Urbanisation and Health Sector Management in Enugu Urban, Enugu State Nigeria

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Abstract

The study examines the urbanisation and health sector management in Enugu Urban, Enugu State Nigeria. The specific objectives of the study were to: assess the impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban, evaluate the effect of rapid population growth and informal settlements on public health and disease prevalence in Enugu Urban and analyze government policies and urban planning strategies in addressing healthcare infrastructure deficits in Enugu Urban. The study employed primary and secondary sources of data. The population of the study was 1,586,200. Freund and Williams (1986) *formula was used to determine the sample size of 369. The collected data was analyzed through the use of mean score. The t-test analysis technique was applied in testing the hypotheses. The findings revealed that there is a significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban, that rapid population growth and informal settlements have a significant effect on public health and disease prevalence in Enugu Urban and that government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban. The study concluded that urbanization significantly affects health sector management in Enugu Urban, leading to increased demand for healthcare services. Rapid population growth and informal settlements contribute to poor sanitation, increased disease prevalence, and pressure on existing health services. The study recommended that the government should increase investment in healthcare infrastructure by expanding hospitals, upgrading existing facilities, and establishing more primary healthcare centers in underserved areas. Public-private partnerships should be strengthened to enhance funding, while medical equipment and essential drugs should be adequately supplied to meet the growing healthcare demands of urban residents.*

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1.Introduction

Urbanization in Nigeria has undergone rapid expansion in recent decades, leading to profound changes in the country's landscape and social fabric. According to the World Bank, Nigeria is one of the fastest urbanizing countries in Africa, with an urban growth rate of 4.7% per annum between 2010 and 2015 (World Bank, 2018). This urban influx has been driven by various factors, including rural-urban migration, natural population growth, and economic opportunities concentrated in urban centers. As a result, Nigeria's urban population is projected to reach 264 million by 2050, with significant implications for public health (United Nations, 2018). The importance of addressing public health challenges in urban areas cannot be overstated. Urbanization brings with it a unique set of health risks and vulnerabilities, ranging from overcrowding and inadequate sanitation to increased exposure to environmental pollutants and communicable diseases. These challenges are particularly acute in the context of low- and middle-income countries like Nigeria, where urban infrastructure and healthcare systems are often strained by rapid urban growth and limited resources (Oluwadare, 2020). Disparities in access to healthcare and social services exacerbate health inequities within urban populations, disproportionately affecting vulnerable groups such as women, children, and the urban poor (Obansa, 2019). Without concerted efforts to address these challenges, the health and well-being of millions of urban residents in Nigeria will remain at risk, hindering the country's progress towards achieving the Sustainable Development Goals (SDGs) and ensuring health for all (World Health Organization, 2020).

Urbanization in Enugu Urban has led to significant socio-economic transformations, but it has also posed challenges for health sector management. The rapid expansion of urban areas has increased the demand for healthcare services, placing immense pressure on existing medical infrastructure. Many public health facilities struggle with overcrowding, inadequate funding, and limited medical personnel, making it difficult to provide quality healthcare services (Okonkwo & Ume, 2022). A major issue is the rise of informal settlements, where access to clean water, sanitation, and healthcare is often inadequate. These conditions contribute to the spread of communicable diseases such as cholera, typhoid, and malaria (Eze et al., 2021). Additionally, the urban lifestyle has led to an increase in non-communicable diseases such as hypertension, diabetes, and respiratory illnesses due to pollution and sedentary living. Despite these challenges, efforts have been made to improve health management in Enugu Urban. Government initiatives, including healthcare infrastructure expansion and public-private partnerships, have aimed to enhance service delivery. However, better urban planning, investment in healthcare technology, and increased funding are required to address the growing health demands effectively (Nnaji & Okeke, 2023).

1. 2 Statement of the Problem

Urbanization plays a vital role in Nigeria’s socio-economic development by driving economic growth, industrialization, and improved living standards. Cities serve as hubs for trade, commerce, and innovation, attracting investments that create jobs and enhance productivity. Urban areas also provide better access to education, healthcare, and infrastructure, contributing to improved human capital development. Furthermore, urbanization fosters technological advancement and entrepreneurship, promoting industrial expansion and increased revenue generation. The concentration of skilled labor in cities boosts economic diversification, reducing dependence on agriculture and oil. However, rapid urbanization also presents challenges such as housing deficits, traffic congestion, and pressure on social services. Addressing these issues through effective urban planning and infrastructure development is

essential to maximizing the benefits of urbanization for Nigeria's long-term socio-economic growth. Urbanization in Enugu Urban has resulted in rapid population growth, leading to increased demand for healthcare services. However, the existing health infrastructure is struggling to keep pace with this expansion. Many public hospitals and clinics are overwhelmed by patient inflows, leading to overcrowding, long wait times, and inadequate medical resources. These challenges are exacerbated by insufficient government funding, poor urban planning, and limited healthcare personnel, making it difficult for residents to access quality healthcare services. One of the key concerns is the rise of informal settlements, where residents face poor sanitation, inadequate access to clean water, and limited healthcare facilities. These conditions contribute to the spread of communicable diseases such as malaria, cholera, and tuberculosis. Additionally, urban pollution and lifestyle changes have led to an increase in non-communicable diseases like hypertension, diabetes, and respiratory conditions, further straining the health sector. Addressing these issues requires a multi-sectoral approach, involving improved urban planning, increased investment in health infrastructure, and policies aimed at ensuring equitable access to healthcare services for all urban residents.

1.3 Objectives of the Study

i. Assess the impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban.
ii. Evaluate the effect of rapid population growth and informal settlements on public health and disease prevalence in Enugu Urban.
iii. Analyze government policies and urban planning strategies in addressing healthcare infrastructure deficits in Enugu Urban.

1.4 Research Questions

i. What is the impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban?
ii. What effect does rapid population growth and informal settlements have on public health and disease prevalence in Enugu Urban?
iii. How effective are the government policies and urban planning strategies in addressing healthcare infrastructure deficits in Enugu Urban?

1.5 Hypotheses

i. There is no significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban.
ii. Rapid population growth and informal settlements have no significant effect on public health and disease prevalence in Enugu Urban.
iii. Government policies and urban planning strategies are not effective in addressing healthcare infrastructure deficits in Enugu Urban.

2. Review of Related Literature

Conceptual Review

Urbanization

Urbanization refers to the process by which rural populations migrate to urban areas, leading to the expansion of cities and towns. It is driven by factors such as industrialization, economic opportunities, and improved infrastructure (United Nations, 2022). This transformation results

in increased population density, shifts in land use, and changes in social structures. Scholars classify urbanization into three main dimensions: demographic, economic, and spatial. Demographic urbanization occurs when a significant portion of a country's population resides in urban areas. Economic urbanization involves the transition from agrarian economies to industrial and service-driven economies (World Bank, 2021). Spatial urbanization refers to the physical expansion of cities, leading to challenges such as housing shortages, traffic congestion, and environmental degradation (UN-Habitat, 2023).While urbanization fosters economic growth, technological advancement, and improved access to services, it also presents challenges like urban poverty, slums, and environmental pollution (Chen et al., 2022). Sustainable urban planning is essential to mitigate these effects and ensure balanced development. Urbanization is the process by which rural areas transform into urban areas, characterized by the migration of people from rural to urban settings, leading to the growth of cities and towns. It involves a shift in population distribution, economic activities, and land use patterns, driven by factors such as industrialization, employment opportunities, and improved living standards (World Bank, 2023). Urbanization often results in increased infrastructure development, access to services, and economic diversification, but it can also lead to challenges such as overcrowding, environmental degradation, and socio-economic inequalities (UN-Habitat, 2022).

Health Sector Management

Health sector management refers to the administration, organization, and coordination of healthcare services to ensure efficiency, accessibility, and quality service delivery. According to WHO (2023), health sector management involves strategic planning, resource allocation, and policy implementation to improve population health outcomes. It encompasses human resources, financial management, healthcare infrastructure, and service delivery systems (World Bank, 2022). Robinson and Levis (2021) define health sector management as the process of organizing and optimizing healthcare resources to meet the demands of growing populations while ensuring cost-effectiveness and patient satisfaction. This includes hospital administration, public health management, and regulatory compliance. From a systems perspective, Meadows (2008) describes health sector management as a dynamic and adaptive system that integrates multiple stakeholders, including government agencies, healthcare providers, and private sector organizations. In urban settings like Enugu Urban, effective health sector management is critical due to rising population pressures, increased disease burdens, and limited healthcare resources. Strengthening health policies, digital health solutions, and capacity building are essential for ensuring sustainable healthcare service delivery.

Availability and Accessibility

Availability and accessibility are key concepts in resource distribution, service delivery, and infrastructure development. Availability refers to the presence of goods, services, or resources within a given area or system. It determines whether essential commodities such as healthcare, education, and clean water exist in sufficient quantity to meet demand (World Bank, 2022). Accessibility, on the other hand, refers to the ease with which individuals can reach and utilize available resources. It is influenced by geographical, economic, social, and infrastructural factors (UNDP, 2023). For example, while hospitals may be available in an urban area, accessibility may be limited by cost, transportation, or discriminatory practices (WHO, 2022). Ensuring both availability and accessibility is crucial for equitable development and social inclusion. Policymakers must implement strategies that not only increase resource supply but also remove barriers that hinder public access.

Rapid Population Growth and Informal Settlements

Rapid population growth refers to the swift increase in the number of people within a given area, often driven by high birth rates, declining mortality rates, and rural-to-urban migration (United Nations, 2023). This growth places immense pressure on urban infrastructure, public services, and economic opportunities, leading to challenges such as unemployment, traffic congestion, and housing shortages (World Bank, 2022). One of the major consequences of rapid urbanization is the expansion of informal settlements—unplanned residential areas that develop without government regulation or proper infrastructure (UN-Habitat, 2023). These settlements, commonly referred to as slums, lack basic services such as clean water, sanitation, electricity, and healthcare, exposing residents to poor living conditions and social exclusion (Davis, 2022).To address these challenges, sustainable urban planning, investment in affordable housing, and inclusive policies are essential. Governments and international organizations must implement strategies to integrate informal settlements into formal urban structures while ensuring access to essential services.

Government Policies and Urban Planning Strategies

Government policies play a crucial role in shaping urban development by providing frameworks for infrastructure, housing, transportation, and environmental sustainability (United Nations, 2023). These policies guide land use, zoning regulations, and public service delivery to ensure orderly and sustainable urbanization. Effective policies promote economic growth, social equity, and environmental conservation, while poorly implemented policies can lead to urban sprawl, congestion, and housing deficits (World Bank, 2022). Urban planning strategies refer to the systematic approaches used by governments and urban planners to design, regulate, and manage city growth. Key strategies include smart city development, mixed land-use planning, public-private partnerships (PPPs), and sustainable transport systems (UN-Habitat, 2023). Cities that adopt inclusive urban planning strategies tend to experience better housing, efficient mobility, and improved quality of life (OECD, 2022).To achieve sustainable urbanization governments must implement evidence-based policies that prioritize resilient infrastructure, environmental protection, and social inclusivity. Collaborative efforts between policymakers, private investors, and local communities are essential for long-term urban success.

Empirical Review

Musa et al (2024) focused on public health challenges and solutions in Urban Areas of Nigeria**.** Rapid urbanization in Nigeria has led to significant public health challenges, including overcrowding, limited access to healthcare, environmental pollution, and socioeconomic disparities. This article examines the multifaceted factors contributing to health challenges in urban Nigeria and explores strategies, successes, and recommendations for addressing them. Statement of the Problem Urban areas in Nigeria face complex public health challenges, including inadequate healthcare infrastructure, environmental pollution, and social inequalities, which pose significant barriers to improving health outcomes and well-being for urban residents. Qualitative method of study was employ in comprehensive review of existing literature, including peer-reviewed research articles, government reports, and policy documents, to analyze the public health challenges in urban Nigeria and identify successful interventions, community-driven projects, and partnerships between government and non-governmental organizations (NGOs) for health improvement. The study found out that the public health challenges in urban Nigeria are shaped by socioeconomic disparities, infrastructure inadequacies, environmental pollution, and a lack of healthcare infrastructure

and resources. These challenges exacerbate health inequities and hinder efforts to improve health outcomes in urban areas. Successful public health initiatives, such as mobile health clinics, mass immunization campaigns, and community-driven health projects, have demonstrated the effectiveness of targeted interventions, community engagement, and partnerships between government and NGOs in improving health outcomes and fostering community empowerment.

Nnadi et al (2024) determined the effects of urbanization on access to healthcare services by older adults in Nsukka Local Government Area. This study adopted a mixed method approach. While questionnaire was used to collect quantitative data, interviews were used to collect qualitative data for the study. Questionnaire survey was used to collect data from 1180 older adults between the ages of 60 years and above from six communities in the study area. Descriptive statistics and Chi square were used to analyze the data while frequency distribution tables and percentages were used to present the results. The research showed that there are inadequate health facilities for the older adults in rural communities in Nsukka LGA. It also found that the older adults suffered challenges arising from lack of medical doctors, nurses, equipments, and drugs for effective healthcare delivery. It is recommended that more efforts should be geared towards providing adequate health facilities and health workers by government at public hospitals in rural communities to increase accessibility and adequate utilization by the older adults.

Wang, and Wang (2024) examined the Impact of Urbanization on environmental Quality in Ecologically Fragile Areas: Evidence from Hengduan Mountain, Southwest China. With a focus on the human–environment interaction in 95 counties of Hengduan Mountain, an ecologically fragile region in southwestern China, in this study, we clarify the impact and mechanism of urbanization on environmental quality through the environmental regulation effect, using econometric models and county-level panel data from 2010 to 2019. The results of this study show that: (1) urbanization and environmental regulation have increased over this 10-year period within the study area and regional differences in environmental quality have decreased; (2) urbanization significantly contributes to environmental quality, with heterogenous effects on different environmental elements—increasing the proportion of wetlands and green areas per capita but suppressing vegetation coverage and production efficiency; and (3) environmental regulation is an important mechanism for urbanization to improve environmental quality; however, there are negative externalities on neighboring areas. The results of this study show that urbanization and environmental quality are not always mutually exclusive, thus providing a reference for the development of pro-environmental urbanization to improve sustainable development in ecologically fragile areas.

Idokpesi, Erifeta and Okiei (2023) examined the data based impact of urbanization on environmental and health quality in Nigeria: Lagos City as a Case Study. Urbanization in Nigeria and in Lagos State; one of the biggest states in Nigeria, in particular has affected its resident's health adversely and this may have had an effect on the present reduced average life expectancy of Lagosians to 52.2 years. Currently, available data have shown that only less than 5% of its population are 60 years and above. This research reports on the adverse impact of urbanization and various steps that can be taken to ameliorate these impacts in Nigeria with a focus on Lagos state, Nigeria as a case study. Findings shows that urbanization has adversely impacted the health of inhabitants of the places reviewed and has grossly increased the public health problems in such urban areas. This project uses mixed methods research design with a broad range of data-collection methods across all the 20 local government areas in Lagos Nigeria. Questionnaire, household surveys, snowball sampling, focus group, direct observation, photography, documentary review and policy document analysis were used in the data collation. This study establishes the direct connection between urbanization and its severe negative environmental impacts, including pollution, deforestation, wetland destruction, severe

traffic congestion, erosion and flooding, urban sprawl, slum and squatter settlement, heat island and aesthetic degradation, which have had dire consequences on human, environment and other living organisms. The study advocates policies that improve the socio-economic conditions of the urban poor and promote their better health. Results from this study encourages urban dwellers and Nigeria as a nation to become better informed about the challenges that may arise when urbanization occurs in their regions without the required social and infrastructural support.

Ibiang (2023) examined the challenges of health care delivery in an urban environment of the study area. A survey design methodology was adopted in the study. A sample size of 1600 of a urban dweller was used for the study. Data for the study was collected through a designed questionnaire. A stratified random sampling technique was used in selecting urban dwellers in the study area. A one-way analysed of variance and multi-regression analysis (stepwise) was used in analyzing the collected data. The findings showed a strong relationship between urbanization and the challenges of health care delivery in the study area. The study suggests the formulation of urban health policy that would easy access to health care services by urban dwellers.

Oke, Gbadebo and Olatunji (2022) examined the effects of population growth and urbanization on economic growth in Nigeria. To achieve the specific objectives, the OLS estimation techniques employed are Autoregressive Distributed Lag (ARDL), Fully Modified OLS (FMOLS), and granger causality to test the causal direction of the model variables. While the ARDL estimates the short-run and long-run impact, the FMOLS estimates the long-run effects of population growth and urbanization on economic growth. Lastly, the granger causality test helps to identify the policy directions in this study. Findings revealed that population growth has a positive and significant effect on economic growth in both the short-run and long-run, while urbanization has a negative and insignificant effect on economic growth in the short-run and the long-run over the study periods.

Fatai, (2021) focused on analysis of Urban Expansion and Land Cover Changes in Lagos Metropolis, Nigeria. The study uses Landsat imageries for 1995, 2000 and 2015 collected from United State Geological Survey (USGS) for analyzing the land use and land cover in the study area. The Landsat images were classified using supervised classification. Results reveal that between year 1995 and 2000, the land use land cover shows that there is less than 20% built up areas and more than 70% significant change in the land use land cover for bare ground, vegetation and water body respectively. In contrast, in the year 2015, there was more than 40% increase in built up areas and less than 60% bare ground, vegetation and water body respectively. At the aggregate level, there was more than 20% increase in built up areas between 1995, 2000 and 2015 and 8% decreased in bare ground between 1995, 2000 and 2015.

Mercandalli et al. (2019) conducted a study on migration concentrating on the patterns and drivers of rural migration in SSA. Their study aimed to understand the multifaceted and diverse drivers of rural migration in Africa over the last decades. They used secondary data from the United Nations Department of Economic and Social Affairs (UNDESA), micro data from Migration and Remittances Households Surveys (MRHS) and Rural Livelihoods Information System (RuLIS). The study was conducted using a cross-sectional survey on the following countries: Burkina Faso, Kenya, Nigeria, Senegal, South Africa, and Uganda. The study concluded that migration is not about the movement of labour from rural to urban areas or labour transfer from agriculture to other sectors.

Ekpeno (2016) focused on urbanization and Environmental Quality in Africa. This paper investigates the environmental impact of urbanization for 49 African countries from 1990 to 2010. Using the Stochastic Impacts by Regression on Population, Affluence and Technology (STIRPAT) framework, a recently developed semi-parametric panel fixed-effects regression technique, and two atmospheric air pollutants, namely carbon dioxide (CO2) and ambient

particulate matter (PM10) emissions, the evidence indicates that urbanization reduces environmental pollution. The semi-parametric analysis reveals that the result is more pronounced with PM10 but weaker for CO2 emissions. Moreover, there is no evidence to confirm the Kuznet's hypothesis of an inverted U-shaped curve between urbanization and environmental pollution. To reap the benefits of urbanization, there is need for a strategic urban planning with basic infrastructure investment that promotes a green environment.

Ipalibo and Wodike (2019) examined the Environmental Degradation Effects of Urbanization in Port Harcourt**.** Urbanization is the physical growth of urban areas as a result of rural migration and even suburban concentration into cities. Due to uncontrollable urbanization in Rivers State, environmental degradation has been occurring very rapidly and causing many problems like land security, worsening water quality, excessive air pollution, flood and problem of solid waste management. This paper emphasizes on the effect of urbanization on environmental components namely; deforestation loss of biodiversity, flooding and environmental pollution. Although it is impossible to restrict urbanization, but there is need to ensure that, urbanization proceeds in the right path, to reduce its impact on the environment. Conclusively, this paper recommended measure that could reduce the escalation of environmental degradation caused by urbanization in Rivers State.

Chamhuri et al. (2016) examined the consequences of rapid urbanisation and urban vulnerable group in Malaysia using data on urbanisation, household income, and poverty, population at rural and urban levels. The finding shows that there was downward trend in urban poverty indices. The rate of poverty decreased from 25.5 percent to 1 percent in 2012 in urban areas. The finding also shows that average household monthly income in urban areas is almost twice that of rural families thus indicating high level of income inequality. The study also observed that although urbanisation increased to about 71 percent in 2010, the high concentration of people in urban areas created various problems including high cost of living, crime, environmental degradation, unemployment and poverty. The paper recommended that the poor should be located and appropriate policies and programs should be designed to tackle poverty.

Theoretical Framework

Systems Theory is a suitable theoretical framework for studying urbanization and health sector management in Enugu Urban, Enugu State, Nigeria. Proposed by Ludwig von Bertalanffy (1968), this theory views a system as an interconnected set of components working together to achieve a common goal. The theory emphasizes that a system is composed of interrelated parts that work together to achieve a common goal. One of the core tenets of Systems Theory is interdependence, which highlights how changes in one component affect the entire system. This principle is crucial in disciplines such as healthcare, urban planning, and management. Another key tenet is holism, which suggests that a system must be analyzed as a whole rather than just as individual parts. Additionally, feedback mechanisms play a vital role in regulating system stability and adaptation. Positive feedback promotes growth or change, while negative feedback helps maintain equilibrium. Equifinality, another tenet, states that different pathways can lead to the same outcome, emphasizing flexibility in achieving objectives.

In urbanization and health sector management, Systems Theory helps in understanding how factors like population growth, infrastructure, and policies interact. By applying this theory, decision-makers can develop integrated solutions that address urban health challenges holistically. The theory remains widely used in various fields, including sociology, business, and environmental science, to analyze and improve system efficiency. In the context of urbanization and health sector management, the healthcare system is influenced by various subsystems, including population growth, infrastructure development, economic resources, and government policies (Meadows, 2008).As urbanization increases in Enugu Urban, the

healthcare system must adapt to rising demand for medical services, disease burden, and healthcare accessibility challenges (World Bank, 2022). Systems Theory helps explain how different components—such as hospitals, government agencies, healthcare professionals, and urban planners—must work together to provide efficient and sustainable healthcare services. By using Systems Theory, policymakers can design integrated urban health policies, improve resource allocation, and enhance collaboration between urban planning and healthcare delivery (WHO, 2023).

3.Methodology

The study employed a descriptive survey design. It was created using qualitative and quantitative methods. Primary and secondary sources of data were used for the study. Questionnaire was utilized for primary source while journals, internet resource and government publications were utilized under secondary source. Population of the study included residents of Enugu Urban totaling 1,586,200 according to National Population Commission projections 2022. Sample size of the study was determined using Freund and Williams (1986) statistical sampling formula as shown below:

$$n = \frac{Z^2 Npq}{Ne^{2+} Z^2 pq} \quad . \quad . \quad . \quad 1$$

Where;

n = Sample size, N = Population of the study, P = Probability of Success /Proportion, q = Probability of Failure /Proportion, Z = Standard error of the mean given under 95% reliability, e = Limit of tolerable sampling error

$$n = \frac{(1.96)^2 (1{,}586{,}200)(0.6)(0.4)}{1{,}586{,}200\,(0.05)^2 + (1.96)^2 (0.6)(0.4)}$$

$$n = \frac{3.8416\,(1{,}586{,}200)(0.24)}{1{,}586{,}200\,(0.0025) + (3.8416)(0.24)}$$

$$= \frac{1462451.0208}{3965.5+0.921984}$$

$$= \frac{1462451.0208}{3966.421984}$$

$$= 368.77909$$

$$= \cong 369$$

Therefore, the sample size for the study is **369.**

This study adopted purposive sampling to select key urban areas in Enugu Urban experiencing rapid urbanization and healthcare challenges. Stratified random sampling was then employed to categorize respondents into groups such as healthcare professionals, urban planners, policymakers, and residents. Within each stratum, simple random sampling was used to select participants to ensure fairness and reduce bias. This approach enhanced the reliability of the study by capturing diverse perspectives on urbanization and health sector management in Enugu Urban.

4.Data Analysis and Results

Table 1: Effect of urbanization on the availability and accessibility of healthcare services in Enugu Urban

s/n	Items	SA (5)	A (4)	U (3)	D (2)	SD (1)	FREQ	Mean	Decision
1	Rapid population growth increases patient load, leading to long wait times and reduced quality of healthcare services	160	115	5	10	10	300	4.3	Accepted
2	Urbanization outpaces infrastructure development, causing shortages of hospitals, clinics, and essential medical equipment	140	120	20	10	10	300	4.2	Accepted
3	Healthcare facilities are concentrated in affluent areas, leaving low-income and informal settlements underserved	130	100	10	40	20	300	3.9	Accepted
4	Poor sanitation, pollution, and congestion contribute to rising cases of communicable and non-communicable diseases.	140	100	10	25	25	300	4.0	Accepted
5	High patient influx overwhelms medical professionals, resulting in burnout, staff shortages, and reduced service efficiency.	110	140	10	20	20	300	4.2	Accepted
	Grand Mean							4.1	

Source: Field Survey, 2025

Table 1 displays the responses to the question on effect of urbanization on the availability and accessibility of healthcare services in Enugu Urban. The respondents strongly agreed with all of the issues from 1 to 5, with mean scores of 4.3, 4.2, 3.9, 4.0, and 4.2, respectively. The grand mean score of 4.1 indicates that the respondents felt that urbanization affect the availability and accessibility of healthcare services in Enugu Urban.

Table 2: Effect of rapid population growth and informal settlements on public health and disease prevalence in Enugu Urban.

s/n	Items	SA (5)	A (4)	U (3)	D (2)	SD (1)	FREQ	Mean	Decision
1	Overcrowding in informal settlements leads to inadequate sanitation, increasing the risk of cholera, typhoid, and other waterborne diseases	120	110	20	20	30	300	3.9	Accepted
2	High population density strains healthcare facilities, causing delays in treatment and increasing the spread of infectious diseases	120	120	20	20	10	300	3.9	Accepted
3	Unregulated waste disposal and poor drainage systems contribute to respiratory diseases and waterborne infections in densely populated areas	110	100	30	30	30	300	3.5	Accepted
4	Overpopulation and economic hardship limit access to nutritious food, leading to malnutrition and weakened immune systems	100	110	20	30	40	300	3.6	Accepted
5	Close living quarters in slums facilitate the rapid spread of contagious diseases like tuberculosis, measles, and respiratory infections.	120	109	11	40	20	300	3.9	Accepted
	Grand Mean							3.8	

Source: Field Survey, 2025

Table 2 shows that all of the respondents were positive in their comments. All of the items 1–5 were accepted by the respondents, with mean scores of 3.9, 3.9, 3.5, 3.6, and 3.9. The grand mean score of 3.8 indicates that the respondents accepted that rapid population growth and informal settlements affect public health and disease prevalence in Enugu Urban.

Table 3: How effective government policies and urban planning strategies are in addressing healthcare infrastructure deficits in Enugu Urban.

s/n	Item	**SA (5)**	**A (4)**	**U (3)**	**D (2)**	**SD (1)**	FREQ	Mean	Decision
1	Government policies focus on building new hospitals and upgrading existing ones to meet increasing healthcare demands	123	97	20	30	30	300	3.8	Accepted
2	Collaborations with private investors enhance healthcare funding, improving medical equipment, hospital facilities, and service delivery	111	108	10	51	20	300	3.7	Accepted
3	Establishing primary healthcare centers in underserved areas improves accessibility and reduces pressure on major hospitals.	106	112	15	37	30	300	3.7	Accepted
4	Policies mandate land allocation for healthcare infrastructure in city planning to ensure equitable healthcare distribution.	99	116	10	43	22	300	3.6	Accepted
5	Training, recruitment, and incentives for healthcare professionals help address staff shortages and improve service efficiency	120	100	10	50	20	300	3.8	Accepted
	Grand Mean							3.7	

Source: Field Survey, 2025

Table 3 shows how respondents responded on how effective government policies and urban planning strategies are in addressing healthcare infrastructure deficits in Enugu Urban. Based on the responses, it can be seen that the respondents affirmed all of the questions from 1 to 5, with mean scores of 3.8, 3.7, 3.6, and 3.8, respectively. The grand mean of 3.7 indicates that the respondents overwhelmingly agreed with the questions posed.

Test of Hypotheses

The research hypotheses were put to the test to see if they were true or not. However, each hypothesis was evaluated independently to determine its significance in light of the data acquired and analyzed in this study. The t-test was used to test the hypotheses.

Test of Hypothesis One

i. There is no significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban.

Table 4: Urbanisation and Healthcare availability and accessibility

Null hypothesis (Ho)	Tcal	Ttab	Df	Decision
Urbanization outpaces infrastructure development, causing shortages of hospitals, clinics, and essential medical equipment	7.39	2.776	4	Reject Ho and Accept Hi

Source: Field Survey 2025

Decision Rule: The decision rule in this case is to reject Ho if t-calculated exceeds T-table (t-cal > t-tab). As a result, the t-calculated is 7.39, while the t-table is 2.776 in the previous table. This demonstrates that there is a significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban. As a result, the null hypothesis (Ho) is discarded, whereas the alternative hypothesis (H1) is accepted.

Hypothesis Two

i. Rapid population growth and informal settlements have no significant effect on public health and disease prevalence in Enugu Urban.

Table 5: Urbanisation and public health and disease prevalence

Null hypothesis (Ho)	Tcal	Ttab	Df	Decision
Overpopulation and economic hardship limit access to nutritious food, leading to malnutrition and weakened immune systems	6.93	2.776	4	Reject Ho and Accept Hi

Source: Field Survey 2025

Decision Rule: The decision rule is that if T-calculated is more than T-table (t-cal > t-tab), Ho is rejected. As a result, the t-calculated is 6.93, while the t-table is 2.776 in the preceding table. This establishes that rapid population growth and informal settlements have a significant effect on public health and disease prevalence in Enugu Urban. As a result, the null hypothesis (Ho) is discarded, whereas the alternative hypothesis (H1) is accepted.

Hypothesis Three

i. Government policies and urban planning strategies are not effective in addressing healthcare infrastructure deficits in Enugu Urban.

Table 6: Urbanisation and Infrastructure Deficit

Null hypothesis (Ho)	Tcal	Ttab	Df	Decision
Collaborations with private investors enhance healthcare funding, improving medical equipment, hospital facilities, and service delivery	11.20	2.776	4	Reject Ho and Accept Hi

Source: Field Survey 2025

Decision Rule: The decision rule is that if T-calculated is more than T-table (t-cal > t-tab), Ho is rejected. As a result, the t-calculated is 11.20, while the t-table is 2.776 in the preceding table. This proves that government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban. As a result, the null hypothesis (Ho) is discarded, whereas the alternative hypothesis (H1) is accepted.

Discussion of Findings

The findings of hypothesis one confirmed that there is a significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban. This is because the t-calculated value of 7.39 is higher than the t-table value of 2.776. The study findings reveal that urbanization has a significant impact on the availability and accessibility of healthcare services in Enugu Urban. The rapid population growth has overwhelmed existing healthcare facilities, leading to overcrowding, longer wait times, and inadequate medical resources. Many healthcare centers struggle to meet the increasing demand, resulting in disparities in service delivery, especially in informal settlements. Additionally, urbanization has led to unequal healthcare distribution, where well-developed areas have better-equipped hospitals while low-income neighbourhoods lack adequate medical infrastructure. Poor sanitation, pollution, and increased disease prevalence further strain healthcare services. Government efforts, such as hospital expansion and public-private partnerships, have improved healthcare accessibility, but gaps remain. The findings highlight the need for strategic urban planning and healthcare investment to bridge the infrastructural deficit. Policies focusing on decentralized healthcare

systems, improved funding, and equitable distribution of facilities are essential to ensuring sustainable healthcare accessibility in Enugu Urban.

Hypothesis two showed that rapid population growth and informal settlements have a significant effect on public health and disease prevalence in Enugu Urban. This is because the t-calculated value of 6.93 is higher than the t-table value of 2.776. Findings indicate that rapid population growth and informal settlements significantly impact public health and disease prevalence in Enugu Urban. Overcrowding in informal settlements has led to poor sanitation, inadequate waste management, and limited access to clean water, increasing the spread of waterborne diseases like cholera and typhoid. Additionally, inadequate healthcare infrastructure in these areas restricts timely medical interventions, worsening disease outbreaks. Air pollution from congestion and poor housing conditions has contributed to respiratory diseases such as tuberculosis and asthma, while malnutrition due to economic hardship weakens immune systems, making residents more vulnerable to infections. The high population density also accelerates the spread of contagious diseases, such as tuberculosis and measles. If left unaddressed, these conditions could lead to rising mortality rates, increased healthcare costs, and reduced workforce productivity. Sustainable urban planning, improved sanitation, and increased healthcare accessibility are essential to mitigating the negative effects of rapid urbanization on public health.

Finally, the t-test result for hypothesis three demonstrated that government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban. The t-test result shows that the t-calculated value is 11.20, whereas the t-table value is 2.776. The findings reveal that urban sprawl has a significant negative effect on biodiversity in Enugu State. The findings suggest that government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban. Policies promoting hospital expansion, decentralization of healthcare services, and public-private partnerships have improved healthcare accessibility. The establishment of primary healthcare centers in underserved areas has reduced the burden on major hospitals and improved service delivery. Urban planning strategies, such as zoning regulations and land allocation for healthcare facilities, have also contributed to better healthcare infrastructure distribution. Investment in medical workforce development through training programs and recruitment incentives has helped mitigate staff shortages in health institutions. The likely effect of these interventions includes reduced disease burden, improved access to quality healthcare, and enhanced public health outcomes. However, continuous policy evaluation and increased funding are necessary to sustain progress. Strengthening urban health planning will ensure long-term improvements in healthcare infrastructure and service efficiency in Enugu Urban.

5.Summary of Findings

i. The findings of hypothesis one confirmed that there is a significant impact of urbanization on the availability and accessibility of healthcare services in Enugu Urban. The rapid population growth has overwhelmed existing healthcare facilities, leading to overcrowding, longer wait times, and inadequate medical resources.
ii. Rapid population growth and informal settlements have a significant effect on public health and disease prevalence in Enugu Urban. Overcrowding in informal settlements has led to poor sanitation, inadequate waste management, and limited access to clean water, increasing the spread of waterborne diseases like cholera and typhoid.
iii. Government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban. The findings suggest that government policies and urban planning strategies are effective in addressing healthcare infrastructure deficits in Enugu Urban.

Conclusion

The study concluded that urbanization significantly affects health sector management in Enugu Urban, leading to increased demand for healthcare services, infrastructure deficits, and unequal access to medical facilities. Rapid population growth and informal settlements contribute to poor sanitation, increased disease prevalence, and pressure on existing health services. However, government policies and urban planning strategies have played a crucial role in addressing healthcare infrastructure challenges through hospital expansion, decentralization, and public-private partnerships. For sustainable healthcare management, continuous investment in healthcare facilities, improved urban planning, and effective policy implementation are essential to ensure equitable and accessible healthcare services in Enugu Urban.

Recommendations

i. The government should increase investment in healthcare infrastructure by expanding hospitals, upgrading existing facilities, and establishing more primary healthcare centers in underserved areas. Public-private partnerships should be strengthened to enhance funding, while medical equipment and essential drugs should be adequately supplied to meet the growing healthcare demands of urban residents.

ii. Effective urban planning policies should prioritize proper land allocation for healthcare facilities, improved sanitation, and waste management systems. Authorities must regulate informal settlements, ensure access to clean water, and promote environmental health initiatives to reduce disease prevalence. Strengthening zoning laws will help create a well-structured urban environment that supports public health.

iii. Recruiting, training, and retaining healthcare professionals are essential to address workforce shortages in Enugu Urban. The government should offer incentives, increase salaries, and provide continuous professional development programs. Additionally, digital health solutions, community health outreach programs, and improved emergency response services should be implemented to enhance healthcare accessibility and efficiency.

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