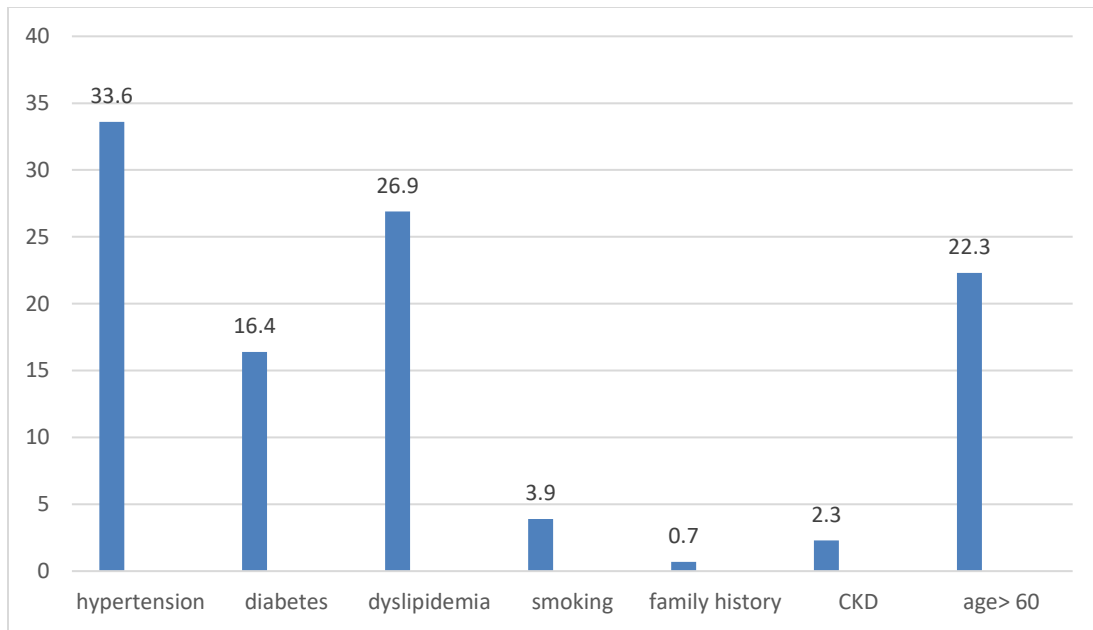


Fig 1. Frequency of risk factors of cardiovascular disease

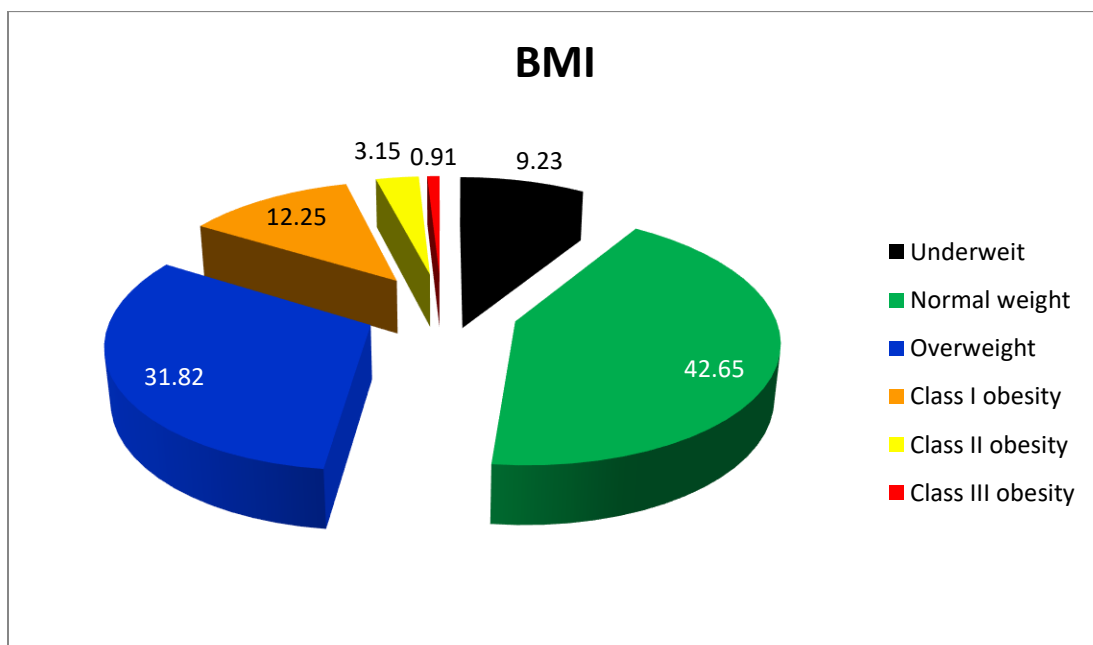


Fig 2. Frequency distribution of the different BMI categories

On presentation, out of the 3094 subjects considered for the study, only 144 (4.65%) were on statins while 243 (7.85%) were using antiplatelet medications. Use of angiotensin converting enzyme (ACE) inhibitors, beta blockers and calcium channel blockers were

also low existing only in 280 (9.05%), 308 (9.95%) and 187 (6.04%) respectively. Similarly, digoxin and diuretics were used in 109 (3.52%) and 283 (9.15%) patients respectively.

Electrocardiography (ECG) was done for 2740 subjects at presentation, of which 904

(32.99%) had abnormal ECG. The most frequent abnormal ECG findings were non-specific ST-T wave changes, occurring in 328 (36.28%) patients; the 3 most frequent significant ECG abnormalities in order were atrial fibrillation (AF) in 112 (12.39%), left ventricular hypertrophy (LVH) in 92 (10.18%) and left bundle branch block (LBBB) in 64 (7.08%) while pathologic Q wave existed in 19 (2.1%). Significant bradycardia (sinus rhythm with rate of <40/min without apparent transient cause) and advanced heart block (symptomatic type I second degree, type II second degree and third degree) were found in 40 (4.42%) and 37 (4.09%) patients respectively.

Out of the 1138 subjects with abnormal echocardiographic findings, the most frequent abnormal echocardiographic diagnosis was left ventricular hypertrophy occurring in 427 (37.52%) followed by regional wall motion change, implying IHD, in 162 (14.24%) individuals. Chronic rheumatic heart disease was the third most frequent echocardiographic finding occurring in 138 (12.13%). Degenerative valvular heart disease and grade II diastolic dysfunction or higher have contributed for 85 (7.47%) and 54 (4.45%) respectively. The least frequent echocardiographic finding was hypertrophic cardiomyopathy existing only in 8 individuals (0.7%).

**Table 2**  
*Echocardiographic findings*

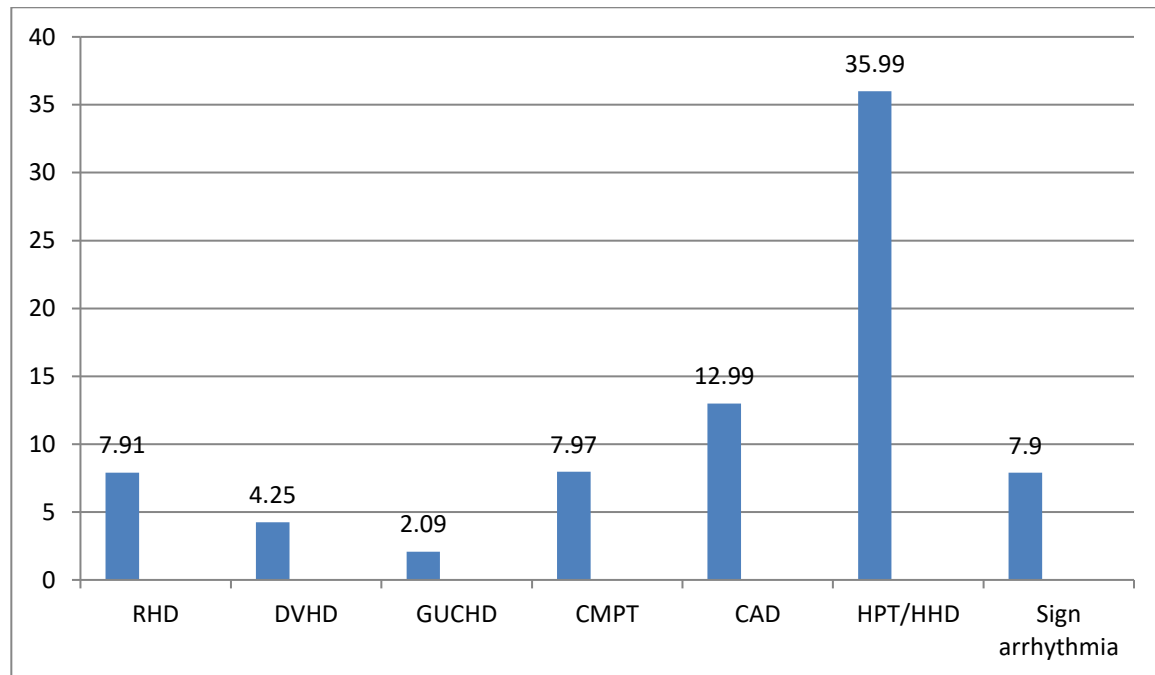
Ser No	Echocardiographic diagnosis	Frequency	%
1	Chronic rheumatic heart disease	138	12.1
2	Degenerative valvular disease	85	7.5
4	Congenital heart disease	49	4.3
5	Dilated cardiomyopathy	128	11.3
6	Hypertrophic cardiomyopathy	8	0.7
7	Regional wall motion changes	162	14.24
8	Pulmonary hypertension	65	5.7
9	Left ventricular hypertrophy	427	37.5
10	Diastolic dysfunction (G II & above)	54	4.8
11	Others	22	1.9
	Total	1138	100

Apparent etiologic diagnosis was reached in 2840 (91.79%), of which 2109 patients (74.26%) had either established CVD or were candidates of statin treatment based on the pooled cohort atherosclerotic cardiovascular disease (ASCVD) risk equations primary prevention recommendations (13). Among the CVD cases, hypertension with hypertensive heart disease accounted for 1040 (49.31%) followed by IHD in 219 (10.38 %) and cardiomyopathy in 133

(6.31%). Rheumatic heart disease was the primary diagnosis in 138 patients (6.54%).

Significant arrhythmia requiring pharmacologic or electrical intervention occurred in 205 (9.72%). Of these, significant bradyarrhythmia requiring pacemaker implantation including significant sinus bradycardia and advanced heart block were found in 40 (19.51%) and 37 (18.05%) respectively. Atrial fibrillation was identified

in 112 patients (54.63%) and paroxysmal supraventricular tachycardia in 37 patients (18.05%) while malignant ventricular tachyarrhythmia/sudden death occurred in only 2 patients (0.96%).



*Fig 3. Frequency of final etiologic diagnosis*

RHD, rheumatic heart disease; DVHD, degenerative valvular heart disease; GUCHD; grown up congenital heart disease; CMPT, cardiomyopathy; CAD, coronary artery disease; HPT/HHD, hypertension/hypertensive heart disease; sign arrhythmia, significant arrhythmia

## DISCUSSION

Upon presentation, the most frequent age range in individuals seeking medical help at the first private cardiac hospital in the country was 21 to 30 years, a probable reflection of the youth dominated population of Ethiopia. The commonest presenting complaints were dyspnea with or without orthopnea and fatigue which indicate that heart failure should be a prime consideration when cardiac patients present even for the first time. Investigations also showed that heart failure is one among the most frequent diagnosis, consistent with the study done at the Tikur Anbessa Specialized Hospital where heart failure was documented as one of the most frequent diagnosis in

patients with CVD (10). This shows the challenge linked to the difficulty in initiation and up titration of disease modifying medications and the application of interventional treatments, besides the distressing scarcity of such treatment options in the region.

Similar to previous reports, the two most frequent risk factors of CVD identified in our study subjects were hypertension and dyslipidemia followed by diabetes (5, 9). Moreover, majority of those who visited the hospital are either overweight or obese showing the affluent nature of patients presenting to the private health institutions in Ethiopia. Smoking is an infrequent CVD risk factor endorsing earlier study results (5, 11).

Despite the high burden of major risk factors of CVD, use of important primary prevention drugs like statins is low among those presenting to the hospital referred from primary care settings. This is in contrary to the fact that almost a couple of decades have lapsed since the place of statins in primary prevention was defined (12). In this study, the place of antiplatelet agents, largely aspirin, was higher than that of statins showing a limitation in evidence-based practice in the country.

Atrial fibrillation was the most frequent sustained cardiac tachyarrhythmia in clinical practice. It is a global health care problem with evidence suggesting an increasing prevalence and incidence worldwide (13,14). Such patients are at increased risk for death, heart failure, hospitalization, and thromboembolic events (13). Our study also revealed AF as the most frequent specific ECG abnormality followed by left ventricular hypertrophy and left bundle branch block. The high frequency of hypertension in the general population results in hypertensive heart disease which is the most common underlying disorder in patients with AF (14). Unlike the present study, a large majority of patients with AF were found to have underlying rheumatic heart disease in a previous report from TASH (15). The difference is related to the demographic variations between patients presenting to the public and private health institutions in Ethiopia. Preceded by hypertension, coronary heart disease complicated by acute myocardial infarction and heart failure is also a common cause of AF (14), the second commonest etiologic diagnosis among our patients.

In this study, LVH is most frequent echocardiographic abnormality, which has been confirmed as one of the common but ominous risk factors for CAD, stroke and heart

failure (16, 17). The chief determinants of LVH, aside from age, were elevated blood pressure, obesity and glucose intolerance (16), frequent conditions in the present study. Left bundle branch block was the third most frequent ECG abnormality diagnosed in the patients study indicating a future risk of left ventricular dysfunction and heart failure, a well-known fact since the early 1980s. In one study clinical, coronary angiographic, and hemodynamic investigations were performed in 55 patients with LBBB and CAD and were compared with 110 patients consecutively matched for age and sex with IHD but without LBBB. Patients with LBBB had a significantly higher frequency of congestive heart failure (38.2% vs 11.8%) and cardiomegaly (63.6% vs 25.5%) (18, 19).

In the present study, hypertension with hypertensive heart disease was the most frequent etiologic diagnosis. This is a reflection of the high prevalence of hypertension in Ethiopia which was found to be 16 % in a population-based study (20). In another study, we showed hypertension as the most frequent risk factor for stroke in the young and in the older age group (11). It has been also determined to be the most important cause of heart failure in Africa including Ethiopia (6). The second most frequent clinical diagnosis in this study is IHD after hypertension with hypertensive heart disease. Similar results have also been shown in other recent studies (5,6). Fifty-four patients required pacemaker implantation. This shows that pacemaker is an essential device which should be available without interruption both in the public and private hospitals in the country. Rheumatic heart disease is not common in the private settings in Ethiopia, a clinical condition most prevalent in low socioeconomic class.

## CONCLUSION

Hypertension, dyslipidemia, diabetes and overweight/obesity are important risk factors of CVD among subjects presenting to the first private cardiac hospital in Ethiopia. Hypertensive heart disease evidenced by left ventricular hypertrophy and/or features of heart failure, ischemic heart disease and the requirement of strict primary prevention for those at elevated global ASCVD risk are important cardiovascular problems identified in the present study. Nevertheless, there are clear indications that the use of guideline recommended primary and secondary prevention medications in primary care settings is very low in Ethiopia.

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