

## Research Article

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## Strengthening Cardiovascular Care in Ghana: Early Detection, Equity and Evidence-Based Practice- A Case Study at Presbyterian Hospital, Agogo

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### ABSTRACT

**Background:** Cardiovascular diseases (CVDs) are the leading cause of morbidity, hospitalization, and death in Ghana. Ghana has put up NCD policies and national programs to improve CVD care. Yet, CVD cases continue to rise with majority of cases showing up in their late-stage. This study analyzes outpatient department (OPD) trends in hypertension, diabetes mellitus, and heart failure at the Presbyterian Hospital, Agogo between 2015 and 2025, to assess the need for early detection and policy alignment to strengthen cardiovascular care.

**Methods:** A retrospective descriptive analysis was conducted using OPD attendances data on hypertension, diabetes, and heart failure collected between 2015 and 2025 extracted from the Presbyterian Hospital, Agogo health information system. Extracted data was visually inspected and annualized totals compiled and summarized graphically.

**Results:** Total CVD OPD attendances rose by 17.7% from 2015 to 26,098 in 2025, with a 385 peak in 2024. Hypertension cases were 204,293 (73.0%) of CVD OPD attendances while 25.8% were diabetes, and 1.2% heart failure attendances. The CVDs especially diabetes showed oscillating patterns with a progressive increase over time creating an unexplained anomaly. Cases of heart failure were noted to increase significantly by 169% by 2025 from the baseline indicating poor upstream management.

**Conclusions:** The growing CVD OPD cases at the Presbyterian Hospital, Agogo reflect the growing disease burden and pressure on the district and national health systems. The oscillations in case attendances further indicate a concern in health-seeking behaviors, gaps in access to continuous care and early detection at the community levels highlighting a wider national challenge. The findings call for more NCD policy alignments to support early detection and equitable access to evidence-based care.

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**Received:** May 12, 2026; **Accepted:** May 19, 2026; **Published:** May 26, 2026

**Keywords:** Cardiovascular Diseases, Heart Failure, Hypertension, Diabetes, Early Detection, Equity Policies, Ghana

### Introduction

Health equity is a basic principle in public health. It ensures that each and every individual at the local, national, and global levels has a fair and just opportunity to access to the highest possible levels of health [1,2]. Achieving health equity has become a priority globally and especially in developing nations as the burden of disease especially non-communicable diseases (NCDs) keeps growing. The World Health Organization (WHO, 2025) reported that NCDs were responsible for 43 million deaths in 2021 translating to 75% of all non-pandemic deaths globally [3]. Out of these deaths, 18 million were below 70 years and 83% of such deaths occurred in low- and middle-income countries (LMICs). The WHO (2025) further reports that of all the NCD deaths occurring the 2021, 73% were in low- and middle-income countries. Related reports indicate that chronic NCDs were responsible for an estimated 60% of the annual 58 million deaths

and 44% of premature deaths globally. Age adjusted disability-adjusted life year (DALY) rates for NCDs show higher distribution among LMICs than in high-income countries. The WHO (2021) notes that deaths related to NCDs globally are expected to rise by 17% in the next 10 years with major increases in LMICs; specifically, by 27% in the African region [4].

Cardiovascular diseases (CVDs) account for most NCD deaths globally [5]. Globally, CVDs were directly linked to 19 million deaths in 2021 and 19.8 million in 2022 (WHO, 2025). 85% of these deaths were due to heart attacks and strokes with over three-quarters occurring LMICs. CVDs have also been linked to 38% of NCD death across the world and in LMICs [5]. This growing burden places significant pressure on health systems in LMICs requiring a more proactive and evidence-based policy approach to strengthen such health systems in countering and caring for CVDs.

Ghana, among other LMICs, has experienced an unprecedented increase in morbidity and mortality due to NCDs especially

CVDs. The WHO (2024) estimates that NCDs are responsible for approximately 45% of all deaths [6]. CVDs including hypertension, stroke, and heart failure, and NCDs such as diabetes have been the main causes of outpatient department visits in Ghana especially at the primary-level health facilities. The related complications from these conditions have also been identified as among the leading causes of hospital admissions and adult deaths across Ghana. National prevalence surveys identify hypertension and stroke as the leading CVDs with the prevalence of hypertension in the 2016-2021 period ranging from 13.0% to 28.4% and prehypertension 22.0% to 51.4% [7]. Currently, the rate of adult hypertension is estimated to range between 30 and 35%. The Ghana Ministry of Health (2022) in the Strategy Plan for the Prevention and Control of Non-Communicable Diseases in Ghana - 2022 – 2026 reported that some regions had over 50% hypertension rates across all sexes [8]. Of concern is that, over 70% of the individuals with hypertensions were not aware of the conditions and had not received any form of treatment; only up to 13% identified cases had their blood pressure under control. During the same period, Ghana experienced an increase in the number of visits from stroke survivors with 75% of these visits occurring in the OPD [9]. Today, hypertension and related complications contribute to more institutional deaths as compared to Malaria; which has been a leading cause of death across sub-Saharan Africa.

Diabetes prevalence in Ghana is estimated to be at 6.46% [6]. Out of these, 60% of the individuals living with diabetes are unaware of their condition. The majority of the cases with hypertensions and diabetes attended in the OPD for the first time have been noted to have target end-organ damage including heart failure, stroke, and chronic kidney disease, suggesting that a long-standing disease without appropriate treatment [8]. The burden of both diagnosed and undiagnosed NCDs strain the health system and threaten an eventual systems collapse.

Ghana has put in place both policy and population-wide strategies and interventions to counter the growing health concern over NCDs especially CVDs. For instance, since 2014, a public-private collaborative team launched the community-based hypertension improvement program (ComHIP) in one health district in Ghana which utilized information and communication technology (ICT) to control hypertension [10]. Ghana has also been running the Ghana Heart Initiative since 2018 at national level focused at improving CVD care with results showing reduced death rates of these diseases across the country [11]. The national government has also collaborated with other stakeholders including the WHO to address factors contributing to CVDs and other NCDs including behavioral, commercial, and lifestyle factors while strengthening the Ghanaian health systems to handle related cases [12]. However, as CVDs and other NCDs continue to devastate the population, policy solutions such as the Ghana's National Policy for the Prevention and Control of Non-Communicable Diseases (2022–2030) push for more institutionalized approaches for NCD and CVD control including early detection and equitable access at all levels of care in both rural and urban regions. Still, there exists a need to analyze and assess the local health systems for actual CVD prevalence and capacity gaps in CVD care to align policies to strengthen cardiovascular care in Ghana.

The Presbyterian Hospital, Agogo (PreHA) is a leading mission hospital March 21, 1931, by the Basel Mission in Agogo, within the Ashanti Region of Ghana. It is Ghana's oldest mission hospital that is fully integrated into the national health system. The hospital provides comprehensive care services ranging from

outpatient, accident and emergency services, to inpatient services including maternity and surgical services. The Ghana Ministry of Health recognizes the facility as a Level a Regional Hospital. PreHA has a 250-bed capacity serving and estimated 500,000 people. The facility which was established on the values of compassion, integrity, excellence, faith, and service combined with professionalism, dignity, love has been providing high-quality, holistic healthcare services to individuals and families across Asante Akim North and the neighboring populations. It remains to be a transformative healthcare facility within the Ghanaian health system promoting innovative and exceptional provisions of healthcare services.

Noting that the Presbyterian Hospital, Agogo operates within the Ashanti Region of Ghana; a region that has and is facing a significant health systems challenge with the rising burden of non-communicable diseases (NCDs), it records a high number of late-presenting NCDs especially cardiovascular cases. This necessitates understanding the trends in cardiovascular conditions including hypertension, diabetes and heart failure at the local level guide related policies and promote early detection, equity and evidence-based practice at the district and national health systems.

Overall, this case study aimed to analyze OPD trends in hypertension, diabetes mellitus, and heart failure at Presbyterian Hospital, Agogo, over an 11-year period (2015–2025) and identify the need for improved early detection and policy alignment. Specifically, it sought to:

- To analyze and describe the burden of hypertension, diabetes mellitus, and heart failure based on trends in case diagnoses at the Presbyterian Hospital, Agogo, outpatient department;
- To examine deficits in early detection, equitable access, and evidence-based practice in CVDs care as drivers for increased morbidity and mortality rates in Agogo, Ashanti region; and
- To utilize the case findings to inform and align Ghana's NCD policies with the principles of early detection, equitable access, and evidence-based practice in cardiovascular care. It was hypothesized that CVDs rates at the community level had increased over the years at a disproportionately higher rate than the recorded rates due to late presentation, suggesting a need to promote early detection and care for CVDs within the district at the community-level. The study is principally significant for practitioners to employ evidence-based practices in the cardiovascular health promotion and care, and for policymakers to align healthcare and economic policies to the reality of the growing burden of CVDs amid other competing health system challenges and social factors now and in the future.

## Methods

### Setting

The study was conducted at the Presbyterian Hospital, Agogo, Ashanti Region, Ghana. The Presbyterian Hospital, Agogo is a 250-bed facility serving over 500,000 people across Asante Akim North and beyond. The facility is a mission hospital therefore; it provides more Christ-centered holistic medical services. The entire study focused on the data from the facility's outpatient department as it is the first point of contact for most patients entering the health system.

### Study Design

A case study methodology employing a retrospective descriptive

analysis design was adopted to analyze the OPD trends in hypertension, diabetes and heart failure between 2015 and 2025 at the Presbyterian Hospital, Agogo. The design of the study was believed to be fit in looking back and analyzing the data recorded at the hospital's HIS and the District Health Information Management System (DHIMS-2) and other records within the facility to help identify trends and patterns in the prevalence of CVDs and diabetes for future care and policy planning.

### Data Source and Extraction

Data was extracted from the facility health information system and the DHIMS-2. Focus was given to monthly data and the total number of OPD reported cases of hypertension, heart failure, and diabetes mellitus. Multiple records indicated, based on HIS unique identifiers, were noted from either condition were linked to same patients visiting the facility multiple times within a year. Complications in identifying trends due to such instances were avoided by focusing on OPD visit frequency over condition incidences. Extracted data was also spread over a 11-year span from 2015 to 2025.

### Data Analysis

Medical records data was visually inspected and annualized totals were compiled, segmented, and summarized per condition. The percentage total OPD cases for each condition was presented graphically to characterize trends in OPD visits. Year-on-year

changes were computed to identify trends. However, due to lack of a sample population and use of past medical records data, the study failed to perform any statistical tests and justify the trends.

### Ethical Considerations

Although no samples were directly used for the study, ethical approval was collected from the Presbyterian Hospital Board and clearance from the other institutions including the university and district health directorate. No personally identifiable data was accessed or used in the study. Any other information that could lead to patient identity access was anonymized and data aggregated before extraction. All security and privacy protocols for accessing and handling health records were adhered to during and after the extraction of the study data.

### Results

#### OPD Attendance for CVD Cases (Year-by-year)

Data was extracted for three conditions of focus at the OPD of the Presbyterian Hospital, Agogo; diabetes (T2DM), hypertension, and heart failure as recorded in the facility's internal HIS from 2015 to 2025. A total of 279,845 CVD cases (including diabetes) were retrieved. The overall CVD OPD attendances year-by-year increased from CVD 22,140 in 2015 to 26,098 in 2025, a 17.7% increase over 10 years. However, it had peaked at 30,542 in 2024; a 38% increase from the 2015 baseline.

**Table 1: Year-by-Year CVD OPD Attendance at Presbyterian Hospital, Agogo (2015-2025)**

Year	Hypertension	Diabetes	Heart Failure	Total CVD	HTN %	T2DM %	HF %
2015	15,483	6,501	156	22,140	69.9	29.4	0.7
2016	19,717	9,088	215	29,020	67.9	31.3	0.7
2017	14,815	4,905	284	20,004	74.1	24.5	1.4
2018	15,192	5,156	337	20,685	73.4	24.9	1.6
2019	15,820	8,194	276	24,290	65.1	33.7	1.1
2020	18,396	4,239	84	22,719	81.0	18.7	0.4
2021	21,539	5,791	387	27,717	77.7	20.9	1.4
2022	19,563	8,318	420	28,301	69.1	29.4	1.5
2023	22,154	5,757	418	28,329	78.2	20.3	1.5
2024	23,994	6,137	411	30,542	78.6	20.1	1.3
2025	17,620	8,081	397	26,098	67.5	31.0	1.5

#### Total Recorded CVD OPD Attendances (2015–2025)

Out of the 279,845 recorded CVD OPD attendances, 204,293 (73.0%) were due to hypertension. Diabetes had 72,167 cases which was 25.8% of the 11-year recorded attendances where heart failure had the least occurrence at the Presbyterian Hospital, Agogo OPD department accounting for only 1.2% (3,385) of recorded attendances.

**Table 2: Presbyterian Hospital, Agogo OPD CVD Total Recorded Attendances (2015-2025)**

Condition	Total Attendances (2015-2025)	% of CVD
Hypertension	204,293	73.0%
Diabetes	72,167	25.8%
Heart failure	3,385	1.2%
Total Cases	279,845	100%

#### Assessment of CVD OPD Attendances Trends (2015-2025)

##### Hypertension

Hypertension accounted for the largest percentages (73.0%) of the recorded CVD cases at the Presbyterian Hospital, Agogo OPD from 2015 to 2025. The total annualized cases grew from 15,483 in 2015 to 17,620 in 2025 peaking in 2024 with 23,994 cases. Although trend line hypertension shows a steady increase in the number of recorded cases from the 2015 baseline to the period ending 2025, absolute caseload numbers show uneven rise and drops. For instance, there was a sharp increase by 27.35% between 2015 and 2016 but a drop of 24.9% between 2016 and 2017. These uneven drops and rises while the cases progressively increase may indicate underlying factors that may influence health-seeking behaviors and overall community health status; either improved early detection or a worsening hypertension-related health status.

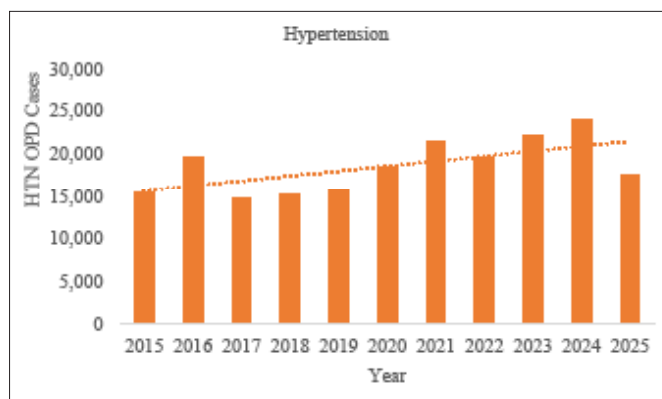


Figure 1: HTN OPD Cases

### Diabetes

Diabetes cases recorded at the OPD from 2015 to 2025 show an oscillating pattern. Some years such as 2016 with 9,088 cases with other counts in 2019 (8,194), 2022 (8,318), and 2025 (8,081). In contrast, other years throughout the period had lower cases recorded. For instance, 2017 had 4,905 while 2020 and 2021 had 4,239 and 5,791. 2023 recorded 5,757 attendances at the facility despite 2022 recording a higher number of 8318. Notably, a trend of high case peaks was noted to occur every two to three years.

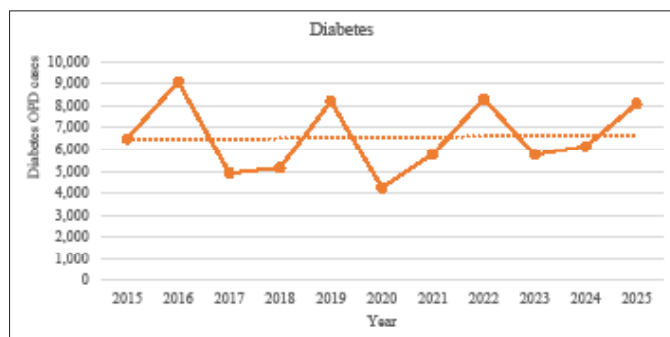


Figure 2: Diabetes OPD Cases

### Heart Failure

Heart failure OPD attendances from steadily 2015 to 2025 with a notable single dip in 2020. 2024 had a 169% rise in recorded attendances from the 2015 baseline. However, there was 48% dip case attendances in 2020 from the 2015 baseline, and a significant 69.6% drop from 2019 visits. In contrast from the dip, the subsequent year, 2021, saw a significant 360.71% jump post the 2020 COVID-19 disruption to record 387 attendances.

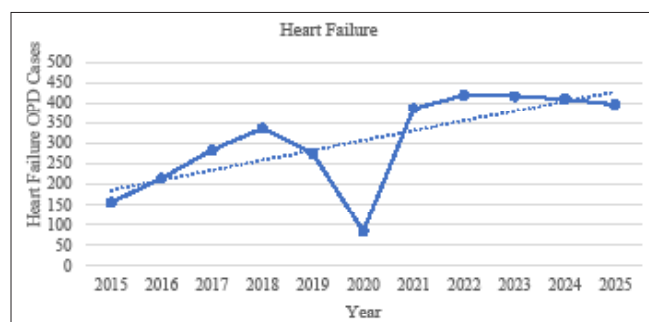


Figure 3: Heart Failure OPD Cases

### Health System Issues Identified during the Trend Analysis

The extracted hypertension and CVDs data was aggregated. However,

it is insufficient to inform decisions and practice and intervention policies as it does not capture under social and economic factors that may explain the observed trends in CVDs. Additionally, the CVDs and diabetes data do not disaggregate information into total burden and prevalence, existing and newly diagnosed cases, and CVD- and diabetes-mediated target-organ damage. Furthermore, the significant drop in in total OPD cardiovascular attendances in 2020 reflected restricted health-seeking behavior due to pandemic control measures.

### Discussion

Evidence-based policy making is the most appropriate approach to achieve health system strengthening at the local and national levels to address the growing threat from NCDs especially CVDs in Ghana. This retrospective case analysis at Presbyterian Hospital, Agogo analyzed the OPD trends in hypertension, diabetes and heart failure between 2015 and 2025 with the aim of providing insights to improve early detection and policy alignment in cardiovascular care. The study found that there has been an increase in cardiovascular related OPD attendance cases with 17.7% increase between 2015 and 2025, and a peak of 38% in 2024 from the 2015 baseline. Although there was no overall OPD denominator to determine the absolute proportion of the facility's OPD CVD attendances, the available data attributable to hypertension and diabetes to majority of OPD diabetes. At the same time, the rising number of the hypertension and diabetes create downstream health impacts including a rise the risk and development CVDs such as heart failure and atrial fibrillation, and also complicate health management by existing as comorbid conditions [13,14].

The fluctuations in CVD OPD case attendances over the 11-year period despite a progressive increase in CVD attendances in the hospital's OPD identified in the analysis indicate an existing health systems concern in community-level detection. The 2-to-3-year cycles in oscillating between high and low case attendances especially in diabetes highlight a lack of a systematic continuous screening for CVDs. Most CVD cases are late presenting with majority of patient more likely to remain undiagnosed with a risk of related target-organ damage. Evidence shows that despite periodical campaigns, cases of hypertension and diabetes keep rising in Ghana [15]. As early diagnosis becomes essential for the reduction of CVD-related complications, premature, and burden of disease, faith-based facilities hold a promise of improving awareness and early detection and management of CVDs and related NCDs [16-19]

Notably, equity and evidence-based practice in cardiovascular care have been noted to go hand-in-hand. Evidence highlights the existing competition in the setting of health system priorities in CVD other non-communicable diseases management in Ghana [10]. At the same time, the rising cases for of CVDs in OPDs in primary care facilities such as in the Presbyterian Hospital, Agogo identify the need for equity-focused interventions at the district levels. The significantly dipped attendance numbers for heart failure, 84 visits in 2020, related to the disruptions to the access to health services as evidenced during the COVID-19 pandemic, necessitate the need to adopt more equitable and evidence-based strategies to manage competing priorities and allow access to health services to those in need [20,21]. Overall, the aggregated data for CVDs at the Presbyterian Hospital, Agogo although highlights the upward trajectory for CVDs in the OPD, it does not allow for the analysis of the quality of care or the level of use of evidence in the management of CVDs and other NCDs [22,23].

### Implications for Practice and Policy

The trend analysis for CVDs at a district level health system is key to assessing the need for early detection and policy alignment to the health status of the population. This study made it possible to identify

the oscillations in case attendances in a single-site and existing data gaps in the DHMIS2 as well as the need for future investigations to understand actual factors leading to the case oscillations and validate such anomalies. It provides a basis for future research in related settings.

### Limitations

The analysis is a single site study. It lacks district- and nation-wide generalizability. There also lacks data to differentiate between new and repeat attendances. However, the design adopted provides analytical transferability which can guide related investigations.

### Conclusion and Recommendations

The study at Presbyterian Hospital, Agogo highlights the growing burden of CVDs and related complications and the need for adopting sustainable and evidence-based strategies to promote early detection and evidence-based cardiovascular care. As CVDs such as hypertension, heart failure, and diabetes continue to put pressure on Ghana's health system, it is recommended that:

- Investigate the cause of the case oscillation observed in CVDs OPD attendances between 2015 and 2025 at the Presbyterian Hospital, Agogo, and if such anomalies existed in other facilities during the same period,
- Adopt a more sustainable and continuous screening programs over the periodic programs,
- Align healthcare and economic policies to actual community health, social, and economic status,
- Focus research on health equity science, data science and modernization to create strategic health systems that absorb shocks and ensure equitable financial and health access.

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