



Comprehensive Overview of the Gambia's Health Landscape

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1. Introduction

The Gambia faces a challenge in healthcare accessibility, with a relatively sparse distribution of healthcare facilities. However, there is a positive trend with the construction of new health clinics across the country. The public health service delivery system in the Gambia is structured into three tiers, in line with the primary healthcare strategy.

As of 2018, healthcare services are provided through a network of facilities. This includes five general hospitals, one NGO-operated hospital, a teaching hospital, and a specialized ophthalmic hospital, as reported by the Health Management Information System (HMIS) (HMIS, 2018). In addition to these major facilities, there are five significant health centers, forty-five minor health facilities, three clinics dedicated to reproductive and child health, fourteen privately-operated clinics, eighteen clinics run by non-governmental organizations, ten clinics serving security services, and sixty-eight community clinics at the secondary level. At the primary level, there are a substantial number of eight hundred and ninety-two health posts (HMIS, 2018). This comprehensive network of healthcare facilities demonstrates efforts to strengthen healthcare infrastructure and improve accessibility to essential services in the Gambia. The inclusion of various levels of care, from specialized hospitals to community clinics, signifies a multi-faceted approach to addressing the diverse healthcare needs of the population.

The primary teaching and referral hospital, Edward Francis Small Teaching Hospital, is situated in the capital city, Banjul. Complementing this central facility, there are several general hospitals strategically located at Bansang, Farafenni, Bwiam, Bundung, and Kanifing. Together, these hospitals, along with major and minor health centers, offer a range of both in-patient and out-patient healthcare services. According to the Health Management Information System (HMIS) of 2018, there were approximately 320 outreach clinics in operation. (HMIS, 2018)

Furthermore, in villages with a population exceeding 400 individuals, a dedicated team of trained village health workers and community birth companions is deployed. These healthcare professionals are entrusted with the crucial responsibility of delivering primary healthcare services to their designated villages. Their roles encompass providing outpatient care, conducting community health education programs, ensuring the availability of essential medicines, and conducting home visits as necessary. This decentralized approach to healthcare delivery plays a vital role in extending healthcare services to even the most remote areas.

2. Health Infrastructure in Gambia

Table 1 presents a detailed breakdown of hospitals in different Local Government Areas (LGAs) within the Gambia for the year 2018. These hospitals are categorized into five types: Teaching, Specialized, General, District, and Private. This information is essential for understanding the distribution of healthcare resources and services across the country.

Table 1: Number of Hospitals by Local Government Area (LGA) in the Gambia (2018) (HMIS, 2018)

LGA	Teaching	Specialized	General	District	Private
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Kuntaur	0	0	0	0	0
Janjanbureh	0	0	1	0	0
Mansa Konko	0	0	0	1	0
Kerewan	0	0	1	1	0
Basse	0	0	0	1	0
Banjul	1	0	0	0	0
Kanifing	0	1	2	0	1
Brikama	0	0	1	1	0
Total	1	1	5	4	1

Banjul, the capital city, is home to the sole Teaching Hospital in the Gambia. This indicates a concentration of higher-level medical education and training facilities in the urban center. It serves a critical role in shaping the next generation of healthcare professionals and providing specialized care. Kanifing stands out as a hub for specialized medical services, boasting one Specialized Hospital. This suggests a focus on advanced and specific areas of healthcare within this LGA, likely catering to complex medical conditions or unique patient populations. Turning to General Hospitals, a broader category of healthcare facilities, we observe a more widespread distribution. Janjanbureh, Kerewan, Basse, and Brikama each have one General Hospital. These hospitals likely play a pivotal role in providing comprehensive healthcare services to their respective regions.

In terms of District Hospitals, these are vital in providing primary healthcare services to local communities. Mansa Konko, Kerewan, Basse, and Brikama each have one. This demonstrates an effort to ensure that even more remote areas have access to essential healthcare services. The presence of a Private Hospital in both Kanifing and at the national level indicates the involvement of private healthcare providers. This adds an important dimension to the healthcare landscape, offering alternative options for individuals seeking medical care.

This data paints a nuanced picture of the healthcare infrastructure in the Gambia for 2018. While the capital city and certain LGAs serve as focal points for specialized and higher-level medical services, efforts have been made to provide comprehensive healthcare services at various levels, from teaching hospitals to district healthcare centers. This diversified approach aims to address the diverse healthcare needs of the population across different regions of the country.

Table 2: Number of Health Centers/ Clinics in the Gambia (2018) (HMIS, 2018)

LGA	Major	Minor	RCH Clinic	Community Clinics	Private	NGO	Service Clinic
Kuntaur	1	3	0	6	0	0	0
Janjanbureh	0	3	1	5	0	2	1
Mansa Konko	1	6	0	9	0	1	1
Kerewan	0	11	1	9	1	1	1
Basse	1	8	0	11	2	0	1
Banjul	0	1	1	0	1	0	1
Kanifing	1	5	0	0	10	3	5
Brikama	1	8	0	28	0	11	0



Total	5	45	3	68	14	18	10
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Table 2 provides a comprehensive overview of the distribution of health centers and clinics in the Gambia for the year 2018. The facilities are categorized into several types, including Major Health Centers, Minor Health Centers, Reproductive and Child Health (RCH) Clinics, Community Clinics, Private Clinics, Non-Governmental Organization (NGO) Clinics, and Service Clinics. This detailed breakdown is crucial for understanding the accessibility and diversity of healthcare services available across different regions.

In terms of Major Health Centers, Kuntaur, Mansa Konko, Basse, Banjul, Kanifing, and Brikama each have one. These facilities typically play a pivotal role in providing essential healthcare services to their respective areas. Mansa Konko, Basse, and Kuntaur, in particular, have a Major Health Center, which signifies their importance in the local healthcare infrastructure. Minor Health Centers are more numerous and serve as primary healthcare providers. Kerewan, Basse, Kanifing, and Brikama have 11, 8, 5, and 8 of these centers respectively. These facilities are crucial in offering basic healthcare services to communities, contributing significantly to the accessibility of healthcare.

Reproductive and Child Health (RCH) Clinics cater to specific healthcare needs, focusing on maternal and child health. Janjanbureh, Kerewan, and Banjul each have one of these specialized clinics. This indicates a targeted effort to address the unique healthcare requirements of women and children in these areas. Community Clinics are widespread, with varying numbers across different regions. Brikama stands out with 28 of these clinics, highlighting its significance in providing local healthcare services. These clinics often play a vital role in reaching communities that might be geographically isolated or have limited access to larger health centers.

Private Clinics, run by individual practitioners or private entities, are notably present in Kanifing. This indicates a robust private healthcare sector in this area, providing an alternative option for individuals seeking medical care. NGO Clinics, which are operated by non-governmental organizations, contribute significantly to the healthcare landscape. Brikama is notable for having 11 of these clinics, showcasing the active involvement of NGOs in providing healthcare services to the community. Service Clinics, which are typically associated with security services, are present in several regions. Kanifing leads in this category with five service clinics, indicating a focus on meeting the healthcare needs of security personnel and their families.

In total, this comprehensive analysis underscores the diversity and distribution of healthcare facilities in the Gambia. The presence of various types of clinics and health centers across different regions reflects a concerted effort to provide accessible and diverse healthcare services to the population.

3. Healthcare service delivery

Despite significant strides made in the last two decades, the healthcare sector in the Gambia remains under immense strain due to several factors. These include a high population growth rate, escalating rates of morbidity and mortality, limited financial and logistical support, deteriorating physical infrastructure, shortages of essential supplies and equipment, an inadequate number of adequately trained healthcare personnel, a high attrition rate, and deficiencies in the primary level referral system (Ministry of Health, 2012). While there are existing policy guidelines and Acts, such as the Health Policy 2012-2020 of the Gambia, many require updating to align with recent developments in the sector, particularly with the establishment of a university and medical school.

Efforts to improve healthcare in the Gambia also hinge on the provision of ample human and material resources to reduce the need for referrals, which often lead to delays in service delivery. Through the Global



Fund for AIDS, Tuberculosis, and Malaria (WHO, 2008), the Government has integrated home-based and palliative care as crucial components of chronic care. This shift has relieved pressure on the country's lone teaching hospital, freeing up beds for critical cases. Specialized services like dental and rehabilitative eye care operate as distinct programs. Although mental health services are primarily centralized in urban areas, where the nation's sole psychiatric hospital is situated, efforts have been made to extend services to both facility and community levels through community visits by the mental health team. Traditional mental health practitioners receive support from this team to ensure quality care and debunk misconceptions surrounding mental illness.

The state of healthcare in the Gambia has been marred by significant challenges, notably limited access to proper healthcare and the subpar condition of state-run hospitals. Furthermore, the Ministry of Health faces financial constraints, with less than 10% of the national budget allocated to it (National Health Account, 2015). These challenges underscore the pressing need for sustained efforts and investments to strengthen the healthcare system and improve access to quality healthcare services for the Gambian population.

The Gambia exhibits distinctive demographic characteristics, marked by a high crude birth rate of forty-six per thousand population and a total fertility rate of 5.4 births per woman (Gambia Bureau of Statistics, 2013). This high fertility rate has led to a notably youthful population structure, with nearly forty-four percent of the population under the age of fifteen and nineteen percent falling within the age group of fifteen to twenty-four years (Gambia Bureau of Statistics, 2013). The elderly population, aged above sixty-five years, constitutes approximately 3.4% of the total population. On average, life expectancy at birth stands at sixty-four years (Gambia Bureau of Statistics, 2013).

The Gambia experiences a population density of 176 people per square kilometer, with a significant portion, 60.6%, residing in urban areas (Gambia Bureau of Statistics, 2013). The country's contraceptive prevalence rate is 9%, while the unmet need for family planning stands at 24.9% (Demographic and Health Survey, 2013). The median age of the population is seventeen years.

Over the years, rural-urban migration has had a profound impact on the country, primarily due to the absence of essential social amenities in rural areas. Furthermore, agricultural performance has waned, and rural farmers have faced challenges with limited access to markets. The Gambia is predominantly a Muslim society, with approximately 95% of the population adhering to Islam. The major ethnic groups in the country include Mandinka, Fulla, Wolof, Jola, and Sarahuleh (Gambia Bureau of Statistics, 2013). These demographic characteristics and trends provide valuable insights into the Gambia's population composition and its associated challenges and opportunities.

Table 3: Demography and Health Profile of the Gambia

No	Indicator	Rate/Ratio	Source (Year)
1	Infant Mortality	34/1000	DHS, 2013
2	Neonatal Mortality	22/1000	DHS, 2013
3	Under-five Mortality	54/1000	DHS, 2013
4	Crude Birth Rate	40.5/1000	DHS, 2013
6	Growth Rate	3.3%	DHS, 2013
7	Maternal Mortality Ratio	433/100,000	DHS, 2013



8	At least one antenatal clinic (ANC) attendance by skilled personnel	98.9%	DHS, 2013
9	At least four ANC by skilled personnel	77.6%	DHS, 2013
10	Deliveries attended by skilled personnel	57%	DHS, 2013
11	Total Fertility Rate	5.6%	DHS, 2013
12	Contraceptive Prevalence	9%	DHS, 2013
13	Family Planning Unmet needs	24.9%	DHS, 2013
14	HIV Prevalence	1.9%	DHS, 2013
15	Life expectancy at Birth	61.4	UNDP, 2018
16	Illiteracy Rate	69.9%	DHS, 2013
17	Poverty Index - Rural (2015/16)	69.5%	GBOS, 2017
	Poverty Index - Urban (2015/16)	31.6%	
18	Current Health Expenditure (% of GDP)	6.7	UNDP, 2018

Table 3 shows that the Gambia grapples with significant mortality challenges, particularly among its youngest population. The infant mortality rate stands at seventy-five per thousand, while the under-five mortality rate is ninety-nine per thousand (Gambia Bureau of Statistics, 2013). Addressing maternal health, the country reports a maternal mortality rate of eleven per one thousand (GDHS, 2013). There has been a noticeable decline in these rates, attributed to an increase in antenatal care utilization, which has reached ninety percent, and improved immunization coverage, standing at eighty-five percent (Ministry of Health, 2016).

The Ministry of Health holds the responsibility for managing the healthcare sector in the Gambia. This oversight encompasses health service provision, regulatory functions, resource mobilization (including human resource development), and health research. The country's public healthcare system operates on a three-tier model rooted in the principles of primary healthcare. Nevertheless, similar to many other nations, there exists an uneven distribution of healthcare facilities, with a concentration in urban areas compared to rural regions (HMIS, 2018). While this urban bias may be justified by the need to cater to the higher population density in urban centers, rural communities face substantial barriers to access due to remoteness and inadequate transportation infrastructure.

Furthermore, disparities in healthcare access persist among different regions, with the Western Region enjoying the lion's share of healthcare resources, likely attributed to its proximity to the urban population centers. In rural areas, reliance on traditional healers remains common, reflecting an informal healthcare system that serves as an essential source of care for many residents. This multifaceted landscape underscores the complexities of healthcare accessibility in the Gambia, emphasizing the need for targeted interventions to address regional disparities and enhance overall healthcare delivery.

The private healthcare sector in the Gambia is relatively limited in size, with a predominant presence in urban areas. Government-led initiatives, such as Vision 2020, seek to promote greater involvement of the private sector across various domains, including healthcare. This approach is envisioned to render the



private sector more agile and responsive to the developmental needs of the country, ultimately leveraging its potential as an engine for economic growth.

According to the Ministry of Health, concerted efforts have been made to enhance accessibility to fundamental healthcare services throughout the nation. Approximately 85% of the population now resides within a 5-kilometer radius of a Primary Health Care (PHC) facility, indicating a significant stride towards improving healthcare accessibility (Primary Health Care, 2012). This progress represents a positive step in ensuring that a substantial portion of the population has convenient access to essential healthcare services.

4. Disease incidence statistics

Compared to its neighboring countries, the Gambia demonstrates a relatively lower disease burden. The nation prioritizes a decentralized health policy, aiming to facilitate efficient service provision. By analyzing Outpatient Department (OPD) attendance and disease incidence patterns across LGA and over time, a comprehensive understanding of the disease burden and its trajectory within the country can be gleaned. In evaluating disease incidence, a specific focus is placed on key ailments and those conditions that may be influenced by various climate variables.

In Figure 1, the distribution of outpatient department attendance in 2018 across LGAs is presented. Brikama LGA and Kanifing municipality recorded the highest OPD attendance rates at 23.1% and 20% respectively. It's noteworthy that these two LGAs collectively account for nearly 60% of the total population of the Gambia. In contrast, Kuntaur and Janjanbureh, when combined, as well as Basse, show attendance rates of 15.5% and 14.2% respectively, despite not being densely populated. Surprisingly, these LGAs exhibit a disproportionately high incidence of diseases, indicating a significant disease burden.

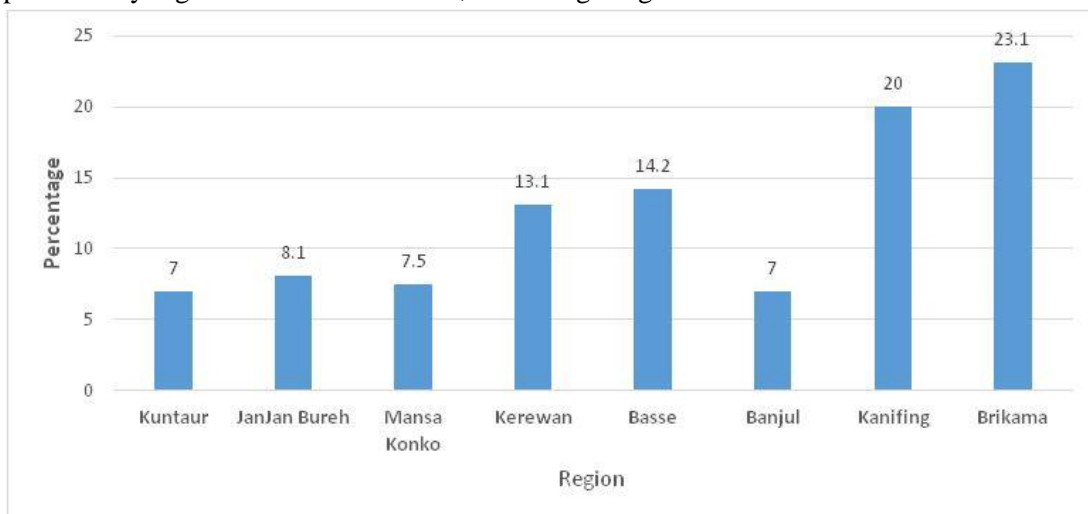


Figure 1: Proportion OPD attendance by LGA (2018)

Through community consultation meetings across the LGA, prevalent health concerns were identified. The most commonly mentioned diseases affecting the population included malaria, diarrhea, pneumonia, high blood pressure, asthma, and diabetes. Notably, participants exhibited a commendable understanding of the causes, prevention, and control measures for malaria and diarrhea.

In the analysis of disease incidence, a spotlight was placed on key water-borne conditions like diarrhea, as well as vector-borne diseases such as malaria. These incidence figures were instrumental in validating the Climate Vulnerability Index (CVI) tailored for the health sector, a detailed account of which follows.



The impact of climate change on health is determined by multiple factors, including the level of exposure, shifts in weather patterns attributed to climate change, and the susceptibility of affected entities. It is well-documented that both humans and pathogens respond differently under varying weather conditions. Human vulnerability is influenced by a range of elements, encompassing factors like malnutrition stemming from economic hardship, substandard living conditions, residence in precarious areas, and availability of public health resources (Table 4).

Table 4: Vulnerable population sub-group to climate change

Vulnerable population	Climate-related vulnerabilities
Infants, children, pregnant women, and poor/malnourished people	Heat stress, air pollution, waterborne/food-borne diseases, vector-borne diseases, malnutrition
Elderly people and people with chronic diseases	Heat stress, air pollution, extreme weather events, waterborne/foodborne diseases, vector-borne diseases
Outdoor workers	Heat stress, air pollution, vector-borne diseases, ultraviolet light (UV) exposure

Climate exerts a significant influence on both the temporal and spatial patterns of certain diseases, particularly those transmitted by vectors. Noteworthy epidemiological trends and disease outbreaks, linked to anomalies in weather patterns over time, serve as valuable indicators of the susceptibility of these diseases to meteorological conditions (e.g., disease incidence during dry or wet seasons) (WHO, 2013). Environments characterized by warmth and high humidity provide optimal conditions for mosquito breeding. The Anopheles mosquito, a carrier of malaria, flourishes in settings with elevated temperatures and abundant rainfall. Consequently, tropical and subtropical regions are particularly conducive to their propagation. Additionally, warm temperatures are crucial for the completion of the malaria parasite's life cycle within mosquitoes. Below 20°C (68°F), the Plasmodium falciparum parasite is unable to complete its life cycle in mosquitoes, rendering it non-transmissible. However, another strain known as Plasmodium vivax is capable of doing so even in lower temperatures.

The IPCC Fourth Assessment Report highlights that climate change has already induced shifts in the distribution of disease-carrying vectors. There is compelling evidence of ticks and mosquitoes expanding their range northward in regions like Sweden and Canada, as well as ascending to higher altitudes in places like the Czech Republic. While future climate change is anticipated to further influence the distribution of disease vectors, it is essential to acknowledge that various other factors—including alterations in land use, population density, and human behavior—can also contribute to changes in vector distribution and infection prevalence.

Climate change is poised to facilitate the spread of malaria into previously unaffected regions. As per the UCAR Centre for Science Education, based on the high scenario model from the Hadley Centre, it is projected that by 2050, the malaria parasite could extend its reach across the entirety of Central Africa, including Western Africa. However, the same Hadley Centre model indicates that certain regions, like Sub-Saharan Africa, may experience a positive impact. Here, climate change is anticipated to lead to reduced rainfall, potentially resulting in a decrease in mosquito populations and, consequently, a decline in malaria transmission rates.



In the Gambia, the incidence of malaria is notably high, accounting for over a quarter of all general outpatient cases (HMIS, 2016). Noteworthy progress has been made in combatting malaria in the country over the past two decades. Figure 2 (a&b) illustrates the reported cases of malaria incidence in both 2011 and 2018 across the nation. Analysis of monthly incidence data for these two time periods distinctly reveals a spike in cases during the rainy season, which typically spans from September to November. Additionally, there is a notable variation in incidence rates throughout the year, influenced by the specific patterns of rainfall. In certain years, the peak occurs slightly earlier, as observed in 2014.

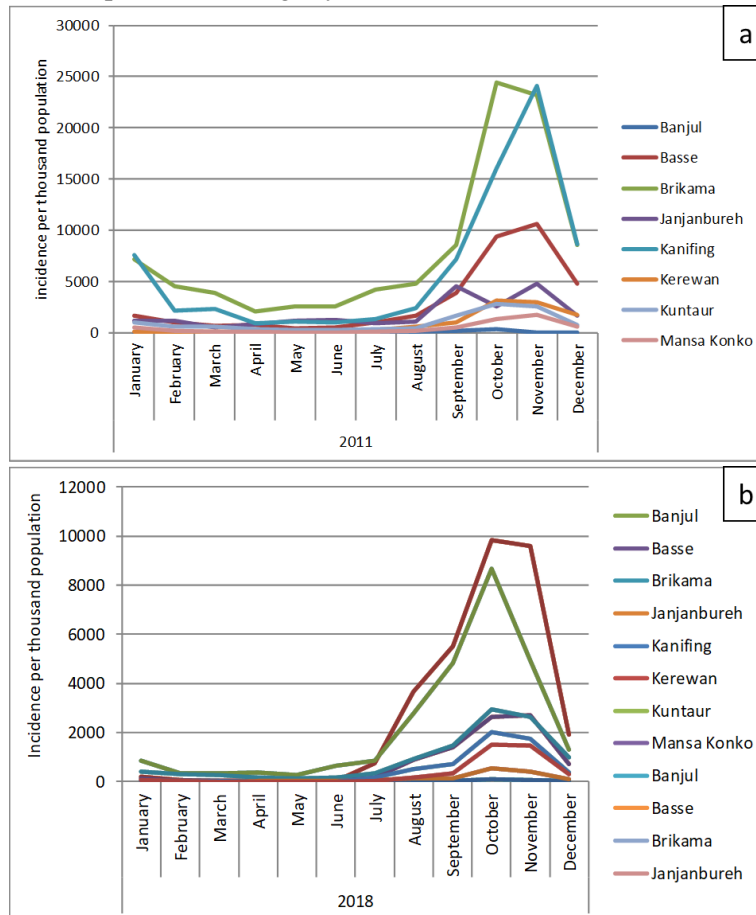


Figure 2 (a&b): Incidence of malaria cases for the different LGA across the year 2011 and 2018

Numerous studies have explored the connection between weather parameters and the incidence of diarrhea, particularly among children, as evidenced by research by Hurtado-Díaz et al. (2009), Musengimana G et al. (2016), and Muluken Azage et al. (2017). Additionally, some investigations have uncovered a lagged effect of climatic factors on diarrhea morbidity, indicating that there can be a time delay between exposure to certain weather conditions and the occurrence of diarrhea, as reported by Musengimana et al. (2016). The World Health Organization (WHO) also acknowledges that changes in diarrheal disease incidence are among the health-related challenges expected to arise from climate change in the future.

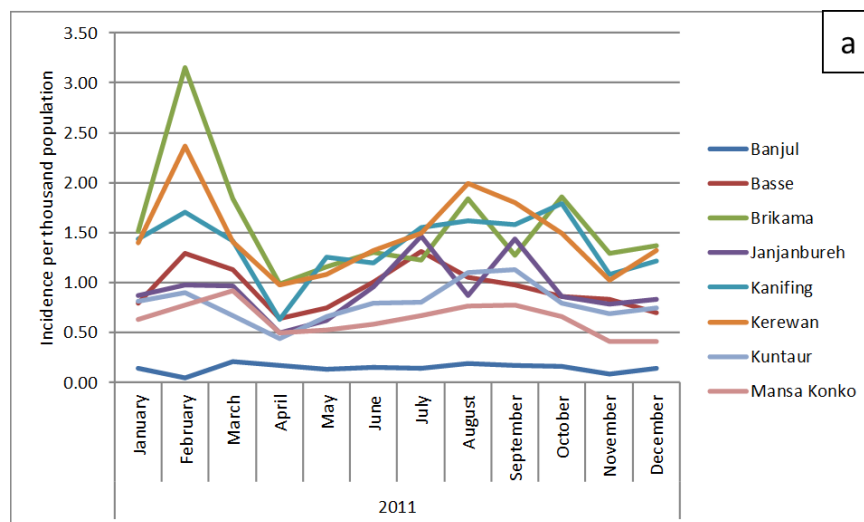
As part of our analysis, we delved into the incidence of diarrhea cases throughout the year to discern any potential links with weather parameters. Notably, there is a decline in the incidence of diarrhea cases during the rainy seasons. Furthermore, the data for the years 2011 and 2018 reveal a higher incidence of diarrhea



cases in February and March, which coincide with the dry months. Interestingly, there is also an uptick in diarrhea cases just before the onset of the rainy season in the country. Figure 3 (a & b) presents a comprehensive visualization of the incidence of diarrhea cases in various LGAs throughout the year for the years 2011 and 2018.

Asthma can be triggered by a combination of factors, with temperature, pollen, mold, and seasonal variations being identified as particularly influential. Studies have demonstrated a robust correlation between seasons, various weather elements like temperature and barometric pressure, and clinic visits related to asthma in regions including Southeastern Virginia, New Orleans, and New York City.

During community consultations, residents reported a higher incidence of asthma across LGAs during the winter months, attributing it to dust storms. However, when examining asthma incidence data for the years 2012 and 2018 (Figure 4), a mixed trend is observed. There is a slight uptick during the dry season and before the onset of the rainy season, though it is not markedly prominent. Notably, an analysis of monthly data spanning from 2011 to 2018 does not reveal any discernible relationship. Consequently, our primary focus for the validation of the Climate Vulnerability Index within the health sector centers on malaria and diarrhea incidence.



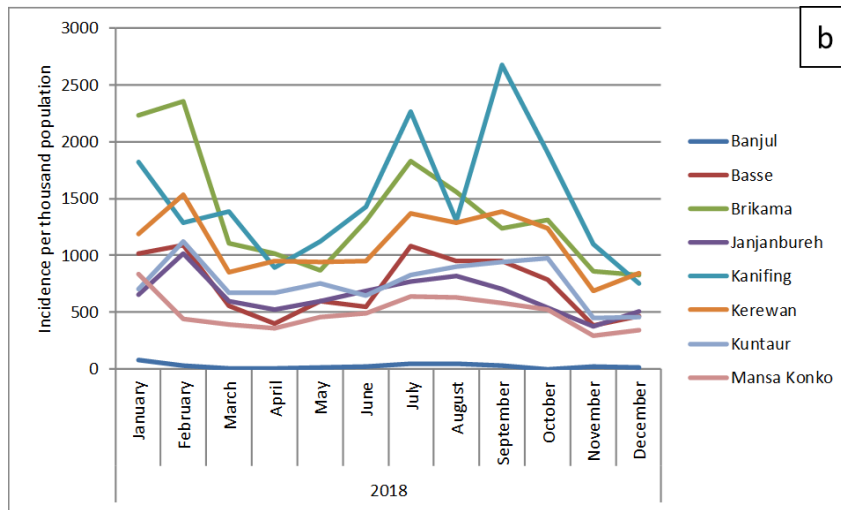


Figure 3 (a&b): Incidence of diarrhea cases for the different LGA across the year 2011 and 2018

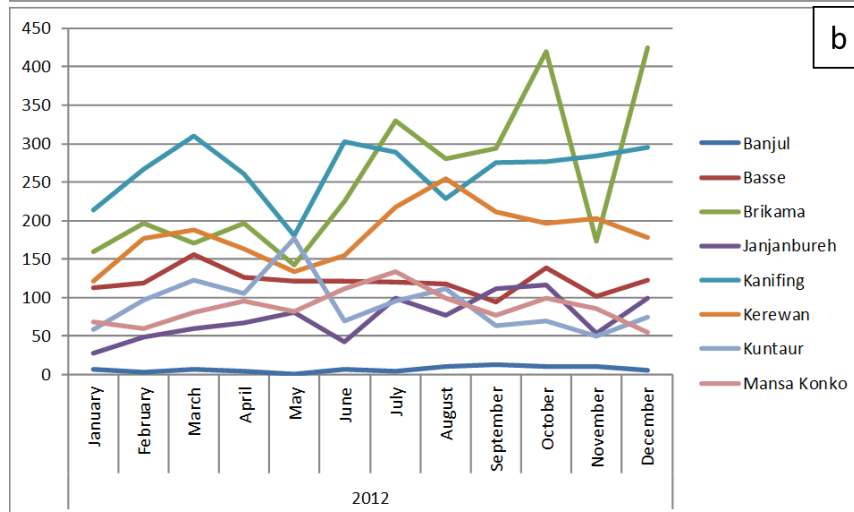
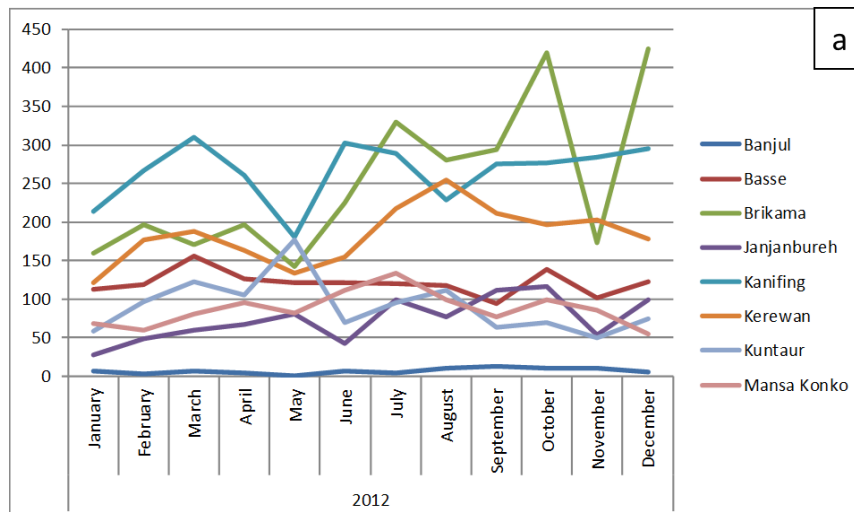




Figure 4 (a&b): Incidence of asthma cases for the different LGA across the year for 2012 and 2018

To gauge the gravity of malaria, diarrhea, and asthma incidence, an in-depth analysis was conducted to discern patterns and disparities across LGAs (Figure 5 to Figure 7). The trend in malaria incidence reveals a general decrease in cases across all seasons. However, there was an increase in 2018 compared to the preceding year. The concerted efforts of the country towards malaria eradication are evident from these statistics. Notably, Kanifing and Basse LGAs exhibit a higher percentage of the population affected by malaria, despite showing a decreasing trend.

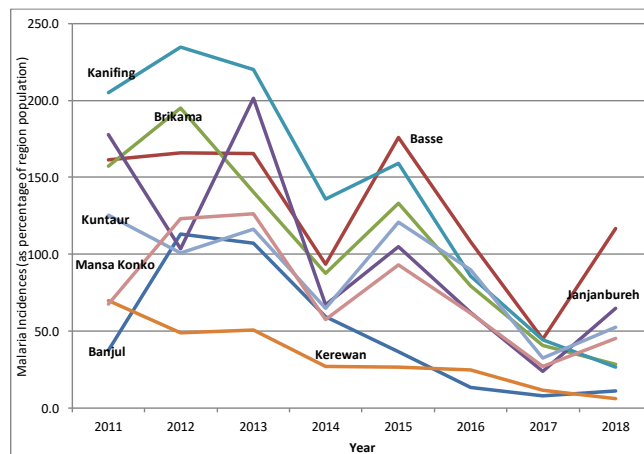


Figure 5: Incidence of malaria in relation to the total population of the LGA (2011-2018)

The incidence of diarrhea is likewise displaying a declining trend over the years 2011 to 2018, albeit at a more gradual pace compared to malaria. An exception to this trend is observed in the Kanifing Local Government Area, which experienced an increase in 2018 compared to the preceding year. Janjanbureh and Kuntaur LGAs have a higher percentage of their population affected by diarrhea.

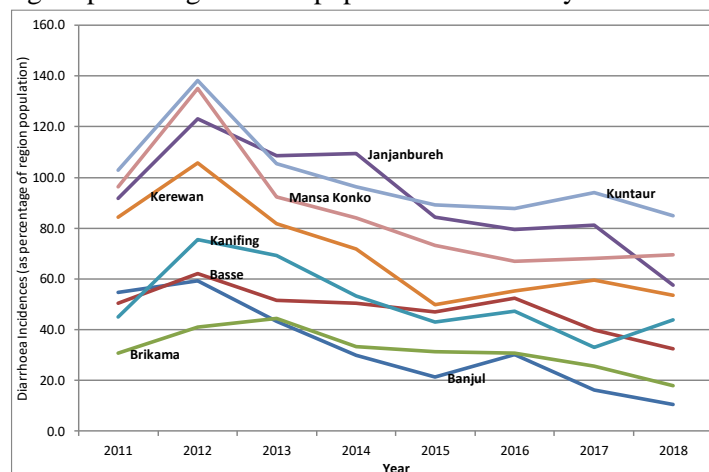


Figure 6: Incidence of diarrhea in relation to the total population of the LGA (2011-2018)

Much like the monthly incidence figures, the severity analysis of asthma data presents a mixed trend. However, there is an overall gradual reduction in the percentage of the population affected. Kerewan and Mansa Konko LGAs exhibit relatively higher percentage incidences, while Banjul experienced a notable spike in incidence in 2015.

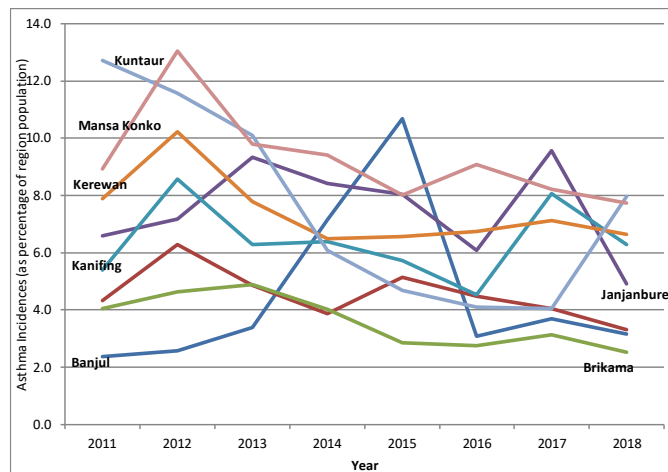


Figure 7: Incidence of asthma in relation to the total population of the LGA (2011-2018)

5. Conclusion

The study offers valuable insights into the incidence and trends of malaria, diarrhea, and asthma across various Local Government Areas in the Gambia. Notably, the analysis of malaria cases demonstrates a consistent reduction over the years, indicating the effectiveness of the country's initiatives towards malaria eradication. Although Kanifing and Basse's LGAs reported higher percentages of malaria cases, they too displayed a decreasing trend.

Similarly, the study highlights a decreasing trend in diarrhea cases from 2011 to 2018, albeit at a more gradual pace compared to malaria. However, Kanifing LGA showed a notable increase in cases in 2018, deviating from the overall trend. Janjanbureh and Kuntaur LGAs were identified with a higher percentage of their population affected by diarrhea.

The severity analysis of asthma data revealed a mixed trend, indicating an overall gradual reduction in the percentage of the population affected. Nevertheless, Kerewan and Mansa Konko LGAs stood out with relatively higher percentages of asthma incidences. In contrast, Banjul experienced a significant spike in cases in 2015.

The study underscores the commendable progress achieved in combatting malaria and diarrhea in the Gambia. However, it also emphasizes the ongoing need for vigilant monitoring and management of asthma cases, particularly in specific LGAs. The findings establish a solid foundation for informed healthcare interventions and policy decisions, with the ultimate goal of enhancing public health outcomes in the Gambia.

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