ENSIGN GLOBAL UNIVERSITY, KPONG

EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

EAR, NOSE AND THROAT CONDITIONS AT THE HO TEACHING HOSPITAL IN THE VOLTA REGION OF GHANA: A RETROSPECTIVE REVIEW (2021 – 2024)

BY

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NOVEMBER, 2025

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A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH, FACULTY OF PUBLIC HEALTH, ENSIGN GLOBAL UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER OF PUBLIC HEALTH DEGREE

NOVEMBER, 2025

Declaration

I hereby declare that this submission is my work toward a master's degree in public health, and to the best of my knowledge, it does not contain any work that has been accepted for a university award or that has been previously published by someone else, except instances where appropriate credit has been given in the text.

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Dedication

This work is dedicated to God, whose guidance, grace, and strength have carried me through every stage of this journey. I also dedicate it to my beloved family for their constant love, prayers, and encouragement that have been my greatest source of motivation. To my dear friends, thank you for your support, understanding, and companionship throughout this academic pursuit. Your faith in me has inspired perseverance and made this achievement possible.

Acknowledgement

I am very grateful to the Almighty God for a successful work. I express my heartfelt gratitude to my supervisor, Dr. Edward K. Sutherland. Thank you, Dr. Edward, for your support, motivation, patience, and immense knowledge. I express much gratitude to our colleagues who assisted us throughout the research process. Lastly, to other family members and friends, I say thank you for your support and prayers and to all those whose names could not be mentioned here. God bless you all.

Definition of Terms

Socio-demographic characteristics refer to specific attributes related to the social and demographic traits of individuals that can influence their health-seeking behavior and the presentation of health conditions

Clinical characteristics refer to the specifics of how ENT disorders present in patients, particularly concerning severity and presentation patterns.

Ear, Nose, and Throat refers to a medical specialty that focuses on the diagnosis and treatment of disorders related to the ear, nose, throat, and related structures of the head and neck.

Treatment modalities refer to the spectrum of interventions utilized to manage ENT disorders.

Presentation Pattern: The nature and classification of disease onset or manifestation, commonly described as infectious, benign, or malignant in ENT literature.

Disease Severity: A classification indicating how serious a health condition is, often categorized as mild, moderate, or severe.

Medical Treatment Modalities: Primarily involves the use of medications tailored to the specific diagnosis, severity, and clinical presentation of a condition.

ICD-10: The International Classification of Diseases, Tenth Revision, a system used by healthcare providers to classify and code diagnoses, symptoms, and procedures.

DRG (Diagnosis-Related Group): A system used to classify hospital cases into groups expected to have similar hospital resource use; not widely applied in ENT practice in Ghana.

Otitis Media: An infection or inflammation of the middle ear, common in children and often linked to upper respiratory infections.

Rhinitis: Inflammation of the nasal mucous membrane, commonly caused by allergies or viral infections.

Pharyngitis: Inflammation of the pharynx, leading to sore throat, often caused by bacterial or viral infections.

Sinusitis: Inflammation or infection of the sinus cavities, causing facial pain, nasal congestion, and discharge.

Otomycosis: A fungal infection in the external ear canal, often associated with humid conditions.

Suppurative Otitis Media: A chronic infection of the middle ear with persistent ear discharge, which may lead to hearing loss.

Antibiotic Stewardship: A coordinated program that promotes the appropriate use of antibiotics to improve patient outcomes and reduce resistance.

Abbreviation/Acronyms

Abbreviation	Meaning
ENT	Ear, Nose, and Throat
HTH	Ho Teaching Hospital
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
LHIMS	Lightwave Health Information Management System
NHIS	National Health Insurance Scheme
ICD-10	International Classification of Diseases, 10th Revision
DRG	Diagnosis-Related Group
OPD	Outpatient Department
CSOM	Chronic Suppurative Otitis Media
CT	Computed Tomography
GSS	Ghana Statistical Service
WHO	World Health Organization

Abstract

Background: Ear, Nose, and Throat (ENT) disorders are a major concern in resource-limited settings. This study assessed the disease conditions, presentation patterns and severity levels, and medical treatment patterns of ENT conditions at Ho Teaching Hospital (2021–2024). **Methods:** A retrospective cross-sectional review of 24,335 medical records from the LHIMS database was conducted. Descriptive and inferential analyses, including Chi-square and multinomial logistic regression, were performed using SPSS version 25.

Results: The study found that most patients were aged 1–10 years (28.93%) and female (57.80%), with common conditions including impacted cerumen and otitis externa. Ear infections were most prevalent but declined over time. The main treatments were use of antibiotics (34.25%) for curative and use of analgesics (44.12%) for pain reliefs. Bivariate analysis revealed significant associations between sociodemographic factors (age, gender, pregnancy status) and the type, pattern, and severity of conditions (all $p = 0.00$). Multivariate analysis showed that males were less likely to have ear infections (AOR = 0.388, $p < 0.0001$), pregnant women had a higher likelihood of ear (AOR = 2.575, $p < 0.0001$) and nose infections (COR = 1.759, $p = 0.000$). Males were more likely to have throat infections (AOR = 1.660, $p < 0.0001$), and pregnant women were less likely (AOR = 0.602, $p < 0.0001$). Additionally, males were less likely to experience benign ENT conditions (AOR = 1.623, $p < 0.0001$) and mild ENT conditions (AOR = 0.643, $p < 0.0001$), while pregnant women had a higher likelihood for both (AOR = 1.561, $p < 0.0001$).

Conclusion: ENT conditions at HTH mainly affect children, with ear infections being most common. Age, gender and pregnancy status were significant predictors of the type of condition, disease pattern and severity, underscoring the need for demographic-specific interventions and improved diagnostic resources.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Ear, Nose, and Throat (ENT) conditions are among the most common medical disorders affecting populations worldwide (source), contributing significantly to the global burden of disease (source). Studies have shown that ENT disorders, such as otitis media, sinusitis, pharyngitis, and allergic rhinitis, can lead to severe complications if left untreated, affecting both quality of life and economic productivity (World Health Organization, 2021). Globally, approximately 330 million people suffer from hearing loss, while sinusitis affects 10-15% of the population in developed countries (Gordon et al., 2020). N. H. Ta (2019) also highlights the substantial economic burden that untreated ENT conditions place on healthcare systems, particularly in low- and middle-income countries.

In Africa, ENT conditions are prevalent due to several environmental, socioeconomic, and healthcare-related factors. The high incidence of infectious diseases such as tuberculosis, HIV/AIDS, and respiratory tract infections has been linked to an increased prevalence of ENT disorders on the continent (Olusola et al., 2022). For instance, studies in Nigeria and Kenya revealed a significant burden of ENT diseases, with otitis media and tonsillitis being the most reported conditions (Ogunleye et al., 2020). These conditions are often worsened by poor access to healthcare, inadequate infrastructure, and limited specialized services (source). A study by Amedofu (2019) in rural Zambia also showed that environmental factors like dust and pollution contributed to rising cases of rhinitis and sinusitis. A Nigerian study found ear disorders to be the most prevalent among children, with cerumen auris and adeno-tonsillar hypertrophy being the most common (Briggs et al., 2022). Diagnostic errors in ENT conditions are a concern in resource-limited settings, with one study reporting a 67.4% misdiagnosis rate by non-ENT clinicians (Lufunda Lukama et al., 2023). Patients with ear and sino-nasal diseases were more

likely to be misdiagnosed compared to those with head and neck diseases. In Ghana, ENT disorders are a growing public health concern, with reports showing that both infectious and non-infectious ENT conditions affect significant portions of the population (source). In northern Ghana, the most frequent emergency ENT admissions were maxillofacial injuries, foreign body ingestion, and deep neck abscesses (T Adjeso et al., 2017). Studies at tertiary healthcare facilities, like Korle-Bu Teaching Hospital in Accra, report a high prevalence of ear infections, sinusitis, and pharyngitis, especially among children and young adults (Quarshie et al., 2019).

Access to ENT specialists remains limited, and delayed treatment often leads to complications such as hearing loss, which affects educational outcomes in children and productivity in adults (source). Another study by Nyarko and Antwi (2020) emphasizes that while urban healthcare settings have seen advancements in ENT care, rural areas in Ghana continue to face challenges in diagnosing and managing these conditions.

In the Volta Region, and specifically in Ho, ENT conditions have been an area of concern due to environmental exposures, including dust and allergens (source), and the limited number of specialized ENT clinics. The Ho Teaching Hospital, which serves as a referral center for the region, has reported an increasing number of patients presenting with ENT disorders. However, detailed epidemiological data on the prevalence and patterns of these conditions in the region remain sparse. A comprehensive review of studies by Dzodze et al. (2021) identified otitis media and allergic rhinitis as the most common ENT conditions in the area, with seasonal variations affecting their incidence. Moreover, healthcare access issues, coupled with limited resources for specialized ENT care, complicate the management of these conditions.

This study assessed the type of ENT condition, the pattern of infection, and the severity of infection at the ENT clinic of Ho Teaching Hospital (HTH) from January 2021 to December 2024.

1.2 Problem statement

Ear, Nose, and Throat conditions are prevalent worldwide, contributing significantly to both morbidity and healthcare costs (source). Despite the global burden of these diseases, access to specialized ENT care in sub-Saharan Africa, including Ghana, remains limited (Olusola et al., 2022). In Ghana, most healthcare facilities, especially in rural and semi-urban regions such as the Volta Region, face substantial challenges in delivering adequate ENT services due to resource constraints, a lack of specialized professionals, and insufficient data for informed healthcare planning (Nyarko and Antwi, 2020). This situation is particularly concerning at the Ho Teaching Hospital, a critical referral center for the region, where there is a significant influx of patients with various ENT conditions.

However, a critical challenge is the scarcity of comprehensive epidemiological data on the prevalence, types, and management outcomes of ENT conditions at the facility. This gap in data limits the ability of healthcare practitioners to develop and implement evidence-based treatment guidelines. Kitcher et al. (2007) noted that inadequate data on ENT conditions in Ghana hampers the development of standardized diagnostic and treatment protocols, resulting in variability in clinical outcomes. Consequently, patients may experience delayed or inaccurate diagnoses, leading to inappropriate treatments and worsened health conditions. Furthermore, the lack of detailed information on ENT conditions impedes the allocation of resources and planning for ENT care at the Ho Teaching Hospital. Without reliable data, it is difficult for healthcare administrators to assess the true burden of ENT disorders and allocate resources effectively, thus exacerbating the challenges already present in managing these conditions (Badu et al., 2019). Lufunda et al. (2023) emphasized that the absence of comprehensive patient data significantly impacts the quality of care, leading to suboptimal health outcomes. This, in turn, can lower patient satisfaction, reduce quality of life, and ultimately affect the healthcare system's efficiency and performance.

Moreover, this knowledge gap prevents the hospital from fully addressing the public health challenges posed by ENT disorders in the Volta Region. As ENT conditions are closely linked to environmental, lifestyle, and socioeconomic factors (Ogunleye et al., 2020), understanding these factors within the local context is critical to improving patient care. Without this understanding, healthcare providers may continue to face difficulties in diagnosing and managing ENT conditions, especially in more vulnerable populations.

In summary, the lack of comprehensive data on ENT conditions at the Ho Teaching Hospital has significant implications for both patient care and healthcare planning. This study seeks to evaluate the prevalence, characteristics, and medical treatment modalities of various Ear, Nose, and Throat (ENT) conditions presenting at specialized clinic of the Ho Teaching Hospital over the past 4 years to improve diagnosis, treatment, and patient outcomes.

1.3 Rationale of the study

The assessment of Ear, Nose, and Throat disorders is essential for delivering effective healthcare and enhancing patient outcomes. In Ghana, especially within the Volta region, ENT disorders frequently contribute to morbidity and mortality (Acheampong et al., 2020), placing a considerable strain on the healthcare system. Nevertheless, there is a notable deficiency in comprehensive data regarding the prevalence, characteristics, and management outcomes of ENT disorders both in the Volta region and across the nation.

This study is justified for multiple compelling reasons. Firstly, there is a significant lack of research focusing on ENT disorders in the Volta Region of Ghana, particularly within the framework of a teaching hospital, highlighting the need for context-specific studies.

Additionally, ENT disorders are prevalent in Ghana, necessitating accurate data to inform healthcare policies and resource distribution. The impact of ENT disorders on patients' quality of life is substantial, and improved management strategies can lead to reduced morbidity and mortality rates. Furthermore, this research will contribute to the development of expertise in

ENT care at the Ho Teaching Hospital, enhancing research capabilities and informing evidence-based practice. Ultimately, the study's outcomes will guide healthcare policy, resource distribution, and quality improvement of ENT services in the hospital, addressing existing gaps and contributing to better patient outcomes and reduced healthcare burden. By conducting this study, we aim to address these gaps and improve ENT care in the Volta region and Ghana.

1.4 Conceptual Framework

This study employs the epidemiological triad model and the Donabedian structure–process–outcome model (De Rosis, 2024; John & Kompithra, 2023). These models further describe how host, agent, and environmental factors interact to determine the incidence, management, and outcomes of ear, nose, and throat (ENT) conditions. Individual susceptibility and healthseeking behaviour are influenced by host factors such as age, sex, pregnancy status, and occupation. Agent factors pertain to ENT problems within their specific classifications, otitis media, sinusitis, tonsillitis, allergic rhinitis, and hearing loss and to how they vary in cause and severity. Environmental issues concern hygiene, access to healthcare, and availability of diagnostic instruments and medicines, which influence the assessment and management of the disease (Haile et al., 2021; WHO, 2021; Yang et al., 2025).

The framework also incorporates Donabedian's model, connecting the structure of care, clinical management processes, and outcomes (De Rosis, 2024). Within a hospital, structural concerns include the availability of ENT physicians, medical equipment, and drugs. The method provides everything that is done to you, including medical and surgical interventions such as antibiotics, myringotomy, tonsillectomy, and counselling or follow-up. These processes are expected to influence outcomes, including recovery, complications, recurrence, and mortality. This synthesis of both models provides insights into how demographic variables and components of service delivery influence disease profiles and treatment response (John & Kompithra, 2023).

This framework is appropriate in the Volta Region, where ENT diseases are not yet well studied, despite their high burden and contribution to morbidity and hearing loss. The limited access to ENT services in Ghana and other low- and middle-income countries, combined with the delayed presentation, results in preventable and sometimes fatal complications (Sefah et al., 2025). The study also provides a fundamental framework to analyse the link between the characteristics of the patient, disease types, and hospital procedures when applying this conceptual framework to identify the key areas where quality can be improved in ENT services (Guo et al., 2024; Haile et al., 2021; WHO, 2021).

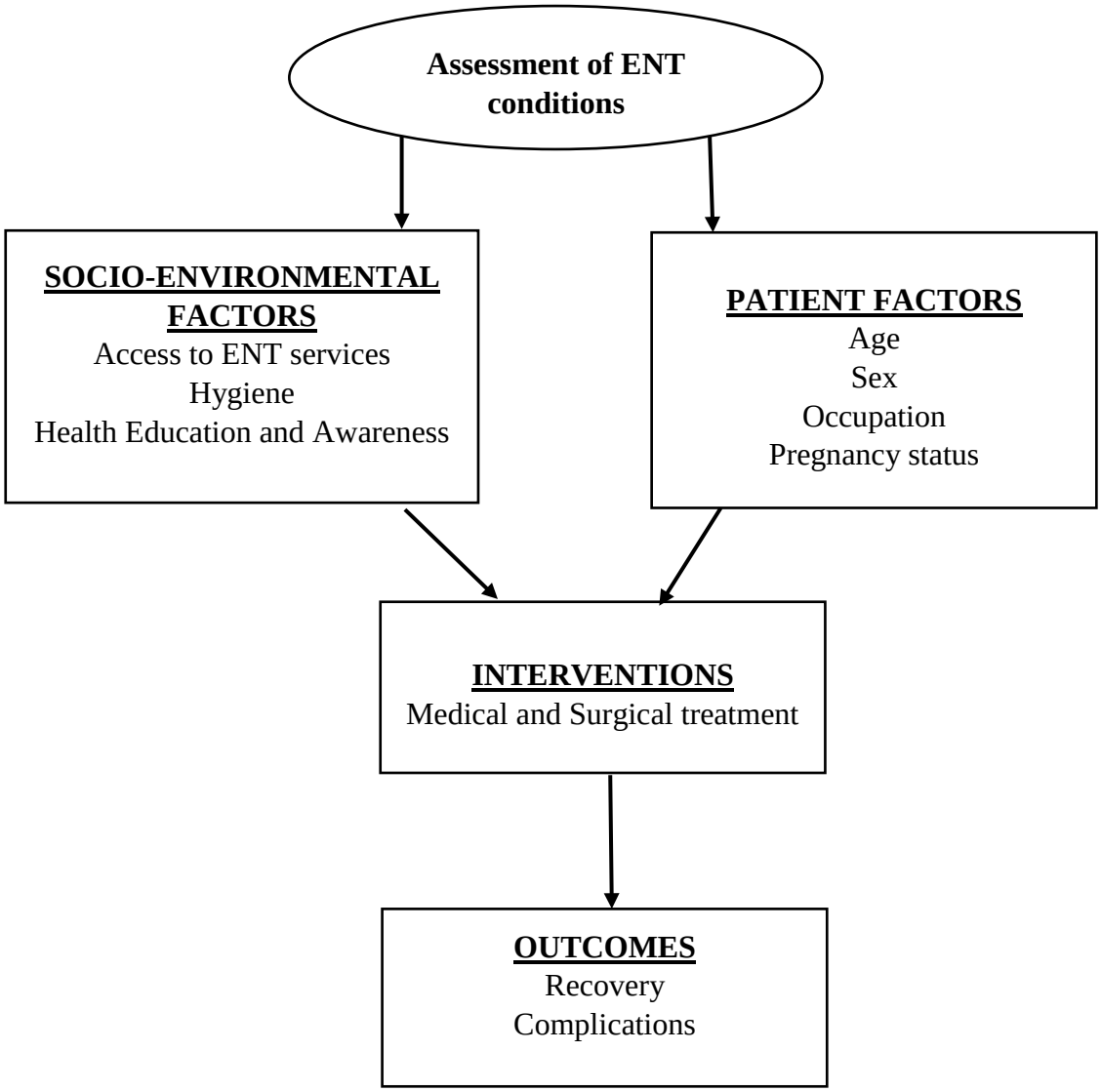

Figure 1. 1: Conceptual framework guiding assessment of conditions of ENT conditions presenting at the clinic, patient factors and interventions.

1.5 Research Questions

1. What are the socio-demographic characteristics of patients who attend the ENT clinic at Ho Teaching Hospital?
2. What are the common ENT disease conditions, their presentation patterns, and severity levels among patients at Ho Teaching Hospital?

3. How are patients' socio-demographic characteristics associated with the type, presentation pattern, and severity of ENT conditions at Ho Teaching Hospital?
4. What medical treatment modalities are provided to patients at the ENT unit of Ho Teaching Hospital?

1.6 General Objective

To conduct a retrospective review of Ear, Nose, and Throat conditions presenting at specialized clinic of the Ho Teaching Hospital over the past 4 years (2021-2024).

1.7 Specific Objectives

1. To assess the socio-demographic characteristics of patients presenting at the ENT clinic.
2. To describe the ENT disease conditions, their presentation patterns, and severity levels among patients at Ho Teaching Hospital?
3. To examine the association between patients' socio-demographic characteristics (age, gender and pregnancy status) and the type, presentation pattern, and severity of ENT conditions diagnosed at Ho Teaching Hospital.
4. To examine the medical treatment modality and care given at the ENT unit of Ho Teaching Hospital.

1.8 Profile of the Study Area

The study was conducted at the Ear, Nose, and Throat (ENT) Unit of Ho Teaching Hospital (HTH), located in the Ho Municipality of the Volta Region, Ghana. The profile of the study site is described into detail within Chapter three on page 37.

1.9 Scope of the Study

This study retrospectively analyzes ENT disorders diagnosed and treated at Ho Teaching Hospital from January 2021 to December 2024. It focuses on the prevalence, types, presentation patterns, and treatment modalities of ENT conditions among patients of all ages and genders. Additionally, the study explores associations between patient factors (age, gender and pregnancy status), disease characteristics and the severity levels. The analysis is limited to data recorded within the hospital's ENT department and excludes follow-up care outside the facility.

1.10 Organization of the study

The study is organized into six chapters. Chapter One introduces the study by presenting the background, problem statement, research objectives, research questions, significance, scope, conceptual framework and organization of the work. Chapter Two reviews relevant literature on Ear, Nose, and Throat (ENT) conditions, focusing on their prevalence, clinical presentations, severity levels, and medical treatment modalities. Chapter Three details the research methodology, including the study design, setting, population, data sources, sampling procedures, and statistical analysis techniques. Chapter Four presents the results using descriptive and inferential statistics, highlighting socio-demographic characteristics (age, gender and pregnancy status), disease types, presentation patterns, severity levels, and medical treatment modalities. Chapter Five discusses the findings in relation to existing literature and interprets the results based on the study objectives. Chapter Six concludes the study and provides recommendations for clinical practice, health policy, and future research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The section reviews scholarly articles pertaining to ear, nose, and throat disorders. The reviewed literature in this chapter will help develop a theoretical foundation that will help solve the questions of this study and goals described in the first section of this research. Literature searches were done in Google Scholar, PubMed, and BMC. The keywords used for the search included "ENT Conditions" combined with "Prevalence," "Socio-demographic and Clinical Characteristics," and "Medical Treatment Modalities." Studies used for the literature review were those published between the years of 2015 and 2025.

2.2 Literature Review

2.2.1 Overview of ENT Conditions

Otorhinolaryngology (ENT) is a medical speciality that addresses the diagnosis and treatment of disorders affecting the ear, nose, and throat (O'Handley et al., 2020). The World Health Organization recognizes ENT disorders as significant contributors to global morbidity (N. Ta, 2019). The evolving landscape of ENT medicine underscores the importance of understanding both common pathological conditions and the interdisciplinary approaches required for effective management (Srinivasan & Raja, 2024).

Ear-related disorders include otitis media, hearing loss, and impacted cerumen. Otitis media, particularly chronic suppurative otitis media (CSOM), has been identified as a leading cause of preventable hearing loss in children globally (Desalew et al., 2020). Impaction of cerumen, often observed with aging or certain health conditions, frequently results in hearing impairment, exacerbating social and academic difficulties (Alan, 2023). Furthermore, studies highlight the

detrimental effects of untreated ear infections on both auditory function and quality of life (Alenezi et al., 2017; Mansour et al., 2023).

According to Babar et al. (2023) nasal disorders include rhinitis, sinusitis, and epistaxis, which can significantly impact both health and lifestyle. Rhinitis, both allergic and non-allergic, affects a substantial portion of the population, leading to chronic nasal obstruction and other respiratory complications (source). Sinusitis, encompassing both acute and chronic forms, often complicates rhinitis and is a common reason for ambulatory care visits (Babar et al., 2023).

Conditions of the throat, such as tonsillitis, pharyngitis, and laryngitis, are prevalent, particularly in paediatric populations (source). Tonsillitis, often infectious, can lead to repeated or chronic episodes, resulting in surgical intervention like tonsillectomy (Rajput et al., 2020). Pharyngitis and laryngitis, typically viral in origin, present unique challenges in differential diagnosis and management, contributing to significant morbidity through associated symptoms such as sore throat and voice changes (Lim et al., 2020).

2.2.2 Common Causes and Risk Factors

One of the prevalent causes of ENT disorders is upper respiratory infections, particularly common in children (Macdonald et al., 2022). Acute otitis media (AOM) is a frequent sequela of these infections, observed in populations globally, and presents significant morbidity potential among children (Mors et al., 2020). In a study conducted by Gupta et al. (2023), chronic otitis media was identified as the leading ear disorder, demonstrating notable prevalence in rural high-altitude settings, which underscores how environmental factors can exacerbate ENT issues. These findings align with reports indicating that disorders such as otitis media are often influenced by respiratory tract infections, with bacterial or viral pathogens playing a critical role in disease progression (Sonbol et al., 2022). Another significant contributor to ENT disorders is anatomical or functional abnormalities, such as a deviated septum or adenoid

hypertrophy, which can lead to obstructive symptoms (Bhat et al., 2018). Hayat and Soenandi (2024) revealed that various ENT disorders often stem from interrelated pathologies that compromise the overall function of the ear, nose, and throat systems. These conditions can result in recurrent infections and hearing loss, particularly in children (Hadid et al., 2021). Additionally, lifestyle and environmental factors significantly contribute to the prevalence of ENT disorders (Alenezi et al., 2024). Exposure to pollutants, allergens, and irritants can lead to rhinosinusitis and allergic rhinitis, which are common across different demographics (Alenezi et al., 2024). In high-incidence zones, behavioural aspects such as earcleaning practices can lead to complications such as foreign bodies lodged in the ear or nose, primarily observed in children (Agrawal & Velankar, 2020). Dąbrowska-Bień et al. (2018) revealed that nasal obstruction caused by allergenic reactions is frequently reported among patients, further complicating the clinical picture.

Studies indicate that children are disproportionately affected by conditions like otitis media, while adults often present with more chronic conditions such as sinusitis and laryngeal disorders (Garg et al., 2022). Pregnancy has also been implicated in altering mucosal status, leading to increased susceptibility to ENT complaints due to hormonal changes (Jamwal et al., 2021). Moreover, socioeconomic status significantly affects access to healthcare resources, which shapes the presentation and management of ENT disorders. Populations in lower-income regions may exhibit higher rates of preventable ENT diseases due to inadequate healthcare access, emphasising the importance of targeted public health interventions (Lukama et al., 2023). Alenezi et al. (2024) found that lack of awareness regarding ENT hygiene can exacerbate common issues, impacting morbidity rates.

2.2.3 The Burden of ENT Conditions

The global burden of ear, nose, and throat disorders remains a significant public health challenge. According to the World Health Organization (2025), hearing loss emerges as the most prevalent ENT disability worldwide, affecting 1.5 billion people in 2021, with projections suggesting 2.5 billion cases by 2050. The WHO estimates 15% of adults globally experience disabling hearing loss, with higher rates in developing nations. Chronic otitis media affects 65330 million people annually, disproportionately impacting Southeast Asia, Africa, and the Western Pacific. (N. Ta, 2019; World Health Organization, 2025). In South India, chronic suppurative otitis media dominated middle ear disorders (62%), while presbycusis accounted for 44% of inner ear conditions (Kumari et al., 2016). The study further revealed that hearing disability from otitis media decreased 12% in South India over a decade, while presbycusis and otosclerosis rose 18%. Epistaxis (25.6%) and ear infections (23.4%) were most frequent in a 5-year Indian emergency department study (Raj et al., 2019).

In Africa, Hearing loss remains a significant public health concern across the African continent, currently affecting approximately 40 million individuals (WHO Africa, 2024). Without urgent and expanded preventive interventions, this number is projected to rise to 54 million by 2030 (WHO Africa, 2024). The burden of ear, nose, and throat conditions is particularly high among pediatric populations, especially in resource-constrained environments. A 2025 study conducted in Chad revealed that 25.1% of children were diagnosed with ENT-related illnesses, underscoring the high prevalence in such settings (Aa et al., 2025). The most frequently reported conditions include infections like nasopharyngitis, tonsillitis, and otitis. These infections, if recurrent or left untreated, often contribute to long-term complications such as hearing impairment (Aa et al., 2025).

A study by Macdonald et al. (2022) found that acute infections of the upper respiratory tract are particularly prevalent among infants and children, with recurrent ear infections being one of the

leading causes of morbidity in this population. Chronic otitis media, characterised by middle ear inflammation, was specifically noted as a predominant disorder in low- to middleincome countries, with a prevalence rate reported as high as 43.5% among patients visiting rural clinics (Gupta et al., 2023). Moreover, Olajide et al. (2018) observed that ENT infections pose a substantial public health challenge affecting these regions, exacerbated by limited access to healthcare resources. A study in Nigeria indicated the predominance of ear (62.7%), nose (23%), and throat diseases (9.6%) among a substantial cohort, underscoring regional healthcare disparities (Farhat et al., 2019). This phenomenon is paralleled by findings at Qassim University outpatient clinics, which noted that ENT infections significantly affect vital functions such as hearing, speech, and breathing across all age groups (Alhazmi et al., 2021).

ENT healthcare delivery in Africa is hampered by a critical shortage of trained specialists and infrastructural support. In Southern Africa, more than 56% of countries report having fewer than one ENT specialist per million people (Lukama et al., 2024; WHO Africa, 2024). This is in stark contrast to Europe, where the ratio stands at approximately 50 specialists per million people (Lukama et al., 2024). The broader Sub-Saharan region faces similarly concerning statistics, with an average of 1.2 million people relying on a single ENT surgeon and 0.8 million per audiologist (Mulwafu et al., 2017). Despite the growing need, minimal improvements have been made in workforce expansion since 2015. Furthermore, over 75% of African nations lack a sufficient number of audiologists and speech-language therapists, further impeding access to comprehensive ear and hearing care services (WHO Africa, 2024).

Lukama et al. (2024) revealed that ENT services across the continent are largely centralized in tertiary healthcare facilities, limiting their availability at the primary care level. This centralization presents substantial barriers to access, especially for rural and underserved populations. Moreover, 35% of African countries do not allocate dedicated budgets for ear and hearing care (EHC), leaving many patients to shoulder the full cost of treatment (WHO Africa,

2024). The lack of basic diagnostic equipment and the underutilization of telehealth technologies further exacerbate the situation, restricting effective screening, diagnosis, and rehabilitation services (Lukama et al., 2024).

2.2.3.1 ENT conditions in Ghana

The prevalence of ENT disorders is an escalating concern in Ghana, impacting the healthcare system significantly. A retrospective study by Adjeso et al. (2022) indicated that emergency ENT admissions showed a high prevalence of conditions like foreign body ingestion and maxillofacial injuries, emphasising the unique challenges faced by the ENT departments in hospitals, particularly in Northern Ghana. This is consistent with findings from a study that highlighted the pattern of foreign body aspiration among paediatric patients, which remains a leading cause of morbidity in ENT practice (Theophilus Adjeso et al., 2017). The study by Zeeshan et al. (2018) reported that among the various ENT conditions seen, allergic rhinitis is particularly common, causing considerable impairment in quality of life for affected individuals. This condition is notable for reducing productivity and sleep quality among patients, indicating both societal and public health implications. Chronic conditions such as tonsillitis and pharyngitis also frequently present at ENT clinics, further contributing to the burden of disease in this speciality (Prasetyo & Utami, 2023).

Report by Agyemang and Opoku (2025) from Adankwame Health Centre demonstrate high community awareness of ENT needs but critical service gaps. This reflects systemic issues across Sub-Saharan Africa, where ENT specialist ratios reach 1:1.2 million population (Lukama et al., 2024). Ghana's Volta Region likely faces similar workforce shortages and equipment deficiencies as documented in Southern Africa (Lukama et al., 2024). However, Agyemang and Opoku (2025) specifically advocates for community-based ENT clinics to reduce referral burdens, a model applicable to Ho Teaching Hospital's catchment area. Adjeso et al. (2023) further illustrated the importance of addressing the professional development of medical

students, suggesting that increasing interest in the ENT speciality could yield a future generation of practitioners better equipped to handle these disorders. Incorporating ENT training in medical education can enhance the quality of care provided, thereby addressing the current and future burden of ENT diseases in Ghana.

2.2.4 General Socio-demographic Characteristics of Patients Presenting with ENT Conditions

Globally, ENT conditions affect individuals across all age groups, with significant sociodemographic variations in their prevalence. Studies show that younger children and older adults are more susceptible to ENT disorders due to weaker immune systems and anatomical predispositions (Yojana et al., 2012). Yojana et al. (2012) found that pediatric patients tend to present with otitis media, while the elderly population is more likely to present with presbycusis and chronic sinusitis. A cross-sectional study in the United States revealed that gender can also influence the presentation of ENT conditions, with males often presenting with more severe cases of laryngeal diseases, while females tend to experience more chronic and recurrent conditions, such as sinusitis (Gordon et al., 2020). A study by Uğur and Yüksel (2023) revealed how the presentation of otolaryngological conditions often varies significantly across different age groups, with children frequently presenting with infections such as acute otitis media, and adults showing a higher incidence of chronic rhinosinusitis and allergies. In the pediatric demographic, ear infections are predominant, which aligns with findings from Surapaneni and Sisodia, (2016), who noted that most pediatric consultations in emergency services were primarily due to upper respiratory infections and ENT disorders. In terms of gender, Kwaśniewska et al. (2023) observe the emerging role of sex hormones, particularly estrogen, in mediating inflammatory responses, which could explain observed gender differences in the prevalence of ENT disorders such as rhinitis and otitis media. Notably, Gupta and Gupta (2019) also examined how male and female patients present different patterns of ENT disorders, suggesting that different biological factors contribute to varying susceptibility and disease

severity.

The influence of socioeconomic factors on the occurrence of ENT diseases is also widely documented. For instance, individuals from lower socioeconomic backgrounds often experience delayed diagnosis and treatment of ENT conditions due to limited access to healthcare services (Ogunleye et al., 2020). Similarly, exposure to environmental risk factors, such as pollution and tobacco smoke, has been linked to an increase in ENT disorders in both urban and rural populations, as evidenced by several epidemiological studies (Dhingra and Dhingra, 2014). These socio-demographic variations are critical to understanding the global prevalence of ENT conditions and determining tailored public health interventions to address these issues.

In Africa, the prevalence and socio-demographic characteristics of ENT conditions are significantly influenced by poverty, limited access to healthcare, and environmental risk factors. According to a study conducted by Ogunleye et al. (2020), ENT conditions are more common in children and adults living in rural and peri-urban areas, where access to healthcare services is limited. These areas often lack specialized ENT care, resulting in late presentations and a higher prevalence of severe ENT disorders compared to urban centers. Additionally, gender differences in the presentation of ENT conditions are also observed in Africa. A study by Olusola et al. (2022) in West Africa revealed that men are more likely to present with occupational-related ENT conditions, such as hearing loss due to noise exposure, while women are more susceptible to chronic rhinitis and sinusitis due to indoor air pollution caused by biomass fuel.

The role of environmental factors in the occurrence of ENT conditions is also evident in Africa. For instance, in regions where dust storms are frequent, conditions such as allergic rhinitis and asthma are more prevalent (Amedofu, 2019). Additionally, the high rates of infection-related

ENT disorders, such as otitis media and tonsillitis, are largely attributed to poor sanitation and overcrowding in low-income communities (Datonye et al., 2022). These socio-demographic factors are crucial in shaping the burden of ENT diseases in Africa.

In Ghana, the prevalence of ENT conditions is influenced by a range of socio-demographic factors, including age, gender, and socioeconomic status. A study by Dzodzomenyo et al. (2021) in the Volta Region reported that children under the age of 10 and adults over 50 were the most affected by ENT conditions, with otitis media and presbycusis being the most common diagnoses, respectively. Gender differences were also observed, with males presenting more frequently with occupational-related ENT conditions, such as noise-induced hearing loss, while females were more likely to suffer from allergic rhinitis and chronic sinusitis due to environmental factors such as indoor air pollution.

2.2.5 General Severity Levels and Presentation Patterns of Patients Presenting with ENT Conditions

On a global scale, the severity of ENT conditions varies depending on the type of condition and geographical region. Developed countries with advanced healthcare systems report milder and more manageable cases due to timely access to medical care. In contrast, patients in developing nations often present with more severe cases due to delayed diagnosis and a lack of specialized ENT services (World Health Organization, 2021). A study by Hayois and Dunsmore (2023) emphasized that the presentation patterns of ENT conditions often depend on environmental factors. In highly industrialized areas, air pollution is a major contributing factor to chronic sinusitis, while rural areas, particularly in tropical climates, report higher cases of fungal infections like otomycosis. Understanding these presentation patterns is key to the development of context-specific management guidelines for ENT disorders.

The severity of ENT conditions in Africa is often exacerbated by late presentations and a lack of specialized care. A study conducted in Nigeria by Ogunleye et al. (2020) reported that up to

40% of ENT conditions presented at tertiary care hospitals were at advanced stages, requiring complex medical and surgical interventions. Additionally, patients with chronic ENT conditions, such as chronic suppurative otitis media (CSOM), often present severe complications, including hearing loss and mastoiditis, due to delayed treatment (Datonye et al., 2022).

The presentation patterns of ENT conditions in Africa also differ from global trends. In rural Zambia, Amedofu (2019) observed that otomycosis and other fungal infections are more prevalent due to the hot and humid climate, which promotes fungal growth. Similarly, in Northern Ghana, Adjeso et al. (2022) reported a higher incidence of epistaxis (nosebleeds) during the Harmattan season, a period characterized by dry and dusty winds. Understanding these patterns is essential for developing targeted interventions that address the unique challenges faced by ENT healthcare providers in Africa.

The severity of ENT conditions in Ghana often reflects the challenges faced by the healthcare system, including limited access to specialized care and a lack of diagnostic facilities. A study by Kitcher et al. (2007) at the Korle Bu Teaching Hospital in Accra found that many patients present with advanced-stage ENT conditions, requiring complex surgical interventions. For instance, patients with chronic suppurative otitis media (CSOM) often present with severe hearing loss, requiring tympanoplasty or mastoidectomy to prevent further complications.

Presentation patterns of ENT conditions in Ghana are also influenced by environmental factors. During the Harmattan season, which is characterized by dry and dusty winds, there is a significant increase in cases of allergic rhinitis and sinusitis (Kitcher et al., 2007). Additionally, regions with high levels of pollution and poor sanitation, such as the Greater Accra Region, report higher incidences of infection-related ENT conditions, including tonsillitis.

2.2.6 Association between Socio-Demographic Factors and ENT Conditions

Research consistently indicates a correlation between age and the prevalence of ENT disorders. Gupta et al. (2023) revealed that individuals aged 10-30 presented the most common ENT problems, notably ear-related issues. Furthermore, Kwaśniewska et al. (2023) reported that otolaryngological symptoms, particularly those linked to COVID-19, are more prevalent in the 18-30 age group, which corroborates findings regarding the demographic distribution of ENT manifestations. Furthermore, while literature indicates variances in misdiagnosis rates across age groups, some studies, such as that of Lukama et al. (2023) have suggested older patients may experience higher rates of misdiagnosis. However, conflicting evidence exists, as some research indicates higher misdiagnosis rates in younger populations (Lukama et al., 2023). This inconsistency may stem from varying symptomatology and clinician familiarity with agespecific presentations of ENT conditions.

Gender differences play a crucial role in the presentation and severity of ENT disorders. Ali et al. found that women constituted the majority of participants in studies assessing ENT symptoms, which may relate to their higher health awareness and responsible health-seeking behaviour (Ali et al., 2025). Studies have also documented that women are more likely to experience ENT manifestations of viral infections like COVID-19 (Kwaśniewska et al., 2023). Additionally, research indicates that women may report symptoms differently, reflecting disparities in healthcare utilization (Ali et al., 2025; Jaradeh et al., 2023). Moreover, investigations of ENT conditions among refugees highlighted that both gender and socioeconomic factors influenced the likelihood of multiple ENT diagnoses. Jaradeh et al. (2023) demonstrated that refugees are more likely to have multiple ENT diagnoses compared to USborn patients, with unmet healthcare needs compounding these issues. Thus, gender appears to intersect with socio-economic status, further complicating the landscape of ENT health presentations.

Pregnancy significantly impacts the presentation of various medical conditions, including those related to ENT (Suri et al., 2016; Swain & Pattnaik, 2021). While specific studies linking pregnancy status directly to ENT conditions remain limited, it is established that hormonal and immunological changes during pregnancy can exacerbate or modify ENT symptoms (Yaghoubi et al., 2024). Such variations in health status during pregnancy, such as increased susceptibility to infections, could indeed result in heightened ENT-related issues, underscoring the need for maternal health strategies that encompass ENT care (Swain & Pattnaik, 2021;
Yaghoubi et al., 2024).

2.2.7 General Medical Treatment Modalities for ENT Conditions

In terms of treatment, global trends indicate that ENT conditions are managed through a combination of medical and surgical interventions. A study conducted in India revealed that surgical interventions, such as tonsillectomies and myringotomies, are commonly performed for recurrent tonsillitis and otitis media, respectively (Dhingra and Dhingra, 2014). Additionally, non-invasive treatments such as corticosteroids and antibiotics are standard for managing chronic sinusitis and otitis externa. However, the use of these medications must be monitored due to the risk of developing antibiotic resistance, a growing global health concern (Gordon et al., 2020).

Health education and follow-up care are also critical components of ENT treatment globally. Patient education on avoiding allergens and environmental pollutants is essential in reducing recurrence rates of conditions like allergic rhinitis and chronic sinusitis (Amedofu, 2019). Furthermore, proper follow-up care ensures early detection of potential complications and promotes patient adherence to prescribed treatment protocols (Setia, 2016).

Treatment modalities for ENT conditions in Africa are often constrained by limited resources and a shortage of trained specialists. In many rural areas, ENT care is provided by general practitioners or clinical officers, who may lack specialized training in diagnosing and managing

complex ENT conditions (Badu et al., 2019). As a result, patients often receive suboptimal care, leading to prolonged suffering and, in some cases, irreversible complications. A study by Lufunda Lukama et al. (2023) in sub-Saharan Africa highlighted the impact of data scarcity on healthcare delivery, with many healthcare providers relying on outdated treatment protocols due to the lack of local research and guidelines.

Despite these challenges, efforts are being made to improve ENT care in Africa. Surgical interventions, such as tympanoplasties and tonsillectomies, are increasingly being performed in tertiary care centers across the continent. Additionally, health education campaigns aimed at raising awareness about the prevention and early treatment of ENT conditions are being implemented in several countries, including Ghana and Nigeria (Ogunleye et al., 2020). These initiatives are critical in reducing the burden of ENT diseases in Africa and improving patient outcomes.

In Ghana, the treatment modalities for ENT conditions are often determined by the availability of healthcare resources. Kitcher et al. (2007) reported that the majority of ENT conditions at Korle Bu Teaching Hospital required surgical intervention, particularly for chronic conditions like CSOM and tonsillitis. However, the availability of such interventions was limited, especially in rural areas.

At the Ho Teaching Hospital, ENT care has been characterised by a reliance on both medical and surgical treatments. However, Dzodzomenyo et al. (2021) note that the lack of diagnostic tools and specialist care often limits the effectiveness of treatment, leading to higher rates of chronic complications. Moreover, the lack of follow-up care and patient education contributes to the recurrence of many ENT conditions.

2.3 Summary

The literature review explored the socio-demographic characteristics, severity levels, presentation patterns, and medical treatment modalities of ENT conditions globally, with a focus on Africa and Ghana. It highlighted that ENT conditions affect all age groups but are more prevalent among young children and older adults due to anatomical and immune factors. Socio-demographic factors such as age, gender and pregnancy status play a significant role in the occurrence and severity of ENT diseases. Globally, males tend to present with more severe ENT conditions, while females experience more chronic conditions like sinusitis. In Africa, ENT conditions are often more severe due to delayed access to healthcare and environmental factors like air pollution and indoor smoke from biomass fuel. Rural and peri-urban populations are particularly vulnerable, presenting with more advanced stages of ENT diseases. Gender differences are also evident, with men experiencing occupation-related conditions like noiseinduced hearing loss and women being more susceptible to rhinitis and sinusitis. In Ghana, studies indicate that children and older adults are the most affected by ENT conditions. During the Harmattan season, there is an increase in conditions such as allergic rhinitis and sinusitis. Factors such as poor sanitation and limited access to specialized care contribute to the high prevalence and severity of ENT disorders in certain regions of the country.

The association between patients' sociodemographic characteristics (age, gender, and pregnancy status) and the type, presentation pattern, and severity of ENT conditions was also examined, emphasizing how demographic factors influence disease manifestation. Treatment modalities for ENT conditions worldwide include both medical and surgical interventions, with surgeries like tonsillectomies and tympanoplasties being common for severe cases. In Africa, limited resources and specialized personnel affect the quality of care, leading to more complex cases requiring advanced interventions.

In Ghana, hospitals such as the Korle Bu Teaching Hospital rely on surgical interventions for chronic ENT conditions, but access to care remains a challenge, particularly in rural areas. Health education and follow-up care are emphasized as essential to improving patient outcomes.

CHAPTER THREE

METHODOLOGY

3.1 Study Design

A quantitative retrospective cross-sectional survey was used for this study. Quantitative research design gathers a range of numeric data (University of Texas Arlington, 2023). A crosssectional study also observes participants only once, offering a 'snapshot' of the characteristics of interest at that particular moment (Setia, 2016). Using a retrospective cross-sectional design, this study aimed to evaluate socio-demographic characteristics, severity levels, treatment modality and outcomes of patients presenting at the ENT clinic of the Ho Teaching Hospital.

3.2 Study Site

The study was conducted at the ENT Clinic of Ho Teaching Hospital in the Ho Municipality. According to the 2021 Population and Housing Census, the municipality has a population of about 187,281, representing 8.4 percent of the region's total population, with about 62 percent living in urban areas (Ghana Statistical Service, 2021). Ho Teaching Hospital is the fifth public teaching hospital in Ghana, established after completing a rigorous accreditation process by the Health Professional Regulatory Bodies and the Health Facilities Regulatory Authority. The municipality lies between latitudes 6°20′N and 6°55′N, and longitudes 0°12′E and 0°53′E. The hospital is located along the Ho–Denu/Aflao highway and occupies an approximate land area of 3,325 square metres (Ghana Statistical Service, 2021).

The Ho Teaching Hospital is a 320-bed capacity hospital serving as a referral healthcare facility and has a staff strength of six hundred and fifty (650). It is strategically located to provide specialized health care services to the people of the Volta Region and beyond. The Hospital

has a total of 650 health workers. Out of this number, 31 are medical doctors, 7 physician assistant anaesthetists, 2 physician assistant medical herbalists, 2 physician assistant medical staff, 271 paramedics, 76 are casual staff and 10 health aides. The number of nurses is 262, comprising midwives, mental health nurses, community health nurses and general nurses. The facility provides services such as OPD (Outpatient Department), antenatal and postnatal, emergency, obstetric, medical and surgical, paediatric, laboratory, pharmaceutical, antiretroviral therapy, counselling, psychiatric, herbal medicine, family planning, diabetes clinic and orthopaedic, dental and eye, ear, nose and throat (ENT) services including primary healthcare services. The weekly average OPD (Outpatient Department) attendance is about 800 to 950 clients.

The ENT Clinic at the Ho Teaching Hospital is well-equipped to provide comprehensive ear, nose, and throat care, boasting modern facilities and advanced diagnostic tools. Examination rooms are furnished with standard ENT diagnostic equipment, including otoscopes and endoscopes, enabling thorough patient assessments. Procedure rooms are also available for minor surgeries and interventions, ensuring timely and efficient treatment. Additionally, the clinic features specialized audiometry and hearing testing equipment to accurately diagnose and manage hearing-related disorders. Streamlined patient registration and record-keeping systems further enhance the clinic's efficiency, ensuring seamless and organized care.

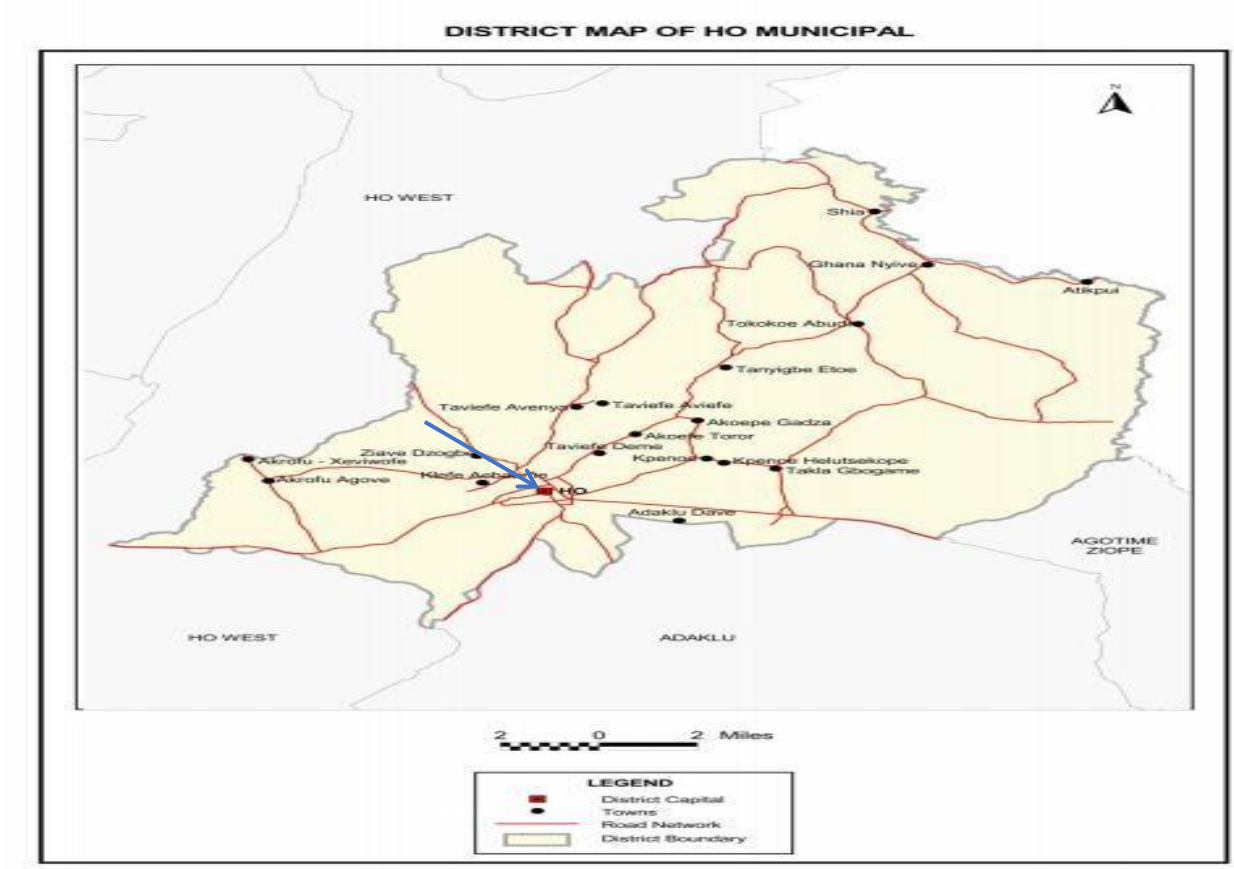

Figure 3. 1: District map of Ho Municipal (Ghana Statistical Service 2021).

Figure 3. 2: Google map of Ho Teaching Hospital

Source: Map data (2025)

3.3 Study Population

The study population for this work involved all patients who presented at the ENT clinic of the Ho Teaching Hospital with ear, nose, and throat conditions during the period from January 2021 to December 2024.

3.4 Inclusion/Exclusion Criteria

Inclusion Criteria:

1. All patients who presented at the ENT clinic of Ho Teaching Hospital with ear, nose, and throat conditions during the period from January 2021 to December 2024.
2. Patients with confirmed diagnosis of an ear, nose, or throat condition.
3. Patients with complete medical records, including demographic information, medical history, diagnosis, and medical treatment.
4. Patients who received treatment or management for their ENT condition at the clinic.

Exclusion Criteria:

1. Patients with incomplete or missing medical records.
2. Patients who did not receive treatment or management for their ENT condition at the clinic.
3. Patients with a diagnosis of a condition that is not ENT.

3.5 Sample Size

For this retrospective study, sample size calculation was not applied. All patients presenting during the time period under study were considered.

3.6 Data Collection Procedure and Instruments

Data for this study were collected through a retrospective review of medical records of patients who attended the ENT clinic at Ho Teaching Hospital from January 2021 to December 2024.

Patient information was retrieved from the Lightwave Health Information Management System (LHIMS). Relevant variables such as age, gender, pregnancy status, and medical treatment data were extracted. ENT conditions were classified by presentation pattern as infectious, benign, and malignant based on the underlying cause and clinical features. Severity was grouped as mild, moderate, or severe based on clinician documentation, patient presenting symptoms, and the level of treatment required. The study focused exclusively on medical treatment modalities because the LHIMS lacked consistent documentation on surgical or procedural interventions.

3.6.1 Quality Control Measures

All extracted data were thoroughly reviewed and cleaned to identify and resolve missing values, duplicates, and inconsistent entries.

3.7 Data handling

After ensuring that the data was collected consistently and accurately. It was entered into Excel, a secure, password-protected laptop to prevent unauthorized access. The data was cleaned to identify and correct errors, inconsistencies, and missing values. Data validation was performed by cross-checking with original sources to ensure accuracy. After cleaning and validation, data was stored on a secure laptop.

3.8 Statistical analysis

SPSS version 25 was used to analyse the data. Descriptive statistics, including frequencies and percentages, were used to summarize socio-demographic characteristics (age, gender and pregnancy status), disease types, severity levels, presentation patterns, and medical treatment modalities of ENT patients. Bivariate analyses were performed using the Chi-square test to assess associations between key independent variables such as age, gender, and pregnancy status and categorical outcomes such as disease type, presentation pattern, and severity. To control for confounding factors and determine independent predictors of disease outcomes,

multivariate logistic regression was used. Adjusted odds ratios (OR) with corresponding 95% confidence intervals (CI) and p-values were reported. Statistical significance was set at $p < 0.05$ for all inferential tests.

3.9 Ethical Consideration

For ethics in research, ethical clearance was sought from the Institutional Review Board of the Ensign Global University and ethical approval was sought from the Ho Teaching Hospital. Confidentiality and anonymity of the data were ensured.

3.10 Limitations of Study

1. The findings were specific to the Ho Teaching Hospital and may not be representative of ENT conditions and healthcare patterns in other regions of Ghana or beyond. Differences in healthcare access, patient demographics, and disease prevalence could vary across settings.
2. The quality and completeness of patient records varied depending on the healthcare provider attendance. Inconsistent recording of symptoms, diagnoses, and treatment plans could introduce bias into the study findings.
3. Since the study is retrospective, it does not track patients over time to evaluate disease progression or long-term treatment outcomes. This limits the ability to assess the effectiveness of different treatment modalities over time.
4. The health information records system lacks information on grouping cases based on mild and severity of patient conditions and hence, classification was based on the clinician documentation, patient presenting symptoms, and the level of treatment required.
5. The study focused only on medical treatment modalities because LHIMS did not capture surgical interventions, procedures, or non-pharmacologic treatments.

6. Medical protocols, diagnostic tools, and treatment approaches may have evolved over the study period (2021–2024), potentially influencing the consistency of data across different years.

3.11 Assumptions

1. It is assumed that patient records maintained within the LHIMS at the ENT unit are accurate, complete, and properly documented, thereby providing a reliable and standardized basis for retrospective data analysis.
2. The study assumes that healthcare professionals at the ENT clinic consistently applied standardized diagnostic criteria, as outlined in the ICD-10 classification system, for identifying and classifying ENT conditions throughout the study period.
3. It is assumed that the medical treatment modalities documented in the hospital records accurately reflect the actual interventions provided to patients during their ENT care.

CHAPTER FOUR

RESULTS

4.0 Introduction

This section presents the findings from the retrospective analysis of patients who attended the Ear, Nose, and Throat (ENT) unit at the Ho Teaching Hospital (HTH) from 2021 to 2024. The analysis focused on the sociodemographic characteristics, clinical presentations of diagnosis (disease conditions, presentation patterns and severity levels) among patients. Frequencies and percentages were computed to describe the distribution of variables such as age, gender and pregnancy status. Furthermore, bivariate and multivariate analyses were conducted to explore associations between selected demographic characteristics (age, gender and pregnancy status) and types of ENT infections, the presentation patterns and the severity levels. To control for confounding factors and determine independent predictors of disease outcomes, multivariate logistic regression was used.

4.1 Sociodemographic characteristics of patients who attended the ENT unit at HTH from 2021-2024

Table 4.1 presents the sociodemographic characteristics of patients who attended the ENT clinic at Ho Teaching Hospital (HTH) from 2021 to 2024, totaling 24,335 patients. The majority of patients were children aged 1–10 years with 7,041 (28.93%), followed by those aged 21–30 years with 3,832 (15.75%), and 31–40 years with 3,480 (14.30%). The least represented age groups were the 81–90 age group with 296 (1.22%), 91–100 years with 52 (0.21%), and those over 100 years with only 4 (0.02%). Females were the majority across all years, accounting for 14,065 (57.80%) of the total, while males comprised 10,270 (42.20%). Among the females, most were non-pregnant at the time of visit, with 13461 (95.71%), while only 604 (4.29%) were pregnant.

4.2 The clinical characteristics of conditions presented at the ENT unit of Ho Teaching Hospital, focusing on the type of disease conditions, patterns of presentation, and severity levels.

Figures 4.1, 4.2, and 4.3 present the disease characteristics of participants who attended the ENT clinic at Ho Teaching Hospital (HTH) from 2021 to 2024

4.2.1 Type of disease conditions

Ear conditions were the most common condition across all four years, although the proportion decreased from 3168 (66.08%) in 2021 to 2787 (38.71%) in 2024. Conversely, head and neck conditions (others) increased significantly from 875 (18.25%) in 2021 to 3068 (42.61%) in 2024. Nose conditions increased from 350 (7.30%) in 2021 to 1431 (21.57%) in 2023 before dropping to 441 (6.13%) in 2024. Throat conditions fluctuated over the years, with 401 (8.36%) cases in 2021, peaking at 904 (12.56%) in 2024 (Figure 4.1)

Table 4. 1: Sociodemographic Characteristics (Age, Gender and Pregnancy Status) of Participants from 2021-2024

Year	2021	2022	2023	2024	TOTAL
	N = 4794	N = 5707	N = 6634	N = 7200	N = 24335
Variable indicator	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Age group (years)					
1-10	1275(26.60)	1685(29.53)	1937(29.20)	2144(29.78)	7041(28.93)
11-20	661(13.79)	604(10.58)	886(13.36)	969(13.46)	3120(12.82)
21-30	858(17.90)	95116.66)	1041(15.69)	982(13.64)	3832(15.75)
31-40	660(13.77)	817(14.32)	911(13.73)	1092(15.17)	3480(14.30)
41-50	410(8.55)	522(9.15)	5768.68)	709(9.85)	2217(9.11)
51-60	372(7.76)	390(6.83)	4546.84)	484(6.72)	1700(6.99)
61-70	332(6.93)	426(7.46)	494(7.45)	459(6.38)	1711(7.03)
71-80	141(2.94)	222(3.89)	266(4.01)	253(3.51)	882(3.62)
81-90	71(1.48)	73(1.28)	52(0.78)	100(1.39)	296(1.22)
91-100	14(0.29)	13(0.23)	17(0.26)	8(0.11)	52(0.21)
>100	0(0.00)	4(0.07)	0(0.00)	0(0.00)	4(0.02)
Gender					
Female	2837(59.18)	3336(58.45)	3744(56.44)	4148(57.61)	14065(57.80)
Male	1957(40.82)	2371(41.55)	2890(43.56)	3052(42.39)	10270(42.20)
Pregnancy status	**(n=2837)**	**(n=3336)**	**(n=3744)**	**(n=4148)**	**14065**
Non-pregnant	2691(94.85)	3245(97.27)	3582(95.67)	3943(95.06)	13461(95.71)
Pregnant	146(5.15)	91(2.73)	162(4.33)	205(4.94)	604(4.29)

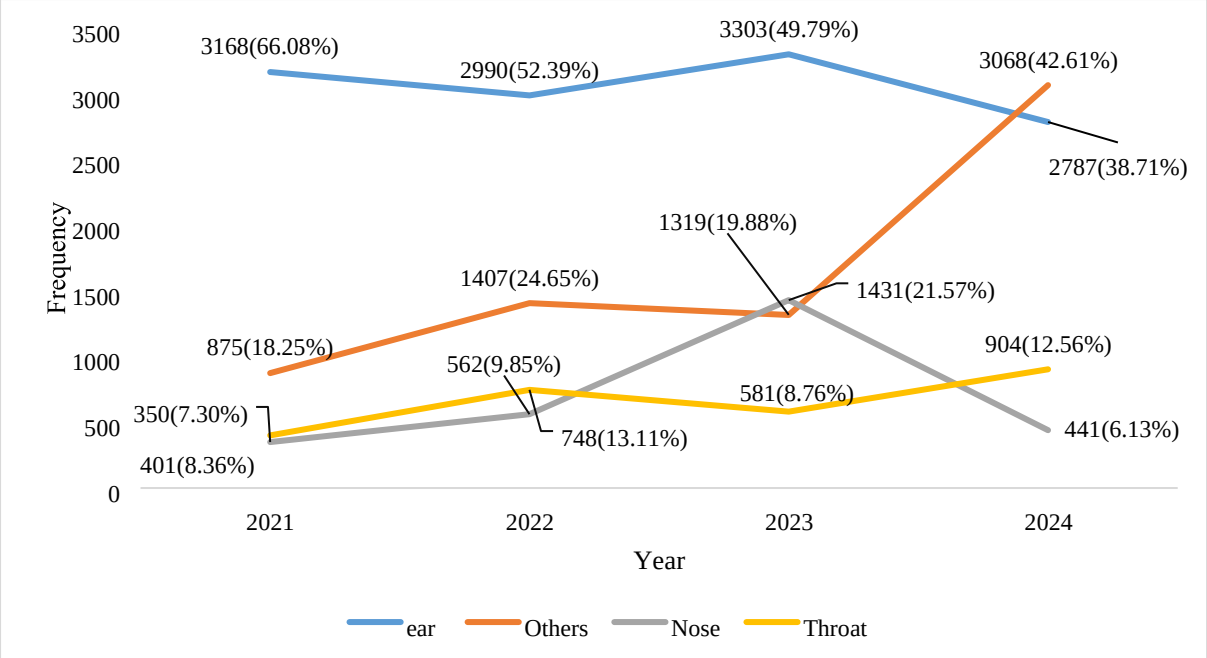

Figure 4. 1: Trend of the type of condition from 2021-2024. Others refer to head and neck cases.

4.2.2 Disease presentation

Infectious conditions were the most prevalent, with a significant increase from 2250 (46.93%) cases in 2021 to 5030 (75.82%) in 2023, followed by a decline to 2897 (40.24%) in 2024. Benign conditions decreased considerably, from 1664 (34.71%) cases in 2021 to 283 (4.27%) in 2023, before slightly increasing to 1232 (17.11%) in 2024. Malignant conditions remained rare across all four years, with only 5 (0.10%) cases recorded in 2021 and 3 (0.04%) cases recorded in 2024. Head and neck cases classified as others increased significantly, from 875 (18.25%) in 2021 to 3068 (42.61%) in 2024 (Figure 4.2).

4.2.3 Disease severity

Mild cases were the most common, with a significant increase from 2370 (49.44%) in 2021 to 5258 (79.26%) in 2023, followed by a decrease to 2734 (37.97%) in 2024. Moderate cases fluctuated, with a peak in 2022 at 2045 (35.83%) and a decline to 1396 (19.39%) in 2024.

Severe cases remained consistently low, with 8 (0.17%) cases in 2021 and only 2 (0.03%) cases recorded in 2024. Like other categories, head and neck cases with no severity classification (others) increased from 875 (18.25%) in 2021 to 3068 (42.61%) in 2024 (Figure 4.3).

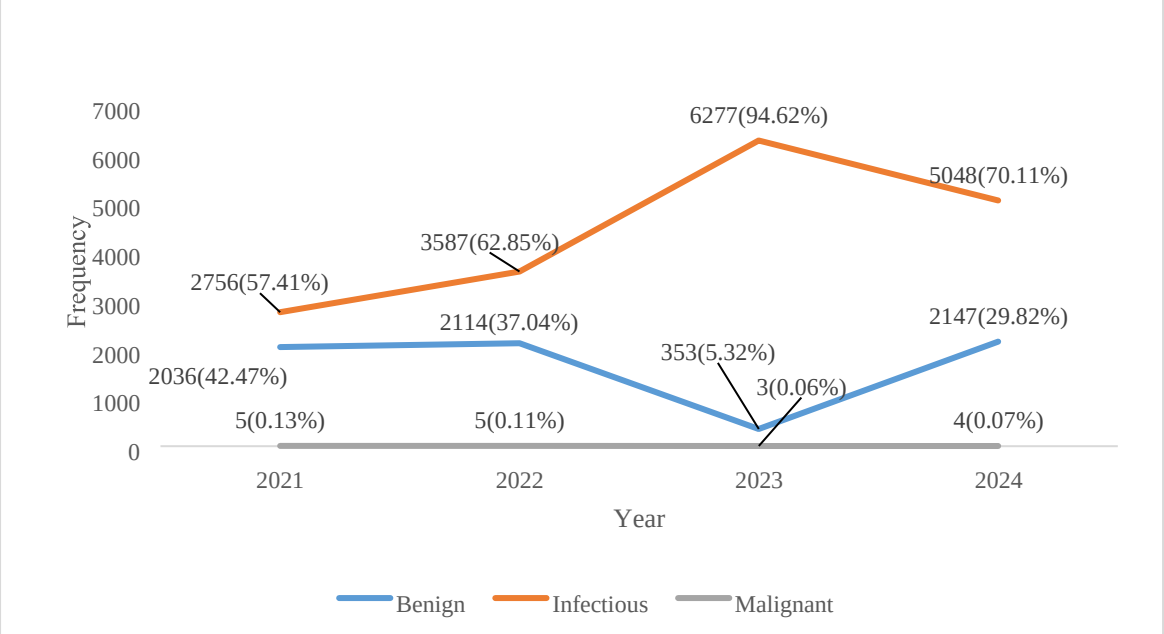

Figure 4. 2: Trend of the disease presentation from 2021-2024.

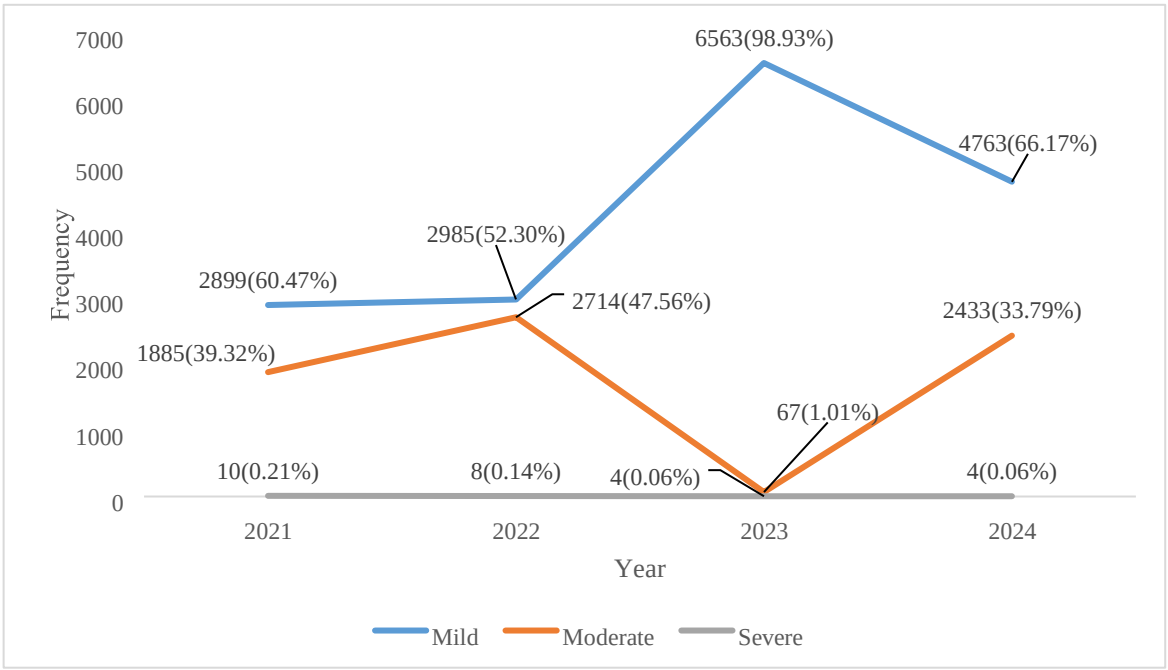

Figure 4. 3: Trend of the disease severity from 2021-2024.

Figure 4. 3: Trend of disease severity from 2021-2024.4.3.1 Top Diagnoses Among ENT

Patients at Ho Teaching Hospital from 2021 to 2024

Table 4.2 presents the most diagnosed ENT conditions from 2021 to 2024 at Ho Teaching Hospital. Across all four years, impacted cerumen consistently emerged as the most frequently diagnosed condition: 636 (13.26%) in 2021, 798 (13.98%) in 2022, and 874 (12.14%) in 2024, although it was surpassed in 2023 by acute eczematoid otitis externa with 1,629 (24.56%) cases. Diffuse otitis externa and acute pharyngitis also featured prominently throughout the years, with diffuse otitis externa ranging from 224 (4.67%) in 2021 to 617 (10.81%) in 2022. Notably, acute nasopharyngitis recorded a significant peak in 2023 with 1,111 (16.75%) cases. The category "Others," represents all remaining diagnoses in addition to head and neck conditions.

Table 4. 2: Top Ten Diagnoses Among ENT Patients at Ho Teaching Hospital per year (2021-2024)

	Frequency	%
Diagnosis 2021 (N= 4797)		
Impacted cerumen	636	13.26
Other infective otitis externa	283	5.90
Other otitis externa	248	5.17
Diffuse otitis externa	224	4.67
Acute pharyngitis	200	4.17
Other acute nonsuppurative otitis media	179	3.73
Acute tonsillitis	135	2.81
Superficial foreign body of initial encounter	128	2.67
Otitis externa	124	2.58
Acute suppurative otitis media without spontaneous rupture of drum	89	1.86
*Others	2548	53.12
2022 (N= 5707)		
Impacted cerumen	798	13.98
Diffuse otitis externa	617	10.81
Otitis media	300	5.26
Acute pharyngitis	298	5.22
Acute tonsillitis	269	4.71
Other acute nonsuppurative otitis media	147	2.58
Allergic rhinitis	129	2.26
Other infective otitis externa	128	2.24
Suppurative otitis media	117	2.05
Acute sinusitis	94	1.65

*Others	2810	49.24
2023 (N= 6634)		
Acute eczematoid otitis externa	1629	24.56
Acute nasopharyngitis common cold	1111	16.75
Diffuse otitis externa	483	7.28
Other infective otitis externa	396	5.97
Acute pharyngitis	306	4.61
Otitis media	262	3.95
Hypertrophy of tonsils	220	3.32
Allergic rhinitis	100	1.51
Other acute nonsuppurative otitis media	97	1.46
Candidal otitis externa	92	1.39
*Others	1938	29.21
2024 (N=7200)		
Impacted cerumen	874	12.139
Diffuse otitis externa	438	6.083
Acute tonsillitis	372	5.167
Acute pharyngitis	359	4.986
Otitis media	244	3.389
Candidal otitis externa	170	2.361
Allergic rhinitis	146	2.028
Suppurative otitis media	110	1.528
Other acute nonsuppurative otitis media	108	1.500
Superficial foreign body of initial encounter	100	1.389
*Others	4279	59.431

*Others represent all remaining diagnoses in addition to head and neck conditions.

4.3.2 Top Five represented Conditions of Ear, Nose and Throat Conditions from 20212022 (Disaggregated for Specific Years)

Across 2021–2024, the clinic's most frequent ear diagnoses were otitis externa (1 226 (38.7%), 566 (18.9%), 1 228 (37.2%), 555 (19.9%)), impacted cerumen (636 (20.1%), 1 567 (52.4%), 678 (20.5%), 609 (21.9%)) and otitis media, which rose to 901 (32.3%) in 2024. Nose infections were dominated by acute nasopharyngitis (86 (24.6%), 112 (19.9%), 419 (29.3%), 156 (35.4%)) and allergic rhinitis (45 (12.9%), 88 (15.7%), 478 (33.4%), 79 (17.9%)), with acute sinusitis and epistaxis each accounting for 8–16%. Throat presentations were led by acute pharyngitis (106 (26.4%), 267 (35.7%), 197 (33.9%), 356 (39.4%)) and tonsillitis (99 (24.7%),

155 (20.7%), 124 (21.3%), 234 (25.9%)), while laryngitis and epiglottitis each made up under 15%. “Others” comprised 10–43% of cases in each category (Table 4.3).

Table 4. 3: Top Five Represented Ear, Nose and Throat conditions from 2021-2024 (Disaggregated for specific years)

Diagnosis	Frequency	%
Top ear diagnosis in 2021 (n=3168)		
Otitis externa	1226	38.70
Impacted cerumen	636	20.08
Otitis media	618	19.51
Superficial foreign body of the external ear canal	128	4.04
Tinnitus	24	0.76
*Others	536	16.92
Top nose diagnosis in 2021(n= 350)		
Acute nasopharyngitis	86	24.57
Allergic rhinitis	45	12.86
Acute sinusitis	38	10.86
Epistaxis	22	6.29
Nasal polyps	9	2.57
*Others	150	42.86
Top throat conditions (n= 401)		
Acute pharyngitis	106	26.43
Tonsillitis	99	24.69
Laryngitis	67	16.71
Epiglottitis	55	13.72
*Others	74	18.45
Top ear diagnosis in 2022 (n=2990)		
Impacted cerumen	1567	52.41
Otitis externa	566	18.93
Otitis media	317	10.60
Superficial foreign body of the external ear canal	234	7.83
Tinnitus	30	1.00
*Others	306	10.23
Top nose diagnosis in 2021(n= 562)		
Acute nasopharyngitis	112	19.93
Allergic rhinitis	88	15.66
Acute sinusitis	69	12.28
Epistaxis	46	8.19
Nasal polyps	12	2.14

*Others	235	41.81
Top throat infections (n=748)		
Acute pharyngitis	267	35.70
Tonsillitis	155	20.72
Laryngitis	109	14.57
Epiglottitis	79	10.56
*Others	138	18.45
Top ear diagnosis in 2023 (n=3303)		
Otitis externa	1228	37.18
Impacted cerumen	678	20.53
Otitis media	546	16.53
Superficial foreign body of the external ear canal	45	1.36
Tinnitus	29	0.88
*Others	777	23.52
Top nose diagnosis in 2023(n= 1431)		
Allergic rhinitis	478	33.40
Acute nasopharyngitis	419	29.28
Acute sinusitis	234	16.35
Epistaxis	34	2.38
Nasal polyps	22	1.54
*Others	245	17.12
Top throat infections 2023(n=581)		
Acute pharyngitis	197	33.91
Tonsillitis	124	21.34
Laryngitis	87	14.97
Epiglottitis	43	7.40
*Others	130	22.38
Top ear diagnosis in 2024 (n=2787)		
Otitis media	901	32.33
Impacted cerumen	609	21.85
Otitis externa	555	19.91
Superficial foreign body of the external ear canal	345	12.38
Tinnitus	34	1.22
*Others	343	12.31
Top nose diagnosis in 2024(n= 441)		
Acute nasopharyngitis	156	35.37
Allergic rhinitis	79	17.91
Acute sinusitis	55	12.47
Epistaxis	37	8.39
Nasal polyps	14	3.17
*Others	100	22.68
Top throat infections in 2024 (n=904)		
Acute pharyngitis	356	39.38
Tonsillitis	234	25.88

Laryngitis	112	12.39
Epiglottitis	87	9.62
*Others	115	12.72

*Others refer to less represented conditions

4.3.3 Top Five Ear, Nose and Throat Conditions from 2021-2024 (Aggregated for the 4Year Period)

From 2021 to 2024, the most commonly diagnosed ear conditions were otitis externa 3,575 (29.20%), impacted cerumen 3,490 (28.49%), and otitis media 2,382 (19.45%), while superficial foreign body in the external ear canal 752 (6.14%) and tinnitus 117 (0.96%) were less frequent. Among nose conditions, acute nasopharyngitis led with 773 (27.78%) cases, followed by allergic rhinitis 690 (24.78%) and acute sinusitis 396 (14.22%), whereas epistaxis 139 (4.99%) and nasal polyps 57 (2.05%) were less common. For throat conditions, acute pharyngitis was the most reported with 926 (35.17%) cases, followed by tonsillitis 612 (23.25%), laryngitis 375 (14.24%), and epiglottitis 264 (10.02%) (Table 4.4).

Table 4. 4: Top Five Ear, Nose and Throat Conditions from 2021-2024 (Aggregated for the 4-Year Period)

Diagnosis	Frequency	Percentage (%)
Ear		
Impacted cerumen	3,490	28.49
Otitis externa	3,575	29.20
Otitis media	2,382	19.45
Superficial foreign body of external ear canal	752	6.14
Tinnitus	117	0.96
*Others	1,932	15.77
Nose		
Acute nasopharyngitis	773	27.78
Allergic rhinitis	690	24.78
Acute sinusitis	396	14.22
Epistaxis	139	4.99
Nasal polyps	57	2.05

*Others	729	26.18
Throat		
Acute pharyngitis	926	35.17
Tonsillitis	612	23.25
Laryngitis	375	14.24
Epiglottitis	264	10.02
* Others	457	17.36

*Others refer to less represented conditions

4.4 Medical treatment modalities from 2021-2024

Between 2021 and 2024, analgesics were the most administered medical treatment at the ENT clinic (44.12%), with usage increasing markedly over time. Antibiotic use declined significantly but remained the second most used category (34.25%). Antihistamines (9.80%) and emollient/hyperosmotic agents (6.14%) were also frequently prescribed. Other treatments including antiseptics/antifungals, corticosteroids, antacids/PPIs, and nutritional supplements were used less frequently, though antacid/PPI use rose notably in 2024 (Table 4.5).

Table 4. 5: Medical treatment modalities from 2021-2024, (N= 1598

Drug Category	2021	2022	2023	2024	Total
	n (%)	n (%)	n (%)	n (%)	n (%)
Analgesics	359 (9.16)	2259(52.03)	2187(55.76)	2249(59.12)	7054(44.12)
Antacids/PPIs	11(0.28)	27 (0.62)	26 (0.66)	166 (4.36)	230(1.44)
Antibiotics	2713(69.23)	1215 (27.98)	889 (22.67)	658 (17.30)	5475(34.25)
Antiseptic/Antifungal	274(6.99)	3 (0.07)	4 (0.10)	13 (0.34)	294(1.84)
Corticosteroids	9(0.23)	47 (1.08)	89 (2.27)	79 (2.08)	224(1.40)
Emollient/Hyperosmotic Agent	290(7.40)	249 (5.73)	225 (5.74)	217 (5.70)	981(6.14)
Nutritional Supplement	28(0.71)	88 (2.03)	45 (1.15)	1 (0.03)	162(1.01)
Antihistamine	235(6.00)	454 (10.46)	457 (11.65)	421 (11.07)	1567(9.80)
Total	**3919(24.51)**	**4342(27.16)**	**3922(24.53)**	**3804(23.79)**	**15987(100.00)**

These medications are not mutually exclusive

4.5 Bivariate association of ENT Conditions by Age, Gender, and Pregnancy Status

This study examined 17,666 cases of ENT conditions, revealing that ear conditions were the most common (69.33%), followed by nose (15.76%) and throat conditions (14.91%). Children aged 1–10 years had the highest burden (28.73%), especially for ear conditions, with condition rates decreasing with age. Females accounted for a greater proportion of conditions (58.26%) across all types compared to males (41.74%). Among women, non-pregnant individuals made up the majority of cases (95.5%). Statistically significant associations were found between type of condition and age, gender, and pregnancy status ($p < 0.001$) (Table 4.6).

4.6 Multivariate association of ENT Conditions by Age, Gender, and Pregnancy Status

This analysis presents the crude odds ratios (COR) and adjusted odds ratios (AOR) for various risk factors associated with ear, nose, and throat conditions. Age group was found to significantly affect the likelihood of ear conditions, with children aged 1-10 showing an increased risk (COR = 0.919, AOR = 2.402). Male gender was associated with a significantly lower risk of ear conditions compared to females (AOR = 0.388, $p < 0.001$), while pregnancy status showed a marked increase in risk for pregnant individuals (AOR = 2.575, $p < 0.001$).

For nose conditions, the 11-20 age group exhibited a significant increase in risk (COR = 1.181,

AOR = 1.294), and male gender was associated with a slightly higher risk compared to females (AOR = 1.037). Pregnant women showed no significant increase in risk for nose conditions. In throat conditions, the 1-10 age group had a reduced risk (AOR = 0.152, $p = 0.021$), and males were at higher risk compared to females (AOR = 1.660, $p < 0.001$). Pregnancy status was a significant factor for throat conditions, with pregnant individuals showing a decreased risk (AOR = 0.602, $p < 0.001$). These findings highlight the importance of age, gender, and pregnancy status as key determinants in the risk of ENT conditions (Table 4.7).

Table 4. 6: Bivariate association of ENT Conditions by Age, Gender, and Pregnancy Status from 2021-2024.

Variable	Type of Infection								P value
	EAR		NOSE		THROAT				
	Frequency	%	Frequency	%	Frequency	%	Total	%	
Age									
1-10	3584	20.29	822	4.65	670	3.79	5076	28.73	**0.00**
11-20	1604	9.08	318	1.80	363	2.05	2285	12.93	
21-30	1999	11.32	468	2.65	435	2.46	2902	16.43	
31-40	1602	9.07	443	2.51	473	2.68	2518	14.25	
41-50	1103	6.24	210	1.19	256	1.45	1569	8.88	
51-60	842	4.77	198	1.12	187	1.06	1227	6.95	
61-70	885	5.01	195	1.10	147	0.83	1227	6.95	
71-80	448	2.54	92	0.52	71	0.40	611	3.46	
81-90	156	0.88	32	0.18	19	0.11	207	1.17	
91-100	22	0.12	6	0.03	10	0.06	30	0.17	
101-110	3	0.02	0	0.00	3	0.02	6	0.03	
Total	**12248**	**69.33**	**2784**	**15.76**	**2634**	**14.91**	**17666**	**100.00**	
Gender									
Female	7092	40.14	1577	8.93	1624	9.193	10293	58.26	**0.00**
Male	5156	29.19	1207	6.83	1010	5.717	7373	41.74	
Total	**12248**	**69.33**	**2784**	**15.76**	**2634**	**14.910**	**17666**	**100.00**	
Pregnancy status									
Non-pregnant	6779	65.86	1524	14.81	1527	14.84	9830	95.50	**0.00**
Pregnant	313	3.04	53	0.51	97	0.94	463	4.50	

Total	**7092**	**68.90**	**1577**	**15.32**	**1624**	**15.78**	**10293**	**100.00**

Variable	**Category**	**n (%)**	**COR**	**P value**	**95% CI**	**AOR**	**P value**	**95% CI**
Ear condition								
Age group	101-110(R)	3(0.02)	1.00	-	-	1.000	-	-
	1-10	(20.29)	0.919 0.954	**0.02**	0.856-0.986	2.402	0.283 0.295	0.484-11.915
	11-20	(9.08)	1.025 1.352	0.336 0.568	0.867-1.050	2.355	0.331 0.494	0.474-11.699
	21-30	(11.32)	0.951 1.036	**0.000** 0.383	0.941-1.118	2.214	0.292 0.339	0.446-10.989
	31-40	(9.07)	0.865 0.817	0.577 **0.028**	1.238-1.477	1.749	0.246 0.218	0.352-8.683
	41-50	(6.24)	0.737 1.646	**0.029** 0.058	0.849-1.063	2.367	0.179	0.476-11.770
	51-60	(4.77)	1.000 0.953	0.126	0.914-1.174	2.187	0.717	0.439-10.885
	61-70	(5.01)	1.000	-	0.760-0.984	2.588	.	0.520-12.883
	71-80	(2.54)	0.869	0.143	0.681-0.984	2.748	**0.000**	0.549-13.757
	81-90	(0.88)		-	0.536-1.012	3.059	-	0.599-15.631
	91-100	(0.12)	1.00	**0.000**	0.864-3.137	1.375		0.245-7.717
Gender	Female (R)	7092(40.14)	0.955 1.181		-	1.000	**0.000**	-
	Male	5156(29.19)	0.968 0.856	-	0.893-1.017	0.388		0.364-0.415
Pregnancy status	Non pregnant (R)	6779(65.86)	1.232 0.970	0.314 **0.010**	-	1.000	-	-
	Pregnant		0.989 1.057	0.552 **0.006**		2.575	0.533 0.047	
			1.023				0.930 0.308	

Nose condition		313(3.04)	**0.007** 0.707	0.389-0.626	1.000	0.064 0.688	2.412-2.749
Age group	101-110(R)		0.894 0.628		1.084	0.676 0.514	
	1-10	0(0.00)	0.905	-	1.294	0.746	-
	11-20	(4.65)		0.874-1.044	1.011		0.841–1.398
	21-30	(1.80)		1.041-1.340	0.911		1.004–1.667
	31-40	(2.65)		0.868-1.078	1.398		0.811–1.259
	41-50	(2.51)		0.766-0.957	0.942		0.745–1.114
	51-60	(1.19)		1.059-1.435	1.102		0.981–1.992
	61-70	(1.12)		0.829-1.136	1.119		0.699–1.269
	71-80	(1.10)		0.844-1.325	1.087		0.701–1.731
	81-90	(0.52)		0.844-1.325			0.786–1.593
		(0.18)		0.700-1.495			0.666–1.774

Table 4. 7: Multivariate association of ENT Condition by Age, Gender, and Pregnancy Status from 2021-2024

	91-100	6 (0.03)	0.998	0.996	0.417-2.388	0.943	0.893	0.348–2.555
Gender	Female(R)	1577 (8.93)	1.000	-	-	1.000	-	-
	Male	1207 (6.83)	0.924	0.059	0.852-1.003	1.037	0.519	0.928-1.159
Pregnancy (R)	Non pregnant status	1524 (14.81)	1.000	-	-	1.000	-	-
	Pregnant	53 (0.51)	1.759	**0.000**	1.290-2.399	0.971	0.802	0.777-1.213
Throat condition								
	101-110 (R)	3(0.02)	1.000	-	-	1.000	-	-
Age group	1-10	670 (3.79)	1.215	**0.000**	1.106-1.336	0.152	**0.021**	0.031-0.755
	11-20	363 (2.05)	0.917	0.160	0.813-1.035	0.189	**0.042**	0.038-0.939
	21-30	435 (2.46)	0.993	0.895	0.888-0.803	0.176	**0.034**	0.035-0.876
	31-40	473 (2.68)	0.719	**0.000**	0.645-0.803	0.231	0.074	0.047-1.150
	41-50	256 (1.45)	0.889	0.101	0.772-1.023	0.195	**0.046**	0.039-0.971
	51-60	187 (1.06)	0.973	0.736	0.828-1.143	0.180	**0.036**	0.036-0.898
	61-70	147 (0.83)	1.310	**0.003**	1.097-1.564	0.136	**0.015**	0.027-0.681
	71-80	71 (0.40)	1.345	**0.020**	1.047-1.729	0.131	**0.014**	0.026-0.664
	81-90	19 (0.11)	1.743	**0.020**	1.085-2.799	0.101	**0.007**	0.019-0.536
	91-100	10 (0.06)	0.490	0.048	0.238-1.009	0.357	0.250	0.062-2.067
Gender	Female (R)	1624 (9.19)	1.000	-	-	1.000	-	-
	Male	1010 (5.72)	1.180	**0.000**	1.084-1.239	1.660	**0.000**	1.527-1.804
Pregnancy status	Non pregnant (R)	1527 (14.84)	1.000	-	-	1.000	-	-
	Pregnant	97 (0.94)	1.931	**0.000**	1.388-2.688	0.602	**0.000**	0.554-0.655

R= Reference category, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

4.7 Bivariate association of Disease Patterns (Benign, Infectious, and Malignant) by Age, Gender, and Pregnancy Status

This study examined the distribution of benign, infectious, and malignant diseases across age, gender, and pregnancy status in a total sample of 24,335 cases. Infectious diseases were most prevalent, comprising 17,668 (72.60%) cases, followed by benign diseases at 6,650 (27.33%), and malignant diseases at 17 (0.07%).

Age distribution showed the highest number of cases in the 1-10 age group, with 7,041 (28.93%) cases, predominantly infectious 4,997 (20.53%). Benign diseases were also most common in this age group 2,042 (8.39%), while malignant cases remained rare across all age groups. As age increased, both benign and infectious diseases decreased, while malignant diseases remained minimal. The p-value for age differences was 0.00, indicating significant variation in disease patterns across age groups.

Gender analysis revealed higher rates in females, with 4,393 (18.05%) cases of benign and 9,661 (39.70%) cases of infectious diseases. Males had 2,257 (9.27%) cases of benign and 8,007 (32.90%) cases of infectious diseases. Malignant conditions were rare in both genders, with males having 6 (0.02%) cases and females having 11 (0.05%). The p-value for gender differences was 0.00, suggesting significant gender-based variations in disease prevalence.

Pregnancy status showed that non-pregnant individuals had a higher prevalence of benign 4,223 (30.02%)) and infectious diseases 9,229 (65.62%), while pregnant individuals had 170 (1.21%) benign and 432 (3.07%) infectious cases. Malignant diseases were similarly rare in both groups, with 9 (0.06%) non-pregnant and 2 (0.01%) pregnant individuals affected. The pvalue for pregnancy status differences was 0.00, indicating significant differences in disease patterns between pregnant and non-pregnant individuals (Table 4.8)

Table 4. 8: Bivariate association of Disease Patterns (Benign, Infectious, and Malignant) by Age, Gender, and Pregnancy Status from 2021-2024.

Variable	Disease pattern								P value
	Benign		Infectious		Malignant		TOTAL		
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
Age 1-10	2042	8.39	4997	20.53	2	0.01	7041	28.93	**0.00**
11-20	821	3.37	2295	9.43	4	0.02	3120	12.82	
21-30	1016	4.18	2813	11.56	3	0.01	3832	15.75	
31-40	863	3.55	2616	10.75	1	0.00	3480	14.30	
41-50	584	2.40	1632	6.71	1	0.00	2217	9.11	
51-60	471	1.94	1227	5.04	2	0.01	1700	6.99	
61-70	481	1.98	1228	5.05	2	0.01	1711	7.03	
71-80	245	1.01	636	2.61	1	0.00	882	3.62	
81-90	105	0.43	191	0.78	0	0.00	296	1.22	
91-100	18	0.07	30	0.12	1	0.00	49	0.20	
101-110	4	0.02	3	0.01	0	0.00	7	0.03	
Total	**6650**	**27.33**	**17668**	**72.60**	**17**	**0.07**	**24335**	**100.00**	
Gender									
Female	4393	18.05	9661	39.70	11	0.05	14065	57.80	**0.00**
Male	2257	9.27	8007	32.90	6	0.02	10270	42.20	
Total	**6650**	**27.33**	**17668**	**72.60**	**17**	**0.07**	**24335**	**100.00**	
Pregnancy status									
Non-pregnant	4223	30.02	9229	65.62	9	0.06	13461	95.71	**0.00**
Pregnant	170	1.21	432	3.07	2	0.01	604	4.29	
Total	**4393**	**31.23**	**9661**	**68.69**	**11**	**0.08**	**14065**	**100.00**	

4.8 Multivariate association of Disease Patterns (Benign, Infectious, and Malignant) by Age, Gender, and Pregnancy Status

In the multivariate analysis of disease patterns, individuals aged 81–90 had higher odds of benign conditions compared to the reference group (101–110 years), (COR=1.469 (95% CI: 1.156–1.868, p=0.020), though adjusted odds were not significant (AOR=0.947, 95% CI: 0.505–1.774, p=0.864). Males were less likely to have benign conditions compared to females (COR=0.620, 95% CI: 0.585–0.658, p<0.001), but the adjusted model showed higher odds for males (AOR=1.623, 95% CI: 1.530–1.722, p<0.001). Pregnant individuals had lower odds of benign conditions (AOR=0.616, 95% CI: 0.581–0.654, p<0.001). For infectious conditions, adults aged 31–40 had significantly higher adjusted odds (AOR=1.918, 95% CI: 1.074–3.424, p=0.028), while males had lower odds (AOR=0.620, 95% CI: 0.585–0.657, p<0.001), and pregnant individuals had increased odds (AOR=1.622, 95% CI: 1.529–1.721, p<0.001). Malignant conditions were rare, but significantly lower odds were observed in younger age groups, particularly 1–10 years (AOR=0.014, 95% CI: 0.001–0.153, p<0.001), and among pregnant individuals (COR 0.047, 95% CI: 0.005–0.412, p=0.013), though this was not significant after adjustment (AOR=0.874, 95% CI: 0.311–2.456, p=0.798) (Table 4.9).

Table 4. 9: Multivariate association of Disease Patterns (Benign, Infectious, and Malignant) by Age, Gender, and Pregnancy Status from 2021-2024.

Variable	Category	n (%)	COR	P value	95% CI	AOR	P value	95% CI
Benign								
	101-110(R)	4(0.02)	1.000	-	-	1.000	-	-
Age group	1-10	2042 (8.39)	1.125	**0.000**	1.057-1.196	0.703	0.237	0.393-1.260
	11-20	821 (3.37)	0.943	0.174	0.866-1.026	0.615	0.104	0.342-1.105
	21-30	1016 (4.18)	0.952	0.218	0.881-1.029	0.621	0.111	0.346-1.116
	31-40	863 (3.55)	0.859	**0.000**	0.790-0.933	0.568	0.058	0.316-1.020
	41-50	584 (2.40)	0.946	0.275	0.857-1.045	0.616	0.106	0.342-1.109
	51-60	471 (1.94)	1.021	0.716	0.914-1.140	0.660	0.168	0.366-1.191
	61-70	481 (1.98)	1.043	0.450	0.935-1.164	0.673	0.189	0.373-1.215
	71-80	245 (1.01)	1.024	0.760	0.881-1.190	0.662	0.178	0.364-1.206
	81-90	105 (0.43)	1.469	**0.020**	1.156-1.868	0.947	0.864	0.505-1.774
	91-100	18 (0.07)	1.546	0.139	0.864-2.765	2.296	0.310	0.461-11.438
Gender	Female (R)	4393 (18.05)	1.000	-	-	1.000	-	-
	Male	2257 (9.27)	0.620	**0.000**	0.585-0.658	1.623	**0.000**	1.530-1.722
	Non pregnant (R)	4223 (30.02)	1.000	-	-	1.000	-	-
	Pregnant	170 (1.21)	0.769	**0.000**	0.700–0.845	0.616	**0.000**	0.581–0.654
Infectious								
Age group	101-110 (R)	3(0.01)	1.000	-	-	1.000	-	-
	1-10	4997 (20.53)	0.892	**0.000**	0.839-0.949	1.548	0.138	0.870-2.757
	11-20	2295 (9.43)	1.057	0.200	0.971-1.151	1.762	0.056	0.986-3.147
	21-30	2813 (11.56)	1.050	0.224	0.971-1.135	1.748	0.059	0.980-3.120
	31-40	2616 (10.75)	1.167	**0.000**	1.075-1.268	1.918	**0.028**	1.074-3.424
	41-50	1632 (6.71)	1.058	0.263	0.958-1.168	1.767	0.055	0.987-3.163
	51-60	1227 (5.04)	0.977	0.682	0.875-1.091	1.643	0.096	0.916-2.947
	61-70	1228 (5.05)	0.956	0.423	0.857-1.067	1.610	0.110	0.898-2.888

	71-80	636 (2.61)	0.975	0.737	0.839-1.132	1.637	0.103	0.905-2.963
	81-90	191 (0.78)	0.683	**0.002**	0.537-0.868	1.152	0.656	0.618-2.146
	91-100	30 (0.12)	0.595	0.074	0.335-1.058	.475	0.363	0.096-2.361
Gender	Female (R)	9661 (39.70)	1.000	-	-	1.000	-	-
	Male	8007 (32.90)	1.613	**0.000**	1.521-1.710	0.620	**0.000**	0.585-0.657
Pregnancy status	Non pregnant (R)	9229 (65.62)	1.000	-	-	1.000	-	-
	Pregnant	432 (3.07)	1.741	**0.000**	1.572–1.927	1.622	**0.000**	1.529–1.721
Malignant								
	101-110 (R)	0(0.00)	1.000	-	-	1.000	-	-
	1-10	2 (0.01)	0.327	0.118	0.075-1.432	0.014	**0.000**	0.001-0.153
	11-20	4 (0.02)	2.094	0.186	0.682-6.425	0.062	**0.013**	0.007-0.562
	21-30	3 (0.01)	1.147	0.830	0.329-3.992	0.038	**0.005**	0.004-0.368
	31-40	1 (0.00)	0.374	0.321	0.050-2.824	0.014	**0.003**	0.001-0.224
	41-50	1 (0.00)	0.623	0.644	0.083-4.703	0.022	**0.007**	0.001-0.351
	51-60	2 (0.01)	1.766	0.439	0.406-7.773	0.057	**0.020**	0.005-0.634
	61-70	2 (0.01)	1.764	0.445	0.403-7.720	0.056	**0.020**	0.005-0.630
	71-80	1 (0.00)	1.663	0.618	0.220-12.551	0.054	**0.041**	0.003-0.884
	81-90	0 (0.00)	0.988	0.647	0.986-0.989	0.000	0.994	0.000-0.000
	91-100	1 (0.00)	3.602	**0.000**	1.102-3.044	0.000	0.999	0.000-0.000
Gender	Female (R)	11 (0.05)	1.000	-	-	1.000	-	-
	Male	6 (0.02)	0.747	0.564	0.276-2.020	1.339	0.565	0.495-3.622
Pregnancy status	Non pregnant (R)	9 (0.06)						
	Pregnant	2 (0.01)	0.047	0.013	0.005–0.412	0.874	0.798	0.311–2.456

R= Reference category, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

4.9 Bivariate association of Disease Severity (Mild, Moderate, and Severe) by Age, Gender, and Pregnancy Status

The table below presents the bivariate association between disease severity and demographic variables (age, gender, and pregnancy status). A significant relationship was observed between disease severity and all three variables ($p = 0.00$). Mild disease was the most common severity category, reported in 17,210 (70.72%) of cases, followed by moderate in 7,099 (29.17%) and severe in only 26 (0.11%). The 1–10 age group recorded the highest proportion of mild 5021 (20.63%) and moderate 2015 (8.28%) cases. Females had higher proportions of mild 9416 (38.69%) and moderate 4629 (19.02%) cases than males 7794 (32.03%) and 2470 (10.15%), respectively. Among pregnant individuals, disease was mostly mild 417 (2.96%), with only 2 (0.01%) severe cases reported, compared to 18 (0.13%) in non-pregnant persons (Table 4.10).

4.10 Multivariate association of Disease Severity (Mild, Moderate, and Severe) by Age, Gender, and Pregnancy Status

The table below presents the multivariate analysis of disease severity by age, gender, and pregnancy status. After adjusting for covariates, males were significantly less likely to present with mild disease compared to females (AOR = 0.643, $p < 0.001$, 95% CI: 0.608–0.681), but

more likely to have moderate disease (AOR = 1.549, $p < 0.001$, 95% CI: 1.463–1.641). Pregnancy was associated with higher odds of mild disease (AOR = 1.561, $p < 0.001$, 95% CI: 1.473–1.654) and lower odds of moderate severity (AOR = 0.643, $p < 0.001$, 95% CI: 0.606–0.681). In severe cases, younger age groups especially 1–10 and 11–20 years had significantly reduced odds compared to the reference group (AOR = 0.034, $p = 0.002$; AOR = 0.015, $p = 0.003$) respectively, while gender and pregnancy did not show significant adjusted associations at the 5% level (Table 4.11).

Table 4. 10: Bivariate association of Disease Severity (Mild, Moderate, and Severe) by Age, Gender, and Pregnancy Status from 20212024.

Variable	Disease Severity								P value
	Mild		Moderate		Severe		Total		
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
Age									
1-10	5021	20.63	2015	8.28	5	0.02	7041	28.93	**0.00**
11-20	2231	9.17	888	3.65	1	0.00	3120	12.82	
21-30	2694	11.07	1133	4.66	5	0.02	3832	15.75	
31-40	2340	9.62	1137	4.67	3	0.01	3480	14.30	
41-50	1558	6.40	656	2.70	3	0.01	2217	9.11	
51-60	1223	5.03	472	1.94	5	0.02	1700	6.99	
61-70	1241	5.10	468	1.92	2	0.01	1711	7.03	
71-80	642	2.64	239	0.98	1	0.00	882	3.62	
81-90	222	0.91	74	0.30	0	0.00	296	1.22	
91-100	34	0.14	14	0.06	1	0.00	49	0.20	
101-110	4	0.02	3	0.01	0	0.00	7	0.03	
Total	**17210**	**70.72**	**7099**	**29.17**	**26**	**0.11**	**24335**	**100.00**	
Gender									
Female	9416	38.69	4629	19.02	20	0.08	14065	57.80	**0.00**
Male	7794	32.03	2470	10.15	6	0.02	10270	42.20	
Total	17210	70.72	7099	29.17	26	0.11	24335	100.00	
Pregnancy Status									
Non-pregnant	8999	63.98	4444	31.60	18	0.13	13461	95.71	**0.00**

Pregnant	417	2.97	185	1.32	2	0.01	604	4.29
Total	9416	66.95	4629	32.92	20	0.142	14065	100.00

Variable	**Category**	**n (%)**	**COR**	**P value**	**95% CI**	**AOR**	**P value**	**95% CI**
Mild								
Age group	101-110(R)	4(0.02)	1.000	-	-	1.000	-	-
	1-10	5021 (20.63)	1.041	0.197	0.979-1.107	1.097	0.767	0.596-2.018
	11-20	2231 (9.17)	1.045	0.302	0.961-1.135	1.107	0.745	0.600-2.043
	21-30	2694 (11.07)	0.976	0.535	0.905-1.053	1.044	0.889	0.567-1.925
	31-40	2340 (9.62)	0.826	**0.000**	0.765-0.892	0.906	0.751	0.491-1.669
	41-50	1558 (6.40)	0.977	0.625	0.888-1.075	1.043	0.893	0.564-1.928
	51-60	1223 (5.03)	1.066	0.252	0.956-1.190	1.131	0.695	0.611-2.096
	61-70	1241 (5.10)	1.100	0.088	0.986-1.228	1.165	0.628	0.629-2.158
	71-80	642 (2.64)	1.112	0.169	0.956-1.293	1.180	0.604	0.631-2.206
	81-90	222 (0.91)	1.245	0.104	0.956-1.622	1.324	0.407	0.683-2.566
	91-100	34 (0.14)	0.938	0.837	0.511-1.724	0.588	0.520	0.117-2.959
	Female (R)	9416 (38.69)	1.000	-	-	1.000	-	-
	Male	7794 (32.03)	1.554	**0.000**	1.468-1.646	0.643	**0.000**	0.608-0.681
	Non pregnant (R)	8999 (63.98)	1.000	-	-	1.000	-	-
	Pregnant	417 (2.96)	0.641	**0.000**	0.605-0.679	1.561	**0.000**	1.473-1.654
Moderate								
Age group	101-110(R)	3(0.01)	1.000	-	-	1.000	-	-
	1-10	2015 (8.28)	0.963	0.225	0.906-1.024	1.002	0.994	0.538-1.867
	11-20	888 (3.65)	0.961	0.350	0.884-1.044	0.995	0.987	0.533-1.858
	21-30	1133 (4.66)	1.023	0.558	0.948-1.103	1.049	0.879	0.562-1.958
	31-40	1137 (4.67)	1.212	**0.000**	1.122-1.309	1.213	0.544	0.650-2.264

41-50	656 (2.70)	1.022	0.650	0.929-1.125	1.051	0.877	0.562-1.966
51-60	472 (1.94)	0.928	0.186	0.832-1.036	0.961	0.901	0.512-1.802
61-70	468 (1.92)	0.908	0.086	0.813-1.014	0.941	0.850	0.502-1.765
71-80	239 (0.98)	0.899	0.167	0.773-1.046	0.929	0.821	0.491-1.758
81-90	74 (0.30)	0.807	0.112	0.620-1.052	0.833	0.596	0.425-1.634

Table 4. 11: Multivariate association of Disease Severity (Mild, Moderate, and Severe) by Age, Gender, and Pregnancy Status from 2021-2024.

	91-100	14 (0.06)	0.971	0.926	0.522-1.806	1.875	0.447	0.371-9.476
Gender	Female (R)	4629 (19.02)	1.000	-	-	1.000	-	-
	Male	2470 (10.15)	0.646	**0.000**	0.610-0.684	1.549	**0.000**	1.463-1.641
Pregnancy status	Non pregnant (R)	4444 (31.60)	1.000	-	-	1.000	-	-
	Pregnant	185 (1.32)	1.556	**0.000**	1.469-1.649	0.643	**0.000**	0.606-0.681
Severe								
Age group	101-110(R)	0(0.00)	1.000	-	-	1.000	-	-
	1-10	5 (0.02)	0.585	0.275	0.220-1.551	0.034	**0.002**	0.004-0.297
	11-20	1 (0.00)	0.272	1.171	0.037-2.006	0.015	**0.003**	0.001-0.250
	21-30	5 (0.02)	1.274	0.626	0.480-3.381	0.063	**0.012**	0.007-0.547
	31-40	3 (0.01)	0.781	0.687	0.235-2.604	0.041	**0.006**	0.004-0.405
	41-50	3 (0.01)	1.302	0.667	0.391-4.339	0.065	**0.019**	0.007-0.637
	51-60	5 (0.02)	3.177	0.014	1.196-8.435	0.142	0.077	0.016-1.235
	61-70	2 (0.01)	1.102	0.895	0.260-4.667	0.056	**0.020**	0.005-0.630
	71-80	1 (0.00)	1.064	0.952	0.144-7.859	0.054	**0.041**	0.003-0.884
	81-90	0 (0.00)	0.988	0.571	0.986-0.989	0.000	0.994	0.000-0.000
	91-100	1 (0.00)	2.218	**0.000**	2.685-12.214	0.000	0.999	0.000-0.000
Gender	Female (R)	20 (0.08)	1.000	-	-	1.000	-	-
	Male	6 (0.02)	0.411	0.048	0.165-1.023	2.436	0.056	0.978-6.068
Pregnancy status	Non pregnant (R)	18 (0.13)	1.000	-	-	1.000	-	-
	Pregnant	2 (0.01)	2.291	0.071	0.909-5.772	0.437	0.078	0.173-1.100

R= Reference category, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Discussion of findings

The discussion of findings was based on the study's objectives;

1. To assess the socio-demographic characteristics of patients presenting at the ENT clinic.
2. To describe the clinical characteristics (disease conditions, presentation patterns and severity levels) of conditions at the ENT unit of Ho Teaching Hospital.
3. To examine the association between patients' socio-demographic characteristics and the type, presentation pattern, and severity of ENT conditions diagnosed at Ho Teaching Hospital.
4. To examine the medical treatment modality and care given at the ENT unit of Ho Teaching Hospital.

5.1.1 Socio-Demographic and Clinical Characteristics of Patients Presenting at the ENT Clinic

The retrospective review of Ear, Nose, and Throat (ENT) conditions at Ho Teaching Hospital from 2021 to 2024 indicates notable patterns in patient demographics and clinical presentations. A total of 24,335 patients were evaluated, with a significant representation of children aged 1–10 years, who comprised 28.93% of the cases. This trend suggests that pediatric ENT issues are particularly prevalent in this region, reflecting findings from other studies indicating that younger patients frequently seek ENT care. Adjeso et al. (2022) found that ear-related conditions were notably common in their cohort of patients from Northern Ghana, echoing the observation that children are significant recipients of ENT services due to conditions such as otitis media, often linked to environmental factors prevalent in Ghana. Further analysis of the age distribution indicates that adults aged 21–30 years (15.75%) and 31–40 years (14.30%) also constitute a noteworthy portion of the patient population. However, the least represented groups were older adults, particularly

those aged 81–90 years, reflecting a common trend in healthcare where elderly patients often underutilize ENT services. Findings have been documented in other geographic contexts; for example, O'Neill et al. (2023) reported varied age distributions across different ENT conditions, noting a prevalence of children aged between 0 and 9 years among patients presenting for ENT emergencies, consistent with global trends. The gender distribution in this current study prominently features females, accounting for 57.80% of patients. This aligns with findings from Ali et al. (2025) which indicate that women are more likely to report ENT symptoms and seek medical interventions, possibly due to greater health-seeking behaviour among women compared to men. In the current study, the vast majority of female patients were non-pregnant (95.71%). This aligns with common demographic trends in ENT consultations, where pregnancy may affect the type of conditions presented but does not significantly impact the overall number of ENT visits (Adjeso et al., 2022; Ali et al., 2025).

5.1.2 Clinical Characteristics of Conditions at the ENT

Findings from this study reveal a notable decline in ear infections from 66.08% in 2021 to 38.71% in 2024, while head and neck conditions increased significantly from 18.25% to 42.61% during the same period. Such trends may reflect a dynamic relationship between environmental factors, infection control practices, and healthcare-seeking behaviour, aligning with studies on variations in ear infection diagnoses and treatments globally (Mettias et al., 2023; van der Velden et al., 2020).

When comparing these findings to other studies, significant rates of head and neck cancer have been highlighted in specific trials, notably in Iran, underscoring the importance of attention toward head and neck health (Shahsavari et al., 2017), mirroring trends observed at Ho Teaching Hospital. Furthermore, while congenital anomalies related to ENT presentations have been documented, the relationship

between these anomalies and ENT conditions requires further clarification to ensure comprehensiveness (Assiry et al., 2020). Comparative studies highlight the prevalence of specific ENT conditions across different geographical areas. A study indicated that foreign body ingestion was a common concern regarding throat conditions in Ghana (Adjeso et al., 2022), paralleling findings about the growing incidence of head and neck conditions at the Ho Teaching Hospital. Their study found maxillofacial injuries (such as facial lacerations, orbital floor fractures, maxillary fractures and mandibular fractures) as one of the common indications for ENT emergency admissions. Interestingly, other studies, including one from Scotland, noted a shift in trends where admissions for tonsillitis increased despite a general decrease in primary care consultations for sore throat (Douglas et al., 2019). The increased prevalence of throat infections at the Ho Teaching Hospital may reflect similar regional trends where factors like antibiotic misuse contribute to higher rates of throat conditions (Akinterinwa et al., 2023; Bozlak et al., 2021).

Infectious conditions constituted most cases, increasing from 2250 (46.93%) in 2021 to a peak of 5030 (75.82%) in 2023 before declining to 2897 (40.24%) in 2024. This trend may indicate patterns observed in other studies, which highlight similar peaks in infectious ENT conditions during periods of heightened seasonal illness or after environmental changes conducive to such infections (Lukama et al., 2023). The reduction in benign conditions from 1,664 cases (34.71%) in 2021 to 283 cases (4.27%) in 2023 indicates a shift toward prioritizing more acute presentations in clinical settings. This trend suggests that healthcare access is increasingly focused on urgent cases, potentially at the expense of chronic benign conditions, consistent with the observations reported by (Alhazmi et al., 2021). Additionally, the increasing number of "other" head and neck cases, rising from 875 (18.25%) in 2021 to 3068 (42.61%) in 2024, may indicate an underdiagnosis of specific conditions in resource-limited settings, as emphasized in a study by Lukama et al,

(2023) discussing diagnostic errors in ENT departments (Lukama et al., 2023). This could be a true reflection of the study as a specialist ENT physician was engaged at the facility from December 2023 onwards.

The disease severity in this study showed that mild cases were the most frequently reported throughout the study period, with a noticeable rise over time before declining in the final year. Moderate cases displayed a fluctuating pattern, peaking mid-way through the review period and later decreasing. These shifts in severity may be influenced by seasonal variations, changes in healthcare-seeking behaviour, and broader epidemiological trends. Notably, public health emergencies such as the COVID-19 pandemic likely impacted the allocation of healthcare resources and the prioritization of certain conditions, contributing to the observed patterns (Puttasiddaiah et al., 2021).

Interestingly, severe cases remained low throughout the study period, indicating effective management. Notably, advancements in management protocols for head and neck issues, particularly in surgical contexts like tonsillectomy, may have contributed to lower severe case presentations (Gowda et al., 2022).

This current study revealed that various pathologies affect patients. Impacted cerumen, which occurred consistently as the most frequently diagnosed ailment, was followed closely by acute eczematoid otitis externa in 2023. The fluctuations in diagnoses year-on-year highlight a dynamic healthcare challenge, particularly relevant for the Volta Region of Ghana. Research indicates that earwax impaction can lead to significant clinical symptoms such as discomfort and hearing loss, necessitating intervention (Kim et al., 2022). Acute otitis externa, which may surpass impacted cerumen in some years, is often a significant issue as it can result from bacterial infections, most notably by pathogens such as Staphylococcus aureus and Pseudomonas aeruginosa, with the

majority of cases being bacterial (Demir et al., 2018; Milani et al., 2023). The aetiology of acute otitis externa is complex, often precipitated by water exposure and subsequent microbial proliferation, indicating potential preventive measures including frequent cleansing of the ear canal, pain control, administering oral or topical medications, acidification of the ear canal, and addressing predisposing factors that could be implemented at the community level to reduce incidence rates (Lipska et al., 2024).

The notable rise in diagnoses of acute nasopharyngitis, especially in 2023, aligns with findings from other studies across diverse demographics. Acute pharyngitis remains a dominant cause of healthcare visits, particularly in pediatric populations, with a significant number being viral in origin, although Streptococcus pyogenes accounts for a notable proportion of bacterial cases (Almarshad et al., 2018). This current study suggests a growing concern for viral rather than bacterial sources in certain demographics, highlighting the necessity for accurate diagnostics to mitigate inappropriate antibiotic use, which can contribute to rising antimicrobial resistance (Sagar et al., 2018).

5.1.3 Association between patients' socio-demographic characteristics and the type, presentation pattern, and severity of ENT conditions

Demographic analyses from the study reveal that children aged 1-10 years accounted for the highest incidence of infections (28.73%), with an AOR = 2.402 suggesting a significant increase in risk compared to older age groups. This finding aligns with prior studies that emphasize the susceptibility of young children to otitis media due to anatomical and immunological factors (Baljošević et al., 2024). Research demonstrates that children, particularly in younger age groups, exhibit more ENT symptoms during respiratory infections, indicating an innate vulnerability that is also reflected in the recent statistics from Ghana (Liu et al., 2023). Furthermore, a review emphasizes that pediatric

populations often experience heightened sensitivity to respiratory pathogens, which can exacerbate ear, nose, and throat infections (Zięba et al., 2022). The gender distribution in this study shows that female patients accounted for 58.26% of infections. This mirrors findings from various studies, including those that report a higher prevalence of ENT symptoms in women, suggesting biological or sociocultural factors may predispose females to more frequent medical consultations for such conditions (Kwaśniewska et al., 2023).

Significantly, the findings demonstrated strong associations between the type of infection and various demographic factors, including age, gender, and pregnancy status ($p < 0.001$). This statistical significance aligns with an analysis suggesting that distinct barriers against understanding disease perception in different demographics can influence medical help-seeking behaviours and subsequent health outcomes, particularly in pediatric populations (Agyemang et al., 2023). Furthermore, good practice in managing ENT symptoms requires an understanding of the underlying factors examined over different periods within varied populations, as demonstrated in studies advocating the necessity for targeted healthcare practices (Ahmad et al., 2016).

However, the claim regarding gender differences and the risk for ear infections needs clarification; existing literature indicates that boys commonly show increased vulnerability to various infections, but our data suggest lower risk for males in this analysis (AOR = 0.388) (Burova et al., 2018), highlighting the need for further exploration of this discrepancy. Pregnancy status emerged as a risk factor; pregnant individuals exhibited heightened risk for ear infections (AOR = 2.575), which may be attributed to physiological changes during pregnancy that affect immune functioning (Burova et al., 2018).

For nasal infections, the risk was somewhat higher in the 11-20 age group (AOR = 1.294). This increase reflects trends observed in other studies, indicating that adolescents and young adults face heightened risk, possibly due to active lifestyles and school attendance that increase exposure (Ali

et al., 2018). Interestingly, gender was linked to a slightly higher risk for nasal infections in males (AOR = 1.037), which may reflect behavioural factors rather than significant biological predispositions (Tekiner et al., 2019). Conversely, pregnancy did not significantly elevate the risk for nasal infections, suggesting that hormonal and immunological adaptations might provide some protective mechanisms (Burova et al., 2018).

The study also identified pregnancy status as a significant variable influencing the severity of ENT diseases, consistent with findings by Piccioni et al. (2019), who examined epistaxis in pregnant women and linked it to hormonal changes that increase nasal mucosal vascularity and fragility. These physiological changes may contribute to a higher prevalence of mild ENT conditions during pregnancy. The current study's results, showing a greater incidence of mild cases among pregnant individuals compared to non-pregnant counterparts, support this association. These findings underscore the importance of targeted public health interventions to address ENT health during pregnancy, as advocated by Ali et al. (2025).

5.1.4 Medical Treatment Modality and Care Given at the ENT Unit

Findings from this current study indicate that analgesics were the most frequently administered treatment, accounting for 44.12% of total prescriptions over the four years. The increase in analgesics from 359 (9.16%) in 2021 to 2249 (59.12%) in 2024 may reflect a growing awareness of the importance of pain management in ENT practice. Analgesics play a crucial role in improving patient comfort and treatment adherence, aligning with findings from studies that emphasise effective pain control as a fundamental aspect of care (Naqvi et al., 2023; Shah & Fayyaz, 2019). Conversely, the usage of antibiotics saw a marked decline from 2713 (69.23%) in 2021 to 658 (17.30%) in 2024, while still constituting 34.25% of the total treatments administered. This reduction may be attributed to an increasing recognition of antibiotic stewardship and the

differentiation between viral and bacterial infections within the ENT domain. Research indicates that a significant proportion of respiratory infections, including those affecting the ENT, are viral in origin, leading to a more judicious approach to antibiotic use (Mahato & Mahato, 2023; Naqvi et al., 2023). Additionally, the enhancement in understanding the microbiological landscape of chronic rhinosinusitis may account for this decline, as providers are more cognizant of the effects of over-prescribing antibiotics and the associated emergence of resistance (Mahato & Mahato, 2023). Chronic rhinosinusitis is one of the most common ENT conditions, frequently leading to repeat consultations. Historically, it has been prone to over-treatment, especially with antibiotics.

The prescription rates of emollient/hyperosmotic agents and antiseptic/antifungal agents align with the management of conditions involving mucus production and infection control, although the references do not directly support this specific utilization in ENT practices. Thus, this remains an area requiring further substantiation (Merza & Abdulkhaleq, 2021). Interestingly, the minimal use of nutritional supplements, antacids, and corticosteroids suggests a focused treatment guideline that prioritizes immediate symptomatic relief. This observation aligns with the general tendency in ENT practice to prioritize direct interventions over supplementary treatments unless explicitly indicated (Lukama et al., 2023).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The retrospective review of ear, nose, and throat disorders at the Ho Teaching Hospital (HTH) from 2021 to 2024 provides critical insights into the clinical characteristics and trends of patients attending the ENT clinic.

The socio-demographic characteristics revealed a predominance of pediatric cases, particularly among children aged 1–10, who comprise the largest patient group. The study also noted a higher representation of female patients, highlighting demographic trends that may influence healthseeking behaviours and disease burden. These findings underscore the need for tailored public health strategies for pediatric and female populations.

Clinical characteristics demonstrated a dynamic shift in disease trends over the review period. While ear infections initially dominated, their prevalence declined significantly, coinciding with a rise in head and neck conditions. Common diagnoses included impacted cerumen, acute otitis externa, and acute nasopharyngitis, reflecting evolving disease patterns possibly influenced by environmental, behavioral, and healthcare factors.

The association between socio-demographic characteristics and disease type, presentation pattern, and severity revealed significant correlations. Younger age, female gender, and pregnancy status were all statistically associated with specific ENT conditions and severity levels. These insights support the need for more nuanced diagnostic and management approaches that account for demographic-related risks.

The evaluation of treatment modalities indicated a substantial increase in the use of analgesics and a concurrent reduction in antibiotic prescriptions. This trend suggests a positive shift towards more rational, evidence-based prescribing practices, likely driven by increased awareness of antimicrobial resistance and a better understanding of disease etiology. Additionally, the use of emollient/hyperosmotic agents and antiseptic/antifungal treatments corresponds with mucus regulation and infection control strategies, though further research is needed to establish their precise role in ENT practice. The minimal reliance on nutritional supplements, antacids, and corticosteroids suggests a focused therapeutic approach that prioritizes immediate symptomatic

relief. The findings advocate strengthened, targeted interventions and continued improvements in ENT care delivery to address the evolving needs of the patient population.

6.2 Recommendation

1. This study found a significantly higher incidence of ENT conditions among children aged 1–10 years, who accounted for 28.93% of all cases. However, other studies mentioned in the discussion, like O'Neill et al. (2023), showed different age patterns, with some ENT conditions being more common in older age groups in various situations. Given this discrepancy, further investigation is warranted to identify the underlying factors driving the high burden of ENT conditions among children in the Ho municipality. Consequently, it is recommended that hospital management and the University of Health and Allied Sciences conduct additional research to inform evidence-based interventions and optimize ENT services for this demographic.
2. The high use of analgesics, which accounted for 44.12% of all prescriptions over the fouryear period and increased dramatically from 9.16% in 2021 to 59.12% in 2024, suggests a growing reliance on pain management in ENT care. While this trend matches what Naqvi

   et al. (2023) and Shah and Fayyaz (2019) found about the need for effective pain control to help patients feel better and stick to their treatment, it also raises worries about too many prescriptions and dependency, especially since there are no standard ways to assess pain. So, the hospital management, medical director, pharmacy department, and ENT health professionals should think about doing more research to see if the way they prescribe analgesics in ENT clinics is appropriate, create guidelines based on evidence for managing

pain in ENT care, and regularly check how often analgesics are prescribed to avoid relying too much on them.

3. The significant association between pregnancy and certain ENT conditions, such as the increased risk for ear infections (AOR = 2.575) and a higher incidence of mild ENT cases highlights the unique vulnerability of pregnant individuals due to physiological and immunological changes. This agrees with research by Burova et al. (2018) and Piccioni et al. (2019), which link ENT symptoms during pregnancy to hormonal changes affecting the blood flow in the nose and the immune system. In response, the Ministry of Health should develop policies and guidelines for ENT care during pregnancy, launch public health campaigns to raise awareness, and allocate resources to support ENT services for pregnant individuals. The Ghana Health Service should develop standardized protocols and training modules for antenatal care providers, particularly midwives, to identify ENT symptoms early and facilitate timely referrals. The Ho Teaching Hospital should integrate ENT care into prenatal services, provide training for healthcare providers, and regularly screen and monitor pregnant individuals for ENT conditions. These steps will enable early identification and management of ENT conditions, improving health outcomes for pregnant individuals. These coordinated efforts will improve maternal health outcomes and address the overlooked burden of ENT conditions during pregnancy.
4. To address the rising incidence of head and neck conditions and support effective treatment, the hospital management and procurement should invest in modern diagnostic equipment, and with the collaboration of the medical director, should ensure continuous professional development for ENT specialists.

REFERENCES

Aa, T., F, B., Ka, A., & Aa, Y. (2025). Epidemiological Profile and Diagnostic Aspects of Pediatric Ear, Nose and Throat (ENT) Pathologies at the Renaissance University Hospital Center in N'Djamena, Chad. *Otolaryngology Open Access Journal*, *10*, 1–11. https://doi.org/10.23880/ooaj-16000303

Adjeso, T., Damah, M., & Murphy, J. (2017). Emergency Ear, nose and throat admissions in northern ghana. *Postgraduate Medical Journal of Ghana*, *6*(2), 83–85.

Adjeso, T., Damah, M. C., & Murphy, J. (2022). Emergency Ear, Nose and Throat Admissions in Northern Ghana. *Postgraduate Medical Journal of Ghana*, *6*(2), 83–85. https://doi.org/10.60014/pmjg.v6i2.120

Adjeso, T., Damah, M. C., Murphy, J. P., & Anyomih, T. T. K. (2017). Foreign Body Aspiration in Northern Ghana: A Review of Pediatric Patients. *International Journal of Otolaryngology*, *2017*, 1–4. https://doi.org/10.1155/2017/1478795

Adjeso, T., Dzantor, E. K., & Adjeso, Y. N. (2023). Ear, Nose and Throat Specialty as a Future Career Preference for Medical Students in Northern Ghana. *Postgraduate Medical Journal of Ghana*, *12*(2), 80–85. https://doi.org/10.60014/pmjg.v12i2.335

Agrawal, S., & Velankar, H. (2020). Study on Prevalence of Foreign Bodies in ENT. *Integrative Journal of Medical Sciences*, *7*. https://doi.org/10.15342/ijms.7.219

Agyemang, C. O., Cobbinah, J., Nyame, H. A., Opoku, A. O., & Opoku, O. A. (2023). Knowledge, Perception and Attitude on Otitis Media Among Parents With Children 5 Years and Below. *Interdiciplinary Journal and Hummanity (Injurity)*, *2*(9), 847–866. https://doi.org/10.58631/injurity.v2i9.129

Agyemang, C. O., & Opoku, O. A. (2025). The Absence of ENT Clinics and Healthcare Access for Residents in Adankwame, Ghana. *Journal of Health Sciences and Medical Development*, *4*(01), 20–32.

Ahmad, M., Kurawa, Z. M., Shuaibu, I. Y., & Yahaya, G. (2016). Microbiological Assessment of Bacterial Isolates From Ear, Nose and Throat (ENT) Among Patients Attending Aminu Kano Teaching Hospital. *Nigerian Journal of Basic and Applied Sciences*, *24*(1), 15. https://doi.org/10.4314/njbas.v24i1.3

Akinterinwa, E. T., Olusola-Makinde, O. O., Oladunmoye, M. K., Bayode, M. T., & Akinbohun, A. (2023). Prevalence and antibiogram profile of bacteria associated with throat infections in Akure metropolis, Ondo State, Nigeria. *Microbes and Infectious Diseases*, *4*(1), 83–93. https://doi.org/https://doi.org/10.21608/mid.2022.120764.1246

Alan, M. A. (2023). Our Results of the School-Age Hearing Screening Program. *Praxis of Otorhinolaryngology*, *11*(1), 18–22. https://doi.org/10.5606/kbbu.2023.49358

Alenezi, M., Al-Harbi, F. A., Alharbi, R., Alayed, A. S., Al-Oadah, E. K., Almutairi, F., & Alanazi, M. (2024). Awareness and Knowledge of Common ENT-Related Issues Among the Population in the Qassim Region: A Cross-Sectional Study. *Cureus*. https://doi.org/10.7759/cureus.71785

Alenezi, N. G., Alenazi, A. A., Elboraei, Y. A. E., Alenazi, A. A., Alanazi, T. H., Alruwaili, A., Alanazi, A., Alruwaili, B. K., & Alanazi, A. F. (2017). Ear Diseases and Factors Associated With Ear Infections Among the Elderly Attending Hospital in Arar City, Northern Saudi Arabia. *Electronic Physician*, *9*(9), 5304–5309. https://doi.org/10.19082/5304

Alhazmi, W., Almutairi, A., Almuqbil, A. A., Al-Ali, A., & Alhasson, M. A. (2021). Pattern of Ear,

Nose, and Throat Disease Seen by Otolaryngologists at Qassim University Outpatient Clinics, Saudi Arabia. *International Journal of Medicine in Developing Countries*, 1430–1436. https://doi.org/10.24911/ijmdc.51-1623238530

Ali, L., Khan, S. M., Israr, H., & Furqan, A. (2018). Sore Throat. *The Professional Medical Journal*, *25*(09), 1421–1425. https://doi.org/10.29309/tpmj/18.4507

Ali, M. A., Taishan, W. S., Almaymoni, A. A., Al Sulaiman, I. N., Althunayyan, T. S., Abdullah, Z. A., Alharbi, M., Alalwani, H. H., Alzahrani, T. M., & Felemban, G. (2025). Prevalence of Ear, Nose, and Throat Problems in Saudi Arabia: A Cross-Sectional Study. *Cureus*, *17*(1). https://doi.org/https://doi.org/10.7759/cureus.76927

Almarshad, T. A., Alsaiari, A. S., Qaq, W. M., Alshehab, M. M., Almosfer, W. A., Al Eid, M. R., Asery, S. A., & Bindayna, M. K. (2018). Pediatric pharyngitis: etiology and management approaches. *The Egyptian Journal of Hospital Medicine*, *70*(11), 2000–2003. https://doi.org/https://doi.org/10.12816/0044857

Amedofu, G. (2019). Environmental risk factors for ENT diseases in rural Zambia. *African Journal of Health Sciences*, *15(3)*,, 45–52.

Assiry, A. A., Khan, S. D., Al-Shubrmi, H. R., Al-Shammary, D. H., Al-Fahhad, H. M., AlShammary, A. F., Al-Shammari, T. N., & Al-Shammari, A. F. (2020). Head and neck congenital anomalies in neonate hospitals in Hail, Saudi Arabia. *International Journal of Clinical Pediatric Dentistry*, *13*(2), 160.

Babar, A., Fatima, M., Fatima, Z., Batool, S., Khan, M. S. G., Mukhtar, F., & Mazhar, F. (2023). Prevalence of Hearing Impairment With Respect of Age and Gender in Patient With Otitis Media. *3*(2), 618–622. https://doi.org/10.61919/jhrr.v3i2.150

Baljošević, I., Šubarević, V., Stanković, K., Opančina, A. B., Novković, M., & Petrović, M. (2024). The Efficacy of Paraprobiotic Lozenges (Lactobacillus Helveticus MIMLh5) for the Prevention of Acute and Chronic Nose and Throat Infections in Children. *Medicina*, *60*(8), 1235. https://doi.org/10.3390/medicina60081235

Bhat, V. K., Paramu, A. T., & Nagachar, S. (2018). Predisposing Sinonasal Disease Foci: Do They Really Affect Mucosal Chronic Otitis Media? *Annals of Otology and Neurotology*, *01*(02), 100–104. https://doi.org/10.1055/s-0038-1636944

Bozlak, Ç. E. B., Bozkurt, H. B., Öziç, C., & Yılmaz, A. (2021). The Presence of Mef (E) and Erm (B) Genes in Throat Samples of Children Infected with Streptococcus pyogenes. *Journal of Contemporary Medicine*, *11*(4), 445–451. https://doi.org/https://doi.org/10.16899/jcm.884444

Briggs, D. C., Ikenga, V. O., Oparaodu, U. A., & Mbak, E. (2022). The pattern of paediatric otorhinolaryngological disorders seen at the Rivers State University Teaching Hospital, South-south Nigeria: a 3-year review. *Pan African Medical Journal*, *42*(1).

Burova, N., Bychkova, V., & Shephard, A. (2018). Improvements in Throat Function and Qualities of Sore Throat From Locally Applied Flurbiprofen 8.75 Mg in Spray or Lozenge Format: Findings From a Randomized Trial of Patients With Upper Respiratory Tract Infection in the Russian Federation. *Journal of Pain Research, Volume 11*, 1045–1055. https://doi.org/10.2147/jpr.s149331

Dąbrowska-Bień, J., Skarżyński, H., Gos, E., Gwizdalska, I., Lazecka, K. B., & Skarżyński, P. H. (2018). Clinical Evaluation of a Polish Translation and Cross-Cultural Adaptation of the Nasal Obstruction Symptom Evaluation (NOSE) Scale. *Medical Science Monitor*, *24*, 7958–7964. https://doi.org/10.12659/msm.909934

Datonye, D., Akpan, B., & Okorie, E. (2022). 'Impact of poor sanitation on the prevalence of infection-related ENT disorders in low-income communities in Nigeria'. *African Journal of Otolaryngology,, 10(3)*, 345–358.

De Rosis, S. (2024). Performance measurement and user-centeredness in the healthcare sector: Opening the black box adapting the framework of Donabedian. *The International Journal of Health Planning and Management*, *39*(4), 1172–1182.

Demir, D., Yılmaz, M., Güven, M., Kara, A., Elden, H., & Erkorkmaz, Ü. (2018). Comparison of clinical outcomes of three different packing materials in the treatment of severe acute otitis externa. *The Journal of Laryngology & Otology*, *132*(6), 523–528. https://doi.org/https://doi.org/10.1017/s0022215118000828

Desalew, A., Gelano, T. F., Semahegn, A., Geda, B., & Ali, T. (2020). Childhood Hearing Impairment and Its Associated Factors in Sub-Saharan Africa in the 21st Century: A Systematic Review and Meta-Analysis. *Sage Open Medicine*, *8*. https://doi.org/10.1177/2050312120919240

Douglas, C. M., Altmyer, U., Cottom, L., Young, D., Redding, P., & Clark, L. J. (2019). A 20-year observational cohort of a 5 million patient population—Tonsillectomy rates in the context of two national policy changes. *Clinical Otolaryngology*, *44*(1), 7–13. https://doi.org/https://doi.org/10.1111/coa.13233

Dzodzomenyo, M., Akoto, A., & Botwe, B. O. (2021). ENT conditions in the Volta Region of

Ghana: A socio-demographic perspective. *Journal of Ear, Nose, and Throat Disorders, 12(2),* 205– 215.

Farhat, F., Daulay, E. R., & Darlan, D. M. (2019). Ent Examination and Cerumen Removal in Letjen Jamin Ginting Junior High School, Berastagi. *Abdimas Talenta Jurnal Pengabdian Kepada Masyarakat*, *4*(2), 173–181. https://doi.org/10.32734/abdimastalenta.v4i2.2814

Garg, J., Castro, F. D., & Puttasidiah, P. (2022). Ear, Nose, and Throat Foreign Bodies in the Paediatric Population: Did the COVID-19 Lockdown Change Anything? *Cureus*. https://doi.org/10.7759/cureus.27892

Ghana Statistical Service. (2021). Population and Housing Census: Population of Regions and Districts. *Ghana Statistical Service*.

Gordon, B. S., Shapiro, D., & Stevens, D. (2020). Gender differences in the presentation of chronic

and recurrent ENT conditions in the United States. *The Laryngoscope, 130(9),* 2032–2038.

Gowda, S., Leong, W. S., & Edafe, O. (2022). Day-case discharge criteria and safety of children undergoing adenoidectomy and tonsillectomy for obstructive symptoms—A systematic review. *Clinical Otolaryngology*, *47*(5), 553–560. https://doi.org/https://doi.org/10.1111/coa.13946

Guo, Z., Ji, W., Song, P., Zhao, J., Yan, M., Zou, X., Bai, F., Wu, Y., Guo, Z., & Song, L. (2024). Global, regional, and national burden of hearing loss in children and adolescents, 1990–2021: a systematic analysis from the Global Burden of Disease Study 2021. *BMC Public Health*, *24*(1), 2521. https://doi.org/10.1186/s12889-024-20010-0

Gupta, T. K., Kasaudhan, S. M., Paudyal, V., Bharati, P., & Hamal, K. (2023). Patterns of Ent Problems Under General Practice in Rural Hospital of High Altitude. *Journal of Chitwan Medical College*, *13*(1), 2–5. https://doi.org/10.54530/jcmc.1266

Gupta, V. P., & Gupta, A. (2019). Pattern of Paediatric Ear, Nose and Throat Disorders in a District Hospital. *International Journal of Otorhinolaryngology and Head and Neck Surgery*, *5*(2),

403. https://doi.org/10.18203/issn.2454-5929.ijohns20190768

Hadid, F., Hakimi, M., Oulghoul, O., Benhommad, O., Rochdi, Y., & Raji, A. R. (2021). Cystic Adenoid Carcinomas in Ear, Nose and Throat: Unusual Localizations and a Literature Review. *European Journal of Medical and Health Sciences*, *3*(2), 53–59. https://doi.org/10.24018/ejmed.2021.3.2.752

Haile, L. M., Kamenov, K., Briant, P. S., Orji, A. U., Steinmetz, J. D., Abdoli, A., Abdollahi, M., Abu-Gharbieh, E., Afshin, A., Ahmed, H., Ahmed Rashid, T., Akalu, Y., Alahdab, F., Alanezi, F. M., Alanzi, T. M., Al Hamad, H., Ali, L., Alipour, V., Al-Raddadi, R. M.,…Chadha, S. (2021). Hearing loss prevalence and years lived with disability, 1990–2019: findings from the Global Burden of Disease Study 2019. *The Lancet*, *397*(10278), 996–1009. https://doi.org/10.1016/S0140-6736(21)00516-X

Hayat, C., & Soenandi, I. A. (2024). Hybrid Architecture Model of Genetic Algorithm and Learning Vector Quantization Neural Network for Early Identification of Ear, Nose, and Throat Diseases. *Journal of Information Systems Engineering and Business Intelligence*, *10*(1), 1–12. https://doi.org/10.20473/jisebi.10.1.1-12

Hayois, L., & Dunsmore, A. (2023). Common and serious ENT presentations in primary care. *InnovAiT*, *16*(2), 79–86.

Jamwal, S., Kalsotra, G., Manhas, M., Raina, A., Kalsotra, P., Islam, O. U., & Youshita. (2021). A Study on Otorhinolaryngological Manifestations in Pregnant Women. *International Journal of Otorhinolaryngology and Head and Neck Surgery*, *7*(12), 1889. https://doi.org/10.18203/issn.2454-5929.ijohns20214680

Jaradeh, K., Tang, A., Czechowicz, J. A., Jacobson, L., & Raphael, E. (2023). Prevalence of Otolaryngological Disease in a Refugee Population Compared to <scp>US-born</Scp> Patients. *Laryngoscope investigative otolaryngology*, *8*(2), 394–400. https://doi.org/10.1002/lio2.1021

John, T. J., & Kompithra, R. Z. (2023). Eco-epidemiology triad to explain infectious diseases. *Indian J Med Res*, *158*(2), 107–112. https://doi.org/10.4103/ijmr.ijmr_3031_21

Kim, S. K., Han, S. J., Hong, S. J., & Hong, S. M. (2022). Microbiome of acute otitis externa. *Journal of Clinical Medicine*, *11*(23), 7074. https://doi.org/https://doi.org/10.3390/jcm11237074

Kitcher, E. D., Jangu, A., & Antwi, B. (2007). Hearing impairment among children in Ghana: A study at the Korle Bu Teaching Hospital. *West African Journal of Medicine,, 26(2),* 118–122.

Kumari, M. S., Madhavi, J., Meghanadh, K., & Jyothy, A. (2016). A Large Study on Otological Diseases from South India: A Decade Report. *J Ear Nose Throat Disord*, *1*(1), 1003.

Kwaśniewska, A., Kwaśniewski, K., Skorek, A., Tretiakow, D., Jaźwińska-Curyłło, A., & Burduk, P. (2023). Correlation of ENT Symptoms With Age, Sex, and Anti-Sars-CoV-2 Antibody Titer in Plasma. *Journal of Clinical Medicine*, *12*(2), 610. https://doi.org/10.3390/jcm12020610

Lim, Z. H., Soo, Y. P., & Loo, J. H. Y. (2020). Clinical Profiles of Patients Referred to an Ear, Nose and Throat Specialist Clinic via Community Mobile Hearing Clinic in Singapore. *Proceedings of Singapore Healthcare*, *30*(4), 286–293. https://doi.org/10.1177/2010105820979322

Lipska, J., Hamerska, J., Hamerska, L., Bocianiak, B., Antczak, J., Kajka, A., Fenrych, U., Wojtczak, K., Skupińska, O., & Ruta, D. (2024). Swimmer's ear: Prevention, Diagnosis, Treatment, and Management Strategies for Athletes. *Quality in Sport*, *18*, 53330–53330. https://doi.org/https://doi.org/10.12775/qs.2024.18.53330

Liu, Y., Huang, X., Li, P., Wang, D., Yin, H., Wang, N., Luo, Y., Li, H., & Sun, S. (2023). Clinical Profile and Outcome Analysis of Ear-Nose-Throat Symptoms in SARS-CoV-2 Omicron Subvariant Infections. *International Journal of Public Health*, *68*, 1606403. https://doi.org/https://doi.org/10.3389/ijph.2023.1606403

Lukama, L., Aldous, C., Kuhn, W., Michelo, C., & Kalinda, C. (2024). Ten years of ear, nose and throat (ENT) services in Southern Africa: a scoping review. *Glob Health Action*, *17*(1), 2370102. https://doi.org/10.1080/16549716.2024.2370102

Lukama, L., Aldous, C., Michelo, C., & Kalinda, C. (2023). Ear, Nose and Throat (ENT) Disease Diagnostic Error in Low-Resource Health Care: Observations From a Hospital-Based Cross-Sectional Study. *Plos One*, *18*(2), e0281686. https://doi.org/10.1371/journal.pone.0281686

Macdonald, D., Ayodele, O. J., Theophilus, U. I., & Ernest, N. (2022). Distribution of Ear, Nose and Throat (ENT) Lesions: An Eleven Year Retrospective Study. *International Journal of*

Family & Community Medicine, *6*(1), 38–41. https://doi.org/10.15406/ijfcm.2022.06.00261

Mahato, R. K., & Mahato, G. (2023). Traditional Use of Medicinal Plants against ENT Diseases by the Tribals of Purulia District, West Bengal, India. *Pharmacognosy Research*, *15*(4). https://doi.org/https://doi.org/10.5530/pres.15.4.073

Mansour, L. M. W., boutros, P. E., & Nahas, L. D. (2023). A Study of Chronic Suppurative Otitis Media Among Patients in Damascus Hospital. https://doi.org/10.21203/rs.3.rs-3287100/v1

Merza, H., & Abdulkhaleq, H. (2021). The Gastroesophageal Disease and Its Association to Ear, Nose, Throat Complaints. *International Journal of Otolaryngology and Head &Amp Neck Surgery*, *10*(05), 337–344. https://doi.org/10.4236/ijohns.2021.105030

Mettias, B., Jenkins, D., & Rea, P. (2023). Ten-year prevalence of acute hospital ENT infections and the impact of COVID: A large population study. *Clinical Otolaryngology*, *48*(1), 10–16. https://doi.org/https://doi.org/10.1111/coa.13978

Milani, G. P., Rosa, C., Tuzger, N., Alberti, I., Ghizzi, C., Zampogna, S., Amigoni, A., Agostoni, C., Peroni, D., & Marchisio, P. (2023). Nationwide survey on the management of pediatric pharyngitis in Italian emergency units. *Italian journal of pediatrics*, *49*(1), 114. https://doi.org/https://doi.org/10.1186/s13052-023-01514-8

Mors, M., Bohr, C., Fozo, M. S., & Shermetaro, C. (2020). Consultation Intervention Rates for the Otolaryngology Service: A Large Metropolitan Hospital Experience. *Spartan Medical Research Journal*, *4*(2). https://doi.org/10.51894/001c.11596

Mulwafu, W., Ensink, R., Kuper, H., & Fagan, J. (2017). Survey of ENT services in sub-Saharan Africa: little progress between 2009 and 2015. *Glob Health Action*, *10*(1), 1289736. https://doi.org/10.1080/16549716.2017.1289736

Naqvi, S., Ahmad, M., Akhter, M., Yadav, A., Singh, A., Ahmad, J., & SHAMS, A. R. (2023). Drug utilization pattern and adverse drug reaction monitoring of antibiotics use in ear, nose and throat infection at tertiary care hospital, Lucknow, India. *Authorea Preprints*. https://doi.org/https://doi.org/10.22541/au.167925245.50477547/v1

Nyarko, E., & Antwi, K. (2020). ENT care in rural Ghana: challenges and future directions. *Ghana Medical Journal*, *54(4)*, 38–45.

O'Handley, J. G., Tobin, E. J., & Shah, A. R. (2020). Otorhinolaryngology. *Textbook of family medicine*, 300.

O'Neill, S., Begg, S., & Spelten, E. (2023). A five year descriptive analysis of potentially preventable hospitalisations for Ear, Nose, and Throat conditions in regional Victoria, Australia, from 2015 to 2020. *BMC Public Health*, *23*(1), 1536.

Ogunleye, A. O., Olumide, Y., & Ojo, A. (2020). Burden of ENT conditions in West Africa: a case study of Nigeria and Kenya. *African Journal of Medicine, 33(2)*, 88–97.

Olajide, T., Aremu, K., Esan, O., Dosunmu, A., & Raji, M. (2018). Topical Ear Drop SelfMedication Practice Among the Ear, Nose, and Throat Patients in Ido Ekiti, Nigeria: A Cross - Sectional Study. *Annals of African Medicine*, *17*(2), 70. https://doi.org/10.4103/aam.aam_28_17

Olusola, A., Gbadebo, F., & Tunde, S. (2022). ENT conditions and infectious diseases: the African perspective. *Pan-African Medical Journal*, *18(4)*, 210–218.

Prasetyo, S., & Utami, I. S. (2023). Pattern of Pharyngitis and Tonsillitis Patients at ENT Clinic of Wlingi Hospital in 2019-2021. *Jurnal Kedokteran Brawijaya*, 182–186. https://doi.org/10.21776/ub.jkb.2022.032.03.8

Puttasiddaiah, P. M., Morris, S., Dwamena, S., & Sanu, A. (2021). Attend anywhere clinic: A virtual outpatient clinic experience in otolaryngology during the COVID-19 pandemic. *Laryngoscope investigative otolaryngology*, *6*(3), 586–589. https://doi.org/https://doi.org/10.1002/lio2.557

Raj, A., Wadhwa, V., & Jain, A. (2019). Epidemiological Profile of ENT Emergencies: Our Experience. *Indian J Otolaryngol Head Neck Surg*, *71*(Suppl 1), 301–304. https://doi.org/10.1007/s12070-018-1284-9

Rajput, M. S.-e.-A., Rajput, M. S. A., Arain, A. A., Zaidi, S., Hatem, A., & Akram, S. (2020). Mucosal Type of Chronic Suppurative Otitis Media and the Long-Term Impact on Hearing Loss. *Cureus*. https://doi.org/10.7759/cureus.10176

Sagar, T. V., Kumar, S., & Patnaik, S. (2018). Evaluation of rationality, efficacy and tolerability of antimicrobials prescribed for acute pharyngitis at a teaching hospital in India. *Asian Journal of Pharmacy and Pharmacology*, *4*(6), 878–882. https://doi.org/https://doi.org/10.31024/ajpp.2018.4.6.24

Sefah, I. A., Dzonu, I. R., Korbuvi, J., Aku, T. A., Alqifari, S., Kurdi, A., Godman, B., & Bangalee, V. (2025). A retrospective clinical evaluation of the quality of antibiotic use in treating ear,

nose and throat infections in ambulatory care setting of a teaching hospital in Ghana: findings and implications. *BMC Infectious Diseases*, *25*(1), 557. https://doi.org/10.1186/s12879-025-10967-7

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian journal of dermatology*, *61*(3), 261–264.

Shah, Q., & Fayyaz, S. (2019). Frequency of Diseases Presenting in ENT OPD at Ayub Teaching Hospital Abbottabad. *Sanamed*, *14*(2), 175–180. https://doi.org/10.24125/sanamed.v14i2.315

Shahsavari, F., Jolehar, M., & Nikpasand, M. (2017). Prevalence of Head and Neck Cancer in Gilan Province, Iran: A 10-Year Study. *Journal of Research in Dental and Maxillofacial Sciences*, *2*(3), 1–4.

Sonbol, F., Abdelaziz, A., El-banna, T., & Farag, O. (2022). Detection and Characterization of Staphylococcus Aureus and Methicillin-Resistant S. Aureus (MRSA) in Ear Infections in Tanta, Egypt. *Journal of Advanced Medical and Pharmaceutical Research*, *0*(0), 0–0. https://doi.org/10.21608/jampr.2022.130700.1026

Srinivasan, D., & Raja, K. (2024). Common Ear, Nose, and Throat Disorders in Childhood. https://doi.org/10.5772/intechopen.1006071

Suri, A., Bhagat, B., Gadgotra, P., Kishore, K., & Kotwal, S. (2016). ENT manifestations in pregnancy. *JK Science*, *18*(2), 85.

Swain, S. K., & Pattnaik, T. (2021). Otorhinolaryngological manifestations in pregnant women. *Medical Journal of Dr. DY Patil University*, *14*(4), 374–379.

Ta, N. (2019). ENT in the context of global health. *The Annals of The Royal College of Surgeons of England*, *101*(2), 93–96.

Ta, N. H. (2019). ENT in the context of global health. *Ann R Coll Surg Engl*, *101*(2), 93–96. https://doi.org/10.1308/rcsann.2018.0138

Tekiner, S., YeĞİN, H., Peker, A. G. C., ÇAylak, M., & ÇÖLgeÇEn, A. (2019). A Rare Cause of Nonresponsive Tonsillitis in the Primary Care Setting: Acute Myeloid Leukemia. *Turkiye Klinikleri Journal of Case Reports*, *27*(3), 137–140. https://doi.org/10.5336/caserep.2018-64138

Uğur, C., & Yüksel, F. (2023). Analysis of Ear Nose Throat Consultations Requested From the

Pediatric Emergency Service in a Tertiary Hospital. *Pediatric Emergency Care*, *39*(5), 342–
346. https://doi.org/10.1097/pec.0000000000002911

University of Texas Arlington. (2023). *Quantitative research design.* Retrieved 20/12/2024 from https://libguides.uta.edu/quantitative (

van der Velden, A. W., Sessa, A., Altiner, A., Pignatari, A. C. C., & Shephard, A. (2020). Patients with sore throat: a survey of self-management and healthcare-seeking behavior in 13 countries worldwide. *Pragmatic and observational research*, 91–102. https://doi.org/ https://doi.org/10.2147/por.s255872

WHO. (2021). *World report on hearing*. Retrieved 5/11/2025 from https://www.who.int/publications/i/item/9789240020481?utm_source=chatgpt.com

WHO Africa. (2024, 07/10/2024). *Burden of hearing loss in Africa could rise to 54 million by 2030: WHO report*. WHO. Retrieved 22/04/2025 from https://www.afro.who.int/news/burden-hearing-loss-africa-could-rise-54-million-2030who-report

World Health Organization. (2021). *Hearing loss: Estimates of global prevalence and hearing healthcare needs*. Retrieved 10/10/2024 from https://www.who.int/news-room/fact sheets/detail/deafness-and-hearing-loss

World Health Organization. (2025, 2/03/2021). *WHO: 1 in 4 people projected to have hearing problems by 2050*. WHO. Retrieved 22/04/2025 from https://www.who.int/news/item/02-03-2021-who-1-in-4-people-projected-to-have-hearing-problems-by-2050

Yaghoubi, F., Motlagh, A. E., & Esmaeilzadeh, M. (2024). The Impact of Pregnancy Associated Hormonal Changes on Sinusitis and Rhinitis: A Narrative Review. *Journal of Otorhinolaryngology and Facial Plastic Surgery*, *10*(1), 1–15.

Yang, J., Liu, F., Yang, C., Wei, J., Ma, Y., Xu, L., Xie, J., & Wang, J. (2025). Application of Donabedian Three-Dimensional Model in Outpatient Care Quality: A Scoping Review. *J Nurs Manag*, *2025*, 6893336. https://doi.org/10.1155/jonm/6893336

Yojana, S., Mehta, K., & Girish, M. (2012). Epidemiological profile of otorhinolaryngological emergencies at a medical college, in rural area of gujarat. *Indian Journal of Otolaryngology and Head & Neck Surgery*, *64*, 218–224.

Zeeshan, M., Zeb, J., Saleem, M., S, A. Z., Khan, A., & Tahir, M. J. (2018). ENT Diseases Presenting to a Tertiary Care Hospital. *Endocrinology&metabolism International Journal*,

6(6). https://doi.org/10.15406/emij.2018.06.00225

Zięba, N., Lisowska, G., Dadok, A., Kaczmarek, J., Stryjewska-Makuch, G., & Misiołek, M. (2022). Frequency and Severity of Ear–Nose–Throat (ENT) Symptoms During COVID-19 Infection. *Medicina, 58*(5), 623. https://doi.org/10.3390/medicina58050623

Appendices

Appendix 1: Ethical Clearance

ENSIGN GLOBAL
COLLEGE

OUR REF: ENSIGN/IRB/EL/SN-290/01
YOUR REF:

January 8, 2025

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Majeste Kouame
Ensign Global College
Kpong.

Dear Majeste,

ETHICAL CLEARANCE TO UNDERTAKE POSTGRADUATE RESEARCH

At the General Research Proposals Review Meeting of the *INSTITUTIONAL REVIEW BOARD (IRB)* of Ensign Global College held on Wednesday, January 8, 2025, your research proposal entitled **"Ear, Nose and Throat Conditions Presenting at the Specialized Clinic of the Ho Teaching Hospital in the Volta Region of Ghana: A Retrospective Review (2021 – 2024)"** was considered.

You have been granted Ethical Clearance to collect data for the said research under academic supervision within the IRB's frameworks and guidelines.

We wish you all the best.

Sincerely,

Dr. (Mrs.) Rebecca Acquaah-Arhin
IRB Chairperson

Appendix 2: Ethical Approval Letter

In case of reply the number
And the date of this
Letter should be quoted
My Ref. No. HTH-REC/
Your Ref. No....
Our Core Values:
- Commitment
- Accountability
- Dedication
- Integrity
- Professionalism
- Innovation
- Teamwork
- Safe Care

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P O BOX MA-374
HO
Tel: +233-(036) 2027318-20/2028207
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Email: info@hth.gov.gh
Website: www.hth.gov.gh

31st December, 2024

ETHICAL APPROVAL

Principal Investigator: **Dr. (Med) Majeste Kouame**

Protocol ID NO: **HTH-REC (44) FC_2024**

Protocol Title: **"Ear, Nose and Throat Conditions Presenting at The Specialized Clinic of The Ho Teaching Hospital in The Volta Region of Ghana: A Retrospective Review (2021 – 2024)."**

The Ho Teaching Hospital Research Ethics Committee upon considering the ethical merits has approved your proposal. This approval requires that you fulfil the following conditions.

- Submit periodic progress report during field work and submit final or study closure report to the HTH-REC.
- The HTH-REC may perform periodic monitoring and evaluation to ensure compliance with the protocol as approved.
- You are to report adverse event related to this study verbally within one week and in writing within two weeks.
- Any significant protocol amendment must be resubmitted to the committee for approval before implementation.
- You are required to notify the committee before publishing any research finding related to this study.

This approval is valid until **30th December, 2025** after which you have to apply for renewal. Please quote protocol identification number in future correspondence related to this protocol.

Rev. Dr. S.T.K. Dzokoto
Chairman
Ho Teaching Hospital Research Ethics Committee (HTH-REC)

Research Ethics Committee (REC)
Ho Teaching Hospital,
P.O. Box MA 374, HO, Ghana
Tel: 233-37-200-0180. Email: info@hth.gov.gh

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