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Magnitude and Pattern of Cardiovascular Diseases in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia

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Abstract

Introduction: Cardiovascular diseases are the leading cause of death worldwide. Approximately 18 million people die each year from cardiovascular diseases, an estimated 32% of all deaths worldwide. In more than 75% of cardiovascular diseases, deaths occur in low- and middle-income countries, and 85% of all cardiovascular disease deaths are due to heart attacks and strokes. In Ethiopia, cardiovascular diseases accounted for 16% of all deaths in 2018 and were the leading cause of death. Cardiovascular diseases are fatal and can lead to serious illness, disability, and compromised quality of life. This data analysis aimed to assess the magnitude and pattern of cardiovascular diseases in Saint Peter's Specialized Hospital, Addis Ababa, Ethiopia.

Method: A descriptive cross-sectional study was conducted from June 9, 2022, to June 29, 2022 to analyze four years cardiovascular disease data covering the period from July 2017 to June 2021. The data was reviewed and analyzed by Excel 2016. The results are summarized as counts, proportions, ratios and means and are illustrated by tables and graphs.

Results: In Saint Peter's Specialized Hospital, hypertension accounted for 46.9% (8182) CVD. Coronary heart diseases and heart failure accounted for 22.9% and 20% respectively among cardiovascular diseases. Cerebrovascular diseases and heart failure accounted for 74% of deaths from cardiovascular diseases, followed by ischemic heart diseases, which accounted for 22% of deaths. Cardiovascular diseases accounted for 74.3% of deaths from noncommunicable diseases and 16.9% of deaths from all deaths.

Conclusion: Hypertension, heart failure, and ischemic heart disease were the three most frequent cardiovascular diseases. Heart failure and cerebrovascular diseases are the leading causes of death. Among noncommunicable diseases, cardiovascular diseases are the leading cause of death. Cardiovascular diseases account for three-fourths of noncommunicable diseases and responsible for a significant number deaths in the hospital, so the hospital places more emphasis on cardiovascular diseases prevention, treatment, and control.

Keywords: cardiovascular diseases; pattern; magnitude; saint peter's specialized hospital; ethiopia

Introduction

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels. Cardiovascular diseases (CVDs) include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions [1]. Before 1900, infectious diseases and malnutrition were the most common causes, and CVDs were responsible for <10% of all deaths [2]. According to the World Health Organization (WHO), CVDs are the leading cause of death worldwide. More than four out of five CVD deaths are due to heart attacks and strokes, and one-third of these deaths occur prematurely in people under 70 years of age. Approximately 18 million people die each year from CVDs, an estimated 32% of all deaths worldwide. More than 75% of CVD deaths occur in low- and middle-income countries, and 85% of all CVD deaths are due to heart attacks and strokes [1]. Ischemic heart disease (IHD) and stroke are the leading causes of global mortality and major contributors to disability. Prevalent cases of total CVD nearly doubled from 271 million in 1990 to 523 million in 2019, and the number of CVD deaths steadily increased from 12.1 million in 1990, reaching 18.6 million in 2019 [3]. In sub-Saharan Africa (SSA), CVDs are the most frequent causes of noncommunicable disease (NCD) deaths; and are responsible for approximately 13% of all deaths and 37% of all NCD deaths. Ischemic heart disease (IHD) is the leading cause of CVD mortality in sub-Saharan Africa (SSA) followed by stroke and hypertensive heart disease [4]. According to a systemic review and meta-analysis conducted by Angaw DA, Ali, R., Tadele, A. et al the prevalence of CVD in Ethiopia,

ranges from 1% to 20% (5). In Ethiopia, CVDs accounted for 16% of all deaths in 2018 and they are the leading cause of death (6,7). In 2017, the number of people affected by CVDs in Ethiopia was 2,838,767. One-third (33.7%) of these cases were rheumatic heart disease (RHD), followed by ischemic heart disease (IHD) (22.5%) and stroke (11.4%). The estimated age-standardized mortality was 519/100 of the population, of which CVDs were 182/100, 000. In 2020, ischemic heart disease (IHD) (45%), stroke (34%), and hypertensive heart disease (HHD) (11%) were the three leading causes of CVD deaths in Ethiopia, with 170 Ethiopians dying each day (8). In 2019, among the top 10 causes of the total number of deaths, there were two CVDs. Deaths due to stroke and ischemic heart disease (IHD) increased by 32% and 32.5%, respectively, from 2009 to 2019 [9]. In Addis Ababa, three of the top 10 causes of the total number of deaths were CVD in 2019. Ischemic heart disease (IHD), stroke and hypertensive heart disease increased by 36.8%, 26.9% and 31.2%, respectively, from 2009 to 2019 [10]. Cardiovascular diseases are fatal and can lead to serious illness, disability, and compromised quality of life. Suffering from stroke may lead to significant disability, such as paralysis, speech difficulties, and emotional problems. Following a heart attack, individuals frequently suffer fatigue and depression, and they may find it more difficult to engage in physical activities [11]. Cardiovascular diseases have a high economic burde [12]. for example, IHD causes more deaths and disability and incurs greater economic costs than any other illness in the developed world [13]. The economic burden on households of individuals with noncommunicable diseases (NCDs), including cardiovascular diseases, is also very high (14). A study conducted using verbal autopsy data from the Addis Ababa Mortality Surveillance between 2007-2012 and 2015-2017 showed that noncommunicable disease (NCD) accounted for 62.8% of adult mortality. Among the top five leading causes of NCD related death, three were cardiovascular disease i.e., cerebrovascular disease (12.8%), HTN (5.7%) and IHD (5.7%) [15]. A study conducted in Selected Hospitals in Addis Ababa among the patients who were attending outpatient clinics showed that 40% of patients had cardiovascular disease [16]. In 2013, WHO Member States agreed on global mechanisms to reduce the avoidable NCD burden including a "Global action plan for the prevention and control of NCDs 2013-2020". This plan aims to reduce the number of premature deaths from NCDs by 25% by 2025 through nine voluntary global targets. Two of the targets directly focus on preventing and controlling CVDs [1]. According to Resolve to save lives, it is possible to save 100 million lives over 30 years by advancing three strategies; increasing the number of individuals with high blood pressure who have it effectively managed from 14% today to 50%; reducing the amount of sodium that people consume by 30% and limiting artificial trans-fat from the global food supply [17]. Ethiopia was implementing its first NCD Strategic plan in 2014-2016 [18]. and another strategic plan is ongoing that covers 2020 to 2025 to prevent and control NCDs including CVDs [19]. The burden of cardiovascular diseases has been increasing worldwide. In developing countries such as Ethiopia CVDs are neglected diseases. Therefore, this data analysis may be used as additional input to develop guidelines and improve NCD programs. Stakeholders, program managers and experts may use this information decisions. These findings may be useful for scientific community as a reference and to conduct further research. There are no data related to CVDs in the hospital, so this data analysis aimed to assess the magnitude and pattern of CVD morbidity and CVD mortality in Saint Peter's Specialized Hospital.

Method

Saint's Peter Specialized Hospital is one of the oldest public hospitals in Addis Ababa, Ethiopia and was established in 1953. It is found in woreda 01 of Gulele subcity, northern Addis Ababa. The hospital was a national tuberculosis diagnosis and treatment Centre until 2005. Currently, the hospital is providing comprehensive health care services at the outpatient and inpatient levels. The hospital has NCD treatment, prevention and control services. It is one of the 74 Resolve to Save Lives (RTSL) sites in Ethiopia. It has one NCD OPD, which serves only patients with NCD including CVD. It has also provided inpatient services, including CVDs, in the inpatient department. The hospital is under FMOH and there is no defined cluster population. Descriptive cross-sectional study was conducted from June 9, 2022 to June 29, 2022. Four years, i.e., July 2017 to June 2021, of Saint Peter's Specialized Hospital CVD data were analysed. All CVD cases and deaths reported via the district health information system (DHIS2), i.e., 17,441 composed the study

populations. Patients who were diagnosed with one or more cardiovascular diseases at Saint's Peter Specialized Hospital were the source population. All cases and NCD cases in the study period were extracted from DHIS2 by using a checklist. Cardiovascular disease data were extracted based on age category, sex, department, time and outcome with the type of CVD. Each category's data were extracted with the type of CVD separately. The extracted data were checked for possible missing CVD values and segregated based on the international classification of disease codes. The data extracted from DHIS2 analyzed with Excel 2016, and the results are summarized as the mean, count, proportion, and ratio and are shown in tables and graphs. The official letter, which was written by the Ministry of Health, was submitted to Saint Peter's Specialized Hospital. The Proposal was prepared and submitted to Saint Peter's Specialized Hospital Research and Evidence Generation Directorate. The directorate approved and provided ethical clearance for data analysis.

Results

Magnitude and types of CVD morbidities

From July 2017 to June 2021, a total of 337,810 cases were reported via DHIS2 in the hospital. Among the total cases, NCDs accounted for 31,346 (9.3%). Among NCD cases, CVDs accounted for 17,441 (55.6%).

Distribution of CVD morbidities by person

Among CVDs, HTN accounted for 8182 (46.9%) and IHD and heart failure (HF) accounted for 4001 (22.9%) and 3,484 (20%), respectively. The majority of the 9803 (56.2%) CVD patients were female. Half of the cases, 8943 (51.3%), were aged 30 to 64 years (Table 1).

Table 1: Magnitude of CVDs by person in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia, 2022.

Type of CVDs*	Sex		Age category years				Total N (%)
	Male N (%)	Female N (%)	<15N (%)	15–29N (%)	30–64N (%)	>=65 N (%)	
HTN**	3,057 (34.4)	5,125 (52.6)	1,469 (18)	915 (11.5)	4,090 (50)	1,680 (20.5)	8,182(46.9)
IHD***	2,213(55.3)	1,788 (44.7)	80 (2)	495 (12.4)	2,423 (60.6)	1,003 (25.1)	4,001(22.9)
Heart failure	1,347 (41)	1,937 (59)	504 (14.5)	567 (16.3)	1,598 (45.9)	815 (23.4)	3,484 (20)
Others	1,000 (51)	953 (49)	72 (4)	375 (20.8)	8,32 (46.2)	523 (29)	1,774(5.2)
Total	7,617 (43.8)	9,803 (56.2)	2,125 (12.2)	2,352 (13.5)	8,943 (51.3)	4,021 (23.1)	17,441(100)

CVDs*-Cardiovascular diseases, HTN**-Hypertension, IHD***-ischemic heart disease

Distribution of CVD Morbidities by time

Approximately half of the cases, i.e., 8652 (49.6%) cases, were reported in 2018/2019. The lowest number of cases, 1603 (9.2%) reported in 2020/2021. On average, 4320 cases of CVD were reported annually. Regarding HTN, nearly half of the cases, i.e., 3751 (45.8%), and fewest, 926 (2.6%), were reported in 2018/19 and 2020/21, respectively. On average, approximately 2045 cases occur annually. Nearly two-thirds of the cases, 2549 (63.7%), were reported in 2018–19, while the lowest, 99 (2.5%), reported in 2020–21, respectively. On average, 1,000 cases of IHD are reported annually (Figure 1).

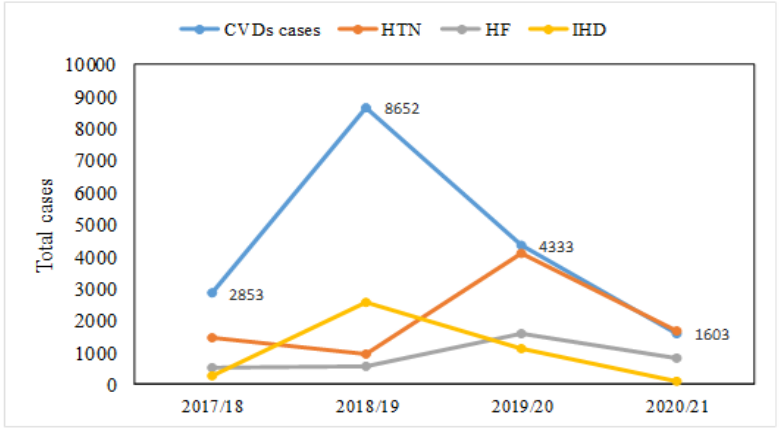

Figure 1: Patten of CVDs by time in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis, Ethiopia, 2022.

Distribution of CVD Morbidities by departments

The outpatient department accounted for 15,321 (87.8%) CVD cases and the rest were inpatients. The highest cases (89.3%) of outpatient departments were reported in 2018/19 and the lowest (80.5%) was in 2020/21. From IPD case 38.5% of CVDs, cases were ischemic heart diseases (IHD) (Table 2). From OPD cases, 52.4% of CVDs cases were HTN. Heart failure (HF) and ischemic heart disease (IHD) accounted for 18.3% and 17.8% of CVD OPD cases respectively. Heart failure (HF) and cerebrovascular diseases accounted for 31.8% and 13.3% of CVDs IPD cases respectively (Figure 2).

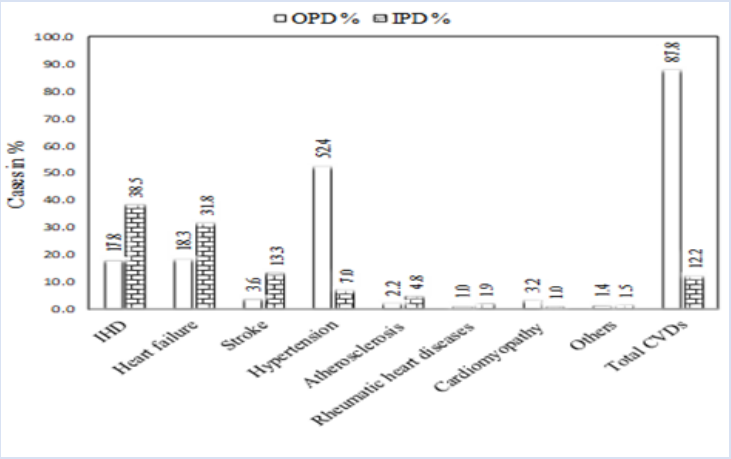

Figure 2: Patten of CVD by department in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia, 2022.

Table 2: CVD cases by department at Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia, 2022.

Years	OPD cases	IPD cases	Total	OPD in %	IPD in %
2017/18	2467	386	2853	86.5	13.5
2018/19	7727	925	8652	89.3	10.7
2019/20	3837	496	4333	88.6	11.4
2020/21	1290	313	1603	80.5	19.5
Total	15321	2120	17441	87.8	12.2

Mortality of CVD

During the review period, a total of 943 deaths were reported in the hospital. Among the total deaths, NCDs accounted for 214 (22.7%) deaths. Among the NCD deaths, CVD accounted for 159 (74.3%) of the deaths and it accounted 16.9% of among all deaths.

Pattern of CVD mortalities

Cerebrovascular diseases and heart failure accounted for 74% of CVD related deaths followed by IHD which accounted for 22% of CVD related deaths. Other CVDs accounted for only 4% of the deaths (Figure 3).

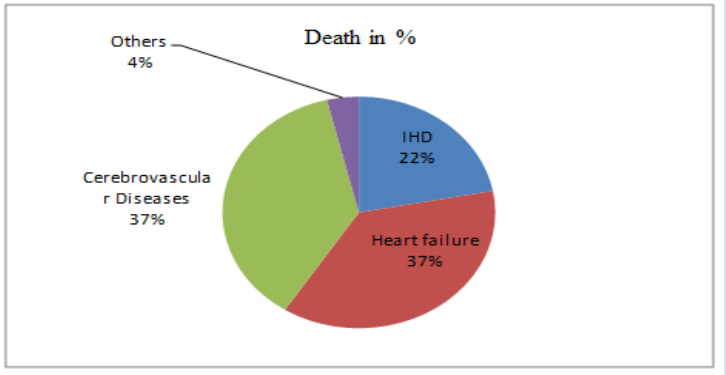

Figure 3: CVD mortality pattern in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia, June 2022.

Distribution of CVD mortality by time

The highest number of deaths [59] reported in 2017/18 accounted for 37% of the total cases. On average, 40 cases of death are reported annually. Figure 4 shows the annual mortality of CVDs.

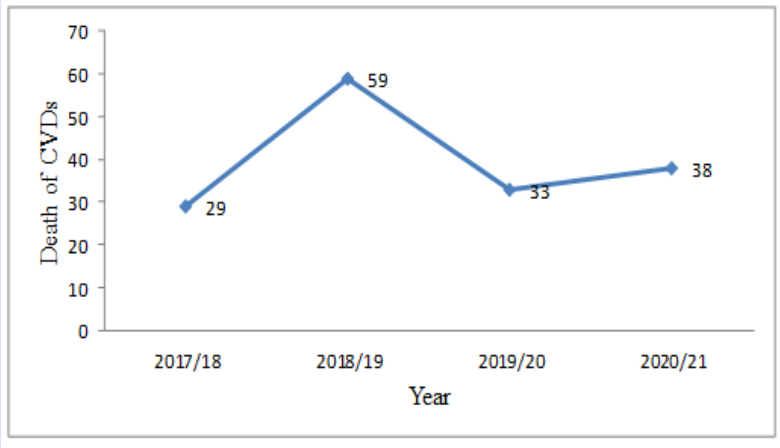

Figure 4: Trend of CVDs in Saint Peter's Specialized Hospital from July 2017 to June 2021, Addis Ababa, Ethiopia, 2022.

Discussion

Four years, i.e., from July 2017 to June 2021, CVD data of Saint Peter's Specialized Hospital were retrieved and analyzed from June 9 to June 29, 2022. A total of 17,441 cases of CVD were reported. Among CVDs, HTN was the leading cause, accounting for 46.9%, followed by IHD and HF. IHD and HF accounted for 22.9% and 20%, respectively. Cardiovascular disease accounted for 74.3% of deaths from NCDs and 16.9% of deaths from all deaths. The trend of CVD morbidity decreased, whereas overall mortality tended to increase. Cerebrovascular diseases and heart failure accounted for 74% CVD deaths, followed by IHD, which accounted for 22% of CVD deaths. Hypertension was the leading cause of CVDs, which is similar to findings of the study conducted at Gondar University Referral Hospital but a study conducted at Saint Paul Hospital Millennium Medical College showed that congestive heart failure (60%) was the leading cause (16,20). A study conducted at Tikur Anbessa Specialized University Teaching Hospital in 2014 revealed that HTN (14.7%) and HF (9.1%) were among the most common diagnoses, but the leading diagnosis was valvular heart disease (62.0%) [21]. A study conducted in cardiology clinics of six referral/teaching hospitals in the country also showed that Valvular heart disease was the most common diagnosis, accounting for 40.5% of the cases [22]. Another study conducted at Ayder Comprehensive Specialized Hospital showed that rheumatic valvular heart disease is the leading cause of CVD (41.1%) CVDs [23]. This may be due to the differences in scope of the services, sample, source of the data and mean age of the participants.

According to our data analysis, IHD was the leading cause of admission, accounting for 38.5%, followed by HF (31.8%) and cerebrovascular diseases (13.3%). A study conducted in admitted patients at the Nepal Tertiary Care Teaching Hospital showed that 35% of CVDs were IHD, followed by hypertension (22.8%) and arrhythmia (13.4%) [24]. In this study, HF and cerebrovascular diseases were the second and third most common causes of admission, respectively, and are lower than those reported in a study conducted at the University of Port Harcourt Teaching Hospital, Nigeria, which showed that the most common CVD was heart failure (43.1%) and cerebrovascular accident (CVA) (24.3%) [25]. Cardiovascular diseases accounted for 16.9% of all deaths, which was consistent with the national figure, i.e., 16% [6]. The incidence of CVD increased from 2017/18 to 2018/19, and then decreased, but other studies have shown that CVD incidence is increasing [26,27]. This may be due to the COVID-19 pandemic. WHO assessments showed that NCD services and screening are compromised due to the COVID-19 pandemic (28). Other studies also show that COVID-19 had a significant effect on decreases in CVDs and other health services (13,19). The source of this data analysis was DHIS2, which may have missing values during data entry or incorrect entry of data. Hypertension and HF were the two most frequent CVD cases while HF and cerebrovascular diseases are the leading causes

of death. Among NCD, CVD is the leading cause of deaths. These data analysis showed that CVD accounted for three-fourths of deaths from noncommunicable diseases and a significant number of deaths from all deaths in the hospital, so the hospital places more emphasis on CVD prevention, treatment and control.

Abbreviations

CDC, Centres for Diseases Control and Prevention; CVDs, Cardiovascular Diseases; DVHD, Degenerative Valvular Heart Disease; DCMP, Dilated Cardiomyopathy; DHIS, District Health Information System; EFETP, Ethiopia Field Epidemiology Training Program; HF, Heart Failure; IHD, Ischemic Heart Disease; IPD, Inpatient Department; HHD, Hypertensive; Heart Disease; HTN, Hypertension; NCD, Non-Communicable Disease; OPD, Outpatient Department; RVHD, Rheumatoid Valvular Heart Disease Arrhythmia; RTSL, Resolve To Save Lives; SSA, Sub-Saharan Africa

Declarations

Acknowledgments

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Availability of data and materials

Most data are available in the paper. Additional data will be shared upon request.

Ethics approval and consent to participate

Not applicable

Authors' contributions

Nigus Goshim designed the research and wrote the manuscript.

Competing interests

The author reports no conflicts of interest in this work.

Consent for publication

Not applicable.

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