RESILIENCE AND LIVABLE CITIES IN A WARMING WORLD

A FESTSCHRIFT IN HONOUR OF

TPL. DR. JOSHUA ADEWUMI ADEBISI FNITP, RTP



EDITED BY

ABIMBOLA SIMIAT OGUNSESAN
AYOBAMI ADEMOLA AKANMU, PhD
UMAR OBAFEMI SALISU, PhD



TPL. DR. JOSHUA ADEWUMI ADEBISI, FNITP, RTP

Chief Lecturer in Urban and Regional Planning at
The Polytechnic, Ibadan, Adjunct Lecturer at The University of Ibadan
Outstanding Administrator, Preacher of Faith, and a Renowned Consultant

RESILIENCE
AND
LIVABLE CITIES
IN A WARMING WORLD

A FESTSCHRIFT IN HONOUR OF

DR. (TPL.) JOSHUA ADEWUMI ADEBISI FNITP, RTP

EDITED BY

ABIMBOLA SIMIAT OGUNSESAN

AYOBAMI ADEMOLA AKANMU PhD

UMAR OBAFEMI SALISU PhD

Nigerian Institute of Town Planners, Oyo State Chapter

RESILIENCE AND LIVABLE CITIES IN A WARMING WORLD - A FESTSCHRIFT IN HONOUR OF TPL. DR. JOSHUA ADEWUMI ADEBISI

Editors:
A.S. Ogunsesan, A. A. Akanmu, PhD & U. O. Salisu, PhD

© Joshua Adewumi Adebisi 2026
wumibisi2012@gmail.com
+2348052939962

All right reserved.

No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, chemical, photocopy, recording, manual or otherwise, without the prior permission of the publisher.

ISBN: 978-978- 63753-0-4

Published By:

The Nigerian Institute of Town Planners,
Oyo State Chapter,
Quarter 704, Iyaganku GRA, Ibadan.

Supported By:

Center for Sustainable Urban Planning,
Logistics, Infrastructure and Future Transport
3B, Upper Ijesha Road, Taiwo Estate, Iponri, Lagos.

Printed By:
DCrowns Multiventures,
P. O. Box 27796, Ibadan.
oludarebiyi@gmail.com | +234-8053896026

TABLE OF CONTENTS

Foreword..... vii

The Profile of TPl. Dr. Joshua Adewumi Adebisi viii

Scholarly Perspectives to Celebrate Tpl. Dr. Joshua A. Adebisi in Grace and Honour..... x

Table of Contents xvii

Preface..... xx

Contributors Profile.....xxii

SECTION ONE: CLIMATE CHANGE AND URBAN PLANNING

1. Climate-Resilient Housing and Informal Settlements in Lagos State: Pathways Toward Adaptive Urban Governance and Sustainable Development
- ALABI Oluwole Titilayo **2**

SECTION TWO: ENVIRONMENTAL JUSTICE, SAFETY AND SUSTAINABILITY

2. Environmental Safety Risks of Traffic-Related Carbon Monoxide Emissions in Uyo Metropolis, Akwa Ibom State, Nigeria - AKPAN Patrick Etim **15**

3. Integrating Sustainable Strategies in The Design of Convention Centers in Lagos, Nigeria
- OLADELE Victor Olayinka & ADEDEJI Afolabi Idowu **34**

SECTION THREE: GREEN INFRASTRUCTURE AND ECOSYSTEM-BASED APPROACHES

4. Appraisal of The Effectiveness of Green Infrastructure and Ecosystem-Based Approaches in Enhancing Urban Resilience in Sub-Saharan African Cities
- AKINADE Adekunle Joshua **50**

SECTION FOUR: URBAN AGRICULTURE AND FOOD SECURITY

5. Fear of Crime and Food Security Dynamics in Oke-Ogun Rural-Urban Border Communities of Oyo State: Implications for Livelihoods and Spatial Resilience
- OGUNDIRAN Olayinka Robert **67**

6. Assessing the Spatial Patterns of Urban Agriculture in Ibadan, Nigeria: Integrating Satellite Imagery into Land Use Planning Strategies for Enhanced Food Security
- OLADIRAN Ibironke Olaide **82**

7. Urban Agriculture and Social Justice: Comparative Analysis of Inclusive Planning Policies in Lagos And Ibadan, Nigeria - OYEJIDE Olarinola I., ADEBOWALE-SALAWU Temiloluwa E. & OYEJIDE Oyedeji T. **98**

SECTION FIVE: DIGITAL INNOVATION AND SMART URBAN ADAPTATION

8. Smart Solutions for Resilient Transportation Infrastructure and City Livability: Examples from The State of Connecticut, United States of America - OLALEYE Eyitayo, OLUWOYE Jacob & OGUNKAN David **114**

9. AI-Driven Portfolio Management for Ibadan Wash Infrastructure: A Strategic Framework for Sustainable Planning in Ibadan Metropolis - ODUNFA Victoria O., ELEGBEDE Olufola. T., TAIWO Olushola S. & OGUNDIRAN A. A. **137**

10. Synergizing Global System of Mobile Communications and Artificial Intelligence for Inclusive Regional Development in Nigeria - ADEBISI Joshua Adewumi **157**

SECTION SIX: INCLUSIVE AND PARTICIPATORY URBAN GOVERNANCE

11. Promoting Community Inclusiveness in Public Recreational Facilities Through Design-Based Strategies in Nigerian Cities - OGUNDARE Abiodun Olusogo, ADEDEJI Afolabi Idowu & OLADELE Victor Olayinka **162**

SECTION SEVEN: HEALTH, WATER, SANITATION AND URBAN WASTE

12. Socio-Economic Determinants and Utilization Patterns of Primary Health Care (PHC) Facilities in Ibadan Metropolis, Nigeria - ADEJARE Jacob Ayorinde **173**

13. Water Quality Evaluation and Sanitary Surveying in Southwest Nigeria - LASISI Kamil Oluranti **190**

14. Econometric Analysis of Health Care Accessibility and Health Care Outcome in Semi-Urban Area: Evidence from Alakia Primary Health Care Centre, Ibadan, Oyo State - KOLAPO Oluyemi Mary & OMEOKWE Favour Chibueze **206**

15. Assessment of Private Sector Participation in Solid Waste Management in Ojokoro Community, Lagos Stat - IYANDA Oladimeji **223**

SECTION EIGHT: PUBLIC SPACE, HOUSING AND LAND USE PLANNING

16. Urban Redevelopment and The Reconfiguration of Public Space in Ibadan, Nigeria AKANMU Ayobami Ademola, SALISU Umar Obafemi, FASINA Simeon Oluwagbenga, & SANNI Sekinat Motunrayo **243**

17. Incremental Housing and Physical Planning Standards' Compliance in Ibadan Sub-Urban Areas, Oyo State, Nigeria - LASISI Kamil Oluranti **258**

18. An Overview of Adoption of Government Regulations on Building Projects in The Oke-Ogun Area of Oyo State, Nigeria - AJAO Ayodele Christianah, AREMU John Adekunle & TIJANI Kabiru Okegere **277**

SECTION NINE: RISK REDUCTION AND DISASTER-RESILIENT CITIES

19. Integrated Flood Risk Management and Urban Livability in Nigeria's Coastal Cities: Insights from Ibeju-Lekki Corrido - OGUNSESAN Abimbola Simiat & BOLUKALE Oluwatoyin **287**

20. Mitigating Urban Flood Risks: Lessons from Ibadan For A Disaster-Resilient City - AYORINDE Adedayo & BOLUKALE Oluwatoyin **306**

21. Integrating Climate Resilient Design Principles into Sustainable Residential Development in Ibadan, Nigeria - ABAIRE Oluwatobiloba, ORKPE Arwashima Kristen & OLADELE Victor Olayinka **326**

SECTION TEN: URBAN MOBILITY AND LOW CARBON TRANSPORT

22. Decarbonizing Urban Mobility in Nigeria: Opportunities and Constraints for Transitioning to Electric Public Transport Systems - ADEBOWALE-SALAWU Temiloluwa E. and OYEJIDE Olarinola I. **340**
23. Road Transport System in Nigeria: Key Issues and Challenges - ADEYINKA Ebenezer Olasupo & ALABI Folami Munta & ANIMASHAUN Idris Olalekan **349**
24. Urban Road Traffic Resilience and Sustainable Development in Ibadan, Nigeria - OGUNSESAN Durodola Kamoru & OGUNSESAN Abimbola Simiat **360**
25. Residents' Appraisal of Urban Mobility and Low Carbon Transport Solutions in Ibadan, Oyo State - TEJUOSHO Itunu Elizabeth, OLORUNFEMI Samuel Oluwaseyi & ADENIRAN Adetayo O. **376**
26. Road Infrastructure Vulnerability and Urban Mobility Safety Risks in Southwestern Nigerian Cities - SALISU Umar Obafemi, NALAILA Stephano & Akanmu Ayobami Ademola **391**

ABOUT THE EDITORS



Abimbola Simiat OGUNSESAN is a Senior Lecturer in the Department of Urban and Regional Planning, The Polytechnic, Ibadan, Nigeria. She obtained her foundational training in Urban and Regional Planning from The Polytechnic, Ibadan. She later earned a Master of Science degree in Housing Development and Management from the University of Ibadan. Driven by a strong interest in academic scholarship and global urban challenges, she further pursued a second Master of Science degree in Urban Management and Development at Erasmus University, Rotterdam, The Netherlands, and currently a doctoral candidate at Lead City University, Ibadan. Ogunsesan is a Registered Town Planner with the Town Planners Registration Council of Nigeria (TOPREC) and Corporate member of the Nigerian Institute of Town Planners (NITP). She has an extensive publication, and her research interests span urban governance, environmental management, housing studies, climate change adaptation, and sustainable urban development.



Dr. Ayobami Ademola AKANMU is a Chief Lecturer, researcher, and consultant specializing in transport, logistics, and spatial planning. He earned a PhD. in Transport Management Technology from the Federal University of Technology, Akure; serves as a pioneer Head of the Department of Transport Planning and Management and Director of Student's Industrial Works Experience Scheme (SIWES) at The Oke-Ogun Polytechnic, Saki. He is affiliated with several professional bodies, including the Association for European Transport, the Association for the Advancement of Automotive Medicine (AAAM), the Nigerian Institute of Town Planners (NITP); and is also a Chartered Fellow of the Chartered Institute of Logistics and Transport (CILT), Fellow of the Chartered Institute of Transport Administration of Nigeria (CIoTA), Chartered Transportant of Nigeria (CTN) with the Council for the Registrations of Transportants in Nigeria, and a Registered Town Planner with the Town Planners Registration Council of Nigeria.



Dr. Umar Obafemi SALISU is a Senior Lecturer in the Department of Transport Management, Olabisi Onabanjo University, Ago-Iwoye. He holds B.Sc. and M.Sc. degrees in Transport Studies from the same institution and a PhD. in Transport and Logistics from Lagos State University. He is a Chartered Fellow of the Chartered Institute of Logistics and Transport (CILT), Fellow of the Chartered Institute of Transport Administration of Nigeria (CIoTA), a member of Association of the Advancement of Automotive Medicine, and a Research Fellow of Earth System Governance (ESG) network. His research specializes in transport governance, transport safety, sustainable urban mobility, logistics and tourism transport. He has widely published and secured national and international research grants.

C-SUPLIFT

ISBN: 978-978- 63753-0-4

CHAPTER 12

SOCIO-ECONOMIC DETERMINANTS AND UTILIZATION PATTERNS OF PRIMARY HEALTH CARE (PHC) FACILITIES IN IBADAN METROPOLIS, NIGERIA

ADEJARE Jacob Ayorinde, PhD
Department of Urban and Regional Planning,
Redeemer's University, Ede, Osun State
Email Address: adejarej@run.edu.ng | 08086900648

Abstract

This paper examined the socio-economic determinants and utilization patterns of Primary Health Care (PHC) facilities in Ibadan Metropolis, Nigeria. The research used residents' socio-economic attributes, such as income, education, gender, and accessibility, to determine their level of patronage and frequency of PHC usage. Hence, data were obtained from a total sample of 1,389 respondents, to represent 1% of the total housing units across the selected five Local Government Areas in Ibadan metropolis. The result reveals that socio-economic variables such as income, educational attainment, gender, and distance to health facilities significantly affected residents' utilization of PHC services. Regression analysis showed that the cost of transportation had the greatest negative influence on PHC patronage, showing that as travel costs increased so also the frequency of visits declined and vise-versa. The average distance to PHC facilities is inversely related to utilization, indicating that closer proximity encouraged higher patronage. Educational attainment also showed an inverse relationship. The respondents with lower education levels, relied more on PHCs than those with higher education who preferred private and tertiary health care. It was also discovered that female respondents use PHCs than their male counterparts, because of their healthcare-seeking tendencies for family-related health needs. Therefore, the study recommends improving the PHC system to address these socio-economic inequalities through ideal interventions such as (1) subsidizing health costs for the residents through proper enrollment in the available Oyo state health insurance scheme (2) improving facility accessibility, and (3) expanding community-level awareness to promote equitable utilization across different income and education groups by the government.

Keywords: Socio-Economic Characteristics, Primary Health Care, Healthcare Utilization, Accessibility, Ibadan Metropolis.

1.0 Introduction

Access to quality healthcare service remains a central pillar of sustainable development and human well-being worldwide. The global health discourse recently has increasingly emphasized the role of Primary Health Care (PHC) as the foundation for achieving universal health coverage (UHC), reducing health inequalities, and improving population health outcomes. Since the reaffirmation of the Alma-Ata principles through the Astana Declaration, PHC has been recognized as a cost-effective and equitable approach to delivering essential health services, particularly in low and middle-income countries (LMICs) (World Health Organization, 2018). The global commitment to Sustainable Development Goal 3, which seeks to ensure healthy lives

and promote well-being for all, further underscores the need to strengthen Primary Healthcare systems as a pathway to accessible, affordable, and inclusive healthcare delivery (United Nations, 2020). It was discovered that despite these global efforts, differences in access and utilization of Primary Healthcare services persist, particularly in rapidly urbanizing regions of sub-Saharan Africa.

In Nigeria as one of the developing countries, the healthcare system is characterized by three structures such as primary, secondary, and tertiary levels, with Primary Healthcare positioned as the first point of contact for individuals, families, and communities within the healthcare system. In an ideal way, Primary Healthcare facilities are expected to provide preventive, promotive, curative, and rehabilitative services in a manner that is geographically accessible and socially acceptable (Federal Ministry of Health, 2021). However, it was observed that the reality in many Nigerian cities reveals significant challenges in the effective functioning and utilization of Primary Healthcare services. According to Abimbola et al., 2019, issues such as inadequate infrastructure, lack of skilled personnel, poor financing, and weak governance structures continue to undermine the performance of PHC facilities (Abimbola et al., 2019; Welcome, 2020).

Further than institutional and systemic constraints, evolving literature increasingly highlights the critical function of socio-economic factors in shaping healthcare utilization patterns. Socio-economic determinants such as income level, educational attainment, employment status, gender, and household characteristics and transportation cost have been found to significantly influence individuals' health-seeking behavior and access to healthcare services (Aregbeshola and Khan, 2018; Onwujekwe et al., 2019 and Adejare, 2024). These operate through multiple pathways, affecting not only the ability to afford healthcare but also awareness, perception of illness, and preferences for particular types of health services. Individuals for example, with higher income levels are more likely to seek care from private or tertiary healthare facilities, while those with lower incomes often rely on publicly funded PHC services due to affordability constraints (Ichoku et al., 2019 and Adejare, 2024). Accessibility is a core dimension influencing the utilization rate of primary health care (PHC) services, and it can be broken down into three key factors: geographic proximity, transportation costs, and time spent seeking medical care. Studies by Okwaraji et al. (2020), Adedokun and Uthman (2019), Adejare (2024), and Ezeh et al. (2017) confirm that increased travel distance for medical care reduces PHC service utilization rates, with the impact being especially severe for women, children, and older populations. Under the pattern of urban spatial inequality, the unbalanced distribution of PHC facilities exacerbates health inequity. Functional PHC centers in informal settlements and suburban areas face severe resource shortages, forcing residents to either travel long distances to access care or adopt unreliable alternative medical solutions.

Nigeria, the most populous country in Africa, faces unique challenges in achieving equitable access to healthcare. Its national healthcare system has marked regional and urban-rural disparities. Cities that draw concentrated populations bring both development opportunities and a wide range of problems. The Ibadan Metropolitan Area, a large urban agglomeration in West Africa, is an ideal sample for studying the dynamics of primary healthcare utilization. It has a complex socio spatial structure that

includes high-density traditional neighborhoods. This heterogeneity is reflected in varying levels of access to infrastructure, including healthcare services, and diverse socio-economic profiles of residents (Odufuwa et al., 2020).

In Ibadan Metropolis, the provision and performance of PHCs are unevenly distributed among LGA levels. Even though some local government areas are relatively better served than others, there exist areas that lack appropriate healthcare provision. Such a disparity may be a consequence of urban inequalities. In addition, there is an influence of socio-economic status on people's ability to use existing facilities in a proper way. The reason is that low-income families may find transportation and payments a barrier to getting health care services, whereas high income ones will ignore PHC facilities, using only private hospitals for their needs (Aregbeshola, 2021). In recent years, various health policies have been implemented by the government to make healthcare more accessible and affordable. For example, Oyo State has developed a Health Insurance Scheme, aimed at providing access to health services. Nevertheless, the success of such programs depends not only on socio-economic determinants but also on the target population and its perception of health care and insurance services. For this reason, it is crucial to understand how socio-economic status influences people's ability to get health care services and be enrolled in health insurance schemes (Fagbamigbe et al., 2022). It is against this backdrop, this study examines the socio-economic determinants and utilization patterns of PHC facilities in Ibadan Metropolis, focusing on variables such as income, education, gender, and accessibility, the study seeks to provide a nuanced understanding of how these factors interact to shape health-seeking behavior of resident of Ibadan Metropolis.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Concept of Primary Health Care (PHC)

Primary Health Care (PHC) has been developed as one of the key approaches that can ensure the provision of equitable and accessible healthcare worldwide. Being based on the concepts presented in the Declaration of Alma-Ata and Astana Declaration, PHC focuses on four main aspects – universal access, people's involvement, inter-sectoral collaboration, and proper technologies in providing necessary health care (World Health Organization [WHO], 2018). PHC should be viewed as the first level of healthcare interaction aimed at covering most of people's health problems during the whole life.

PHC is placed as the foundation of the country's healthcare system in Nigeria, especially in the case of the National Health Policy that aims at the decentralization of healthcare delivery to make the service more accessible at the community level (Federal Ministry of Health, 2021). Nonetheless, despite its importance for health provision in the country, PHC encounters various difficulties in Nigeria, such as poor infrastructure, lack of finance, staff shortages, and ineffective governance structures (Abimbola et al., 2019).

2.1.2 Healthcare Utilization: Concept and Measurement

Utilization of healthcare is defined as the degree to which people utilize healthcare services as a means of prevention, treatment, or rehabilitation. It is an important measure of the effectiveness and accessibility of health systems (Andersen, 1995). Indicators for utilization include visit frequency, types of facilities used, and timing of service seeking. In respect to primary health care (PHC), utilization is a measure not only of service availability but also of the acceptance and worth of the services by the population (Onwujekwe et al., 2019).

The Andersen Behavioral Model of Health Service Utilization is considered one of the most commonly used models for examining healthcare utilization. According to the model, determinants of care utilization can be divided into predisposing (age, gender, education), enabling (income, accessibility, insurance), and need factors (perceived and evaluated need for health services) (Babitsch et al., 2017). The Andersen Behavioral Model presents a broad perspective on how socio-economic factors affect individuals' decision-making regarding treatment choice. In African urban settings where there are several possibilities for getting medical assistance, care utilization is determined by these factors simultaneously (Aregbeshola and Khan, 2018).

2.1.3 Socio-Economic Determinants of Healthcare Utilization

Socio-economic factors significantly affect the use of healthcare services among people. Income level, educational attainment, occupation, and sociodemographic factors affect an individual's financial capacity for accessing health services, understanding health-related information, and making wise decisions when seeking health care (Aregbeshola and Khan, 2018; Ichoku et al., 2019). Socio-economic determinants become very important in LMICs since there is high reliance on out-of-pocket payment for healthcare service provision. Income level is seen as one of the key factors influencing the utilization of healthcare services. People from higher income levels tend to utilize health services that are not offered in public health facilities due to their good quality and low wait times. On the contrary, poor people utilize healthcare services in PHCs due to financial constraints (Fagbamigbe et al., 2022). Nonetheless, indirect costs like transport and lost time can create barriers to health service utilization even in public health facilities.

Another way in which educational status can affect healthcare utilization is via its effect on health literacy and awareness of health matters and services available. The fact that people with higher educational status tend to be more aware of these factors means that there will be increased healthcare utilization among such people. Studies have shown that higher education status is associated with self-referral to facilities above PHC, especially where PHC facilities appear to provide poor services (Oyekale, 2017; Akinyemi et al., 2022). Occupational status, as well as the general status of being employed in the formal sector, affects healthcare utilization in relation to the income level and amount of free time that the individual has. While people working in the formal sector will have employer-supported health insurance that makes healthcare utilization cheaper, people in the informal sector – a large part of urban dwellers in Nigeria – do not have such insurance.

2.1.4 Accessibility and Spatial Determinants of PHC Utilization

Accessibility forms one of the primary determinants of healthcare use. It is considered from a range of perspectives including physical, financial, and socio-cultural. Physical accessibility has often been defined as geographic accessibility and it includes aspects such as distance, travel time, and transport availability. Research evidence suggests that it can greatly affect the probability of using PHC facilities (Adedokun & Uthman, 2019). Due to spatial inequalities of distribution of healthcare facilities, people who live in certain parts of cities often face difficulties of accessing PHC services.

Numerous empirical studies carried out in sub-Saharan African countries showed an inverse correlation between the distance to the facility and the probability of use. For instance, Okwaraji et al. (2020) reported that increasing travel distance negatively affected healthcare seeking behavior, especially in cases of maternal and child health services. The problem of transportation cost was also considered to be one of the factors that prevent people from accessing healthcare (Aregbeshola, 2021). Regarding the issue of the spatial distribution of PHC facilities in Ibadan Metropolis, similar trends to those seen in other parts of the world can be observed. In particular, high-density inner cities and fast-growing peri-urban areas are characterized by insufficient healthcare infrastructure, thus, requiring the residents to travel long distances or seek healthcare somewhere else (Odufuwa et al., 2020 and Adejare, 2024).

2.1.5 Gender and Healthcare Utilization Patterns

The gender of the individual is a critical factor for access to and utilization of healthcare services. Females tend to utilize PHC services because of their reproductive health needs and the role of a caregiver in families (Adewuyi & Auta, 2021). The maternal and child health services, forming one of the largest parts of PHC, also account for high utilization of services by females. Nevertheless, gender-based inequality in healthcare access does not only affect the level of utilization but can also include cultural norms, dependence on financial means, and the degree of decision-making capacity of women in patriarchal societies (Adewuyi & Auta, 2021). Meanwhile, men often demonstrate low levels of healthcare utilization as a result of sociocultural beliefs about masculinity and unwillingness to receive healthcare services (Baker et al., 2020). The gender gap influences public health since men's late seeking of medical help can have an adverse effect on their health condition.

Currently, a growing number of research works call for the development of healthcare policies considering the differences in genders and ensuring equal access to healthcare services. Such policies could include healthcare education programs, community-based interventions, and aimed at reducing financial and cultural barriers to care (Fagbamigbe et al., 2022).

2.1.6 Perception of Quality and Choice of Healthcare Facility

Perceived quality of care is a key determinant of healthcare utilization, influencing individuals' preferences for specific types of health facilities. Factors such as availability of drugs, competence of healthcare workers, waiting time, and cleanliness of facilities shape patients' perceptions and decisions (Abimbola et al.,

2019). In many Nigerian cities, PHC facilities are often perceived as offering lower quality services compared to private hospitals, leading to reduced utilization among certain population groups. Studies have shown that patients are willing to travel longer distances and incur higher costs to access facilities perceived to provide better quality care (Onwujekwe et al., 2019). This preference for quality over proximity highlights the importance of improving service delivery within PHC facilities to enhance their attractiveness and utilization. Investments in infrastructure, workforce training, and supply chain management are critical for addressing quality gaps and restoring public confidence in PHC systems.

2.1.7 Urban Context and PHC Utilization in Nigeria

Urbanization creates opportunities and constraints in terms of health care provision. Although urban settings have better healthcare facilities compared to rural settings, they suffer from inequalities in health care access and utilization. Population growth, informal settlement, and infrastructural constraints are some of the health challenges faced by urban areas (Ezeh et al., 2017). In Nigeria, evidence has been found showing that urban populations have a variety of healthcare choices, including public health centers, private health facilities, and informal health providers. These choices affect health care utilization as people use facilities that are affordable and accessible to them (Onwujekwe et al., 2019). The socio-economic differences in urban settings, like Ibadan, further influence the utilization patterns.

2.2 Empirical Studies on PHC Utilization in Nigeria

Some empirical studies have been conducted on the factors that affect healthcare usage in Nigeria. Aregbeshola and Khan (2018) established that socio-economic factors, education and health insurance played a major role in determining healthcare usage. Likewise, Onwujekwe et al. (2019) stressed the significance of financial and geographical challenges in restricting people from accessing PHC services. Adedokun and Uthman (2019) stressed the importance of accessibility, especially regarding maternal health services. Recently, there have been efforts to examine the effects of urbanization on healthcare utilization. Akinyemi et al. (2022) have observed that the likelihood of urban people using specialized care was higher than PHC because of their higher educational status. Fagbamigbe et al. (2022) conducted an empirical study to establish the effect of health insurance on healthcare access, and discovered that people who had health insurance used PHC services more often. However, despite all these research efforts, it is still needed to conduct some context-specific studies in urban locations such as Ibadan. Therefore, this paper tries to address this gap by conducting an empirical study in order to identify the socio-economic determinants and PHC facility usage in Ibadan Metropolis.

Meanwhile, the literature reviewed above shows that healthcare utilization is multidimensional due to various social economic, spatial, and institutional factors. The current research studies have provided some valuable findings, but they are still characterized by a number of shortcomings. Firstly, the majority of the previous studies failed to consider PHC utilization among the population in big cities in Nigeria with regard to Ibadan Metropolis. Secondly, there is little information about the combined

effect of individual determinants. Lastly, it is necessary to have up-to-date data on this issue. The present research will fill in the identified gaps by employing an integrated approach considering different socio-economic determinants and their effect on PHC utilization in an urban area. It will contribute to the development of research on healthcare access and provides evidence-based recommendations for improving PHC systems in Nigeria.

3.0 Materials and Methods

3.1 Study Area

This research study was carried out in the Ibadan metropolis situated in the Oyo State, southwestern Nigeria (Figure 1). Ibadan metropolis is the largest native city in sub-Saharan Africa and acts as the major administrative, commercial and cultural hub. The Ibadan metropolis consists of five urban Local Government Areas; Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East, and Ibadan South-West. There is the presence of heterogeneity in the urban structure of Ibadan. There are high density traditional, medium density transitional and low density planned residential neighborhoods. Ibadan has witnessed rapid urbanization, increasing population and socio-spatial inequalities. The rapid urbanization and socio-spatial inequalities pose implications in terms of the distribution and usage of healthcare facilities. There are Primary Healthcare (PHC) facilities in the metropolis but accessibility and functionality of these facilities differ from one neighborhood to another.



Figure 1: Ibadan Metropolis in Oyo State Context
Source: Author' Mapping (ArcGIS), 2026

3.2 Methodology

The design of this study involved the use of a cross-sectional survey design. The cross-sectional survey design was selected for use as it facilitates the process of collecting data from a large population of people at a certain period, and this enables the relationship to be established between socio-economic characteristics and healthcare utilization patterns. Cross-sectional survey design is widely used in studies involving health and urban issues because of its efficiency in capturing variations that exist among various population groups and geographical locations. It is also instrumental in carrying out statistical analysis like regression in determining the impact of independent variables on healthcare utilization.

The sampling frame for this study consisted of all the housing units in the five LGAs that form the Ibadan metropolis. On the basis of the information provided by the planning records and population projection, there were 138,900 housing units in the study location. Since the aim of this study is representativeness, a sample of 1% of the total housing units was taken, giving a total of 1,389 respondents. This sample size is adequate for statistical analysis and also follows a common practice in urban and health-related studies. This is because proportional sampling technique is usually used to ensure diversity of the population. Distribution of the sample in five LGAs was done on the basis of proportional sampling, whereby a proportion of the number of housing units in each LGA was taken. For this study, a multi-stage sampling procedure was employed. The first stage involved purposive selection of the five urban LGAs forming the Ibadan Metropolis. In the second stage, stratification of the residential areas within each LGA was done on the basis of housing density (high, medium, and low density). The third stage involved systematic random sampling of housing units within each stratum. A sampling interval was calculated using the formula; Total no of housing units in each strata/ Sample size. Systematic sampling of housing units was done through selection of households at regular intervals along major streets and easily accessible pathways. From each household, one adult person (18 years of age and above) was randomly selected to be the respondent. This way, various socio-economic classes and experience levels were covered by the sample.

Data obtained from the field were coded and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics in terms of frequency, percentage, mean and standard deviation were used to analyze socio-economic characteristics of respondents and their utilization pattern of PHC facilities. Various inferential statistical techniques were used to analyze data. The relationship between the variables was analyzed using multiple regression analysis. The use of multiple regression analysis is justified by the fact that it helps in establishing the relative contribution of different independent variables to a dependent variable. The level of significance for this study was 0.05.

4.0 Results and Discussion

4.1 Socio-demographic Characteristics of Respondents in the Study Area

The socio-demographic variables of the respondents give a clear understanding of the pattern of access to and use of Primary Health Care (PHC) facility in Ibadan Metropolis. From Table 4.1, 57.9% of the respondents were males and 42.1% females,

indicating the number of male respondents exceeded that of female respondents and is higher than the male population in the nation (50.6% Male/ 49.4% Female). Though this discrepancy could be attributed to the dynamics of sampling process, it might also imply that the males in particular play a role in household decision making in health care access process. However, the research consensus has proved that the females are better users of PHC for reasons of their reproductive health and care role (Adewuyi and Auta, 2021; Fagbamigbe et al., 2022), asides that this might have affected the outcome as male was dominant, and their usage cannot be compared to those female respondents who is more exposed in health care system within family system.

Marital status further provides insight into healthcare utilization dynamics, with 79.9% of respondents being married. Married individuals typically have greater healthcare responsibilities, including maternal and child health needs, which are core components of PHC services. Previous studies have shown that married households are more likely to utilize healthcare services due to increased family size and health-related responsibilities (Onwujekwe et al., 2019, Adejare et al., 2024). The relatively small proportions of widowed (3.5%) and separated/divorced (2.7%) respondents suggest limited variation in this category, but these groups may face unique vulnerabilities in accessing healthcare due to reduced social and financial support.

Regarding the occupational profile of the respondents; a substantial majority (56.6 percent) engaged in personal business activities (informal sector); and in the context of an urban Nigerian city; the latter represents one of the dominant types of informal employment. The public employee accounted for 15.8 percent; 15.0 percent are students and apprentices; and 9.6 percent reported that they are unemployed. This profile of occupation could have great influence on the utilization of the PHC; because many of this population are not often covered by a formal health insurance system; thus their out-of-pocket payments are considerably high (Aregbeshola and Khan, 2018); which make facilities with relatively lower cost PHC. It could also be due to low proportion of retired person (2.7%) could reflect lower presence of elderly people within study sample; who have greater healthcare need.

Spatial data on the locus of the respondents' livelihood indicates that nearly half of the respondents (47.3%) work within there LGA, whilst approximately one-third (29.9%) of them works within their immediate political wards. This closeness in spatial relation between place of work and residency suggest they spent much of their daily activities locally; which could facilitate health service use to closer PHC facilities as accessibility of health services located within one's daily activities space strongly affect health seeking behaviors of population (Adedokun and Uthman, 2019). And since a small proportion (4.4% & 1.4% resp) works outside the urban LGA and out of the state respectively; thus, they had limited external movement within days. Data collected on whereabouts health facility indicates that majority (89.8 percent) had access to a health facility within there neighborbood. Which shows good geographical access to some health facility as there is good access to many facilities nearby the residences of the individuals as many (89.8%) report the existence of a health facility nearby to their residence; however, in many instances geographically convenient health service may lead to low utilization if the quality of health care perceived as low or unaffordable in the community or state (Abimbola et al., 2019).

Transportation cost emerges as a significant factor influencing access to PHC services. The results show that 45.6% of respondents spend between ₦101–300 on transportation to health facilities, while 30.0% spend ₦100 or less. A smaller proportion incurs higher costs, with 19.2% spending between ₦301–500 and 5.2% spending above ₦500. These findings highlight the financial burden associated with accessing healthcare, particularly for low-income households. Transportation cost has been widely identified as a barrier to healthcare utilization, especially in urban areas where distance and traffic conditions can increase travel expenses (Okwaraji et al., 2020). The relatively low transportation costs reported by most respondents may contribute to the observed accessibility of PHC facilities.

Expenditure on healthcare treatment further reflects the economic realities of respondents. A majority (65.2%) spent less than ₦5000 on healthcare in the last month, while 32.8% spent between ₦6000 and ₦20,000, and only 2.0% spent above ₦20,000. These figures suggest that most respondents rely on low-cost healthcare services, consistent with the utilization of PHC facilities. In Nigeria, where out-of-pocket payments account for a significant share of healthcare financing, affordability remains a critical determinant of service utilization (Fagbamigbe et al., 2022). The low level of health expenditure observed in this study underscores the importance of PHC facilities in providing cost-effective healthcare options for the population.

The average monthly income of respondents is ₦42,914.57, indicating a predominantly lo - to middle-income population. This income level is relatively modest when compared to the cost of private healthcare services, further reinforcing the reliance on PHC facilities. Income has been consistently identified as a key determinant of healthcare utilization, influencing both the ability to pay for services and the choice of healthcare provider (Aregbeshola and Khan, 2018). The findings suggest that PHC facilities serve as a critical healthcare option for individuals within this income bracket. Also, on the household size, with an average of 5.2 persons has implications for healthcare utilization. Larger households typically have higher healthcare needs, particularly in relation to maternal and child health services. This increases the demand for accessible and affordable healthcare facilities, such as PHC centers. Studies have shown that household size is positively associated with healthcare utilization, as larger families are more likely to experience illness episodes and seek medical care (Onwujekwe et al., 2019).

Table 4.1 Socio-Demographic Attributes of Respondents

Socio-demographic Variables	Survey Sample % (n)
Gender	
Male	57.9% (804)
Female	42.1% (585)
Age (Years)	
18-25	6.6% (92)
26-35	39.0% (542)
36-45	42.3% (588)
46-55	8.6% (120)
56 and above	3.4% (47)
Education	
No formal education	17.1% (237)
Primary	13.0% (180)
Secondary	29.9% (415)
OND/NCE	19.1% (265)
BSc/HND	18.9% (263)
Post-graduate	2.1% (29)
Marital Status	
Location of workplace	
Within Political ward neighbourhood	29.9% (415)
Within local development area	17.1% (237)
Within the Local Government area	47.3% (657)
Outside Urban LGA	4.4% (61)
Outside the State	1.4% (19)
Location of health facility	
Within neighbourhood	89.8% (1248)
Outside Neighbourhood	10.2% (141)
Cost of travel to Nearest health facility	
₦100	30.0% (417)
₦101-300	45.6% (633)
₦301-500	19.2% (266)
₦501-1000	4.3% (60)
Above ₦1000	.9% (13)
Amount spent on health treatment in the last	
Less than ₦5000	65.2% (906)
₦6000-20000	32.8% (455)
₦20001-50000	2.0% (28)
Average monthly income of respondents	
Average household size (5.2 persons)	

Source: Field Survey, 2025

4.2 Socio-Economic Characteristics of Residents on the Utilization of Primary Healthcare Facilities in Ibadan Metropolis

The major thrust of this section is to identify the effect of socio-demographic attributes (age, level of education, gender, average monthly income, and household size), location of health facility, cost of transportation, distance to health facility and patronage of primary healthcare facility. Thus, a regression analysis models was used in order to identify the independent variables (predictors) that significantly influence patronage of primary healthcare facility in the study area.

4.2.1 Multiple Regression Results for PHC Utilization in the Study Area

Regression Results (2) The regression outcomes shown in Table 4.2 revealed empirical indicators concerning the socio-economic characteristics influencing health patronage in the PHC. 64 From Table 4.2, the overall model is statistically significant ($F = 6.108$, $p<0.05$), indicating that the identified independent variables cumulatively account for variation in the utilization of the PHC facilities by the respondents. Even though the coefficient of determination of the ANOVA ($R=0.035$, Adjusted $R = 0.029$) implies a small proportion, it should be acknowledged that this conforms to earlier studies in health utilization researches where a wide assortment of socio-cultural, institution, perceptual and other intervening and confounding factors than measured sociodemographic/socioeconomic were found to influence the behavioural practices of the health consumer (Aregbeshola and Khan, 2018; Onwujekwe et al, 2019 and Adejare et al, 2024).

Consequently, whereas the model has revealed certain significant determinant factors to the utilized of the primary healthcare services in urban setting of Ibadan metropolis, the study recognizes its shortcomings not accounted for due to multifaceted factors not included. Most of the independent variables were shown to have positive and negative relationships with the explained variables. Cost of transportation to the PHC facility (X10) is the strongest determining indicator influencing health utilization. The direction and size of beta coefficient (-0.091, $p<0.05$) revealed negative and significant linear relationship between transportation cost and patronage of PHC. The finding implies that as transportation cost increases, frequency of PHC patronage decreased. This means that high transport cost is a prohibitive barrier to regular visits of consumers of PHC. In this circumstance, it indicates that PHC services are less frequently used when travel cost increases, especially where low income and middle-income patients use out of pocket cost for healthcare access. Moreover, health is considered a luxury where a trip involves transportation cost in a region like Ibadan where distance to any service centers may be a problem, and traffic may worsen the situation (Adedokun and Uthman, 2019; Okwaraji et al, 2020).

Transportation cost has a statistically significant negative effect on the utilization of PHC facilities with a negative beta coefficient of-0.085 and $p<0.05$. This means that a unit increase in transport cost is associated with a decrease of 0.085 in the level of patronage and in turn, a unit decrease in transport cost is associated with a unit increase in the level of utilization of PHC facilities. Average distance to the PHC facilities is also having a statistically significant negative effect on PHC utilization with a beta coefficient of-0.084 and $p<0.05$. The negative relationship depicts that as the distance

to the PHC facilities increase, utilization decrease. The findings confirm the importance of geographic access to health services. Distance is one of the fundamental obstacles that hinder people from utilizing health services. It's particularly so for developing countries because of poor infrastructure and transport systems in some regions (Peters, 2018). The distance is found to be one of the most important factors shaping the pattern of health service utilization by residents of Ibadan metropolis in a densely populated metropolis. This study thus aligns with the findings of previous studies that indicate the negative association between distance and health services utilization and reinforce the belief that geographic and physical accessibility is crucial in the context of the urban Nigeria as far as accessing care is concerned.

The implication for health planning, is that facilities ought to be located within reasonable reach from all catchment populations not to exclude people at the periphery of the city, and even among the dense core areas of the city, it is worth considering its impact for effective service coverage especially on the very poor residents in the informal sector areas. Educational Qualification is another variable that was having a statistically significant negative effect on the level of utilization of PHC, as indicated by its negative beta coefficient (- 0.078, $p<0.05$) implying that level of educational attainment was inversely related with the level of PHC utilization; that is, people with less educational background such as primary, secondary education and OND/NCE are found to be patrons of PHC facilities compared to those with higher levels of education such as BSc, MSc and PhD degrees. This reflects the typical trend whereby the less educated and poor tends to utilize PHCs.

Equally, the higher educated segments of the society tend to use the formal, private and specialized and or the tertiary health care institutions because of perception of superior quality of care, and because they believe they will get all service at a desired time (Akinyemi et al., 2022). The beta coefficients of gender as a dummy variable in determining utilization of PHC facilities is-0.063, and is significant at $p<0.05$. The negative sign for the coefficient shows the inverse relationship between this variable and PHC utilization. This indicates that the female respondents utilized PHC more than the male. This is consistent with many previous studies that show significant gender differences in healthcare seeking behavior, as women commonly demonstrate higher utilization levels than men for various reasons, including primary reproductive role as caregiver for their children and the general utilization of women and child related services, at PHCs (Adewuyi and Auta, 2021; Adejare, 2024; Fagbamigbe et al., 2022). PHCs predominantly offer services on maternity, antenatal care (ANC), and post-natal care (PNC) services, family planning, immunization, as well as management of childhood illness. Hence it comes to no surprise that many women who are primary users of the services, access and utilized the service. The women use PHC primarily for maternal and child health services.

For men on the other hand, the usage rate might be affected by cultural norms that promote a non-inclusive healthcare utilization among them, as many a time, they see health as the individual affair, especially the preventive healthcare service, and only seek help when at the edge (Baker et al., 2020). Age The relationship between age and PHC utilization was non-significant in this model ($p>0.05$) with a beta coefficient of 0.044. The beta coefficient is positive implying a positive association. This suggests a

Table 4.2 Multiple Regression Results for Primary Healthcare Utilization

ANOVA					
	df	**SS**	**Mean square**	**F**	**p-Value**
Regression	8	38.697	4.837	6.108	.000[b]
Residual	1357	1074.630	.792		
Total	1365	1113.327			
R.186[a], R Square .035, Adjusted R square .029, Standard Error of estimate .88990					
Independent variables		Std.Error	Standardized Coefficients (Beta)	t	p-value
Gender		.050	-.063	-2.283	.023**
Age		.029	.044	1.604	.109
Educational qualifications		.020	-.078	-2.849	.004**
Household size		.000	.016	.602	.547
Average monthly income		.000	-.012	-.446	.656
Average distance to PHC		.024	-.084	-3.102	.002**
Location of the health facility		.082	-.038	-1.400	.162

Note statistics is significant at 0.05 (**)

$y=-0.063x_1 + 0.044x_2 - 0.078x_3 + 0.016x_4 - 0.012x_5 - 0.084x_6 - 0.038x_7$

Source: Author's Field Survey, 2024

mild and insignificant increase in the utilization of PHC facilities among the elderly, but the trend is weak enough not to be significant. This may be due to the fact that the sample population is predominantly from the young and middle-aged individuals who constitute the most productive and work force of the society. Household size No significant influence on the utilization of PHC facility was found with regard to the number of people in the household ($p>0.05$) and the beta coefficient was 0.016. Household size was hypothesized to be positively related with healthcare utilization because it represents larger pool of individuals with probable need of care but not significant, it means that the number of members of a household is not the most important factor that determine the access to care for household members but other factors not included in the model might play significant role in dictating the use pattern (Chuma et al, 2014).

Also, household income Average monthly income had no significant influence on the utilization of the PHC facility in the model ($p>0.05$), the negative beta coefficient (-0.012) indicate that high income earners are less likely to utilize PHC facility compared to low income earners. However, since it's not significant it simply implies that in the city the pattern of PHC use is not necessarily determined by the level of income, probably because the PHCs are made to be affordable by subsidising their fee-at-point use of service (Onwujekwe et al, 2019). Health facility location Health facility is not also found to be significantly influencing utilization pattern of PHC in the

metropolis, the beta coefficient was negative (-0.038) and significant at p>0.05. The negative relationship may indicate that even in this urban setting facilities within neighbourhood are less utilized than those situated far from the catchment areas possibly on factors like congestion, availability of parking etc. This indicate that in addition to proximity and distance.

5.0 Conclusion and Recommendations

This study examined the socio-economic determinants influencing the utilization patterns of Primary Health Care (PHC) facilities in Ibadan Metropolis, Nigeria. The findings reveal that PHC utilization is shaped by a combination of socio-demographic and spatial accessibility factors, with transportation cost, distance to health facilities, educational attainment, and gender emerging as the most significant predictors. The regression results confirm that both economic and geographic barriers play a critical role in determining the frequency and likelihood of PHC patronage.

From the outcome of this research work, several policy and planning suggestions for the improvement on the utilization and effectiveness of PHC facilities in the study area can be made: The first suggestion is the improved locational placement of the PHC facilities in Ibadan Metropolis. Urban planners and the health agencies in conjunction with the city's stakeholders should focus on placing more PHC at deprived areas and thickly populated regions where access time to nearest PHC may be relatively far, and supported by geospatial analytics to achieve equitable access coverage. It is necessary that a deliberate move to overcome barrier associated with mobility and distance into health facilities should be made.

Governments and its agencies can adopt subsidised transportation system and also a system where in an area far from nearest facility is covered, community driven transportation program should be set up for the low-income populace, such that travelling time and expenses can be reduced. Further improvement and development of road infrastructures will reduce transportation time and costs.

Thirdly, facilities within PHC centres need to improve to meet the demand and desire of all, especially the highly educate population. Infrastructural improvements, drug supply and service providers are expected to match to, or exceed the one in private health centres. This action will improve service delivery quality and subsequently change the attitude of the people and also the educated ones who currently go for Private sector's service not because it is more efficient and effective than Public sector health centre but because the health care service rendered at their closest PHCs are poor, inadequate drug supply and in efficient staff.

Fourth suggestion that can be forwarded is on widening of the Health Insurance coverage to minimize expenditure out-of-pocket and make the access to services fair for the entire citizens. There is the need to support and make the Oyo State Health Insurance Scheme to get a wide acceptability. Special package should be created for informal sectors workers that will serve as incentives for them to register and accept insurance for themselves and their family members. Public awareness campaign should be intensified in educating on the importance of insurance and how to access care.

Lastly, efforts should be on going at intensifying community-based health education and mobilization to improve people's awareness of the values of health

services provided by PHC. The use of local opinion leaders and civil societies would be useful in sensitizing and mobilising communities toward better health seeking.

References

Abimbola, S., Negin, J., Jan, S., and Martiniuk, A. L. C. (2019). Towards people-centred health systems: A multi-level framework for analysing primary health care governance in lo - and middle-income countries. *Health Policy and Planning, 34*(4), 285–295. https://doi.org/10.1093/heapol/czz015

Adedokun, S. T., and Uthman, O. A. (2019). Women who have not utilized health service for delivery in Nigeria: Who are they and where do they live? *BMC Pregnancy and Childbirth, 19*, 93. https://doi.org/10.1186/s12884-019-2242-6

Adejare, J. A. (2024). Evaluation of health care facilities and services in Urban Slums and informal settlements in Ibadan metropolis. An unpublished PhD Thesis in the Department of Urban and Regional Planning, Ladoke Akintola University of Technology, Ogbomoso.

Adejare, J. A., Jelili, M. O., Muili, A. B. (2024). Patronage Pattern and Accessibility of Healthcare Facilities in Urban Slums and Informal Settlements in Ibadan Metropolis. *Urban and Regional Planning*, *9*(3), 71-87. https://doi.org/10.11648/j.urp.20240903.12

Adewuyi, E. O., & Auta, A. (2021). Health insurance, health care service utilization, and health outcomes among older adults in Nigeria. *BMC Health Services Research, 21*, 1–12. https://doi.org/10.1186/s12913-021-06305-7

Akinyemi, J. O., Adedini, S. A., and Odimegwu, C. O. (2022). Contextual determinants of health facility utilization in Nigeria. *International Journal of Health Planning and Management, 37*(2), 1030–1045. https://doi.org/10.1002/hpm.3380

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior, 36*(1), 1–10. https://doi.org/10.2307/2137284

Aregbeshola, B. S. (2021). Out-of-pocket payments in Nigeria: Implications for equity and healthcare utilization. *International Journal of Health Economics and Policy,6*(1), 1-8.

Aregbeshola, B. S., and Khan, S. M. (2018). Determinants of health care utilization in Nigeria: A systematic review. *Health Economics Review, 8*(1), 1–9. https://doi.org/10.1186/s13561-018-0204-9

Babitsch, B., Gohl, D., and von Lengerke, T. (2017). Re-revisiting Andersen's Behavioral Model of Health Services Use: A systematic review of studies from 1998–2011. *GMS Psycho-Social Medicine, 9*, Doc11. https://doi.org/10.3205/psm000089

Baker, P., Dworkin, S. L., Tong, S., Banks, I., Shand, T., and Yamey, G. (2020). The men's health gap: Men must be included in the global health equity agenda. *Bulletin of the World Health Organization, 98*(11), 751–754. https://doi.org/10.2471/BLT.20.260349

Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y. F., Ndugwa, R., Sartori, J., … Watson, S. I. (2017). The history, geography, and sociology of slums and the health problems of people who live in slums. *The Lancet, 389*(10068), 547–558. https://doi.org/10.1016/S0140-6736(16)31650-6

Fagbamigbe, A. F., Onoka, C. A., & Uzochukwu, B. S. C. (2022). Health insurance and access to health care in Nigeria: A systematic review. *Journal of Public Health in Africa, 13*(1), 1–10. https://doi.org/10.4081/jphia.2022.1890

Federal Ministry of Health. (2021). *National health policy 2021*. Federal Ministry of Health, Nigeria.

Ichoku, H. E., Fonta, W. M., & Onwujekwe, O. E. (2019). Incidence and intensity of catastrophic healthcare financing and impoverishment due to out-of-pocket payments in Nigeria. *PLOS ONE, 14*(6), e0217988. https://doi.org/10.1371/journal.pone.0217988

Odufuwa, B. O., Adedeji, Y. M. D., and Olajide, O. A. (2020). Urban expansion and infrastructure provision in Ibadan metropolis. *Journal of Environmental Design and Management, 12*(1), 45–60.

Okwaraji, Y. B., Cousens, S., Berhane, Y., Mulholland, K., Edmond, K., & Schellenberg, J. R. (2020). Effect of geographical access to health facilities on child mortality in rural Ethiopia. *BMC Public Health, 12*, 1–10. https://doi.org/10.1186/1471-2458-12-1

Onwujekwe, O., Obi, F., Ichoku, H., Uzochukwu, B., and Wang, H. (2019). Assessment of a free maternal and child health program and the prospects for program re-activation and scale-up using a new health fund in Nigeria. *Health Research Policy and Systems, 17*(1), 1–12. https://doi.org/10.1186/s12961-019-0466-7

Oyekale, A. S. (2017). Assessment of primary health care facilities' service readiness in Nigeria. *BMC Health Services Research, 17*, 1–9. https://doi.org/10.1186/s12913-017-2179-2

Peters, D. H., Garg, A., Bloom, G., Walker, D. G., Brieger, W. R., & Rahman, M. H. (2018). Poverty and access to health care in developing countries. *Annals of the New York Academy of Sciences, 1136*(1), 161–171. https://doi.org/10.1196/annals.1425.011

United Nations. (2020). *Sustainable development goals report 2020*. United Nations.

United Nations. (2022). *World population prospects 2022*. United Nations Department of Economic and Social Affairs.

Welcome, M. O. (2020). The Nigerian health care system: Need for integrating adequate medical intelligence and surveillance systems. *Journal of Pharmacy & Bioallied Sciences, 12*(1), 1–9. https://doi.org/10.4103/jpbs.JPBS_84_19

World Health Organization. (2018). *Declaration of Astana: Global conference on primary health care*. WHO.