Ministry of Education and Science of Ukraine
National University of Kyiv-Mohyla Academy
Faculty of Social Sciences and Social Technologies
School of Public Health

Master Thesis

Topic: **«EFFECTIVENESS OF GOVERNMENT INTERVENTIONS AND STRATEGIES FOR ENDING ENDEMICS OF MALARIA AND TUBERCULOSIS IN THE FLOATING VILLAGE OF MAKOKO »**

Thesis is accepted by
(Head of the Department signature)

Submitted by

Second-year student
Oluwatamilore Babajide Ibrahim Moradeyo
(*Student name / signature)*

Specialty 073 «Management»

Master Program «Management in Health Care»

Scientific Supervisor
Yuliia Vernyhor
(Name, scientific and academic degree / signature)

Reviewer

_____
(Name, scientific and academic degree)

Master Thesis Defense Grade

«_____»

Examination Committee Secretary

_____

«____» _____ 20__.

Kyiv 2022

National University of Kyiv-Mohyla Academy
Faculty of Social Sciences and Social Technologies
School of Public Health

Master Degree
Specialty 073 «Management»
Master Program «Management in Health Care»

ABSTRACT

Oluwatamilore Babajide Ibrahim Moradeyo

Effectiveness Of Government Interventions and Strategies for Ending Endemics of Malaria and Tuberculosis in The Floating Village of Makoko

Globally, there is an estimation of 3.3 billion people living in areas where malaria, Tuberculosis, and other respiratory disease are transmitted. The Malaria endemic is said to cover 107 countries and subtropical regions, with sub-Saharan Africa having the hardest hit with an estimated 350 to 500 million clinical cases annually, leading to about 1 million deaths every year. Malaria and Tuberculosis are one of the highest causes of mortality in Nigeria**.** The study investigated the effectiveness of government interventions for ending the endemics of malaria and Tuberculosis in the village of Makoko, Lagos State, Nigeria.

Urbanization is a culprit in worsening the phenomenon of slums with more people moving to cities to seek higher-paying jobs and a better life, with Nigeria struggling with the high mortality rates from these endemics, even with better access to healthcare in the cities. The researcher proceeded to understand how these endemics were being addressed in the slums with limited access to healthcare. Makoko, famous

as the "Venice of Africa," is one of Nigeria's most notable slums. Canoe boats taxiing on black, murky waterways between closely built wooden houses built on silts that lie on Lagos State's prime waterfront.

The study set out to ascertain the burden of malaria and tuberculosis, substantiate the government’s interventions present, determine their effectiveness and identify improvements that may be necessary to end endemics in Makoko effectively. The researcher identified five healthcare workers who serviced the makoko area and conducted in-depth interviews to obtain their points of view regarding the study's objectives. The collected information was then analyzed and compared to malaria and tuberculosis government policies.

The study found that a majority of policy endemic interventions, which include awareness, use of Insecticide Treated Net, Indoor Residual Spraying, Fumigation for Malaria and Education about Tuberculosis, Finding and Treating, Contact Tracing for Tuberculosis were present in Makoko; more so for malaria than for Tuberculosis. Although interventions were present in some way, there were not sufficient enough to cater to the general population of Makoko, with many NGOs taking responsibility to scale up limited government interventions, which were scarce in many areas. To adequately end the endemics of Malaria and Tuberculosis, the Government will have to scale up its interventions and successfully navigate the peculiarities of the locality and the people of Makoko.

Key words:
Makoko
Slum
Malaria
Tuberculosis
Prevention

CONTENT

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
AIDS	Acquired Immune Deficiency Syndrome.
Anti-TB	Anti Tuberculosis.
BCG	Bacillus Calmette-Guerin.
BHCPF	The Basic Healthcare Provision Fund.
CDC	Centre for Disease Control.
COVID-19	Corona Virus Disease.
HBM	Health Belief Model.
HIV	Human Immunodeficiency Virus.
INTALInC	International Network for Transport and Accessibility in Low Income Communities.
IPT	Intermittent Preventive Therapy.
IRS	Indoor Residual Spraying.
ITN	Insecticide Treated Nets.
LLIN	Long Lasting Insecticide Net.
NACA	National Agency for the Control of AIDS.
NGOs	Non-Governemental Organizations.
P	Participant.
Pb	Lead.
PCV	Packed Cell Volume.
R	Researcher.
RDT	Rapid Diagnostic Test.
TB	Tuberculosis.
UN	United Nations.
UNAIDS	United Nations Program on HIV/AIDS.
WHO	World Health Organization.

CHAPTER 1: INTRODUCTION

1.1 Background

The world is increasingly urbanizing with a growing urban population, the emergence of new towns, and sprawling metropolitan areas. According to de Vijver et al. (2015), the projected 1.1 billion increase in the world population between 2010 and 2025 occurs in urban centers. Thus, the population growth rate in urban areas is likely to double the rural rate, but the slum growth rate will be the most offensive. de Vijver et al., (2015) also stated that in the next few decades, the urban population living in sub-Saharan Africa slums will increase from one to two billion during the next 30 years. Wamukoya et al. (2020) indicate that 54% of the global population lived in urban areas in 2016 and will increase to 55% by 2018 and 68% by 2050, with the tremendous increase occurring in Asia and Africa where 88% of all new urban inhabitants will reside. Lilford et al. (2019) indicate that the individuals will be highly vulnerable to poverty, poor services, crime, and dangerous locations. In this regard, expanding slums translates to “inadequate access to safe water, inadequate access to sanitation and infrastructure, poor structural quality of housing, overcrowding, and insecure residential status” (de Vijver et al., 2015, p.1). Subsequently, endemics, such as malaria, respiratory diseases, gastrointestinal disease, poor mental health, and malnutrition are likely to increase in densely inhabited slum areas, which induce sharing of the physical environment by allowing one person’s behavior to impinge on another.

Cities are epicenters of creativity and technology that steer economic growth in addition to providing a lure of better culture, healthcare, employment, and education, leading to disproportionate contribution to national economies. For instance, a combination of factors, including the increase of informal urban settlements, reclassification of rural areas, and

natural population growth trends, will steer rapid urbanization in Africa and Asia by 2050. However, Awadalla (2013) notes that rapid and unplanned urban growth results in poverty, pollution, urban sprawl, environmental degradation, and population demands that overwhelm established service capacity. Subsequently, a significant fraction of the urban population lives in a decaying urban environment with life and health-threatening conditions due to behavioral factors, poor nutrition, lack of adequate sanitation, and crowding that generate the high rate of maternal and child mortality. According to Awadalla (2013), 400 million people lack proper sanitation, and 250 million lack easy access to safe drinking water. Thus, improving the quality of life in slums is extremely difficult due to poor drainage that leads to flooding and damaging flimsy sanitation facilities, while rubbish collected in drainage canals holds stagnant water, creating a breeding ground for disease (Norman et al., 2021).

Slums are a popular settlement feature of the urban landscape in Sub-Saharan Africa countries. According to Amega (2021), slums describe an urban area with an inadequate supply of essential services besides social exclusion, insecure tenure, unhealthy and hazardous locations, overcrowding, and substandard housing. In this regard, the environment links with poor health due to susceptibility to different weather phenomena and natural disasters. For instance, inadequate heating systems expose slum dwellers to increased mortality rates during cold periods, while the morphology of the settlements increases the danger of heat islands or creates a microclimate that influences the health of inhabitants. Although settlement structures in slums constrain health, recording the current state of housing and distribution is relatively challenging because slums are highly dynamic. Friesen et al. (2020) report that the slum area around Hyderabad, India, expanded by 70% between 2003 and 2010. Moreover, the desperate living conditions in slums increase health risks by encouraging individuals to engage in risky behaviors, such as excessive alcohol consumption, prostitution, and drug abuse, which escalate

interpersonal violence, injury, and deaths. Thus, health in slum populations is relatively worse than in other urban areas, leading to adverse mortality and morbidity indicators.

The environment we live in is at the core of our health. Therefore, the need for the upgrades of slums was reiterated at the 9th global conference on health promotion which set the 2030 agenda for sustainable development. Sustainable Development Goal 11 (2016) sets out to make cities and human settlements more inclusive, safe, resilient, and sustainable. It recognizes that cities move beyond their expected boundaries and the harm this could cause to our environment. The Sustainable Development Goal 11 (2016) aims for positive economic, social, and environmental links between urban, periurban, and rural areas by strengthening national and regional development planning. Access for all to adequate, safe, affordable housing and upgrade slums by the year 2030. The U.N characterizes slums by inadequate access to water, sanitation, and infrastructure, poor structural quality of housing, overcrowding, and insecure residential status. Upgrading slums will entail infrastructure and access to basic municipal services.

In the last 100 years, several public health programs, planning sessions, seminars, symposia, and conferences have focused on elimination, control, and eradication of human diseases. Most discussions and eradication programs on significant illnesses have been unsuccessful but have significantly enhanced biological, social, political, and economic understanding of complexities constraining disease control (Center for Disease Control and Prevention [CDC], 1999). Meanwhile, the expansion of slums where nearly 1 billion people live in slums is dominating the discussion because the transition gradient is highly variable, the settlements have unfair differences in health, the inequality is evident and continues to grow in developing countries, and public health in slums areas has immense health problems (Mberu et al., 2016). In this regard, the government interventions and strategies of controlling malaria, respiratory diseases, and malnutrition in endemic regions,

such as Makoko, Lagos aim at reducing the number of related cases and deaths to a level where they are no longer a public health problem (Center for Disease Control and Prevention [CDC], 2018). Meanwhile, control differs from elimination, which focuses on purging a disease from a region, while eradication concentrates on global elimination. Subsequently, this study evaluates the control and elimination of malaria, and tuberculosis in the floating village of Makoko, Lagos, through concerted government efforts, which enhances resource allocation, political will, and commitment.

1.2 Problem Statement

Malaria is a significant killer in sub-Saharan Africa despite enhance progress in control and treatment. According to Orok et al. (2021), the vector and parasite both carry pesticide and medication resistance genes, making control and eradication more difficult. Meanwhile, the poor health of most slum inhabitants limits their immune response to infection, leading to increased Plasmodium strain virulence and severe individual health implications. The World Health Organization ([WHO], 2017), iterates that pregnant women and children under the age of 5 are the most susceptible, a significant source of morbidity and mortality in Africa, with an estimated 216 million clinical cases in 2016. According to the National Agency for the Control of AIDS (NACA, 2017), Nigeria has the second-highest burden of HIV infection in the world, with approximately 3.6 million infected people, 9% of the national population living with HIV, 10% of new HIV infections, and 14% of HIV-related deaths in the world. In this regard, malaria and HIV/AIDS generate adverse health outcomes among slum dwellers due to poor access to health services, inadequate reproductive health, and constrained child maternal health.

Lagos is one of the largest cities in the world that is highly popular in Africa due to its rapidly urbanizing agglomerations. INTALInC (2017) posits

that the city has a population of approximately 15 million residents and an annual growth rate of 6%, making it the eighth fastest-growing urban agglomeration worldwide. Meanwhile, Lagos has under-developing urban transport systems characterized by acute poverty and rising urbanization. Moreover, the city has a complex governance and administration structure, whereby a single administrative unit covering the entire metropolitan area is nonexistent (INTALInC, 2017). The phenomena enhance the development and sprawling of slums around the city due to poor and uncoordinated provision of utilities, roads, transport, power, health, and education. In this regard, 65.8% of the urban population dwell in slums translating into health accessibility, affordability, and sufficiency problems. Thus, the federal and statutory governments have unreliable and inadequate interventions and strategies for ending malaria, and tuberculosis, which challenge the health outcomes and wellbeing of slum dwellers around Lagos.

1.3 Purpose of the Study

Although most health and wellbeing surveys acknowledge that urban slum residents have worse health status than other urban populations, they do not differentiate between slum and non-slum urban residents. In this regard, implementing a health program in the slums requires effective identification of a target audience entailing the knowledge of complex and multifactorial effects that urban settings imposes on health programs and their outcomes. However, the absence of health-generating policies, structures, and interventions creates a substantial gap in the national and international political arena about awareness of the growth and importance of slums. Subsequently, Lilford et al. (2019) indicate that identifying people who live in slums is vital for enhancing target investments and services to areas of utmost deprivation by non-governmental organizations, donors, program managers, and policymakers. In this regard, this study evaluates the role of physical proximity

among slum dwellers and their assumed access to health, chiefly around Makoko, Lagos.

Slums have several factors that make them a critical risk for general public health. For example, de Vijver et al. (2015) indicate that high population density, restricted healthcare access, and poor living circumstances challenge implementing health interventions in slum settings. For instance, formalizing land tenure in low-income urban settlements can foster service delivery by water and sanitation service providers besides increasing a sense of ownership and individual investment (Norman et al., 2021). Additionally, slums require solid waste management and drainage interaction with sanitation besides improving vehicle access in enhancing accessibility of water and sanitation services. In this regard, this study assesses the effectiveness of government interventions and strategies of ending malaria, and tuberculosis in Makoko, which requires the contribution of different stakeholders because they have varying perceptions toward the government, public health policies, and endemic control measures. The goal is to understand the causes of failure in government interventions of ending endemics in low-income urban settlements of Makoko.

1.4 Goals and Objectives

The endemics affecting the floating village of Makoko are relatively challenging to control. According to CDC (2018), the main reasons disadvantaging effective control of malaria, respiratory diseases, and malnutrition include high costs of implementing effective intervention that the Nigerian government is unwilling to bear, weak public health infrastructure for addressing endemics, favorable tropical climate for pathogen and vector breeding, a high prevalence of deadly species of the Malaria parasite, and insecticide-resistant mosquitoes that transmit infections. In this context, this study's goals entail

- To disclose the cost of endemics on the human population in the floating village of Makoko;
- To substantiate established government interventions and strategies of ending endemics of malaria and TB in Makoko, Lagos;
- To establish the effectiveness of the current government control and elimination measures against malaria, tuberculosis, and
- To substantiate improvements required to enhance the effectiveness of the Nigerian government interventions and strategies of ending endemics.

1.5 Research Questions

The enhancement of research and advancement of science generates new technologies and mechanisms for preventing, treating, curing, and supporting populations affected or infected with critical ailments. However, the government interventions and strategies to end malaria, respiratory diseases, and malnutrition among key and priority populations, such as children, teens, and young women, remain fragile and acutely inadequate (UNAIDS, 2021). Meanwhile, the floating village has numerous social and legal environments besides social, economic, and gender inequalities that impede response to endemics. Subsequently, this study focuses on responding to several research questions listed below.

- Do the national and statutory governments have effective interventions and strategies for ending endemics in Makoko?
- What are the effective interventions and strategies for ending malaria, and tuberculosis?
- Why is the floating village vulnerable to endemics of malaria, and tuberculosis?

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The distinction between diagnosed and non-diagnosed individuals explains misperceptions of the case fatality rate and endemic spread (Giordano et al., 2020). In this regard, literature reviews delineate popular endemics in the floating village of Makoko and the factors promoting susceptibility. The reviews further evaluate suitable and reliable interventions and strategies for ending endemics. The embedded studies also highlight factors constraining the effectiveness of popular endemic control and eradication strategies. Hence, the researcher evaluated the challenges facing Nigerian and Lagos governments in formulating and implementing reliable interventions and strategies for ending malaria, and tuberculosis in Makoko. Thus, the literature review describes the health impact of urbanization in developing countries besides providing perception into the difficulties in designing and implementing interventions to improve the health and wellbeing of people living in a dynamic setting. The chapter creates a firm foundation for developing the research methodology used for identifying, collecting, analyzing, and presenting meaningful, comprehensive, and reliable data in the subsequent study sections.

2.2 Theoretical Formulation

Theories are critical tools for crafting interventions with powerful effects compared to interventions developed without theory. Meanwhile, Glanz et al. (2008) indicate that health behaviors are actions of individuals, groups, and organizations that correlate to enhanced quality of life, improved coping skills, policy development and implementation, or social change. Thus,

health behavior models are critical instruments for explaining and advancing interventions to medical conditions. In this regard, effective health behavior interventions influence the trajectory of infectious diseases, such as malaria and diarrheal ailment, which pose grim threats to young, old, and those with compromised immune systems. The embracement of positive behavior changes at multiple levels reduces suffering, premature mortality, and medical costs. Additionally, the models allow public health infrastructure to plan for emergencies and enhance preparedness against human-made and natural disasters. Public health practitioners, according to Bergeron et al. (2017), use theoretical frameworks to increase capacity through learning, improve performance, and improve the quality of working settings in order to meet stated public health goals. Thus, the health models provide an alternative paradigm for informing new ways of conceptualizing and responding to pressing contemporary challenges in public health (Blue et al., 2014). Arguably, health behavior models encourage the development of health and social infrastructure in slums to enable individuals to embrace actions and routines that constrain endemics and promote wellbeing.

2.2.1 Health Belief Model

The Health Belief Model (HBM) is one of the popularly conceptual frameworks used in health behavior research for explaining change and maintenance of health-related behaviors besides guiding framework for health behavior interventions (Suess et al., 2021). The model emerged in the 1950s to explain the widespread failure of people to participate in disease prevention and detection programs. According to Champion and Skinner (2008), people consider susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and self-efficacy before preventing, screening, or controlling illness conditions. Thus, individuals who perceive themselves as susceptible to a condition tend to believe that a specific illness has potentially grim

consequences. According to Redmond (2015), the accessible course of action is advantageous in lowering vulnerability or severity, and taking action outweighs the barriers to inaction; however, health-related behaviors are influenced by a variety of demographic, socio-psychological, and structural variables.

Poverty, financial constraints, and availability of health infrastructures challenge constructs of HBM, including susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and self-efficacy, chiefly among slum dwellers. Nonetheless, some protective behaviors among slum dwellers are a function of the perceived risk of contracting the disease, perceived severity, and perceptions of benefits and barriers to specific AIDS-protective behaviors. The model does not consider the emotional component of behavior. Perceived benefits and barriers are strong behavior change predictors when a perceived threat is high.

2.2.2 The Ecological Model

The ecological model acknowledges numerous inputs and levels of influence on health behaviors. For instance, the individual factors involve traits, such as knowledge, attitudes, beliefs, and personality, which stimulate certain decisions. Montao and Kasprzyk (2008) posit that attitudes, subjective norms, and perceived control all explain and predict behavioral intention, including health habits. According to Sallis et al. (2008), the ecological model articulates an understanding of how people interact with their environments, developing multi-level approaches for improving health behaviors. The fundamental premise of the ecological perspective is inducing motivation and fostering skills to change behavior. Thus, the absence of effective environments and policies challenges the development of healthful behaviors. Besides motivating and educating people about those choices, responsible

stakeholders should create environments and policies that make healthful choices convenient, attractive, and economical.

Embracement of health behaviors involves a combination of public policy factors, community factors, interpersonal factors, and institutional and organizational factors (Pearson, 2011). Golden and Earp (2012), opines that in order to improve health behavioral patterns ecological model requires skills enhancement of target population, people who interact with the target population, institution members beyond target population and immediate contact, and general community beyond target population and immediate contacts besides the creation or modification of public policies. Hence, the ecological model provides a complete perspective of the social, cultural, biological, psychological, policy, community, physical environmental, and organizational factors that influence health and wellbeing.

2.3 The Urban Environment and Health

The urban environment induces significant health challenges either directly or through alteration of the consumption patterns, industrialization, and widespread poverty. Awadalla (2013) indicates that the resultant challenges from the urban environment are relatively complex when coupled with inaccessibility to development opportunities, illiteracy, and low incomes. The absence of affordable housing for the low-income individuals in urban centers makes them dwell in shelters without natural light or ventilation, which are highly susceptible to fire. Slum residents are exposed to a variety of disease-causing substances, including car exhaust fumes and hazardous chemicals, as well as noise pollution, smoke, dust, mosquitoes, flies, stray animals, potholes, and waste (Awadalla, 2013). Lead (Pb) poisoning from industrial operations and automobiles, for example, causes perceptual difficulties in slum children, including low intellect, hyperactivity, and poor fine motor coordination (Awadalla, 2013). In this regard, low-income people,

including migrants, children, and women, are the most vulnerable to the negative impact on health and wellbeing due to their poor access to clean water and sanitation services. Poor people cannot afford to live in safe, well-located, well-serviced dwellings on property free of environmental risks such as biological diseases, chemical pollutants, physical hazards, natural resource deterioration, and poor natural resource quality (Awadalla, 2013). Therefore, the rapid urbanization rate increases environmental, economic, and social problems that enhance low-income earners' susceptibility to disease, accidents, and premature death.

Since the onset of industrialization in the 18th century, the radical transformation of human beings and their ecology is significantly increasing the global population residing in major cities and towns. Ezeh et al. (2016) evaluated existing scientific literature to exhibit slums with shared physical and social environments as critical cities in most low-income and middle-income countries. For instance, in the last 50 years, sprawling slums have become home to more than half of the city population in Nairobi, Kenya, Mumbai, India, and Mexico City, Mexico. However, the measurement of slum populations is not an exact science due to inconsistent application of the definition of a slum, measurement of slum populations is not an exact science, and underrepresentation of slum communities in censuses. Meanwhile, living in poverty and slums generate different results because shantytowns allow people to share environmental risks, slum dwellers benefit collectively from interventions, and social and health improvement interventions used in non-slum localities are not transferable to slums. However, slum localities arouse health concerns due to enhanced risks, such as settling in flood plains subject to drowning (Manila, Philippines), ravines subject to landslides (Caracas, Venezuela), under power lines subject to fires (Nairobi, Kenya), and above city limits for municipal water distribution systems (Quito, Ecuador) (Ezeh et al., 2016). Additionally, the use of readily available material and the absence of piped water or lavatories enhance access for disease vectors. Poor maternal

mental health reduces willingness to breastfeed or immunize infants, resulting in physical and social risks. Moreover, slums expose children to contaminated water and malnutrition that produce enteropathy and stunting associated with poor school performance and reduced life chances.

Urbanization is a critical source of numerous opportunities and benefits, but inadequate planning and coordination promotes environmental degradation that increases human health risks. According to Ssemugabo et al. (2021), the main risks associated with urbanization include water, food, and soil contamination as a result of limited access to clean water and sanitation, as well as increased reliance on solid fuels combined with overcrowding in poorly ventilated houses that expose urban dwellers to indoor air pollutants, increasing the risk of contracting pneumonia and chronic pulmonary obstructive disease. Overcrowding on uneven terrain is also a major cause of accidents and unintentional injuries. Photovoice in an urban slum in Kampala, Uganda, involving five females and five males, identified health risks from poor food hygiene and safety, excreta management, and solid and liquid waste management in this regard (Ssemugabo et al., 2021). The rapid slum development in Kampala is creating numerous health hazards, such as indiscriminate solid waste disposal, low security of tenure, indiscriminate fecal sludge disposal, inadequate durability of housing, settlements in unsafe topography, waterlogging, and flooding, which stimulate disease outbreaks, increase disease vectors, and constrain access to essential utilities (Ssemugabo et al., 2021). As a result, rapid urbanization compromises health by limiting environmental sanitation, deteriorating physical infrastructure, unfavorable working conditions, poor food hygiene and safety, unsafe sexual practices, and ecological ceiling overshoot (Ssemugabo et al., 2021).

The COVID-19 pandemic significantly altered the health and socioeconomic dimensions of different global societies. Nyandera and Onditi (2020) indicate that informal urban settlements experienced double tragedy due to direct and indirect negative effects of the health crisis arising from

containment measures and government policies. For instance, the marginalization of slum dwellers by the government's economic and health policies expose them to the unabated spread of the virus due to the high population density and uncertainty over jobs and income and direct adverse effects, such as anxiety and depression. In this regard, health challenges in informal settlements are critical during the COVID-19 pandemic due to high population density and lack of health insurance coverage and proper sanitation. Moreover, blanket policies involving curfews, social distancing, and lockdown fail to address the needs for survival of low-income people. Hasan et al. (2021), in an exploratory secondary analysis of cross-sectional microdata from Bangladesh slums, found that the conventional COVID-19 management practices, including social distancing, regular hand washing, and not sharing spaces, are impractical because 83.3% of the dwellings share shared toilet facilities and sources of water. Corburn et al. (2020) add that informal settlements lack waste collection, sewers, toilets, water, and adequate housing while space constraints, violence, and overcrowding make self-quarantine physical distancing unattainable. In this context, urban centers have high health risks due to high diversity of attitudes and needs, demographic diversity of residents, adverse effect of some political relations, lack of sustainable change in the neighborhood, and the challenge of creating trust (Mehrolhasani et al., 2021). Therefore, the COVID-19 pandemic highlighted required reforms in urban public health to achieve the guaranteed welfare of all residents.

2.4 The Floating Village of Makoko

Makoko is a fishing village and Nigeria's oldest slum. The village is located at mainland Lagos' shore in a tiny vicinity of approximately across the 3rd Mainland Bridge (Berlanda, 2016). Thus, it overlooks the Mainland Local Government Area to the south-east and the Lagos Lagoon and the Third Mainland Bridge to the east. Makoko has two neigbouring communities: Oko-

Agbon and Ago-Egun, connected by a short bridge constructed over a wide canal with stagnant, black, and murky water. All three distinct communities share the same problems, characteristics, and history, leading to the whole area being referred to as Makoko. Despite the fact that the community speaks Egun as a common language, it is not homogeneous and is divided into five groups led by different chiefs (Baale). Okeke et al. (2019) report that a third of the slum lies on stilts along the murky Lagos lagoon, and the rest is built on the land. However, the location is within a 500m boundary from the coastline, where 64.3% of the site is accessible and marshy, 14.3% accessible and well-drained, and 14.3% largely occupied (see Appendix A).

When the Egun or Ogu inhabitants from Badagary and the Republic of Benin came to the marshes on the lagoon's southwest boundaries in the late 1800s, they constructed the floating village of Makoko (Berlanda, 2016). The community constructs living structures by erecting resting posts above the lagoon, causing the lagoon to split into a series of informal waterways for taxi canoes to navigate (Okeke et al., 2019). Collins (2015) opines that the re-appropriation of available objects, such as cement bags and parboiled-rice sacks, allows shelter construction while stereo-equipped canoes provide portable music boxes, ensuring Makoko’s residents have a complete adjustment for surviving on water. Nonetheless, the community is still marginalized and faces eviction because it occupies what appears to be prime waterfront land. Although no exact population figures exist and the government repeatedly avoids including Egun in the national census to deter official recognition, the 1995 population projection suggested that the community comprised of 51,336 residents with a growth rate of 7.5% to mean that the Makoko population was 85,168 in 2002 and 113,740 in 2006 (Berlanda, 2016). The neighborhood is plagued by poverty characterized by inadequate disposal and waste management systems, numerous health hazards, and a lack of basic school facilities and a steady power supply (Kazeem,

2018). In the meantime, the village's religious beliefs range from Christianity to Islam to ancient African religions.

2.4.1 Structures

Makoko is a self-sustaining community with established social and economic facilities, such as churches, schools, hostels, commercial, and residential. The hamlet is located in Lagos, which has a tropical wet and dry climate with a tropical monsoon season in the horizon. Two wet seasons and a protracted dry season with desert Harmattan winds occur in the neighborhood between December and March. The average monthly rainfall is 300 millimeters, with annual temperatures ranging from 22°C to 32°C. Despite the fact that rainstorms can be severe, climate change is gradually reducing their frequency while increasing the likelihood of extreme precipitation and flooding lasting up to four days. In this regard, the Lagos climate allows Makoko inhabitants to build temporary structures that last for an extended period.

Makoko has only one school Whayinna Nursery and Primary School, constructed with locally available materials. Other structures in the neighborhood are clusters of sand-filled blocks, tattered shacks, and canoes. The shallow waters with limited tidal excursion ensure all houses are built on stilts and float on the lagoon's murky, dark, and sludgy water. The combination between land and water determines the imprecise boundaries of firm ground. Berlanda (2016) notes that the mainland's edge of the neighborhood has one-story concrete bungalows, but wood dominates the building material used for structures in the lagoon. Meanwhile, 52% of residents live in the plank/ bamboo structures, sitting four to six feet above the water to contain flooding. Landfilling in some areas is common to allow stable construction, where sawdust is poured into the lagoon to mask the odor from the prevalent waste and subsequently covered with sand.

Makoko locals harvest large logs from inland forests and transfer them to the lagoon via river networks and streams. The local sawmill provides timber planks, but a significant fraction of the population cannot afford them, leading to the embracement of diverse makeshift solutions innovated from locally available Akoko trees and wild swamp vegetation (Oduwaye et al., 2011). In this regard, the popular construction material in Makoko includes zinc, rubber, plastic, hessian sacks, bamboo, and thatch. Duke (2018) notes that the lumber industry is the community's secondary vocation that allows inhabitants to obtain wood for building houses, canoes, and smoking fish. The walls of the structures may involve zinc-coated corrugated steel, but roofs are primarily made of thatch or tin. Subsequently, 35% of the housing in the community involves wooden shacks, while 22% are single-story concrete bungalows.

The years of trial and error have perfected construction around Makoko, but formalized building code does not exist. The inhabitants build structures individually to allow canoes to move through the waterways without distraction, while east-west orientation captures the southwest wind and reduces solar heat gain. The lack of official infrastructure of any kind, such as water, electricity, and sewerage, makes people dependent on water for free cooling and candles and lanterns for lighting. Nonetheless, approximately 5% of the community has access to illegal electrical connections through cables looped over the roofs and paying mainland residents to draw power from their grid, while 19% use generators. Moreover, the village accesses clean water from communal water points, but some residents have an independent system of pipes to bring water from boreholes to their neighborhoods.

2.4.2 Population

Makoko does not have official figures on the population size, but estimates show that approximately 100,000-300,000 people reside in the

community. The majority of the residents are migrants from Niger Delta, Togo, Ghana, Benin, and Egun state in Nigeria. The population density is 713 people per hectare, where 50% of the 20,000 houses in the neighborhood have four to six dwellers. Meanwhile, the average monthly income is about $170, meaning most residents are tenants (80%) compared to 10% owners and 10% squatters (see Appendix A). In this regard, the majority of the residents engage in low-paying jobs and occupations. For instance, 32% work in the informal sector, 20% are unemployed, 19% are formal, 19% are students, and 10% are retirees. The main occupations in the community are 10% wharf workers, 8% street cleaners, 12% civil servants, 15% artisans, 25% traders, and 30% fishermen (Duke, 2018). Arguably, land ownership and legal status are nonexistent in most residents occupying the lagoon, but those with legal titles acquired them from the government, Olaiya family, transferred from previous occupants, purchased from vendors, or self-acquisition. Subsequently, the main deterrents to land acquisition include expected relocation, lack of awareness about ownership implications, and expensive and laborious acquisition processes.

2.5 Health Challenges

Makoko village is a perfect economic, health, and social nightmare for the Lagos government. The crowded community sitting on a fetid lagoon is gradually spreading out beneath one of the most traveled bridges in West Africa. Although the community is a nuisance to city developers and the government, Ogunlesi (2016) notes that Makoko does not pose a significant burden of communicable diseases, such as cholera. Instead, the floating village is under critical threat from non-communicable diseases, including malaria, respiratory diseases, and malnutrition. Although residents believe they are immune to epidemics, the absence of antenatal care in the neighborhood makes childbirth and maternal health significant challenges. Okporua (2020)

indicates that the COVID-19 pandemic enhances malnutrition risks through lockdowns that challenge livelihoods. According to World Food Programme (2020), hunger and the threat of eviction significantly challenge residents' livelihood compared to disease or infection. Thus, the government interventions for containing the pandemic exposed many Makoko inhabitants to hunger catastrophe and subsequent malnutrition. In this context, the national government and other stakeholders placed 164,408 children and pregnant and lactating women in malnutrition prevention programs while treating 4,313 children aged 6–59 months for moderate acute malnutrition across Lagos, Kano, and Abuja (World Food Programme, 2020).

The rate of malnutrition correlates with high malaria-endemic areas. In this context, chronic malnutrition fosters severe malaria. For instance, Makoko residents live in stagnant and brackish water, which provides a good breeding ground for mosquitoes. The environment makes the neighborhood record the highest malaria incidents – 542 patients between January and June 2015. In the meantime, Nigeria accounts for 25% of malaria morbidity in Africa, with 63 percent of visits to public health facilities, 30% of hospital admissions, 29% of childhood deaths, 25% of newborn mortality, and 11% of maternal mortality (Aman-Oloniyo & Oduneye, 2015). In this context, a sample of 423 residents from the Makoko slum area reported one attack of malaria annually in 54% of the respondents, 2-3 attacks annually in 37.9%, treatment of malaria in 96.5%, and e self-diagnosis of malaria in 66.5%.

Additionally, malnutrition and malaria are the greatest causes of under-five mortality, where malnutrition accounts for 56% and malaria accounts for 25%. According to Adedokun (2020), malaria accounts for 30% of children's admission in an emergency ward, diarrhea accounts for 20%, and respiratory tract infections explain 19%. Hence, the environmental factors prevailing around Makoko enhance the risk of death and comorbidity.

Children below five years in the lowest socioeconomic quintile are highly susceptible to morbidity and mortality from diarrhea and respiratory

tract infections. Ogunsola et al. (2013) indicate that contaminated hands are a crucial transmission mode from infected persons to susceptible hosts. In this regard, the primary point of contact or contamination is improper disposal of feces and poor hygiene before handling food and after handling feces. Thus, slum dwellers have the highest risk of infection due to poor sanitation and the inaccessibility of clean water. However, hand washing can substantially reduce the risk of diarrheal disease by 50% and respiratory tract infections by 16%. Meanwhile, Ogunsola et al. (2013) study with 1,000 respondents found that cholera, typhoid, watery stools, malaria, cough, and catarrh were the most prevalent diseases among slum dwellers. The study associated the diseases with exposure to cold air, dust, smoking, polluted air, dirty water, proximity, eating spoilt food, and a dirty environment.

2.6 Factors Promoting Susceptibility

In most slums, women are the majority residents due to inability to get work or exclusion from the formal economy. Uriri et al. (2019) indicate that women residents in shantytowns have exponentially worse conditions because of a lack of clean and sanitary water. The absence of good water and sanitation enables different ailments medical conditions to thrive, increasing maternal and baby mortality rates. Moreover, slums, such as Makoko, lack hospitals and healthcare workers, resulting in amplified health challenges. Uriri et al. (2019) posit that education is a critical health determinant, but women and girls living in slums do not access it because they care for sick family members and fetch water over long distances. Additionally, poor or inadequate sanitation exposes women to sexual harassment when visiting toilets at night or early morning hours.

Omotayo et al. (2021) indicate that the level of education and type of dwelling structure influences malaria mortality and morbidity. Adedokun (2020) indicates that factors influencing childhood morbidity include the level

of hygiene practice, indoor pollution, cooking fuel, dirty environment, toilet facility, water source, immunization, household wealth, and maternal education. Additionally, children are at different risks of contracting ailments when living in the slums due to variances in a child's current age, household wealth index, media exposure, and child's size at birth. According to Ogunsola et al. (2013), slum dwellers are vulnerable to different ailments due to fatigue, laziness, and lack of water, soap, and time, chiefly when articulating interventions to contain diarrhea or respiratory tract infections.

Akinwale et al. (2013) highlighted different factors that promote disease susceptibility in Makoko, including inadequate water and electricity supplies, overstressed facilities, poor personal hygiene habits, open defecation in ditches, blocked drainage systems, perennial flooding, uncontrolled population growth, polluted environment, illiteracy, unemployment, and poverty. Contact with dogs, dog age, dog feeding site, raw vegetable consumption, and drinking unboiled water were all identified by Gyang et al. (2015) as risk factors for *Toxocara canis* infection among Makoko youngsters. Global Burden of Disease (2021) indicates that unemployment and extreme poverty constrain economic development, resulting in enhanced adverse effects on health. In this regard, unemployed and people living in poverty cannot timely and effectively articulate interventions to control, prevent, or treat diseases.

Makoko community is self-governed without the influences of security forces, leading to an enhanced security threat. Uriri et al. (2019) report that the community's negative perception of contraceptives and birth control pills provides a high fertility rate, responsible for pressuring available resources and utilities. In this regard, women with few children experience social stigmatization, meaning the village will continue to grow exponentially despite resource limitations. Thus, general social insecurity, health-related risks, and substandard living conditions coupled with serious environmental and infrastructural deficiencies, such as housing, health care facilities, schools, and roads, will continually expose the community to adverse health outcomes.

Furthermore, environmental degradation, overcrowding, the use of low-grade home fuels, insufficient solid waste disposal, insufficient housing and services, and a lack of safe water, sanitation, and drainage will exacerbate the health situation.

2.7 Government Interventions

Nigeria is one of the countries in the world with a high burden of HIV. The country has been consistently developing National Strategic Frameworks through intense consultation with a wide cross-section of stakeholders (NACA, 2017). In this regard, the government interventions for reducing HIV/AIDS in Makoko include HIV treatment, elimination of mother-to-child transmission of HIV, HIV testing services, and prevention of HIV. The primary goal is to eliminate AIDS-related prejudice, stigma, and new infections in order to render the country AIDS-free. Thus, established practices and policies aim at reducing the incidence of new HIV infections across Makoko by ensuring 90% of the residents adopt HIV risk reduction behavior and have access to HIV prevention interventions and desired HIV prophylaxis.

Land ownership concerns, poor energy connections, drainage network inadequacies, waste accumulation, infections, insecurity, and flooding are just a few of the obstacles that Makoko faces (Heinrich-Böll-Stiftung, 2014). Most residents live in an unhygienic settings that foster spreading of diseases or ill health among family members. Additionally, the slum dwellers do not have access to clean latrine facilities, despite their susceptibility to perennial flooding, unemployment, mosquitoes, lack of electricity supply, and extreme heat (Akinwale et al., 2013). In this regard, through the State Ministry of Waterfront Infrastructure in 2012, the government earmarked some structures in the village for demolition in preparation for urban renewal. The World Bank aimed at investing $US40.9 million in the renewal of urban slum neighborhoods. However, claims of fund mismanagement and diversion in

addition to the absence of resettlement or compensation initiatives, halted the program. In the meantime, Lagos State Government in 2014 approved a public-private partnership in the construction of an integrated primary healthcare system for advancing conventional medicine to residents of Makoko/Iwaya. Subsequently, the primary government intervention in Makoko focuses on policy approval and endorsement of regeneration plans for the community.

Nigeria is one of the countries with high maternal deaths, with a significant maternal ratio against live births. Furthermore, married women use contraception at a low rate of 15%, resulting in a high fertility rate of 5.5 children per woman. Nigerian women also have limited use of skilled health providers, antenatal care, and health facilities during pregnancy and birth. In this regard, Eshiet (2018) indicates that government and non-governmental organizations are increasingly formulating and implementing targeted campaigns in informal settlements, including Makoko, to educate women on the dangers of lack of maternal healthcare, improve health facilities, and train unemployed women. The government is also promoting adherence of health facilities in the Makoko community to the WHO standards of operation.

Environmentally-responsive architecture allowed the development of structures that adapts to changes in circumstances, climate, and needs. The approach provides cost benefits in the long term because buildings remain in use for an extended period. Therefore, the government attempts to embrace the architecture of floating buildings for coastal lines and riverine areas constructed local and recyclable building materials enhances structural safety and pursuit for compliance around Makoko (Okeke et al., 2019). The intervention enables slum dwellers to access shelter in emergency situations that are cost and ecologically friendly. Moreover, the provision of concepts, such as the Makoko Neighborhood Hotspot, coordinate efforts of different stakeholders in the enhancement of the floating village. The Makoko Neighborhood Hotspot is also responsible for promoting sustainability by

harnessing renewable energy and biogas from community toilets (Hoelzel, 2016). Hence, government interventions articulate affordability and accessibility across the floating village despite the lack of initiatives to enhance healthcare, education, and utility access that promote the wellbeing of all Makoko slum dwellers. Nonetheless, direct government services are completely absent or limited due to the lack of political or governance interest in the community (Heinrich-Böll-Stiftung, 2014).

Nigeria is a federalized country with a decentralized health system that challenges coherent national health policymaking. Ajisegiri et al. (2021) indicate that the federal government develops national health policies and implementation guidelines for state and local governments. In this regard, the national government addresses respiratory diseases in Makoko through the National Multi-Sectoral Action Plan for the Prevention and Control of Non-Communicable Diseases (2019–2025) and malnutrition through the National Food and Nutrition Policy National Strategic Plan of Action for Nutrition (Ajisegiri et al., 2021). In addition to fundamental hygiene concepts, cough etiquettes, face masks, and social distancing, slum people have access to vaccinations and vaccination to help prevent respiratory infections (Goni et al., 2020). Moreover, the government promotes nutrition education and training in early child care, enforces school feeding programs, institutes bi-annual Vitamin-A supplementation to children, iron-folate supplements to pregnant women, and enforces fortification standards in regulated food products (Ministry of Budget and National Planning, 2016). The Basic Healthcare Provision Fund (BHCPF), established under the Nigerian National Health Act, aims at enhancing primary healthcare delivery by ensuring funds are readily available at primary health care without misappropriation (Uzochukwu et al., 2018). The fund reduces the cost of treating malaria, respiratory disease, and malnutrition across the country. Additionally, the Federal Ministry of Health (2019) has *National Technical Guidelines for Integrated Disease Surveillance and Response* for coordinating prevention, preparedness, detection, and

response to priority diseases, including malaria, respiratory disease, and malnutrition, which are significantly overwhelming health, social, and economic wellbeing of Makoko.

The government's intervention against malaria in Makoko and other areas with high-intensity transmission before 2008 included indoor residual spraying with propoxur and mass administration of sulfalene and pyrimethamine to residents (WHO, 2008). Moreover, the government sources and distributes insecticide-treated bed nets, enhances diagnostics and case management by availing rapid test kits, and conducts regular insecticidal resistance monitoring (CDC, 2021b). The federal and state governments also engage in campaign planning against malaria, continuous research, surveillance of acute flaccid paralysis, vector sentinel surveillance, and massive scale-up of facilities for parasitological confirmation. According to the National Malaria Elimination Programme (2014), Larval management, Intermittent Preventive Antimalarial, Insecticide Treated Nets, Indoor Residual Spraying are preventive methods against malaria However, Chimezie (2020) opines that mosquitoes that carry resistant strains of malaria ensure that the burden of disease persists in spite of government interventions.

Global governments have successful interventions for popular endemic control and eradication strategies for malaria, respiratory disease, and malnutrition. For instance, Lesotho offers elemental zinc supplements to malnourished children, while India provides vitamin E supplementation, effectively reducing mortality from protein-energy malnutrition (Ubesie & Ibeziakor, 2012). Prüss-Üstün and Corvalán (2006) recommends manipulating land, water, or vegetation conditions to create unfavorable conditions for vector propagation besides the use of insecticide-treated mosquito nets. Goudet et al. (2019) indicate that zinc supplementation and nutrition education in pregnant women and nutrition systems strengthening targeting infants and children living in slums in Bangladesh, India, and Peru are highly effective strategies against malnutrition. Wilson et al. (2015) posit that effective malaria

control and eradication strategies should involve an enhanced understanding of regional epidemiology and vector ecologies for effective control strategies. Infections acquired in cities, for example, necessitate policies aimed at those cities, but malaria cases imported from rural regions necessitate actions aimed at infected persons, breeding sites, and vectors in those places. Carr (2014) notes that Mumbai reduced malaria prevalence in slum areas by 80% through micro-mapping and micro-planning vulnerable areas for screenings, investigations, regular splaying, and widespread awareness campaigns.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter elaborates on the research methodology of this study. It outlines the method used by recalling the purpose of the study, the rationale for the method, research design, population sample, and data collection methods. It also elaborates on the sources of data, its assessment method, ethical considerations, and limitations. The chapter is essential in providing the core dynamics that create the relationship between the literature review, the topic of study, and the discussion of how the data relates to the objectives of the topic. The research methodology provides insight into the access of information regarding the effectiveness of government interventions and strategies for ending endemics, particularly malaria and tuberculosis, in the floating village of Makoko, Lagos.

3.2 Study Design

This study acknowledges the existence of endemics in the slum areas of urban Nigeria. By focusing on the floating village of Makoko in Lagos, the paper investigates the efficacy of the government's interventions and strategies that seek to alleviate the endemic of malaria and tuberculosis. The study also acknowledges the need for solutions to social endemics in the village that lead to the issue of malaria and tuberculosis and their consequences on the population. To do so, the study has to investigate and comprehend the causes of failure in government interventions in ending malaria and respiratory diseases in the area. The researcher has to address the cost of endemics, identify the existing government interventions, their effectiveness, and identify the improvements needed to improve the interventions. To do so, the study has

adopted the use of qualitative methodology. The study will use in-depth interviews to seek answers to the research questions and ensure that the data addresses the study goals and objectives.

In this regard, this study involved descriptive research because it will adequately reflect the situation in Makoko from the perspective of the participants who have firsthand knowledge.

3.2.1 The rationale for Research Design

The study opts to use a descriptive design. According to this design, the study has to identify a specific topic of study, such as the effectiveness of government intervention in ending malaria and respiratory diseases in Makoko. The study will then collect data on the current government interventions that exist and are aimed at reducing malaria and tuberculosis, as well as their effectiveness, or in this case, their failure. The research design also provides the study insight required into developing a plan to improve the government interventions through assessment of the data and how to implement the strategies necessary to better the situation in Makoko.

3.2.2 Rationale for Qualitative

Qualitative methodologies in research are essential in providing points of view of the participants regarding the topic of study. The study aims and objectives identify the need for qualitative methodology as it identifies the existing government interventions regarding the ending of malaria and tuberculosis, as well as the means of improving the effectiveness of the interventions. The data to be collected is essential as it has to be assessed and related to the objectives for necessary conclusions that would infer recommendations vital in improving the government's input in ending endemic malaria and respiratory diseases in the floating village of Makoko. A

qualitative methodology provides data from the healthcare workers who have firsthand experience in handling the endemics and have to bear the burden of the inefficiency of the government in reducing malaria and tuberculosis in the area. Also, a qualitative methodology suits the research better since the data required is of abstract value. The study has no need for any arithmetic or numerical value.

3.3 Population and Sample Selection

This section identifies the population of interest from the general population that would be used as a study sample to provide the necessary data for the assessment and implementation of better strategies for ending malaria and tuberculosis. The researcher adopted a Purposive sampling method. This method is essential as it ensures the study reaches potential participants who can provide relevant information to the study.

3.3.1 Sample Size

The qualitative sample size sought here will include five healthcare workers, which includes three medical doctors and two nurses who service the makoko area. The sample size ensures the study collects a varied number of responses, and can still provide valid data for assessment and the arrival of proper conclusions.

3.3.2 Recruiting and Sampling Strategy

The research will find the initial participants through working with community health volunteers who are knowledgeable about the population and health dynamics of Makoko. The study will draft a message that can be sent to the community health workers who will then share it with potential initial

participants. The messages will be sent via WhatsApp as its the most used technology for communication. The initial three participants, upon conducting the first round of interviews, will be asked to identify at least one person from the population who fit a sampling criterion necessary and relevant to the study. The study identified six additional healthcare workers, the study participants were sent a draft message and the second round of interviews, organized electronically was conducted with two of the six participants due to scheduling constraints.

3.4 Sources of Data

Qualitative data from in-depth interviews were used as the major source of data for this research. In-depth interviewing ensured the researcher could explore in detail the topic of research to get information and experiences about an assortment of issues from the participants point of view. The information was gathered using and in-depth interview guide using open-ended questions with the researcher asking probing questions in key issues.

Desk Research was conducted on policy documents, the researcher reviewed publicly available documents in relation to malaria and tuberculosis prevention. Included documents that were focused on national and state prevention of malaria and tuberculosis and excluded others.

3.5 Data Collection and Management

Qualitative researchers can choose diverse data collection instruments depending on the study purpose and ability to utilize them effectively. In this case, the researcher used a variety of tools to collect the primary and secondary data needed to meet the goal and answer the study questions. Primary data was collected by in-depth Interviewing of healthcare workers using an in-depth interview guide structured according to the objectives of the

study. The participants were firstly asked for consent, giving permission for the interview, to record the interview, and to use the data for research purposes. Confidentiality was assured to each participant. Interviews were recorded using smartphone application and transcribed by the researcher. Important responses were reported verbatim. Secondary data was obtained by analysing policy papers, data relevant to the objectives of the study were collected and categorized.

3.6 Data Analysis Technique

Qualitative data obtained from recorded interviews were transcribed and analyzed using Microsoft word. The in-depth interview was recorded using a telephone software recorder. The data was separated for malaria and tuberculosis, tabulated, and codes were assigned to relevant portions of the interviews according to the objectives of the study. A thematic framework was developed according to the coded data, the results were tabulated and conclusions were drawn.

3.7 Ethics and Limitations

The interviewees were asked for and provided consent, with the opportunity to withdraw their consent at any time. The copy transcribed interviews were offered. Pseudonyms are used in respect to the interviewees to ensure anonymity. The limitation of the study is that data was not collected from ordinary residents of makoko who are the intended recipients of government interventions the researcher believes effectiveness is subjective and data from ordinary residents will complement the data obtained from the healthcare professionals interviewed. Owning to the lack of available data and previous research the study provides a basis for future research into malaria and tuberculosis on the Island of Makoko.

Conclusions

The researcher adopted a descriptive study design, Qualitative data was collected by in-depth interviewing of five healthcare professionals servicing the makoko area, data was collated analyzed and the researcher develpoed and applied a thematic analysis and conclusions were drawn.

CHAPTER 4: RESULTS

4.1 Introduction

In this section, the researcher analyses and interprets the information collected from the interviews conducted with the five healthcare workers servicing Makoko, Lagos State area. In-depth interviews were conducted in respect of malaria and tuberculosis endemic prevention. However, analysis was undertaken by the researcher using thematic framework analysis. The transcripts were reviewed, and the researcher identified themes, developed a coding system, and subsequently categorized the data according to the coding system. Analysis was conducted manually using Microsoft word.

4.2 Cost of endemics on the human population in the floating village of Makoko.

4.2.1 Malaria

This focuses on the participants' knowledge with regards to the cost of endemics on the human population in the floating village of Makoko. In regards to malaria, two questions were asked to the respondents. The first question was if the participants can disclose the burden of malaria endemic on the human population in floating village of Makoko. The participants responded that it's been overcome in the general population. In rural area, they are still struggling with it. The second question was how often do the participants see patients with malaria? Most of the participants provided estimates between 70 and 90%. P4 stated I don't have any empirical proof, but roughly 70%. It's not a specialist center so they provided general internal

medicine services. And according to the P3, close to 90% of patients would have malaria involved.

R: *Can you disclose the burden of malaria on the people of Makoko?*
P: *It's been overcome in the general population. In rural areas, they are still struggling with it* ***[P1]***

R: *How often do you see patients with malaria?*
P: *I don't have any empirical proof, but roughly 70%. It's not a specialist center so we provided general internal medicine services.* ***[P4]***
P: *I will say close to 90% of patients would have malaria involved.* ***[P3]***

4.2.2 Tuberculosis

In regards to TB, questions were asked to the respondents on whether the participants can disclose the cost of tuberculosis endemic on the human population in the floating village of Makoko. The participants responded that cases of TB and respiratory diseases are seasonal, towards the harmattan period there are a lot of flu and TB cases. Some of the participants noted that TB cases were usually diagnosed at the later stages or in conjunction with other diseases, such as coinfection with HIV. They also stated that February and March mark the peak incidence, rough figures will be 10-20% of patients that came.

R: *Can you disclose the burden of Tuberculosis on people in Makoko?*
P: *Respiratory disease is seasonal, towards the harmattan period there are a lot of flu cases. For TB and the times I was on call, we admitted one TB patient, but there was a coinfection with HIV. Measles is seasonal.* ***[P5]***
P:*Between February and March mark the peak incidence, rough figures will be 10-20% of patients that came.* ***[P1]***

4.3 Established government interventions and strategies of ending malaria and tuberculosis endemic in Makoko.

Malaria		Tuberculosis
▪ Environmental Sanitation ▪ Fumigation ▪ IRS and Coils	Environmental (structural)	• Adequate Ventilation • Overcrowding
• Personal Hygiene • Healthy lifestyle • Traditional methods	Personal	• Personal Hygiene • Healthy Lifestyle
• Chemoprevention • RDT Testing	Prophylactic	• Finding and Treating • Prophylactic antiTB • Contact Tracing • BCG vaccine
• Sensitization • health promotion	Education	• Awareness Campaigns, • *COVID protocol • Health promotion

4.3.1 Malaria

To substantiate established government interventions and strategies of ending malaria endemic in Makoko, some questions were asked to the participants. In their response, the participants stated that the government established a lot of interventions and strategies of ending the malaria endemic in the study area. These interventions were categorized by the researcher into Environmental, Prophylactic, Education, and Personal. Environmental comprises the use of IRS and Coils, Fumigation, and environmental sanitation;

Personal includes ITNs provided by the government, Personal Hygiene, Healthy lifestyle, and Traditional methods which consisted of the use of herbs and herbal concoctions; Prophylactic includes chemoprevention by the provision of prophylactic antimalaria and IPTs as well as available malaria testing and RDT; Education includes health promotion and sensitization.

R: *Are they any outreach programs that do malaria testing?*
P: *Well, you can do the RDT in a pharmacy, the thin and Thick film is done in a lab. But they are now home testing kits as well. Sensitization as well, as in awareness, once you are aware that due to your environment you can be prone to malaria you will want to pay more attention to your surroundings. The awareness campaign usually should be done by the staff of the health centres but often they do not have time because they are overwhelmed* ***[P3]***

R: *Are you aware of local remedies used in the prevention of malaria?*
P: *The people take Dogo Yaro leaves, they boil it and drink it. Some people use pawpaw leaves. They use it as a form of prophylaxis. When they have serious symptoms of malaria and require blood, they use blood leaves "go to market" once taken the PCV usually increases* ***[P4]***

R: *Can you tell me about the roles of NGOs in preventing malaria?*
P: *So NGOs come there to try to give support because underfunding is a problem in these primary health centers, so NGOs come in to try to help with funding and procurement of drugs. Also sometimes they come with the assistance of manpower because the center is overcrowded. Also the chemists play a role in filling in for the centers when they are closed, lots of chemists operate businesses there.* ***[P5]***

R: *In the prevention of malaria, is there any form of permanent prevention methods the Government is looking at of Health sectors?*

P: *Yes. There is a vaccine being developed but it has not yet been approved by FDA* ***[P2]***

R: *Are you aware of any trials?*

P: *No. I am not aware of such.* ***[P2]***

R: *Are there any biological factors that aid in the prevention of malaria?*

P: *There is general speculation about genotype AA being prone to having malaria, it's just a theory and no proven yet* ***[P1]***

R: *Are there preventions used in the prevention of malaria?*

P: *The knowledge is quite widespread, but I don't think people go the extra mile to observe those preventive measures. It's not a question of the knowledge of preventing malaria, but do the people think it's significant enough to put In the extra work.* ***[P1]***

R: *Are there any Government programs that focus on prevention?*

P: *In particular partnership with the hospital that I worked. No. There is usually WHO, NGOs who have a running program targeted at preventing malaria.* ***[P3]***

R: *Are there any local remedies that patients chose to take?*

P: *There is a lot of Agbo. The people who are enlightened enough, who have some level of education will not subscribe to the unorthodox means of prevention. But on the other side of the divide which forms a majority, usually do not present in the hospital. They have their go-to concoctions that they believe with its use they don't have any need to seek any orthodox treatment of prevention.* ***[P3]***

4.3.2 Tuberculosis

In response to the established government interventions and strategies of ending tuberculosis endemic in Makoko, Interventions according to the participants comprises were categorized by the researcher into Environmental, Prophylactic, Education, and Personal. Environmental comprises the overcrowding reduction and adequate home ventilation; Personal includes personal hygiene, Healthy lifestyle; Prophylactic includes contact tracing, finding and treating and prophylactic antiTB medications; Education includes health promotion and awareness campaigns.

R: *Are they any government interventions targeted at ending the tuberculosis endemic in Makoko?* ***P:*** *Yes there are such as enlighten the general public on how to avoid such areas where is tuberculosis cases, avoid contact with persons that has been tested positive, encourage people to promote personal hygiene and provide immunizations.* ***[P3]***

4.4 Effectiveness of the current government control and elimination measures against malaria, and tuberculosis.

In an attempt to ascertain the effectiveness of the current government control and elimination measures against malaria, the researcher categorized the coded data into effective and not-effective and calculated the mean in percentage for each category. The researcher asked the participants if the control and elimination measures provided by the present government are sufficient and effective.

Effectiveness	Malaria	Tuberculosis
Effective	**12%**	**8%**
Not Effective	**15%**	**11%**

4.4.1 Malaria

The participants stated that the measures generally available are effective, but due to the lack of resources directed towards the rural areas it will seem as if it's not effective. They however stated that measures are available but the population exceeds the amount of resources available.

R: *Do the control and elimination measures provided by the present government are efficient and effective?*
P: *The measures generally available are effective, but due to the lack of resources directed towards the rural areas it will seem as if its not effective.* ***[P4]***
P: *Measures are available but the population exceeds the amount of resources available.* ***[P3]***

4.4.2 Tuberculosis

In regards to tuberculosis, The participants stated that government interventions are scarce in makoko, NGOs and individuals do a lot of campaign in regards to awareness. All participants stated COVID-19 protocols were effective and aid in prevention of most respiratory diseases including tuberculosis.

R: *Do the control and elimination measures provided by the present government are efficient and effective?*
P: *NO, interventions are mostly absent from the Government at all levels, NGOs and individuals do a lot of campaign in regards to awareness.* ***[P4]***
P: *Well there are none that I know of in this area, I can only speak of the COVID-19 protocols which covers most respiratory diseases and that will include TB.* ***[P5]***

4.5 Improvements required to enhance the effectiveness of the Nigerian government interventions and strategies for ending endemic

	Malaria	Tuberculosis
Improvements	• **Education** • **Data** • **Availability**	• **Education** • **Raising of Socio economic status** • **Contact Tracing**

4.5.1 Malaria

This section seeks participants' opinions on whether improvements are needed to enhance the effectiveness of the Nigerian government interventions and strategies for ending malaria-endemic. All participants stated that more education is required and the Government should make available ITNs in rural areas. Some of the participants believed that data would go a long way in helping to mitigate all of these issues; once we get the right data, we can understand how many people we are catering for. Once we have the numbers, we can understand and plan toward a proper prevention method.

R: *Is there any need for improvements to enhance the effectiveness of the Nigerian government interventions and strategies of ending malaria endemic?*

P: *Yes. Data will go a long way in helping to mitigate all of these issues, once we can get the right data we can understand how many people we are catering for. Once we have the numbers we can understand and plan toward a proper prevention method.* ***[P1]***

P: *Involving the community leaders in the sensitization process because most villagers only listen to their local chiefs.* ***[P5]***

4.5.2 Tuberculosis

Regarding tuberculosis, they stated that raising the socio-economic status of the people will go a long way in pushing down the figures—awareness campaigns and education about the transmission of TB and rigorous contact tracing.

> ***R:*** *What improvements do you think are necessary?*
> ***P:*** *What I think will go a long way in pushing down the figures will be education and raising the socio-economic status of the people.* ***[P5]***

4.6 Policy Analysis

National and State policy papers were analyzed, the researcher included policy papers that focus on malaria and tuberculosis at a national or state level and excluded all others, National Malaria Strategic Plan of the Malaria Elimination Programme (NMEP), Lagos State Malaria Program, National, and Human Rights and Gender Action Plan for Tuberculosis Care and Prevention in Nigeria 2021 – 2025, , The National Strategic Plan for Tuberculosis Control, The National Malaria Strategic Plan of the federal ministry of health of Nigeria aims to reduce the number of malaria to zero by the year 2020, by making sure appropriate malaria preventive measures are adopted by vulnerable populations, RDT or microscopy testing of all care seekers suspect of malaria, effective administration of anti-malaria to malaria cases in public and private health care settings, To make sure at least 80% of Nigerians adopt appropriate malaria preventive methods by making information available, To make available the drugs for the treatment of malaria, To make sure periodic reports on malaria are provided by healthcare facilities and, To improve coordination of all stakeholders (National Malaria Elimination Program, 2014-2020). The State Government of Lagos recognizes the burden of malaria and has set out policies at a state level to reduce the number of malaria cases, The

Lagos State Malaria Program aims to prevent malaria through Advocacy and Social Programs, providing LLINs, IRS, and Larviciding. It champions the use of IPT in pregnancy, Diagnosis, and treatment of malaria as well as the availability of RDT and antimalarial medications (Lagos State Malaria Control Program). The Human Rights and Gender Action Plan for Tuberculosis Care and Prevention in Nigeria 2021-2025 aims to achieve a 50% reduction in prevalence and 75% of mortality of Non-HIV related TB cases by mobilizing for greater in-country funding for TB, Case Findings, engagement of the private healthcare sector, availability of TB laboratory services, Tackling childhood TB, strengthening of vulnerable populations, equitable access to treatment and care. (National Tuberculosis and Leprosy Control Program ,NTBLCP). The National Strategic Plan for Tuberculosis Control aims to complement the National Tuberculosis and Leprosy Control Program, it complements the program's strengths while reinforcing its weakness. It aims primarily to promote the integration of HIV and TB service delivery, tackle the failures in the treatment of TB in endemic areas, Increase testing and diagnosis of TB in adults and children, and create resilient systems to support its objectives.

CHAPTER 5: DISCUSSION

This chapter discusses findings, conclusions drawn from the study findings, and recommendations. This research aims to disclose the cost of endemics on the human population in the floating village of Makoko, substantiate established government interventions and strategies for ending endemics in Makoko, Lagos, demonstrate the effectiveness of the current government control and elimination measures against malaria, tuberculosis, and substantiate improvements required to enhance the effectiveness of the Nigerian government interventions and strategies of ending endemics. Fulfilling our research aims will help the researcher understand why is the floating village vulnerable to endemics of malaria and tuberculosis, the effective interventions and strategies for ending malaria and tuberculosis, and if national and statutory governments have effective interventions and strategies for ending endemics in Makoko.

The analysis identifies Environmental, Personal, Prophylaxis, and Education as key themes to substantiate established government interventions in ending the endemics of malaria and tuberculosis in makoko. Regarding malaria, environmental consists of fumigation, use of IRS and Coils, and environmental sanitation; Personal consists of personal hygiene, a healthy lifestyle, and the use of traditional methods such as herbs; Prophylactic consists of chemoprevention and RDT testing; and Education consists of health promotion and sensitization. Malaria prevention in makoko could be improved with greater availability of malaria prevention programs, persistent and sufficient educational campaigns, and greater availability of local demographic data. Regarding tuberculosis, environmental consists of reducing overcrowding in homes, ensuring proper and adequate ventilation of dwellings; Personal consists of personal hygiene, and a healthy lifestyle; Prophylactic consists of finding and treating people infected with tuberculosis, administering prophylactic anti-TB drugs to people in contact with TB patients

or suspected to be high risk for TB; and Education consists of health promotion, TB awareness campaigns and respiratory disease prevention guidelines such as the COVID-19 protocols. TB prevention in makoko could be improved by expanding educational campaigns for TB and raising the socio-economic standards of the people of makoko.

The data suggest that healthcare workers in the floating village of makoko estimate a high malaria incidence as malaria infection is said to be involved in about 70 – 90% of hospital visits; this is consistent with available data as it's known that makoko residents live in stagnant and blackish water, which provides a good breeding ground for mosquitoes. The environment makes the neighborhood record the highest malaria incidents – 542 patients between January and June 2015. Hospital visits with tuberculosis involved were about 10 – 20% as TB cases were known to peak during the harmattan seasons in February and March. Most patients diagnosed with TB presented to the healthcare setting due to other illnesses and were known to have coinfections with other diseases such as influenza and HIV.

Government interventions in makoko have been categorized under four themes, Environmental relating to the general environment and structure of the dwellings, Personal which refers to actions that are to be implemented on an individual level, Prophylactic which are interventions that aim to prevent the infectious process of malaria, TB and Education which involves the use of information as means to prevent malaria and TB. Regarding malaria, environmental sanitation, fumigation, Indoor Residual Spraying (IRS), and coils are Environmental. Personal hygiene, and healthy lifestyle are Personal. Chemoprevention by the provision of prophylactic antimalarials, Intermittent Preventive Therapy (IPT), available malaria testing, and Rapid Diagnostic Tests (RDT) are Prophylactic. And sensitization, health promotion, and awareness are Education. The data suggests that there is a significant portion of the population does not seek hospital treatment for malaria; P3 states "*There is a lot of Agbo [herbs]. The people who are enlightened enough, who have*

*some level of education will not subscribe to the unorthodox means of prevention. But on the other side of the divide which forms a majority, usually do not present in the hospital. They have their go-to concoctions that they believe with its use they don't have any need to seek any orthodox treatment of prevention.***"** Instead, relies on the use of traditional methods such as herbs and herbal concoctions as a means of prevention and treatment. "*The people take Dogo Yaro leaves, they boil it and drink it. Some people use pawpaw leaves. They use it as a form of prophylaxis. When they have serious symptoms of malaria and require blood, they use blood leaves "go to market" once taken the PCV usually increases"* ***[P4].***

Regarding tuberculosis, reducing the number of house occupants hence overcrowding, and ensuring adequate ventilation of homes are Environmental. Personal hygiene and leading a healthy lifestyle are Personal. Actively finding people potentially infected with TB and administering treatment which aims to cure and stop the spread of TB unknowingly by an infected person, administration of prophylactic anti-TB drugs to people who are at high risk of TB or have been in contact with persons suspected of TB, Contact tracing and subsequent screening and treatment of confirmed TB cases as well as administration of the BCG vaccine for TB are Prophylactic. Awareness campaigns about the signs and symptoms of TB, what to do when in contact with someone suspected of TB, and general health promotion campaigns are Education. **P3** states, "*Yes there are such as enlighten the general public on how to avoid such areas where is tuberculosis cases, avoid contact with persons that has been tested positive, encourage people to promote personal hygiene and provide immunizations."*

Effectiveness could be very subjective; the mean for effective and not effective was calculated in percentage to determine effectiveness from the collected data. Regarding malaria, 12% of the data suggests that government interventions were effective, and 15% of the data suggests that government interventions were not effective. However, malaria interventions are generally

effective lack of sufficient resources directed toward the rural areas. **P3** stated, "*Measures are available but the population exceeds the amount of resources available."* According to **P1,** "*The knowledge is quite widespread, but I don't think people go the extra mile to observe those preventive measures. It's not a question of the knowledge of preventing malaria, but do the people think it's significant enough to put In the extra work."* This is consistent with Champion and Skinner (2008), people consider susceptibility, seriousness, benefits, and barriers to a behavior, cues to action, and self-efficacy before preventing, screening, or controlling illness conditions. Thus, individuals who perceive themselves as susceptible to a disease tend to believe that a specific illness has potentially grim consequences. Regarding tuberculosis, 8% of the data suggests that government interventions are effective, and 11% of the data suggests that government interventions are not effective. TB Interventions are scarce in makoko, and the bulk of the work is left to NGOs and Individuals.

Improvements are necessary to enhance the effectiveness of government interventions in makoko. Regarding malaria, all the participants stated that more education is needed, and the government should focus on expanding intervention programs to accurately cater to the population of makoko. Some of the participants believed that data would go a long way in helping to mitigate all of these issues; once we get the right data, we can understand how many people we are catering for. Once we have the numbers, we can understand and plan toward a proper prevention method.

CONCLUSIONS

The Makoko slum is a consequence of Urbanization; the terrain and location make the village more susceptible to diseases, hence adverse health outcomes. The study substantiated the established Government Interventions in preventing Malaria and Tuberculosis in the floating village of Makoko to ascertain if they were in line with Government Policy and effectively prevented endemics. The study found that the costs of malaria and TB endemics in makoko are quite high. Although there is a robust and comprehensive policy from the Government to prevent Malaria and Tuberculosis, the resources are inadequate to cater to the population of Makoko. Due to a lack of data and political will, the village suffers from neglect from many Government programs, and most of the work is left to the NGOs. There is Inadequate Government support to tackle other determinants of health that adversely affect the health of the village. To tackle endemics the government will have to tailor its policies to the peculiarities of the village, engaging necessary stakeholders. Given the findings, the following recommendations are made.

RECOMMENDATIONS

- The government should actively support the village in addressing other determinants of health, like poverty and low-socioeconomic status.
- Availability of data will go a long way in addressing many issues in the village; these will help healthcare facilities plan accordingly.
- The government should engage with community leaders and actively include them in ensuring sustainable interventions in makoko
- Government interventions should be tailored to the peculiarities of the village of makoko, its geography, religion, local languages, and beliefs.
- The government should scale up its interventions to prevent malaria and tuberculosis in makoko, to meet the actual demand for these services.
- Upgrading the slums should reduce a portion of the cause of endemics in the village, and removing barriers to access to healthcare will encourage the population to seek care in a healthcare setting more often.
- Engaging with NGOs who play an active role in the village should be relevant to coordinating and streamlining resources to areas where they are most needed.

REFERENCES

Adedokun, S. T. (2020) Correlates of childhood morbidity in Nigeria: Evidence from ordinal analysis of cross-sectional data. *PLoS ONE 15*(5), e0233259. https://doi.org/10.1371/journal.pone.0233259

Ajisegiri, W. S., Abimbola, S., Tesema, A. G., Odusanya, O. O., Ojji, D. B., Peiris, D., & Josh, R. (2021) Aligning policymaking in decentralized health systems: Evaluation of strategies to prevent and control non-communicable diseases in Nigeria. *PLOS Global Public Health, 1*(11): e0000050. https://doi.org/10.1371/journal.pgph.0000050

Akinwale, O. P., Adeneye, A. K., Musa, A. Z., Oyedeji, K. S., Sulyman, M. A., Oyefara, J. O., Adejoh, P. E., & Adeneye, A. A. (2013). Living conditions and public health status in three urban slums of Lagos, Nigeria. *South East Asia Journal of Public Health, 3*(1), 36-41. https://www.researchgate.net/publication/273682019_Living_conditions_and_public_health_status_in_three_urban_slums_of_Lagos_Nigeria

Aman-Oloniyo, A., &. Oduneye, A. (2015). Knowledge, attitude and perceptions of residents of a slum area of Lagos State, Nigeria on malaria. *International Journal of Epidemiology, 44*(1), i163–i164, https://doi.org/10.1093/ije/dyv096.217

Amega, A. K. (2021). Slum decay in Sub-Saharan Africa: Context, environmental pollution challenges, and impact on dweller's health. Environmental Epidemiology, 5(3), 1-3. doi: 10.1097/EE9.0000000000000158

Awadalla, H. I. (2013). Health effect of slums: A consequence of urbanization. *Scholarly Journal of Medicine*, 3(1), 7-14. https://www.researchgate.net/publication/235963598_Health_effect_of_slums_A_consequence_of_urbanization

Bergeron, K., Abdi, S., DeCorby, K., Mensah, G., Rempel, B., & Manson, H. (2017). Theories, models and frameworks used in capacity building interventions relevant to public health: a systematic review. *BMC Public Health, 17*, 914. https://doi.org/10.1186/s12889-017-4919-y

Berlanda, T. (2016). *2016 on site review report: Makoko Floating School*. NLE. https://s3.us-east-1.amazonaws.com/media.archnet.org/system/publications/contents/10740/original/DTP103125.pdf?1475749432

Blue, S., Shove, E., Carmona, C., & Kelly, M. P. (2014) Theories of practice and public health: Understanding (un)healthy practices. *Critical Public Health, 26*(1), 36-50, DOI: 10.1080/09581596.2014.980396

Carr, C. (2014, February 1) War on the 'Malaria mayhem' in Mumbai reduces infection by 80%. *The Guardian*. https://www.theguardian.com/global-development-professionals-network/2014/aug/01/mumbai-malaria-strategy-monsoon-india

Center for Disease Control and Prevention [CDC] (1999). *The Principles of Disease Elimination and Eradication.* https://www.cdc.gov/mmwr/preview/mmwrhtml/su48a7.htm

Center for Disease Control and Prevention [CDC] (2018). *How Can Malaria Cases and Deaths Be Reduced?* https://www.cdc.gov/malaria/malaria_worldwide/reduction/index.html

CDC. (2021). *The social-ecological model: A framework for prevention*. https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fviolenceprevention%2Fpublichealthissue%2Fsocial-ecologicalmodel.html

CDC. (2021b). *CDC in Nigeria.* https://www.cdc.gov/globalhealth/countries/nigeria/default.htm

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). *Health behavior and health education: Theory, research, and practice*. John Wiley & Sons, Inc. https://www.researchgate.net/publication/43508113

Chimezie, R. (2020) Malaria hyperendemicity: The burden and obstacles to eradication in Nigeria. *Journal of Biosciences and Medicines, 8*(11), 165-178. https://www.scirp.org/journal/paperinformation.aspx?paperid=104267

Collins, J. (2015, June 2). *Makoko Floating School, beacon of hope for the Lagos 'waterworld' – a history of cities in 50 buildings, day 48*. https://www.theguardian.com/cities/2015/jun/02/makoko-floating-school-lagos-waterworld-history-cities-50-buildings

Corburn, J., Vlahov, D., Mberu, B., Riley, L., Caiaffa, W. T., Rashid, S. F., …, Ayad, H. (2020). Slum health: Arresting COVID-19 and improving well-being in urban informal settlements. *Journal of Urban Health, 97*, 348–357. https://doi.org/10.1007/s11524-020-00438-6

De Vijver, S. V., Oti, S., Oduor, C., Ezeh, A., Lange, J., Agyemang, C., & Kyobutungi, C. (2015). Challenges of health programmes in slums. *Viewpoint*, 1-3. http://dx.doi.org/10.1016/S0140-6736(15)00385-2

Duke, S. (2018). Makoko: (re)development of an aquatic home. *Master Thesis*, Carleton University. https://curve.carleton.ca/system/files/etd/38882825-46f2-414c-8bce-73ec270f5a91/etd_pdf/1dc4fe93dd4f2cc03d8fc464eb428406/duke-floatcitymakokoredevelopmentofanaquatichome.pdf

Eshiet, I. (2018). Socio-economic predictors of maternal healthcare uptake by women in Makoko Community, Lagos, Nigeria. *International Journal of Integrative*

Humanism, 9(1), 23-34. https://www.researchgate.net/publication/330882286_Socio-economic_Predictors_of_Maternal_Healthcare_Uptake_by_Women_in_Makoko_Community_Lagos_Nigeria

Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.-F., Ndugwa, R., Sartori, J., … Lilford, R. J. (2016). The health of people who live in slums 1: The history, geography, and sociology of slums and the health problems of people who live in slums. *The Lancet*, 1-12. http://dx.doi.org/10.1016/S0140-6736(16)31650-6

Federal Ministry of Health. (2019). *National technical guidelines for integrated disease surveillance and response* (3rd ed.). Federal Ministry of Health - Nigeria Centre for Disease Control. https://ncdc.gov.ng/themes/common/docs/protocols/242_1601639437.pdf

Friesen, J., Friesen, V., Dietrich, I., & Pelz, P. F. (2020). Slums, space, and state of health—A link between settlement morphology and health data. *International Journal of Environmental Research and Public Health, 17*(6), 2022. https://doi.org/10.3390/ijerph17062022

Giordano, G., Blanchini, F., Bruno, R., Colaneri, P., Di Filippo, A., Di Matteo, A., & Colaneri, M. (2020). Modelling the COVID-19 epidemic and implementation of population-wide interventions in Italy. *Nature Medicine, 26*, 855-860. https://doi.org/10.1038/s41591-020-0883-7

Glanz, K., Rimer, B. K., & Viswanath, K. (2008). Theory, research, and practice in health behavior and health education. In Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). *Health behavior and health education: Theory, research, and practice*. John Wiley & Sons, Inc. https://www.researchgate.net/publication/43508113

Global Burden of Disease. (2021). Tracking development assistance for health and for COVID-19: A review of development assistance, government, out-of-pocket, and other private spending on health for 204 countries and territories, 1990–2050. *The Lancet, 398*(10308), 1317-1343. https://doi.org/10.1016/S0140-6736(21)01258-7

Golden, S. D. & Earp, J. A. (2012). Social ecological approaches to individuals and their contexts: Twenty years of health education & behavior health promotion interventions. *Health Education & Behavior, 39*(3), 364–372. https://journals.sagepub.com/doi/pdf/10.1177/1090198111418634

Goni, M. D., Hasan, H., Wan-Arfah, N., Naing, N. N., Deris, Z. Z., Arifin, W. N., Baaba, A. A., Aliyu, A., & Adam, B. M. (2020) Health education intervention as an effective means for prevention of respiratory infections among Hajj pilgrims: A review. *Frontier in Public Health, 8,* 449. https://www.frontiersin.org/articles/10.3389/fpubh.2020.00449/full

Goudet, S. M., Bogin, B. A., Madise, N. J., & Griffiths, P. L. (2019). Nutritional interventions for preventing stunting in children (birth to 59 months) living in urban slums in low- and middle-income countries (LMIC). *The Cochrane database of*

systematic reviews, *6*(6), CD011695. https://doi.org/10.1002/14651858.CD011695.pub2

Gyang, P. V., Akinwale, O. P., Lee, Y. L., Chuang, T. W., Orok, A. B., Ajibaye, O., Liao, C. W., Chen, P. C., Chou, C. M., Huang, Y. C., Barghouth, U., & Fan, C. K. (2015). Seroprevalence, disease awareness, and risk factors for Toxocara canis infection among primary schoolchildren in Makoko, an urban slum community in Nigeria. *Acta tropica*, *146*, 135–140. https://doi.org/10.1016/j.actatropica.2015.03.018

Hasan, S. M., Das, S., Hanifi, S. M. A., Shafique, S., Rasheed, S., & Reidpath, D. D. (2021). A place-based analysis of COVID-19 risk factors in Bangladesh urban slums: A secondary analysis of World Bank microdata. *BMC Public Health*, *21*, 502. https://doi.org/10.1186/s12889-021-10230-z

Heinrich-Böll-Stiftung (2014). *Urban and infrastructural issues: Makoko Floating School — African water cities project*. https://ng.boell.org/sites/default/files/uploads/2014/06/challenges-and-conditions.pdf

Hoelzel, F. (2016, September 21). Strategic projects and tactical interventions for urban development in West Africa. Heinrich-Böll-Stiftung. https://ng.boell.org/en/2016/09/21/strategic-projects-and-tactical-interventions-urban-development-west-africa

INTALInC (2017). *Transport and mobility: Meeting the needs of informal settlements and slum dwellers in Nigeria*. INTALInC. https://intalinc.leeds.ac.uk/wp-content/uploads/sites/28/2018/03/INTALInC-Nigeria-report.pdf

Kazeem, Y. (2018). A floating school in Lagos has helped bring solar power to one of the city's oldest slums. *Quartz Africa*. https://qz.com/africa/578843/a-floating-school-in-lagos-has-helped-bring-solar-power-to-one-of-the-citys-oldest-slums/#:~:text=VENICE%20OF%20LAGOS-,A%20floating%20school%20in%20Lagos%20has%20helped%20bring%20solar%20power,of%20the%20city's%20oldest%20slums&text=Now%2C%20Adeyemi's%20firm%20announced%20that,light%20up%20the%20Makoko%20waterfront.

Lilford, R., Kyobutungi, C., Ndugwa, R., Sartori, J., Watson, S., Sliuzas, R., …, Ezeh, A. (2019). Because space matters: Conceptual framework to help distinguish slum from non-slum urban areas. *BMJ Global Health*, *4*, 1-7. doi:10.1136/bmjgh-2018-001267

Mberu, B. U., Haregu, T. N., Kyobutungi, C., & Ezeh, A. C. (2016) Health and health-related indicators in slum, rural, and urban communities: a comparative analysis. *Global Health Action*, *9*(1), 33163. https://doi.org/10.3402/gha.v9.33163

Mehrolhasani, M. H., Yazdi-Feyzabadi, V., & Ghasemi, S. (2021). Community empowerment for health promotion in slums areas: A narrative review with

emphasis on challenges and interventions. *Journal of education and health promotion, 10*, 263. https://doi.org/10.4103/jehp.jehp_1628_20

Ministry of Budget and National Planning. (2016). *National policy on food and nutrition in Nigeria*. Ministry of Budget and National Planning. https://nationalplanning.gov.ng/wp-content/uploads/2020/12/National-Policy-on-Food-Economic-Growth.pdf

Montaño, D. E., & Kasprzyk, D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). *Health behavior and health education: Theory, research, and practice*. John Wiley & Sons, Inc. https://www.researchgate.net/publication/43508113

National Agency for the Control of AIDS [NACA]. (2017). National Strategic Framework on HIV and AIDS: 2017-2021. NACA. https://www.childrenandaids.org/sites/default/files/2017-11/NATIONAL-HIV-AND-AIDS-STRATEGIC-FRAMEWORK.pdf

National Malaria Elimination Programme (2014). *National malaria strategic plan 2014 – 2020*. Federal Ministry of Health. https://health.gov.ng/doc/NMEP-Strategic-Plan.pdf

Norman, G., Martín, S. M., & Arteche, G. S. (2021). *Integrated slum upgrading: How can we link water and sanitation improvements with wider urban development?* Water & Sanitation for the Urban Poor and Arquitectura Sin Fronteras. https://www.wsup.com/content/uploads/2021/05/WSUP-Integrated-Slum-Upgrading-_FINAL_MAY-2021.pdf

Nyadera, I. N., & Onditi, F. (2020). COVID-19 experience among slum dwellers in Nairobi: A double tragedy or useful lesson for public health reforms? *International Social Work, 63*(6), 838–841. https://doi.org/10.1177/0020872820944997

Oduwaye, L., Ilechukwu, V., & Yadua, O. (2011). Socio-economic determinants of urban poor housing types in Makoko Area, Lagos. *Real Corp*, 873-882. https://www.researchgate.net/publication/228463818_Socio-Economic_Determinants_of_Urban_Poor_Housing_Types_in_Makoko_Area_Lagos

Ogunlesi, T. (2016, February 23). Inside Makoko: danger and ingenuity in the world's biggest floating slum. *The Guardian.* https://www.theguardian.com/cities/2016/feb/23/makoko-lagos-danger-ingenuity-floating-slum

Ogunsola, F., Balogun, M., Aigbefo, S., Oduyebo, O., Oladele, R., Olufemi, J., & Ajieroh, V. (2013). Perception and practice of hand washing in Kuramo Community, Lagos, Nigeria. *International Journal of Infection Control*, *9*(1), 1-8. https://doi.org/10.3396/ijic.v9i1.10780

Okeke, F., Chukwuali, C., & Enechojo, I. (2019). Environmentally-responsive design; A study of Makoko floating school building. *International Journal of Development and Sustainability*, *8*(8), 476-487. https://www.researchgate.net/publication/337935560_Environmentally-responsive_design_A_study_of_Makoko_floating_school_building

Okporua, K. (2020, October 5). Residents of Nigeria's floating slum keep their hopes up as lockdown sinks their livelihoods. *Independent.* https://www.independent.co.uk/arts-entertainment/photography/largest-floating-slum-lockdown-livelihoods-b745528.html

Omotayo, A. I., Ande, A. T., Oduola, A. O., Olakiigbe, A. K., Ghazali, A. K., Adeneye, A., & Awolola, S. T. (2021). Community Knowledge, Attitude and Practices on Malaria Vector Control Strategies in Lagos State, South-West Nigeria. *Journal of medical entomology, 58*(3), 1280–1286. https://doi.org/10.1093/jme/tjaa278

Orok, A. B., Ajibaye, O., Aina, O. O., Iboma, G., Oboshi, S. A. & Iwalokun, B. (2021). Malaria interventions and control programs in Sub-Saharan Africa: A narrative review. *Cogent Medicine*, *8*(1), 1940639. https://doi.org/10.1080/2331205X.2021.1940639

Pearson, T. A. (2011). Public policy approaches to the prevention of heart disease and stroke. *Circulation*, *124*(23), 2560- 2571. https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.110.968743

Prüss-Üstün, A., & Corvalán, C. (2006). Towards an estimate of the environmental burden of disease. World Health Organization. https://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

Redmond, C. (2015). Health belief model. https://foliocdnfiles.azureedge.net/files/61e9bf91-d77c-4f28-b79c-e32ee64917a3

Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practic*e (pp. 465–485). Jossey-Bass. http://31.42.184.140/main/264000/2727fe286ff44b2d0a25c36efcacf725/Karen%20Glanz%2C%20Barbara%20K.%20Rimer%2C%20K.%20Viswanath%20-%20Health%20Behavior%20and%20Health%20Education_%20Theory%2C%20Research%2C%20and%20Practice-Jossey-Bass%20%282008%29.pdf

Ssemugabo, C., Nalinya, S., Lubega, G. B., Ndejjo, R., & Musoke, D. (2021). Health risks in our environment: Urban slum youth' perspectives using photovoice in Kampala, Uganda. *Sustainability*, *13*(1), 248. https://doi.org/10.3390/su13010248

Suess, C., Maddock, J., Dogru, T., Mody, M., & Lee, S. (2022). Using the Health Belief Model to examine travelers' willingness to vaccinate and support for vaccination requirements prior to travel. *Tourism management*, *88*, 104405. https://doi.org/10.1016/j.tourman.2021.104405

Ubesie, A., & Ibeziakor, N. (2012). High burden of protein-energy malnutrition in Nigeria: beyond the health care setting. *Annals of medical and health sciences research*, *2*(1), 66–69. https://doi.org/10.4103/2141-9248.96941

UN. (2016). *Sustainable Development Goals*. Goal 11: make cities inclusive, safe, resilient, and sustainable. https://www.un.org/sustainabledevelopment/cities/

UNAIDS. (2021). *Global AIDS strategy 2021–2026. End Inequalities. End Aids*. Joint United Nations Programme on HIV/AIDS. https://www.unaids.org/sites/default/files/media_asset/global-AIDS-strategy-2021-2026_en.pdf

Uriri, A. E., Makanju, A. O, & Ikpe, R. (2019). A socio-economic profiling of households livelihood and vulnerability at urban slum/bligted communities in Lagos: A case study of Makoko. *International Journal of Research and Innovation in Social Science (IJRISS), 3*(8), 475-484. https://www.rsisinternational.org/journals/ijriss/Digital-Library/volume-3-issue-8/475-484.pdf

Uzochukwu, B., Onwujekwe, E., Mbachu, C., Okeke, C., Molyneux, S., & Gilson, L. (2018). Accountability mechanisms for implementing a health financing option: the case of the basic health care provision fund (BHCPF) in Nigeria. *International Journal for Equity in Health*, *17*, 100. https://doi.org/10.1186/s12939-018-0807-z

Wamukoya, M., Kadengye, D. T., Iddi, S., & Chikozho, C. (2020). The Nairobi urban health and demographic surveillance of slum dwellers, 2002–2019: Value, processes, and challenges. *Global Epidemiology, 2*, 100024. https://doi.org/10.1016/j.gloepi.2020.100024

Wilson, M. L., Krogstad, D. J., Arinaitwe, E., Arevalo-Herrera, M., Chery, L., Ferreira, M. U., Ndiaye, D., Mathanga, D. P., & Eapen, A. (2015). Urban Malaria: Understanding its Epidemiology, Ecology, and Transmission Across Seven Diverse ICEMR Network Sites. *The American journal of tropical medicine and hygiene*, *93*(3), 110–123. https://doi.org/10.4269/ajtmh.14-0834

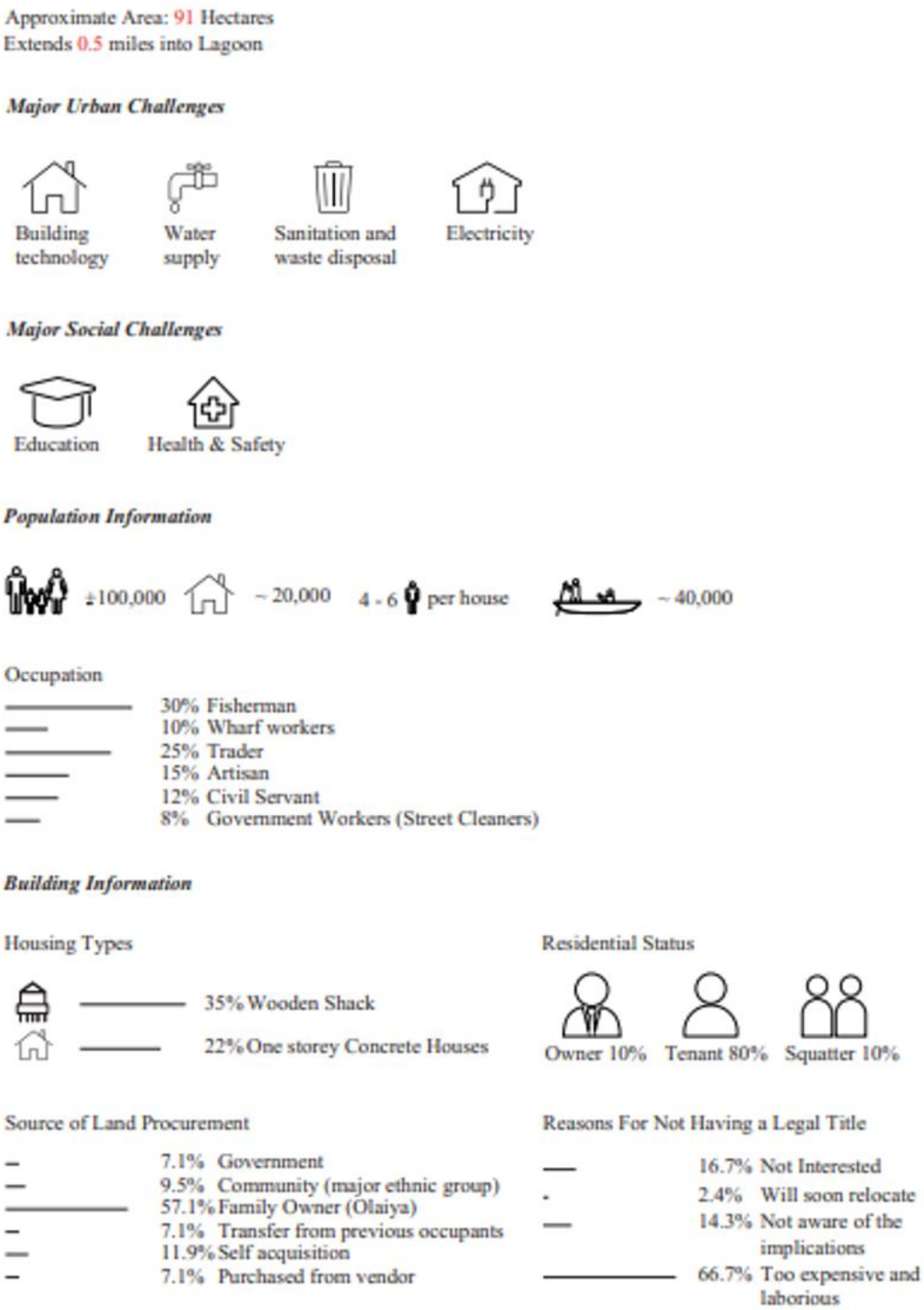
World Food Programme. (2020). *WFP Nigeria country brief*. https://reliefweb.int/sites/reliefweb.int/files/resources/WFP%20COUNTRY%20BRIEF%20NIGERIA%20JUNE%202020.pdf

World Health Organization [WHO]. (2008*). Global malaria control and elimination: report of a technical review*. World Health Organization. https://apps.who.int/iris/handle/10665/43903

World Health Organization [WHO]. (2017*). Factsheet on adolescent pregnancy*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy

APPENDIXES

APPENDIX A. GENERAL DESCRIPTION OF MAKOKO'S RESIDENTS



Source: https://curve.carleton.ca/system/files/etd/38882825-46f2-414c-8bce-73ec270f5a91/etd_pdf/1dc4fe93dd4f2cc03d8fc464eb428406/duke-floatcitymakokoredevelopmentofanaquatichome.pdf P.27