ENSIGN GLOBAL COLLEGE

DEPARTMENT OF COMMUNITY HEALTH

PATTERNS AND OUTCOMES OF ADMISSIONS AT THE MEDICAL WARDS OF HO TEACHING HOSPITAL IN THE VOLTA REGION OF GHANA: - A RETROSPECTIVE REVIEW (2020- 2024)

BY:

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SEPTEMBER, 2024

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EMMANUEL TEYIE

A Thesis submitted to the Department of Community Health in the Faculty of Public Health in partial fulfilment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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DECLARATION AND CERTIFICATION

I hereby declare that this thesis is an original work done by myself under the supervision of my supervisor. All sources used have been duly referenced and acknowledged and this work has not been presented wholly or in part for the award of any degree elsewhere.

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Certified by:

Dr. Edward Kofi Sutherland	……..	……
(Supervisor)	Signature	Date

Certified by:
Dr. Stephen Manortey
(Head of Academic Program)

……..	……
Signature	Date

DEDICATION

I dedicate this work to my mother, Madam Favour Miketo, who has been my source of motivation from childhood and all her encouragement in those formative years that stirred my desire to achieve greatness. I will make you proud ‘mama’.

ACKNOWLEDGEMENT

I am and will always be highly indebted to the Most High God, our Lord Jesus Christ for all my achievements so far. Surely, He that has begun a good work in us will complete it…(Phil. 1:6)

And to my wonderful supervisor Dr. Edward Kofi Sutherland for his immense patience and guidance through this journey to successfully complete my thesis. You have not only been a supervisor but a good friend with a big heart. God richly bless you.

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To my lovely siblings, Anthony Amezah, Priscilla Teyie and Doris Teyie who supported run various errands to make this thesis a success, I say I love you all so much and God bless you.

Finally, to all the wonderful people out there who made my thesis a success, I love you all.

ABSTRACT

Background

The patterns and outcomes of admissions in the hospital are a reflection of disease patterns in society; hence, the identification of these patterns is necessary for the assessment of the healthcare system and also provides scientific data for policy making and proper resource allocation into various communities. This study aimed to comprehensively assess the patterns and outcomes of admissions at the medical wards of the Ho Teaching Hospital using retrospective LHIMS data.

Method

This was a descriptive retrospective study that analyzed secondary data extracted from the LHIMS of the Ho Teaching Hospital covering a period from December 1, 2020 to May 31, 2024. Data from 5, 758 patients were analyzed using MS Excel and Stata version 18.0 (Stata Corporation, College Station, TX, USA). Some varia age, sex, NHIS status, date of admission, date of discharge, principal diagnosis, length of stay, and outcome of admission. Data analysis involved grouping diseases according to ICD- 10 classification with further categorization into communicable and non- communicable diseases.

Results

Data was collected on 5,758 patients. The analysis revealed a slight female predominance in admissions (50.6%) with the majority of patients being 55 years and older (46.7%). NCDs accounted for 86.4% of all admissions with stroke, congestive heart failure and chronic kidney disease being the most prevalent conditions. Communicable diseases constituted 13.6% of admissions with pneumonia (6.0%) and malaria (6.0%) equally being the most common. The average length of stay was 11.5 ± 12.1 days with a significant variation compared to other studies within Ghana and worldwide. Most patients were discharged home (83.8%) while mortality rate was at 14.4%.

Conclusion

The findings of this study underscore the need for enhanced healthcare policies targeting NCDs, promoting ongoing policies to further reduce communicable diseases, improvement in documentation and clinical practices and targeted resource allocation. The study offers valuable insights into the healthcare landscape of the Volta region of Ghana but its implications extend across this region and can serve as reference material for similar settings across Africa and the world at large.

Keywords: Patterns, admissions, medical ward, Teaching Hospital, Ho, Communicable, Non-communicable

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ABBREVIATIONS

CDs- Communicable Diseases

CNS- Central Nervous System

CPD- Continuing Professional Development

CVDs- Cardiovascular Diseases

DAMA- Discharged Against Medical Advice

DM- Diabetes Mellitus

HeFRA- Health Facilities Regulatory Authority

HIV- Human Immunodeficiency Virus

ICD- 10- International Classification of Diseases- 10^{th} Edition

ID- Identification

LHIMS- Lightwave Health Information Management System

LOS- Length of Stay

MS Excel- Microsoft Excel

NCDs- Non- Communicable Diseases

NHIS- National Health Insurance Scheme

OECD- The Organization for Economic Cooperation and Development

OPD- Out Patients Department

WHO- World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The patterns and outcomes of admissions at the medical wards is a reflection of disease burden in the society and also very crucial in the assessment of health status of the society although the actual prevalence of these diseases in the society may not be determined (Olatayo Adeoti *et al.*, 2015; Egboh and Bozimo, 2023). Approximately 56% of hospital admissions are for medical cases (Witt, Weiss and Elixhauser, 2014).

Disease patterns vary geographically because the unique characteristics of different locations offer insights into the causes of diseases. The factors that distinguish these places help in identifying potential disease cause (Ruiz, 2017).

According to world health statistics, 2023, there is an epidemiological transition globally regarding the shift of disease burden due to infectious diseases to the high prevalence of chronic NCDs (WHO, 2023). This transition has been achieved by the Americas, Western Pacific and European regions over the past two decades with the proportion of deaths due to NCDs reaching, 81%, 87%, and 90% respectively.

However, the Eastern Mediterranean and Africa regions are slowly catching up with the trend with the proportion of deaths due to NCDs reaching 66% and 38% respectively (WHO, 2023).

According to the WHO, non-communicable diseases (NCDs) contribute to 43% of all deaths in Ghana, with major conditions like heart disease, stroke, diabetes, cancer, and respiratory diseases becoming increasingly prevalent in healthcare settings. Despite this noticeable rise in NCDs, Ghana continues to face a dual disease burden, grappling with both communicable and non-communicable diseases. This situation is referred to as the "double burden of disease" (Agyei-Mensah and de-Graft Aikins, 2010).

In Ghana, chronic non-communicable diseases were the leading causes of death in 2017 and 2018, responsible for 25% and 20% of deaths, respectively. Among the most common NCDs were hypertension, other non-ischemic heart diseases, and diabetes (Yaa *et al.*, 2021). These findings align with the 2012 annual report from Korle Bu Teaching Hospital, which identified anemia, diabetes, hypertension, chronic kidney disease, cerebrovascular accidents, pneumonia, and congestive heart failure among the top ten leading causes of admission in the medical department however, the 2016 annual report saw another twist with communicable diseases topping the chart such as pulmonary tuberculosis, cerebral toxoplasmosis, anaemia, chronic kidney disease, dehydration secondary to gastroenteritis, and diabetes mellitus respectively as part of the top ten causes of admissions to the medical wards.

A study utilizing data from the Ghana Health Service's District Health Information Management System between 2014 and 2018 revealed that the Upper East and Volta regions experienced the highest rise in institutional mortality rates (Yaa *et al.*, 2021). It is therefore imperative to delve into major health institutions in these regions to assess the patterns and outcomes of admissions while comparing these findings to the ongoing epidemiological transition in the country and African region at large.

The Volta region has one tertiary facility which is the Ho Teaching Hospital that serves as the major referral center for the whole Volta region with a population of about 1.6 million (Ghana statistical service, 2021) hence it is very important to conduct such studies in this facility to better understand the trend of diseases prevailing in this region. Medical admissions are known to contribute significantly to general admissions in many hospitals (Bassi *et al.*, 2018). Therefore, conducting a study on the patterns and outcomes of admissions on the medical ward will subsequently give a significant overview of trends in the whole hospital as well as the community. Understanding the patterns of admissions and identifying the most prevailing diseases on admission is very important for adopting preventive measures for primary prevention and health

promotion in the society or community. This has been recognized as a cost-effective strategy for disease control (Bello Yusuf Jamoh, Sani Atta Abubakar, 2018).

1.2 Problem Statement

The medical wards within Teaching Hospitals serve as a major referral center, catering to the healthcare needs of communities and regions within their catchment area. Understanding the patterns and outcomes of admissions in such facilities is crucial for optimizing healthcare delivery, resource allocation and policy development. However, there is a notable gap in research regarding patterns and outcomes of admissions at the medical wards of Teaching Hospitals in Ghana.

Notwithstanding the significance of this study, existing studies upon literature search focused on specific disease conditions and patient populations therefore rendering very little work on the broader patterns and outcomes on the medical wards (Kitcher, Jangu and Baidoo, 2007; Sarfo *et al.*, 2016; Id *et al.*, 2020; Ofei-palm *et al.*, 2022). Moreover, within the Teaching Hospital under this study, there is no documented research into the general the patterns and outcomes of medical ward admissions.

In contrast, countries like Nigeria, Sudan, Ethiopia, and South Africa have conducted extensive research on this topic, highlighting its importance for effective healthcare planning and evaluation (Olatayo Adeoti *et al.*, 2015; Bane *et al.*, 2016; Bello Yusuf Jamoh, Sani Atta Abubakar, 2018; Omar *et al.*, 2022; Egboh and Bozimo, 2023). The deficiency in such similar studies in the context of Ghana is a hindrance to the development of informative database for building a strong healthcare system and making informed health policies that can guide proper healthcare delivery. Also, the absence of adequate research on this subject hinders the development of evidence-based healthcare practices as well as development of strategies to assess and improve performance of medical wards within Teaching Hospitals as health research is very important in achieving the sustainable development goals (Hanney *et al.*, 2020).

A clear understanding of admission patterns and outcomes in medical wards is essential for healthcare providers and policymakers to effectively address the changing needs of patients and society. Therefore, it is crucial to conduct comprehensive research to investigate these patterns and outcomes at the medical wards of Ho Teaching Hospital, with the goal of replicating the study across all Teaching Hospitals in Ghana.

1.3 Rationale of The Study

The objective of this study is to provide valuable scientific data to the health sector by offering in-depth insights into the types of cases admitted to the medical wards at Ho Teaching Hospital. By highlighting the patterns and outcomes of admissions in this context, the findings will address a significant research gap and lay the groundwork for future studies in various regions of the country. Furthermore, given the scarcity of research on this topic in Ghana, the study results can be compared to data from other African countries and globally to discern trends and patterns of diseases on medical wards in Ghana relative to other contexts. This comparative analysis will also highlight on the epidemiologic transition occurring within the country, informing healthcare planning and resource allocation strategies. This will also inform public health action and evidence-based policymaking aimed at promoting healthy lifestyles and reducing disease burden in the society where the hospital is situated (Singh, Gupta and Acharya, 2012).

Additionally, the study will explore outcomes of admissions, including morbidity and mortality rates, and identify conditions associated with higher mortality. This information will facilitate the implementation of measures to reduce mortality rates and promote community health based on the research findings.

1.4 Conceptual framework

The nature of this study is a descriptive study and does not seek to draw associations between conditions and causality but rather objectively describe the prevailing patterns and outcomes of

medical conditions on the medical wards of the Ho Teaching Hospital and hence a conceptual framework was not used.

1.5 Research Questions

1. What are the demographic characteristics (age, gender) observed among patients admitted to the medical wards of the Ho Teaching Hospital?
2. What are the patterns of disease conditions admitted to the medical wards of the Ho Teaching Hospital?
3. What is the average length of stay on admission?
4. What are the outcomes (death, survival, sequelae) associated with admissions at the medical wards of the Ho Teaching Hospital?

1.6 General Objective

To comprehensively assess the patterns and outcomes of admissions at the medical wards of the Ho Teaching Hospital using retrospective LHIMS data between December 31, 2020 to May 31, 2024.

1.7 Specific Objectives

1. To assess the socio- demographic characteristics (age, sex, education, employment status, NHIS status) observed among patients admitted to the medical wards of the Ho Teaching Hospital.
2. To describe the patterns of disease conditions admitted to the medical wards of the Ho Teaching Hospital.
3. To determine the average length of stay on admission at the medical wards of the Ho Teaching Hospital.

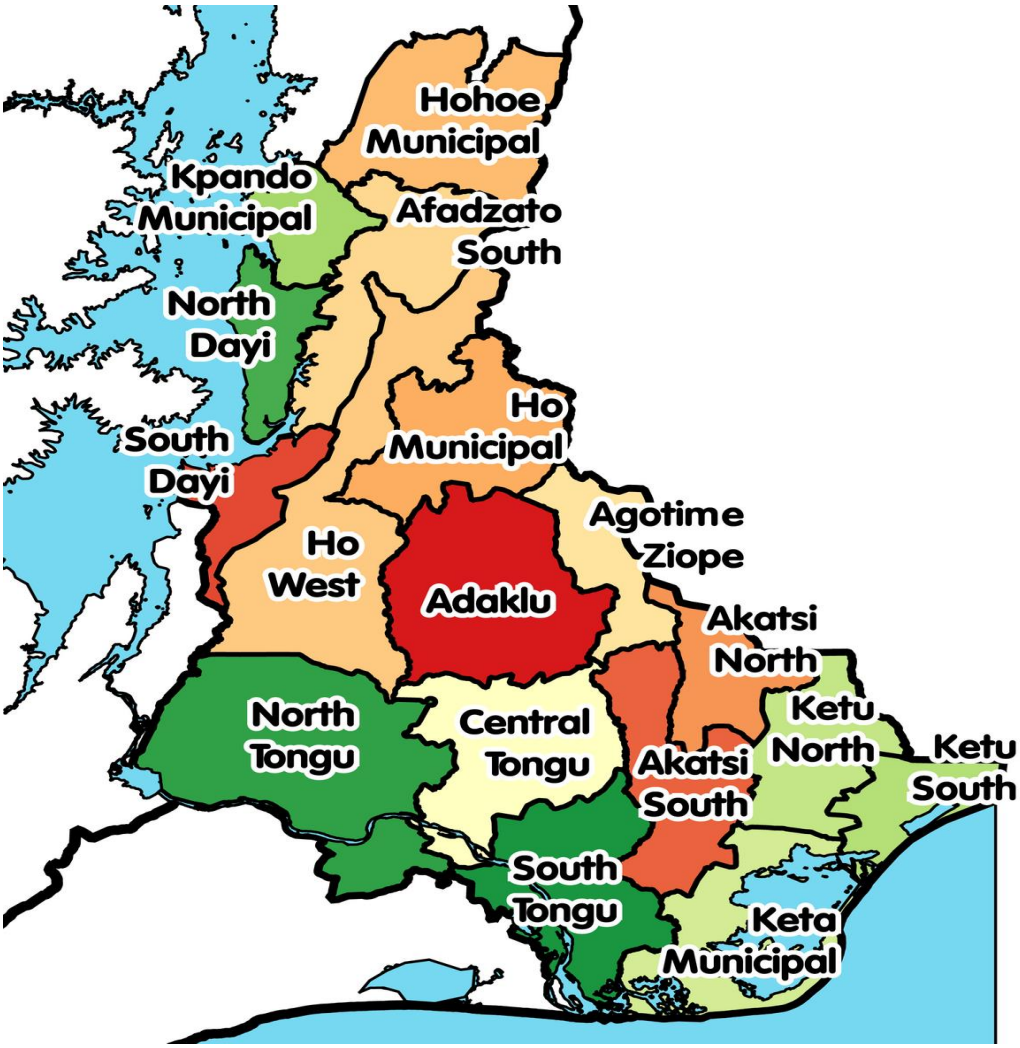
4. To establish the outcomes (death, survival, sequelae) associated with admissions at the medical wards of the Ho Teaching Hospital.

1.8 Profile of Study Area

Ho Teaching Hospital is situated in the capital city of the Volta Region. On April 29, 2019, it was re-commissioned as the fifth public teaching hospital by the Minister of Health, Hon. Kwaku Agyemang Manu, following a thorough accreditation process by the Health Facilities Regulatory Authority (HeFRA). The hospital serves as a teaching facility for the University of Health and Allied Sciences.

The construction of the hospital was undertaken by Kaevener Construction International from the United Kingdom, and it was formally handed over to the Government of Ghana in November 1998. Service delivery began in April 1999, and the hospital was officially inaugurated as the Volta Regional Hospital in December 2000 by former President John Jerry Rawlings and his wife, Nana Konadu Agyeman Rawlings.

With a capacity of 240 beds, the hospital is strategically positioned to provide specialized health services to residents of the region and beyond, including clients from Togo, Benin, and the Federal Republic of Nigeria.



Source: *https://commons.wikimedia.org/wiki/File:Districts_of_the_Volta_Region_(2018).png*

Figure 1.7.1 The Volta Region Map

The hospital currently employs around 1,200 staff members and has a bed capacity of 306 across 14 wards. It is the sole teaching hospital in the entire Volta Region and serves as the primary referral center for a population of approximately 1.6 million. In 2019, the total number of outpatient visits and inpatient admissions was 164,173 and 9,562, respectively (Dodoo *et al.*, 2021).

Ho Teaching Hospital comprises five clinical departments: Internal Medicine, Surgery, Obstetrics and Gynecology, Child Health, and Public Health.

All patients are admitted through the out-patients' department, the emergency unit or transferred from other departments internally to the medical wards and all relevant data are captured using the LHIMS. The LHIMS was first introduced to Ho Teaching Hospital in December 1, 2020.

Source: www.hth.gov.gh

1.9 Scope of Study

This descriptive study aimed to evaluate the patterns and outcomes of medical ward admissions at Ho Teaching Hospital. Patient data were collected from the hospital's LHIMS software, which was first implemented on December 1, 2020. The study analyzed data from December 1, 2020, to May 31, 2024, and included information on patients admitted to both the male and female wards during the study period.

1.9.1 Organization of Report

The study is organized into six chapters. Chapter one covers the study's setting, including the background, problem statement, rationale, research questions, and objectives. Chapter two presents a detailed literature review relevant to the topic. The methodology, including the research design, study population, sampling, pretesting, and inclusion and exclusion criteria, is outlined in chapter three. Chapter four presents the findings from the data analysis, while chapter five discusses the major findings of the study. Finally, chapter six provides conclusions drawn from the study and offers recommendations for improvement in the research area.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Importance of Reviewing/ Analyzing Hospital Data

Due to the digitalization of the healthcare system, an enormous amount of data is being captured on a daily basis. This data represents a variety of information on patients, healthcare staff and the healthcare system in general. According to Raja *et al.*, (2020), here are some major benefits in analyzing healthcare data:

Patients: Analyzing healthcare data enables patients to make informed decisions at the right time, improving their health outcomes while minimizing costs.

Clinical Operations: Healthcare data analysis fosters innovative and more efficient methods of diagnosing and treating patients, leading to greater cost-effectiveness.

Healthcare Providers: Data from healthcare organizations provides stakeholders with critical insights to develop strategies that reduce hospitalization rates.

Research and Development: Healthcare data supports researchers and scientists in enhancing healthcare services by developing accurate and effective treatments.

Public Health: The analysis of healthcare data helps assess health risks and track disease trends, improving public health surveillance.

2.2 Epidemiological Transition

The concept of the epidemiological transition was introduced by Omran in the mid-1960s and first published in 1971. It provides insight into the shifting patterns of disease and health, fertility rates, age structures, lifestyle transitions, and healthcare changes amid technological advancements (Omran, 2005).

Understanding this theory and how societies progress through different stages is crucial for determining a population's current stage. The classic epidemiological transition includes four stages:

Stage One (The Age of Pestilence and Famine): Characterized by high mortality and fertility rates, with slow or cyclical population growth. This was prevalent in Western societies until the late 18th or early 19th centuries and persisted in many developing countries until the mid-20th century.

Stage Two (The Age of Receding Pandemics): Marked by a decline in devastating pandemics by the late 18th or early to mid-19th century. Mortality rates decreased while fertility rates remained high, leading to rapid population growth.

Stage Three (The Age of Degenerative and Man-Made Diseases): This stage saw an increase in chronic diseases such as heart disease, cancer, diabetes, and metabolic disorders. Mortality continued to decline in the West, and life expectancy rose from 50 to 75 years.

Stage Four (The Age of Declining Cardiovascular Mortality, Aging, Lifestyle Changes, and Emerging Diseases): This phase features further increases in life expectancy, along with an increase in chronic diseases and an aging population. Not all countries that entered the third stage have progressed to the fourth, with some, like Australia, New Zealand, Japan, and Israel, already in the fourth stage, while others, especially in Europe, still face a high burden of cardiovascular diseases. In developing countries, the epidemiological transition is markedly different from that of developed nations. Many are facing a triple health burden, which includes: (1) unfinished

challenges such as communicable diseases, reproductive health issues, nutritional deficiencies, and rapid population growth; (2) rising concerns like cardiovascular disease, cancer, diabetes, aging-related conditions, accidents, and re-emerging diseases; and (3) underdeveloped healthcare systems and medical training that are ill-equipped to handle the growing prevalence of chronic and acute diseases, as well as long-term care for the elderly, disabled, and mentally ill.

Below if a figurative representation of the above phenomena:

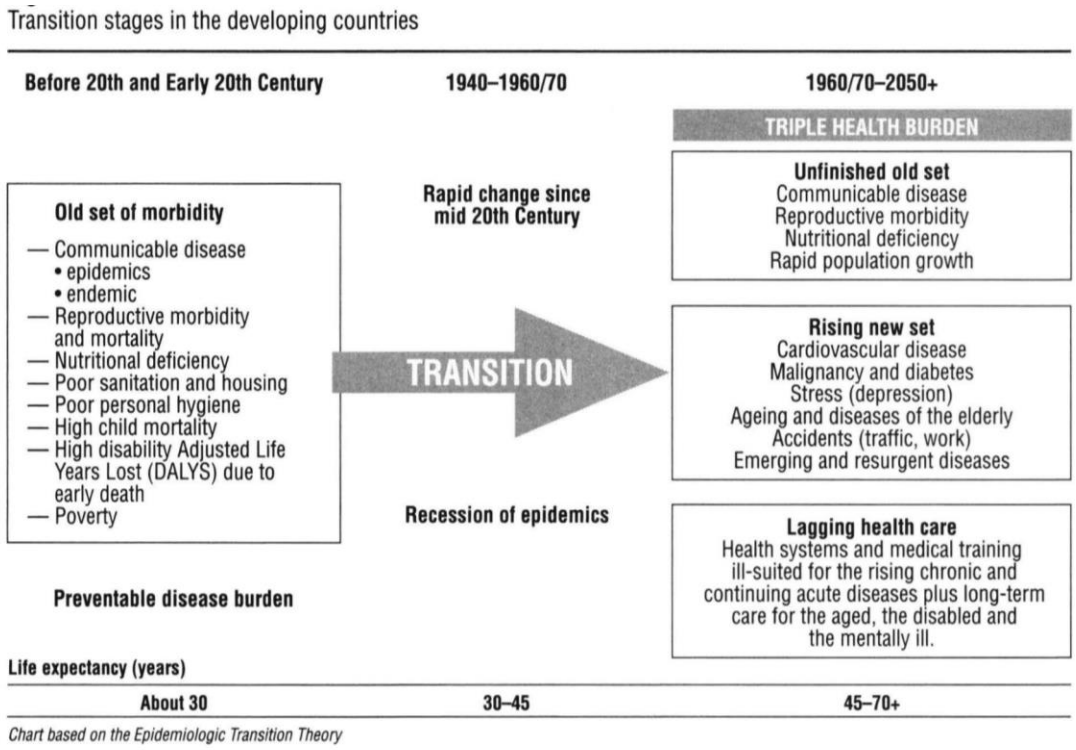


Figure 2.2.1. *Transition Stages in the Developing Countries*

2.3 International Classification of Diseases- 10th Edition (ICD-10)

The International Classification of Diseases was developed by the World Health Organization in 1948 as a comprehensive system for the accurate tracking, reporting and analysis of global health data. It was originated in the 18th century with major contributions from François Bossier de Sauvages de Lacroix and his contemporaries and has undergone several changes until 1948 when

WHO took over the system. ICD- 10 succeeded the ICD- 9 after successful endorsement by WHO in 1992. The ICD- 10 is noticeable for enhancement in its granularity. It operates an alphanumeric system with the first three digits of a code representing the category of a disease and subsequent characters providing additional specificity. The system comprises 21 chapters with each representing a body system or condition. The chapters cover infectious and parasitic diseases, blood and blood-forming organ diseases, metabolic disorders, nervous system diseases, mental health conditions, and more. A common challenge with using the ICD-10 is its complexity, which can affect billing and reimbursement processes (Hirsch *et al.*, 2024).

2.4 Characteristics of Patients Presenting at Medical Wards in Similar Studies

The demographic characteristic of patients admitted to the medical wards gives insight into the population health dynamics of the study population and also helps understand the specific healthcare needs of different groups in the society. Several studies have shown the significance of demographic data in understanding patterns of disease and healthcare utilization.

According to Egboh and Bozimo, (2023), in a retrospective 3-year review conducted in a federal medical center in Nigeria, there were more males (52.4%) than females on admission at the medical wards, although not very significant ($p = 0.21$). The ages of patients admitted ranged from 17 to 104 years, with average ages of 52.54, 51.83, and 53.83 in 2017, 2018, and 2019, respectively. Most patients admitted were in their 50s, 60s, and 70s.

A three-year retrospective study conducted in Cameroon found that male patients (55.3%) outnumbered female patients in the medical wards. The ages of patients ranged from 15 to 101 years, with a mean age of 52.9 ± 17.2 years, 51.3% of participants were young (<55years) and 91.5% lived in urban areas (Rachidou *et al.*, 2023).

Furthermore, in a study by Ogunmola and Oladosu, (2014), conducted in Ekiti state, Nigeria, the total number of participants were 1519 of which males were the majority (54.2%). The male-to-

female ratio was 1.2:1, with ages ranging from 16 to 120 years and a mean age of 56.0 ± 18.8 years. The elderly group constituted the majority (40.6%), followed by the middle-aged group (31.1%) and the young-aged group (28.4%).

While many studies show a slightly higher percentage of male admissions to medical wards, a few report the opposite, though most differences were not statistically significant. However, a study by Bassi *et al.*, (2018) at a Teaching Hospital in Jos, Nigeria, found more female patients (51.54%) than male patients (48.46%). In that study, ages ranged from 13 to 93 years, with a mean age of 34.25 ± 18.02 years. Similarly, Mautjana, (2011) reported that approximately 53% of admissions to medical wards were female. These findings suggest that gender distribution in medical wards varies across regions, though many studies identify a predominance of male admissions.

2.5 Patterns of Medical Admissions

The patterns in medical admissions are very dynamic and are necessary for planning, formulation of policy and the assessment of health of a population (Olatayo Adeoti *et al.*, 2015).

According to (Olatayo Adeoti *et al.*, 2015), non-communicable diseases (NCDs) accounted for the majority of medical admissions, with stroke (21%), diabetes mellitus (18%), systemic hypertension (13%), and heart failure (11%) being the most common. Additionally, communicable diseases were prevalent among young adults, particularly HIV/AIDS (73%), pulmonary tuberculosis (60%), and malaria (60%).

In contrast, a four-year retrospective study at Gadarif Hospital in Eastern Sudan found that medical admissions were predominantly NCDs (56.2%) compared to communicable diseases (43.8%). The leading causes of admission included cardiovascular diseases (18.4%), snakebites (12.9%), visceral leishmaniasis (12.0%), renal diseases (9.4%), neurological conditions (9.1%), diabetes mellitus (7.3%), sepsis (7.1%), and severe malaria (6.7%) (Saeed M. Omar *et al.*, 2022).

In a similar study conducted in Nigeria, Non- communicable diseases (NCDs) were notably higher than Communicable Diseases (CDs) constituting 68.4% and 31.6% of medical admissions respectively. Cardiovascular disorders topped the list of admissions while cases like toxins and poisons as well as dermatology cases were uncommon, 0.7% and 0.4% respectively (Ogunmola and Oladosu, 2014).

On the contrary, another studies carried out in Jos, Nigeria had infectious and parasitic diseases, including malaria, septicemia, typhoid fever and diarrheal diseases as the leading causes of medical admissions constituting about 19.8% of all admissions followed by NCDs such as CNS, Cardiovascular diseases (CVDs) and seizure disorders accounting for 16.2% while hematological disorders accounted for 11.3% (Bassi *et al.*, 2018). This implies that even in the same country there are differences in patterns of illnesses depending on the locality.

According to (Omran, 2005), developing nations are undergoing an incomplete epidemiological transition from infectious to degenerative diseases. However, many countries, including Ghana, are currently facing a double burden of disease, where both communicable and non-communicable diseases coexist and overlap (Konkor and Kuuire, 2023).

2.6 Outcomes of Medical Admissions

The outcomes of medical admissions varied from place to place but with some similarities in identical geographic areas. Mortalities from medical admissions ranged from 12.3% to 19.8% of medical admissions. According to Egboh and Bozimo, (2023), most patients admitted at the medical wards were discharged home while overall mortality was 16.5%. this study identified malignant diseases to be the most common cause of death. This was identical to a study carried out by Mautjana, (2011) where majority of patients (76.9%) were discharged, 3% referred out and an overall mortality of 18.6%.

In a study by (Rachidou *et al.*, 2023), the majority of patients (77.2%) were discharged, 4.4% left against medical advice, and the overall mortality rate was 17.4%. Similarly, (Ogunmola and Oladosu, 2014) found that 77.3% of patients were discharged, 6.4% left against medical advice, 4.5% were referred to other facilities, and the overall mortality rate was 12.3%. Non-communicable diseases, particularly cardiovascular diseases, were identified as the leading cause of death.

There is limited literature on such general medical admissions studies in Ghana however, some studies have been done on specialized wards such as cardiovascular and neurological wards. Trends in mortality on such wards are notable high. A case fatality rate among stroke patients was noticed to be 52% while 48% were discharged while the cardiovascular wards recorded a mortality of about 23% (Appiah *et al.*, 2017; Ofei-palm *et al.*, 2022).

2.7 Length of Stay

The average length of stay (LOS) in a medical ward serves as an indicator of healthcare staff and hospital efficiency. A shorter LOS can decrease discharge costs and facilitate the transition of patients to outpatient treatment, which is typically less expensive than inpatient care (Sarfo, Keney and Achampong, 2017). According to the Organization for Economic Co-operation and Development (OECD) in 2018, the average hospitalization duration is 5.9 days in the United States and 7.1 days in the United Kingdom. The OECD also noted that a shorter stay can reduce discharge costs and shift care from inpatient to more affordable outpatient management. The OECD defines the average length of stay as the average number of days a patient spends in the hospital, calculated by dividing the total number of days of admission by all patients during the year by the total number of admissions or discharges.

In 2012, there was an average stay of 4.5 days in the United States, with a range of 3.6 to 5.2 days. The length of stay was associated with age, gender, primary payer for bills, and hospital region

(Witt, Weiss and Elixhauser, 2014). Another study at the Ahmadu Bello University Teaching Hospital in Kaduna, Nigeria, found that the average hospital stay for discharged patients was 12.5 days, while those who passed away stayed for an average of 4.95 days (Garko, Ekweani and Anyiam, 2003). On the other hand, another study conducted in Nigeria at a Federal Medical Centre revealed an average LOS of 11.27 ± 8.20 days for those who were discharged, 8.67±9.76 days for those who were discharged against medical advice and 7.90 ± 7.49 days for those who died on admission (Egboh and Bozimo, 2023).

A study carried out at the Cape Coast Teaching Hospital in Ghana found that the average duration of stay in the medical wards was 7.4 ± 4.5 days, ranging from 6.5 to 11.4 days. The length of stay was affected by socio-demographic factors, institutional characteristics, and health issues (Sarfo, Keney and Achampong, 2017).

It is important to note that the length of stay in developing nations is notably longer than in developed countries. Garko, Ekweani and Anyiam, (2003) stated that factors such as a weak economy, limited resources, delayed presentation, and inadequate medical audit systems in developing countries contribute to the extended average length of stay.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Research Methods and Design / Data Collection Techniques and Tools

This study was a three-year and six months' descriptive retrospective study that involves the analysis of secondary data extracted from the LHIMS of Ho Teaching Hospital in the Ho municipal district of Ghana. Data was extracted in MS Excel format. The demographic data such as age, sex, education, employment status and NHIS status, date of admission, date of discharge, principal diagnosis, length of stay, outcome of admission and cost of treatment were extracted. It is a census study that includes data on all patients who had been admitted to both male and female wards between December 1, 2020 and May 31, 2024. Patients are admitted through the accident and emergency units, OPD or transferred from other departments of the hospital to the medical wards.

3.2 Study population

Patients admitted into both male and female wards between December 1, 2020 to May 31, 2024 as captured by the LHIMS who fit into the inclusion and exclusion criteria were studied. The medical ward admits patients beginning from the age of 12 years.

3.3 Sampling

Under this study, the whole dataset was used for analysis to maximize the representativeness of the research findings. All patient data collected via the LHIMS between December 1, 2020 to May 31, 2024 were cleaned using MS Excel and Stata software and utilized hence there was no need for a sample size calculation.

3.4 Pretesting

The secondary nature of this study does not warrant pretesting. The validity and reliability of the data obtained from the LHIMS has been thoroughly assessed by examining the dataset for any

inconsistencies and errors such as missing variables or incomplete documentation. Data was then cleaned and rid of inconsistencies to enhance the integrity of the data before analysis.

3.5 a. Inclusion criteria

All patients admitted to both male and female medical wards within the specified time period (December 1, 2020 to May 31, 2024) whose details were captured on the LHIMS were included in the study.

b. **Exclusion criteria**

1. Any patient who was not admitted on any of the medical wards.
2. Patients who were not on admission between December 1, 2020 to May 31, 2024.
3. Patients whose principal diagnoses were not captured on the LHIMS.
4. Patients whose diagnoses were not related to a medical condition according to the ICD-10 coding system.

3.6 Data handling

All data collected from the LHIMS was identified with special ID numbers which were specially generated by the researcher and did not reveal the names of the patients. Also, the information obtained from the data is confidential and is used for research purposes only. All necessary measures were been put in place to ensure anonymity and confidentiality protocols are met (Kang and Hwang, 2023). Data was stored in the form of a soft copy on a password- protected laptop.

3.7 Statistical analysis

Data collected was analyzed using MS Excel and Stata version 18.0 (Stata Corporation, College Station, TX, USA). Sociodemographic data was analyzed and represented in a frequency table and graphs generated where necessary for better comprehension and comparison. Diseases were grouped using the ICD- 10 classification and ranked to identify the top 10 prevalent conditions

admitted on the medical wards as well as their respective age distribution. Disease patterns were further grouped under the broad ICD-10 categories and ranked such as: Infectious and parasitic diseases, Malignant tumors, Blood and blood-forming organ disorders, Endocrine and metabolic disorders, Mental and behavioral disorders, Nervous system diseases, Circulatory system diseases, Respiratory system diseases, Digestive system diseases, Skin and subcutaneous tissue diseases, Musculoskeletal system diseases, Genitourinary system diseases, Injuries, poisoning, and other external causes" (Egboh and Bozimo, 2023). Further analysis was done to classify diseases into communicable and non- communicable diseases and their various distribution among age categories and the annual trend of admissions was represented on a line graph. The average length of hospital stay was analyzed and grouped into Length of Stay bands such as < = 24 hours, 48 hours, 72 hours, 4- 9 days, 10- 19 days, 20- 39 days and >= 40 days as well as length of stay in relation to survival rate was analyzed and represented on tables and graphs. Finally, the outcome of admissions was grouped into categories such as: absconded, discharged against medical advice (DAMA), referred, discharged and died as well as calculation of overall mortality and survival rate was done and represented in tables and graphs.

3.8 Ethical considerations

Ethical clearance was sought from the Institutional Review Board of Ensign Global College as well as the ethics committee of the Ho Teaching hospital before obtaining data from the health information department of the hospital. This dataset was coded with specialized ID numbers to avoid traceability of patients and also ensure anonymity and confidentiality. All precautionary measures were taken to protect the privacy of research subjects (World Medical Association, 2013).

3.9 Limitations

Data quality assessment- due to the secondary nature of this data and the large quantity of data extracted, there were a substantial number of variables that were incomplete. Variables such as: age, sex, NHIS status, date of admission and date of discharge are mostly completed on the LHIMS since they are mandatory fields on the LHIMS software. On the other hand, other variables such as occupation, educational status, locality and principal diagnoses have a lot of missing entries because such fields are not mandatory on the LHIMS software. The additional diagnosis was not included in the analysis because of the high number of missing entries (66.9%). Availability of complete data is very essential as it could make for a more detailed study. Data collected in the future on the LHIMS software should make these fields mandatory such that a complete save cannot be made unless these mandatory fields are completed to enable future research prospects.

3.2 **Assumptions**

It was assumed that the medical personnel who entered data into LHIMS chose the closest and accurate ICD- 10 diagnoses.

CHAPTER FOUR

4.0 RESULTS

4.1 General overview of data

In this study, data was analyzed from a total of 5,758 patients. Out of this some variables did not have complete entries captured on the extracted data from the LHIMS. Additional diagnoses were not used during analysis of disease patterns because of the large number of missing entries (66.9%) hence only principal diagnoses were used as it had fewer number of missing entries (7.0%). Below is a tabular representation of variables and the number of missing entries noticed (**Table 4.1.1**).

Table 4.1.1. *Variables and associated missing entries*

Variable	Number of Missing Entries, n (%)
Age	0 (0.0)
Gender	0 (0.0)
Locality	356 (6.2)
Employment	1585 (27.5)
Educational Status	1513 (26.3)
Date of Admission	0 (0.0)
Date of Discharge	0 (0.0)
Outcome of Discharge	1 (0.02)
Principal Diagnoses	401 (7.0)
Additional Diagnoses	3851 (66.9)
Cost of Treatment	0 (0.0)
NHIS Status	0 (0.0)
TOTAL (N)	**7707**

4.2 Socio- demographic Characteristics

During the study period of 3 years and 6 months (December 1, 2020 to May 31, 2024), a total of 5,758 patients were admitted into the male and female medical wards of the Ho Teaching Hospital which comprised 2,845 (49.4%) males and 2,913 (50.6%) females with a male to female ratio of 0.98:1. The mean age was 51.6 ± 19.8 years with a range of 12 to 108 years. There was no significant age difference between males and females admitted to the ward during the period of this study (Males- 51.4 ± 20.2 and Females- 51.9 ± 19.3). The majority of patients were less than 65 years old constituting 71.6%. There were more females than males on admission during the study period (50.6% vs 49.4%).

Most patients were insured under the National Health Insurance Scheme (83.2%) and majority of patients admitted over the period had some level of education (86.8%) where primary level of education constituted 55.5% as against 12.8% who had no educational background. Approximately, 69.8% of patients had some form of occupation and were employed as against 30.1% who were unemployed (**Table 4.2.1**).

Table 4.2.1. *Socio- demographic characteristics*

Socio- demographic Characteristics		**Total N= 5758 (100%)**	**Dec. 2020 n= 153 (2.7%)**	**Jan- Dec 2021 n= 1709 (29.7%)**	**Jan- Dec 2022 n= 1738 (30.2%)**	**Jan – Dec 2023 n= 1609 (27.9%)**	**Jan-May,2024 n= 549 (9.5%)**
Age, years	12-24	687 (11.9)	13 (0.2)	215 (3.7)	235 (4.1)	173 (3.0)	51 (0.9)
	25-34	569 (9.9)	10 (0.2)	186 (3.2)	189 (3.3)	139 (2.4)	45 (0.8)
	35-44	809 (14.1)	24 (0.4)	232 (4.0)	251 (4.4)	213 (3.7)	89 (1.6)
	45-54	1006 (17.5)	28 (0.5)	300 (5.2)	304 (5.3)	275 (4.8)	99 (1.7)
	55-64	1051 (18.3)	41 (0.7)	301 (5.2)	291 (5.1)	310 (5.4)	108 (1.9)
	65- 74	885 (15.4)	25 (0.4)	247 (4.3)	235 (4.1)	285 (5.0)	93 (1.6)
	75- 84	516 (9.0)	11 (0.2)	167 (2.9)	156 (2.7)	144 (2.5)	38 (0.7)
	≥85	235 (4.1)	1 (0.02)	61 (1.1)	77 (1.3)	70 (1.2)	26 (0.5)
Sex	Male	2845 (49.4)	78 (1.4)	822 (14.3)	856 (14.9)	826 (14.4)	263 (4.6)
	Female	2913 (50.6)	75 (1.3)	887 (15.4)	882 (15.3)	783 (13.6)	286 (5.0)
NHIS	Yes	4792 (83.2)	139 (2.4)	1403 (24.4)	1419 (24.6)	1367 (23.7)	464 (8.1)
	No	966 (16.8)	14 (0.2)	306 (5.3)	319 (5.5)	242 (4.2)	85 (1.5)
Employment		**N= 4173 (100%)**	**n= 136 (3.3%)**	**n= 1509 (36.2%)**	**n= 1491 (35.7%)**	**n= 778 (18.6%)**	**n= 259 (6.2%)**
	Employed	2912 (69.8)	97 (2.3)	1036 (24.8)	1051 (25.2)	535 (12.8)	193 (4.6)
	Unemployed	1254 (30.1)	39 (0.9)	471 (11.3)	437 (10.5)	242 (5.8)	65 (1.6)
	Unknown	7 (0.2)	0 (0.0)	2 (0.1)	3 (0.1)	1 (0.02)	1 (0.02)
Education		**N= 4254 (100%)**	**n= 143 (3.4%)**	**n= 1525 (35.9%)**	**n= 1506 (35.4%)**	**n= 805 (18.9%)**	**n= 273 (6.4%)**
	None	545 (12.8)	19 (0.5)	194 (4.6)	202 (4.8)	91 (2.1)	39 (0.9)
	Primary	1481 (34.8)	56 (1.3)	523 (12.3)	509 (12.0)	286 (6.7)	107 (2.5)
	Secondary	1371 (32.2)	41 (1.0)	494 (11.6)	491 (11.5)	274 (6.4)	71 (1.7)
	Tertiary	839 (19.7)	27 (0.6)	310 (7.3)	299 (7.0)	148 (3.5)	55 (1.3)
	Unknown	18 (0.4)	0 (0.0)	4 (0.1)	5 (0.1)	6 (0.1)	3 (0.1)

4.3 Pattern of Diseases

Non- communicable diseases (NCDs) constituted the majority of admissions on the medical wards constituting 86.4% as against 13.6% of Communicable diseases (CDs) (**Figure 4.3.1**). The top 10 diagnoses (**Table 4.3.1**) on the medical wards constituted more of non-communicable diseases (80.0%) such as stroke (20.2%), congestive heart failure (20.1%), chronic kidney disease (17.6%), type 2 diabetes mellitus (9.3%), liver disease (6.9%), sickle cell disorders (5.4%), essential hypertension (5.1%) and urinary tract infection (3.4%) while communicable diseases among the top 10 diagnoses included pneumonia (6.0%) and plasmodium falciparum (malaria) (6.0%). Other communicable diseases which made it to top 50 diagnoses category were typhoid infection (0.32%) and HIV (0.26%).

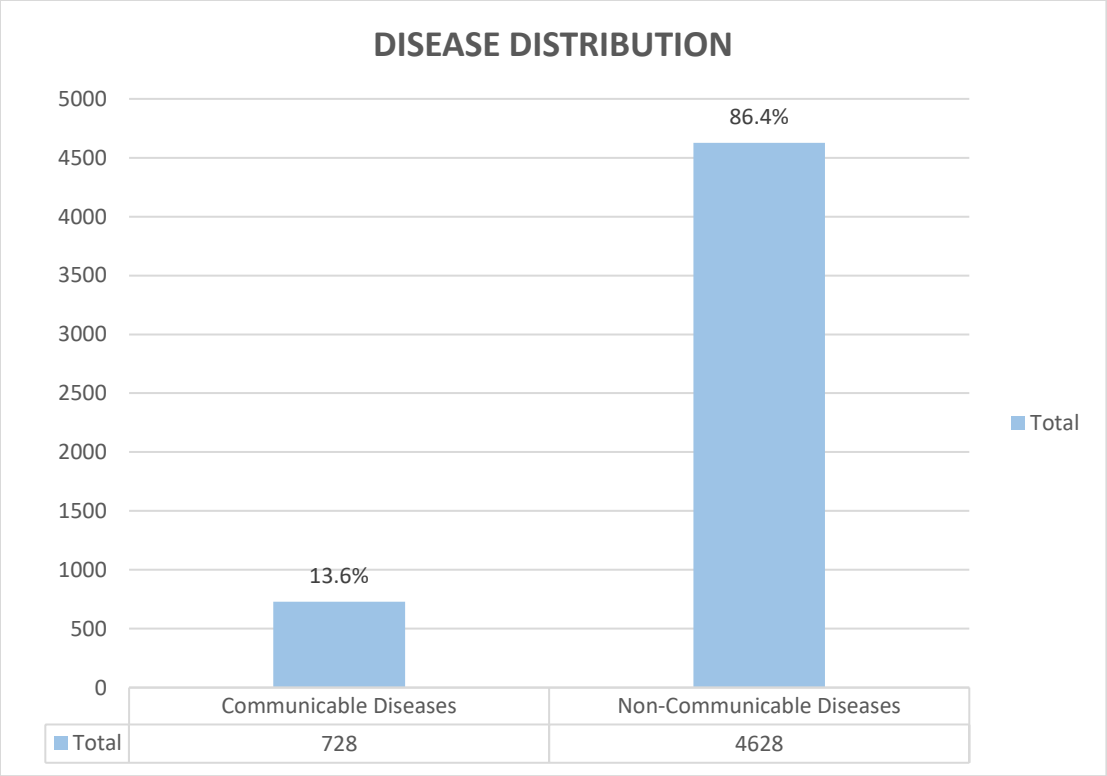


Figure 4.3.1. *Disease Categories*

Table 4.3.1 *Top 10 Diagnoses*

PRINCIPAL DIAGNOSES	FREQUENCY (%)
1. Stroke, not specified as haemorrhage or infarction(I64)	433 (20.2)
2. Congestive heart failure(I50.0)	432 (20.1)
3. Chronic kidney disease, unspecified(N189)	377 (17.6)
4. Type 2 diabetes mellitus With unspecified complications(E11.8)	200 (9.3)
5. Liver disease, unspecified(K76.9)	149 (6.9)
6. Pneumonia, unspecified(J18.9)	129 (6.0)
7. Plasmodium falciparum, unspecified(B50.9)	128 (6.0)
8. Sickle-cell disorders(D57)	117 (5.4)
9. Essential (primary) hypertension(I10)	109 (5.1)
10. Urinary tract infection, site not specified(N39.0)	73 (3.4)
TOTAL	**2147 (100)**

Also, under the broad ICD-10 classifications it is noticed that diseases of the circulatory system ranked highest (32.9%) followed by diseases of the genitourinary system (11.3%), certain infectious and parasitic diseases (9.5%), diseases of the digestive system (9.3%) and endocrine, nutritional and metabolic diseases (8.0%). Below is a tabular representation of the broad ICD-10 classifications and their distribution over the study period (**Table 4.3.2**).

Table 4.3.2 *Broad ICD-10 categories and their distribution*

Row Labels	2020 n (%)	2021 n (%)	2022 n (%)	2023 n (%)	2024 n (%)	TOTAL N (%)
IX Diseases of the circulatory system	41 (0.8)	450 (8.4)	521 (9.7)	561 (10.5)	188 (3.5)	1761 (32.9)
XIV Diseases of the genitourinary system	13 (0.2)	189 (3.5)	182 (3.4)	158 (2.9)	62 (1.2)	604 (11.3)
I Certain infectious and parasitic diseases	17 (0.3)	164 (3.1)	158 (2.9)	128 (2.4)	42 (0.8)	509 (9.5)
XI Diseases of the digestive system	21 (0.4)	152 (2.8)	148 (2.8)	126 (2.4)	49 (0.9)	496 (9.3)
IV Endocrine, nutritional and metabolic diseases	9 (0.2)	139 (2.6)	123 (2.3)	116 (2.2)	44 (0.8)	431 (8.0)
X Diseases of the respiratory system	12 (0.2)	105 (2.0)	105 (2.0)	111 (2.1)	34 (0.6)	367 (6.9)
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	4 (0.1)	78 (1.5)	101 (1.9)	99 (1.8)	26 (0.5)	308 (5.7)
VI Diseases of the nervous system	3 (0.1)	67 (1.3)	58 (1.1)	49 (0.9)	23 (0.4)	200 (3.7)
XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2 (0.04)	61 (1.1)	57 (1.1)	53 (1.0)	18 (0.3)	191 (3.6)
XIX Injury, poisoning and certain other consequences of external causes	2 (0.04)	16 (0.3)	43 (0.8)	24 (0.4)	10 (0.2)	95 (1.8)
II Neoplasms	1 (0.02)	16 (0.3)	27 (0.5)	31 (0.6)	12 (0.2)	87 (1.6)
V Mental and behavioural disorders	3 (0.1)	23 (0.4)	27 (0.5)	19 (0.4)	3 (0.1)	75 (1.4)
XII Diseases of the skin and subcutaneous tissue	2 (0.04)	21 (0.4)	14 (0.3)	15 (0.3)	8 (0.1)	60 (1.1)
XIII Diseases of the musculoskeletal system and connective tissue	0 (0.0)	10 (0.2)	22 (0.4)	19 (0.4)	8 (0.1)	59 (1.1)
XXI Factors influencing health status and contact with health services	3 (0.1)	13 (0.2)	9 (0.2)	8 (0.1)	2 (0.04)	35 (0.7)
XX External causes of morbidity and mortality	0 (0.0)	4 (0.1)	11 (0.2)	8 (0.1)	2 (0.04)	25 (0.5)
XXII Codes for special purposes	0 (0.0)	14 (0.3)	5 (0.1)	0 (0.0)	0 (0.0)	19 (0.4)
VII Diseases of the eye and adnexa	0 (0.0)	4 (0.1)	5 (0.1)	2 (0.04)	1 (0.02)	12 (0.2)
VIII Diseases of the ear and mastoid process	0 (0.0)	4 (0.1)	1 (0.02)	4 (0.1)	1 (0.02)	10 (0.2)
XVII Congenital malformations, deformations and chromosomal abnormalities	0 (0.0)	2 (0.04)	0 (0.0)	6 (0.1)	0 (0.0)	8 (0.1)
Others	0 (0.0)	2 (0.04)	1 (0.02)	1 (0.02)	1 (0.02)	5 (0.1)
Grand Total	**133 (2.5)**	**1534 (28.6)**	**1618 (30.2)**	**1538 (28.7)**	**534 (10.0)**	**5357 (100)**

Table 4.3.3. *Age in Relation to Disease Category*

Age	Communicable Diseases (%)	Non- communicable Diseases (%)	TOTAL (%)
Less than 45 years	340 (6.4)	1597 (29.8)	1937 (36.2)
45- 64 years	222 (4.1)	1684 (31.4)	1906 (35.5)
65 years and above	166 (3.1)	1348 (25.2)	1514 (28.3)
TOTAL	**728 (13.6)**	**4628 (86.4)**	**5356 (100)**

It is well noticed that CDs decrease with increasing age as demonstrated in (**Table 4.3.3**) above. **Figure 4.3.4**, shows the disease trend in annual admissions where it is noticed that NCDs are increasing gradually over the period of study as against CDs which are on a gradual decline.

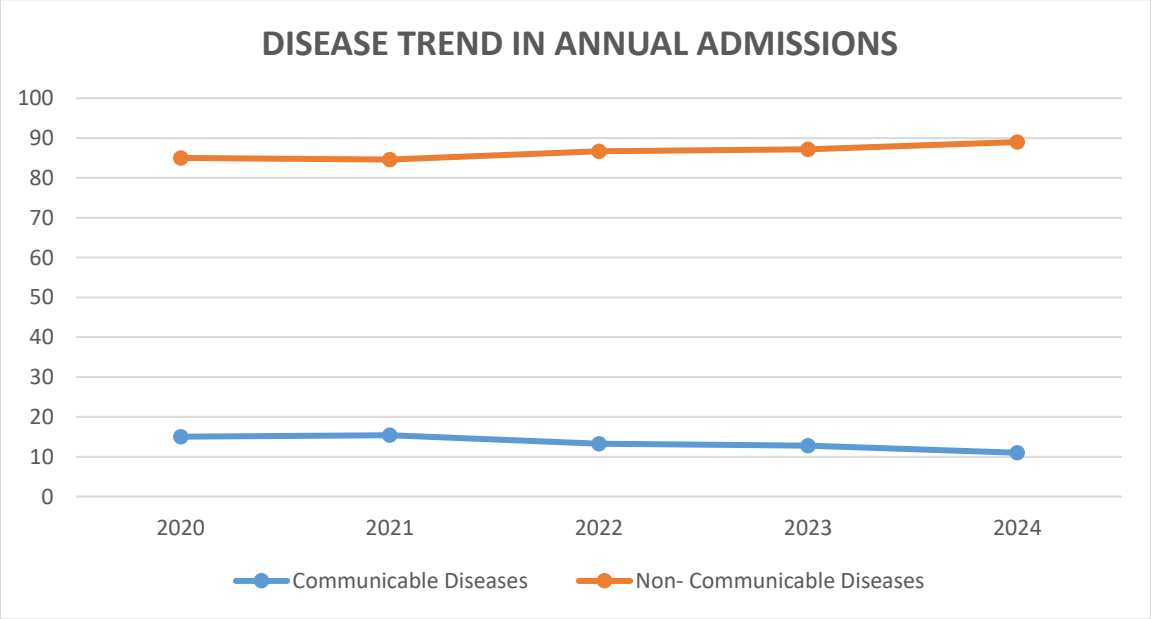


Figure 4.3.4. *Trend in Annual Admissions*

4.4 Length of Stay

The length of stay which was deduced from the difference between the date of discharge and the date of admission showed a range of 0 to 298 days of hospital stay among medical ward admissions. In this analysis, the descriptive statistics showed the average length of stay was 11.5 ± 12.1 days with males staying on the ward slightly longer than females (11.6 ± 12.1days vs 11.4 ± 12.0 days). Data is represented in tabular format below (**Table 4.4.6 and Table 4.4.7**). A total of 14.5% of patients had a short hospital stay of 72 hours or less while a majority of patients (71.2%) had moderate hospital stay between 4 and 19 days. On the other hand, approximately 14.3% of patients had long hospital stays of ≥ 20 days while others (2.5%) stayed extremely long on admission ≥ 40 days (**Table 4.4.9**).

Table 4.4.6. *Average Length of Stay*

Variable	Mean	Std. dev.	Min	Max
Length of Stay	11.5	12.1	0	298

Table 4.4.7. *Average Length of Stay by sex distribution*

	Mean	Std. dev.
Male	11.6	12.1
Female	11.4	12.0

Table 4.4.8. *Distribution of Length of Stay among patients*

Length of Stay	(n[%])
< = 24 hours	141 (2.5)
48 hours	295 (5.1)
72 hours	399 (6.9)
4- 9 days	2477 (43.0)
10- 19 days	1621 (28.2)
20- 39 days	680 (11.8)
>= 40 days	145 (2.5)
TOTAL	**5758 (100)**

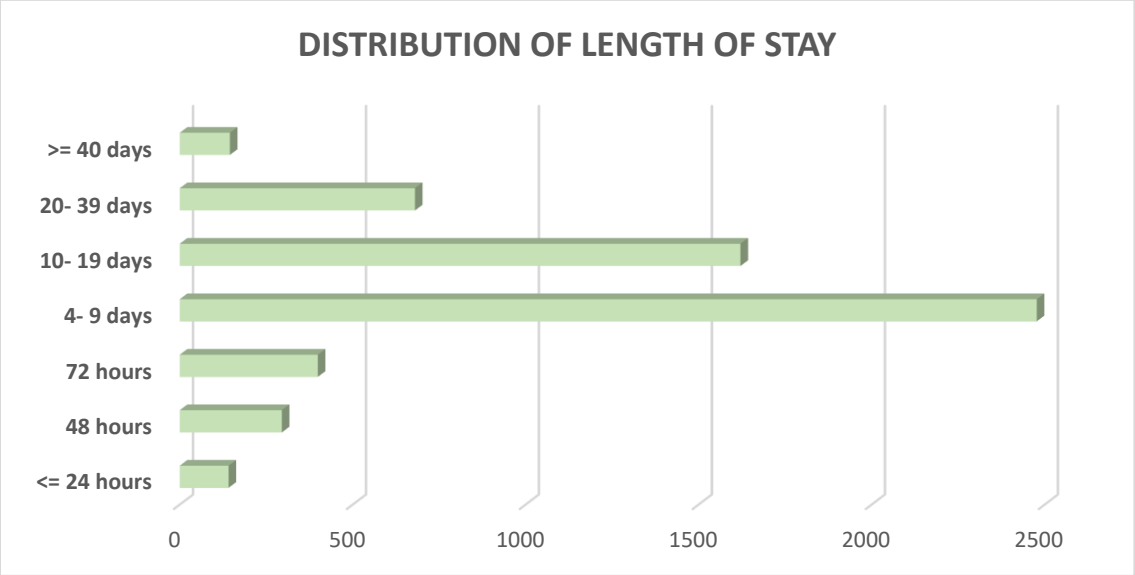


Figure 4.4.1. *Distribution of Length of Stay*

Further analysis of data on patients whose principal diagnoses were known was made. A total of 5357 patient data was analyzed to compare the survival rate to duration of admission. The analysis revealed that patients that stayed on admission for approximately 4- 9 days had a higher chance of survival (39.4%) followed by those who stayed for about 10- 19days (25.3%) as against a lower survival rate of up to 1.0% among patients who stayed for 40 days or more on admission (**Table 4.4.9**).

Table 4.4.9. *Survival Rates by Length of Stay Categories*

Length of Stay	Total Patients	Survivors	Survival Rate %
≤ 24 hours	128	112	2.1
48 hours	275	252	4.7
72 hours	375	342	6.4
4-9 days	2341	2112	39.4
10-19 days	1556	1355	25.3
20-39 days	601	496	9.3
≥ 40 days	81	54	1.0
TOTAL	**5357**	**4723**	**88.2**

4.5 Outcome of Admissions

The outcome of admissions which was analyzed using the variable, outcome of discharge. This variable had one missing entry (0.02%) hence the total data size was 5,757. The data was categorized into groups where majority of patients on admission were discharged (83.8%), 0.3% absconded, 0.2% were discharged against medical advice (DAMA), 1.3% were referred to another tertiary facility and 14.4% died. This put the overall survival rate at 83.8% and mortality rate at 14.4% respectively. The most common causes of death were Diseases of the circulatory system

(37.1%), Diseases of the digestive system (13.3%) and Certain infectious and parasitic diseases (10.5%). The above data has been demonstrated in **Table 4.5.1, Table 4.5.2** and **Figure 4.5.1** below.

Table 4.5.1. *Outcome of Admissions*

Outcome of Admissions (n[%])	
Absconded	14 (0.3%)
DAMA	13 (0.2%)
Referred	76 (1.3%)
Discharged/ Survival Rate	4824 (83.8%)
Died/ Mortality Rate	830 (14.4%)
TOTAL	**5757 (100%)**

**DAMA= Discharged Against Medical Advice

Table 4.5.2. *Cause of Death*

BROAD ICD-10 CATEGORIES	DIED	
	FREQUENCY	PERCENTAGE (%)
IX Diseases of the circulatory system	198	37.1
XI Diseases of the digestive system	71	13.3
I Certain infectious and parasitic diseases	56	10.5
XIV Diseases of the genitourinary system	51	9.6
X Diseases of the respiratory system	31	5.8
XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	29	5.4
IV Endocrine, nutritional and metabolic diseases	22	4.1
II Neoplasms	20	3.7
VI Diseases of the nervous system	20	3.7
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	7	1.3
XIII Diseases of the musculoskeletal system and connective tissue	6	1.1
XX External causes of morbidity and mortality	6	1.1
XIX Injury, poisoning and certain other consequences of external causes	4	0.7
V Mental and behavioural disorders	3	0.6
VII Diseases of the eye and adnexa	3	0.6
XXI Factors influencing health status and contact with health services	3	0.6
XXII Codes for special purposes	3	0.6
XII Diseases of the skin and subcutaneous tissue	1	0.2
TOTAL	534	100

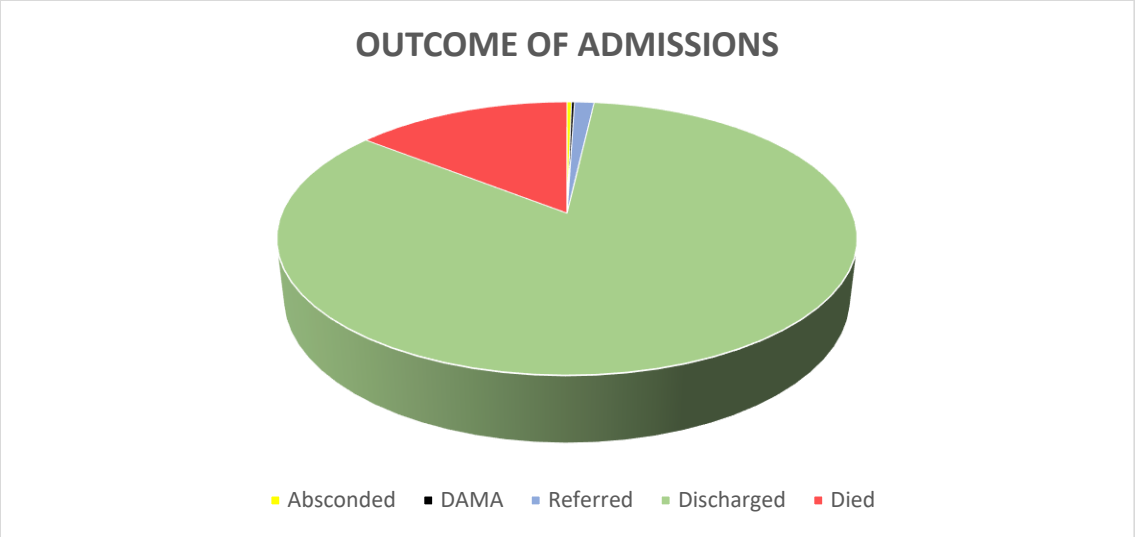


Figure 4.5.1. *Outcome of Admissions*

CHAPTER FIVE

5.0 DISCUSSIONS

This study was conducted to assess the patterns of disease admitted to the medical wards of the Ho Teaching Hospital which includes socio-demographic characteristics, disease distribution, duration of hospital stays and outcome of admissions. This is to better understand the dynamics on the medical wards and to help improve quality of care, enhance adequate resource allocation and also inform policy making.

5.1 Socio- demographic Characteristics

According to this study, there were more females (50.6%) than males (49.4%) on admission through the study period which was consistent with very few studies such as Mautjana, (2011); Bassi *et al.*, (2018) who identified female predominance of medical ward admissions, 53.0% and 51.54% respectively. On the contrary, most studies such as Ogunmola and Oladosu, (2014); Egboh and Bozimo, (2023); Rachidou *et al.*, (2023) showed male predominance of medical ward admissions, 52.4%, 55.3% and 54.2% respectively. According to this study, the age range of patients on the medical wards ranged from 12 to 108 years with an average age of 51.6 ± 19.8 years. The research also found that a large proportion of patients admitted were aged 55 and above (46.7%), which contrasts with a study carried out at a Teaching Hospital in Jos, Nigeria by Bassi *et al.*, (2018), where the average age was lower (34.25 ± 18.02) than in most studies, including the present one. This suggests that individuals in their fifth decade and older had a higher likelihood of being admitted. NHIS coverage in the medical wards in this study stood at 83.2%, comparable to a study conducted in the central region of Ghana where NHIS coverage was at 70.0% (Sarfo, Keney and Achampong, 2017). Further research has to be done to ascertain the reason behind the non- use of NHIS by patients on admission at the medical wards.

5.2 Pattern of Diseases

This study revealed that NCDs constituted the majority of admissions on the medical wards constituting 86.4% of all admissions over the study period with conditions such as stroke, congestive heart failure and chronic kidney disease ranking highest at 20.2%, 20.1% and 17.6% respectively followed by type 2 DM (9.3%), liver disease (6.9%), sickle cell disorders (5.4%) and essential hypertension (5.1%). The study conducted by Saeed M. Omar *et al.*, (2022) at Gadarif Hospital in Eastern Sudan from January 2017 to December 2020 included a total of 7230 patients admitted over the study period. The study revealed that non-communicable diseases (NCDs) accounted for 56.2% of medical ward admissions, with cardiovascular diseases (18.4%), snake bites (12.9%), visceral leishmaniasis (12.0%), renal diseases (9.4%), and diabetes mellitus (7.1%) being the most common conditions. The differences in common diagnoses between this study and others may be attributed to the geographical region, as the study was conducted in Eastern Sudan, which has a desert climate where conditions such as leishmaniasis and snake bites are prevalent. Additionally, previous studies by Ogunmola and Oladosu, (2014); Olatayo Adeoti *et al.*, (2015) also identified NCDs as the majority of medical admissions, at 65% and 68.4% respectively. These studies also found cardiovascular diseases to be the main diagnosis. Similarly, Olatayo Adeoti *et al.*, (2015) in a study at Ekiti State University Teaching Hospital between January 2008 and December 2015, analyzed data from about 3750 patients and identified stroke (21.0%), diabetes mellitus (18.0%), systemic hypertension (13.0%), and heart failure (11.0%) as common NCDs leading to admissions. These findings align with current trends indicating that cardiovascular diseases are the leading cause of mortality worldwide. According to WHO, the leading cause of mortality in the world are ischemic heart diseases which are responsible for 13% of the world's total deaths. Since 2000, deaths due to this disease has increased from 2.7 million to 9.1 million in 2021 which WHO describes as the largest increase in deaths by a disease.

The proportion of medical ward admissions due to communicable diseases was 13.6%, which is lower than the findings of other studies. For example, a study conducted by Bassi *et al.,* (2018) in Jos, Nigeria, found that infectious and parasitic diseases such as malaria, septicemia, typhoid fever, and diarrheal diseases were the primary reasons for medical admissions. These variations in findings between regions within the same country could be attributed to factors such as urbanization, urban poverty, and globalization (Agyei-Mensah and de-Graft Aikins, 2010). Additionally, this study aligns with the "double burden" of disease phenomenon observed in Accra, Ghana, where both non-communicable diseases and communicable diseases were identified as the main causes of medical ward admissions. In that study by Agyei-Mensah and de-Graft Aikins, (2010), it was noticed that both chronic diseases and infectious diseases constituted major causes of morbidity and mortality where wealthy communities experienced higher risk of chronic diseases and poor communities experienced higher risk of infectious diseases. Similar to this study, there is a coexistence of CDs and NCDs but however, the burden of NCDs seem to be much greater.

The most common CDs according to this study were pneumonia (6.0%) and plasmodium falciparum (malaria) (6.0%). This study differed significantly from other studies such as Egboh and Bozimo, (2023) and Mautjana, (2011) conducted in the Federal Medical Centre, Yenagoa, Nigeria and George Masebe Hospital (a district hospital in Limpopo Province), South Africa respectively where HIV was part of the leading causes of infectious disease admissions constituting 59.9% and 10.2% respectively. This shows a far less burden of HIV in the Volta region of Ghana where this study was carried out.

5.3 Length of Stay

According to this study, the average length of stay on admission at the medical wards was 11.5 ± 12.1 days with a range of stay of 0 to 298 days. This is somewhat similar to a study conducted at the Federal Medical Centre, Nigeria by Egboh and Bozimo, (2023) which shows an average length

of stay of 11.27 ± 8.20 days. Meanwhile, in the Central Region of Ghana, Cape Coast, a study carried out at the Cape Coast Teaching Hospital showed an average length of stay of 7.4 ± 4.5 days with a range of stay being 6.5 to 11.4 days (Sarfo, Keney and Achampong, 2017). This implies a shorter average length of stay at the Cape Coast Teaching Hospital compared to the Ho Teaching Hospital. In contrast, average length of stay in developed countries such as the USA is further reduced and shorter as evidenced by a study conducted by Witt, Weiss and Elixhauser, (2014) which revealed an average LOS of 4.5 days with a range of stay of 3.6 to 5.2 days. According to the OECD, 2021, the average length of stay for the USA is 5.9 days while that of the United Kingdom is 7.1 days. This confirms that length of stay in developing countries is much higher than in developed countries. Some factors responsible for this disparity includes poor economy, scarcity of resources, late presentation as well as lack of good medical audit mechanisms in developing countries (Garko, Ekweani and Anyiam, 2003).

5.4 Outcome of Admissions

Most patients admitted on the medical ward through the period of this study survived and were discharged home (83.8%). About 0.3% absconded, 0.2% were discharged against medical advice (DAMA) and 1.3% were referred to another tertiary facility. These findings were in line with several other findings such as Mautjana, (2011); Ogunmola and Oladosu, (2014); Rachidou *et al.*, (2023) where the discharge rate was at 76.9%, 77.2% and 77.3% respectively. On the other hand, mortality rate in this study was slightly lower (14.4%) while the aforementioned studies' mortality rate was at 18.6%, 17.4% and 12.3% respectively. Although several factors could influence these outcomes, it could be an indication of good quality of care at the Ho Teaching Hospital leading to higher survival outcomes and low mortality.

Additionally, it was found that the most frequent reasons for mortality in the medical wards were diseases of the circulatory system (37.1%), diseases of the digestive system (13.3%), and certain

infectious and parasitic diseases (10.5%). These results align with a study by Ogunmola and Oladosu, (2014) where cardiovascular diseases were the primary cause. Similar findings were reported by Yaa *et al.*, (2021) in their assessment of institutional mortality rates and causes of death in Ghana's health facilities, indicating that non-communicable diseases (NCDs) accounted for 25% of deaths in 2017 and 20% in 2018. This was followed by certain infectious and parasitic diseases (15% for both years) and respiratory infections (10% in 2017 and 13% in 2018). These findings are quite similar to our study. Similarly, a study by Sutherland et al. (2018) examining the causes of death at the University of Ghana Hospital in Accra revealed that almost 60% of deaths during the 37-year review were attributed to NCDs, including cancers, diabetes, cardiovascular diseases, and other systemic conditions. This implies a higher burden of NCDs even though there is a double burden of disease.

5.5 Implications of the study

The implications of the findings from this study is essential for improvement in various aspects of health especially in the context of Ghana and Africa at large and also serve as a reference material for other developing and developed countries across the world.

Health Policy:

This study shows a significant improvement in the tackling of communicable diseases such that even though there was a double burden of disease, communicable disease burden was much less of a burden. Therefore, all health policies in place for addressing the issue of communicable diseases must continue to be enforced.

Clinical Practice:

The study has shown the need for specialized focus in the field of NCDs management and the need for Continuing Professional Development (CPD) workshops and trainings to be organized at the Ho Teaching Hospital.

Training of doctors:

The study also shows that record keeping and proper documentation would be necessary in the training of medical doctors. This is to avoid large numbers of missing entries that could help with an even more detailed research.

Research:

This study discovered a huge gap on similar researches like this kind in Ghana. Few African counterparts have done several similar studies of this kind hence this serves as foundation for replication in several other regions in Ghana and Africa at large.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Conclusions

In conclusion, the study identified a female predominance of medical ward admissions at the Ho Teaching Hospital. There was a high percentage of NHIS coverage among patients admitted to the medical wards. The study also identified that NCDs constituted a majority of the hospital admissions and was also the number one cause of morbidity and mortality with the major NCDs being stroke, congestive heart failure, chronic kidney disease, diabetes mellitus, liver disease, sickle-cell disease, essential hypertension and urinary tract infection. Communicable diseases on that contributed to the top 10 diagnoses were pneumonia and malaria. Although this study does not necessarily reflect the whole of Ghana, it creates a tone for further research of this kind to be conducted in all regions across the country and the need to deploy the necessary resources and education to be carried out in the setting of this study.

Patients stayed longer on admission compared which suggests potential inefficiencies in healthcare delivery and resource allocation and utilization that needs to be addressed to reduce the duration of hospital stay. The recovery rate on the medical wards of the Ho Teaching Hospital is higher compared to other studies while the mortality rate was also lower than in some comparable studies possibly implying a much favorable quality of care at the Ho Teaching Hospital. The study also revealed that cardiovascular diseases were the leading cause of mortality followed by diseases of the digestive system, certain infectious and parasitic diseases, diseases of the genitourinary system and diseases of the respiratory system.

6.1 Recommendations

Based on the findings from this study, here are a few proposed recommendations:

1. The health promotion unit in the hospital should create awareness on NCDs and also educate the populace on healthy lifestyle that can help mitigate admissions on account of NCDs.
2. The hospital management should strengthen existing policies that have successfully curbed the incidence of communicable diseases such as policies that promote improved sanitation, ensuring assess to clean water and maintaining immunization programs which can further reduce admissions on account of communicable diseases.
3. Researchers and public health experts should conduct studies to identify factors contributing to disparities in disease patterns, length of stay and admission outcomes across different regions and health facilities in the country.
4. The hospital administration should implement strategies to reduce hospital stay duration. This can be done by adopting best practices from hospitals with shorter average length of stay.

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