

# Mapping of Health Resources in Lower Manya Krobo Municipality in the Eastern Region of Ghana

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## ABSTRACT

**Introduction:** Spatial disparities impact population health and are linked to social and health disparities. Understanding the scope, nature, and trends of regional inequalities can help create policies, strategies, and interventions that affect the morbidity and mortality of various disease control. The variations in the distribution of health facilities have resulted in differences in health outcomes within Ghana's administrative districts, of which the Lower Manya Krobo Municipality (LMKM) is no exception. The primary objective of this study was to examine the distribution of healthcare resources in the LMKM in the Eastern Region of Ghana. **Methods:** A single case study approach involving all health resources, facilities, and supporting service centers in the LMKM was adopted. All functional health facilities in the municipality during the study were included. The study partly used records of generated coordinates using the global positioning system of other resources and services. **Results:** The Municipality had 16 health facilities and 29 supporting centers. There were 285 clinical health workers in the municipality. Odumase and Akuse had higher percentages of clinical health personnel. The municipality's population per single health worker ratio was 13,201:1. Agomanya had the highest number of facilities and support centers. The population per health facility ratio was 15,086 per facility. **Conclusion:** The study demonstrated disparities in the distribution of health facilities across the municipality. There is a need to ensure that all health resources are allocated to the population size and the health needs of the LMKM.

**Keywords:** health resources, health disparities, population

## INTRODUCTION

Access to healthcare is an essential component of the health system and directly impacts the burden of disease that affects many countries in the developing world. Measuring accessibility to healthcare contributes to a broader understanding of the performance of health systems within and between countries, which facilitates the development of evidence-based health policies.<sup>[1]</sup> This study is vital to managing scarce resources and healthcare effectively and efficiently. Experience has shown that people of low socioeconomic status and other ordinary people

are likely to get included in strategic policies and focused spending mechanisms. Global position systems (GPS) as a tool to enhance public sector performance is well documented in different sectors of the economy. The extension of this experience to the health sector is more recent, and lessons learned are now being successfully applied to developing countries.<sup>[2]</sup>

A profile of healthcare resources within communities describes the health status and availability of resources that promote health within communities.<sup>[3]</sup> Low socioeconomic status shoulder the most significant burden of disease but receive a smaller share of healthcare resources



**Table 1.** Lower Manya Krobo Municipality population distribution by subdistrict<sup>[9]</sup>

Subdistrict	Population (%)
Akuse	9504 (9.0)
Agormanya	30,731 (29.1)
Asitey	5703 (5.4)
Kpong	24,500 (23.2)
Oborpa	6231 (5.9)
Odumase	28,935 (27.4)
<b>TOTAL</b>	<b>105,604 (100)</b>

licensed chemical shops, and private laboratories. Traditional healers and herbal treatment centers were excluded from the study.

### Data Analysis

GIS (QGIS 2.10.1) software was used to derive the location of facilities, the proximity of service availability, and the proportion of the population within a specified distance of critical services and resources. Data were entered using Excel 2010, and STATA statistical software (Stata Corp. 2007, Stata Statistical Software Release 14 Stata Corp, LP, College Station, TX, USA) was used for all univariate and multivariate analyses.

The geographic coordinates of health facilities were converted to a shapefile format and launched in the QGIS software to display the position of health facilities within the map of the LMKM. Data on health facilities and subdistrict populations were categorized and subjected to a  $\chi^2$  analysis to explore the influence of the geopolitical zones on the number and type of health facilities provided. The dependent variable was the number of health facilities, and the independent variable was the resident population in each subdistrict. Pearson correlation was applied to investigate the relationship between the population size and number of health facilities as well as population size and number of healthcare workers.

## RESULTS

The study included a total population size of 105,604 individuals; population estimates for the LMKM by subdistrict are shown in Table 1. Health facilities were classified into two broad areas: primary health centers and supporting health centers. The primary health facilities included hospitals, health centers, clinics, maternity homes, and

CHPS; the supporting centers included pharmacies and licensed chemical shops. A total of 45 health facilities were included in the study, comprising 16 (35.55%) primary facilities and 29 (64.44%) supporting facilities.

Table 2 shows the distribution of all 16 primary health facilities by subdistrict. Most facilities are CHPS ( $n = 7$ ), followed by health centers ( $n = 4$ ) and hospitals ( $n = 3$ ). Reproductive and Child Health (RCH) centers and maternity homes were the least, with only one each found in Agomanya and Odumase. It was observed that Kpong, Oborpa, and Asitey need hospitals and RCH centers. The number of chemical shops in the LMKM was on the high side compared with other facilities (Fig. 2C).

Table 3 shows the ratio of primary health facilities to the population size for each subdistrict. In computing the ratios, priority was given to the primary health facilities, specifically those with high numbers in the municipality. The ratio of CHPS (15,086:1) was by far better than that of hospitals (35,201:1) and health centers (26,401:1). None of the differences were statistically significant.

### Community-Based Health Planning Services

Ghana's primary health care system is set up to prioritize serving the needs of the rural and urban populations. With programs like the CHPS, which aims to convert clinic-based primary healthcare and reproductive health services to community-based health services, the rural areas primarily devoid of permanent health infrastructures have been prioritized. Most CHPS employees are nomadic and move from community to community, educating residents on preventive behaviors and providing curative services.

The distribution of CHPS in the LMKM showed a significant disparity in the allocation of health resources (Fig. 2A). More than half of CHPS are located in Agomanya and Kpong, whereas Asitey and Oborpa had only one CHPS each. In Akuse, despite its vast population of about 26,788, only one structured CHPS serves the entire population.

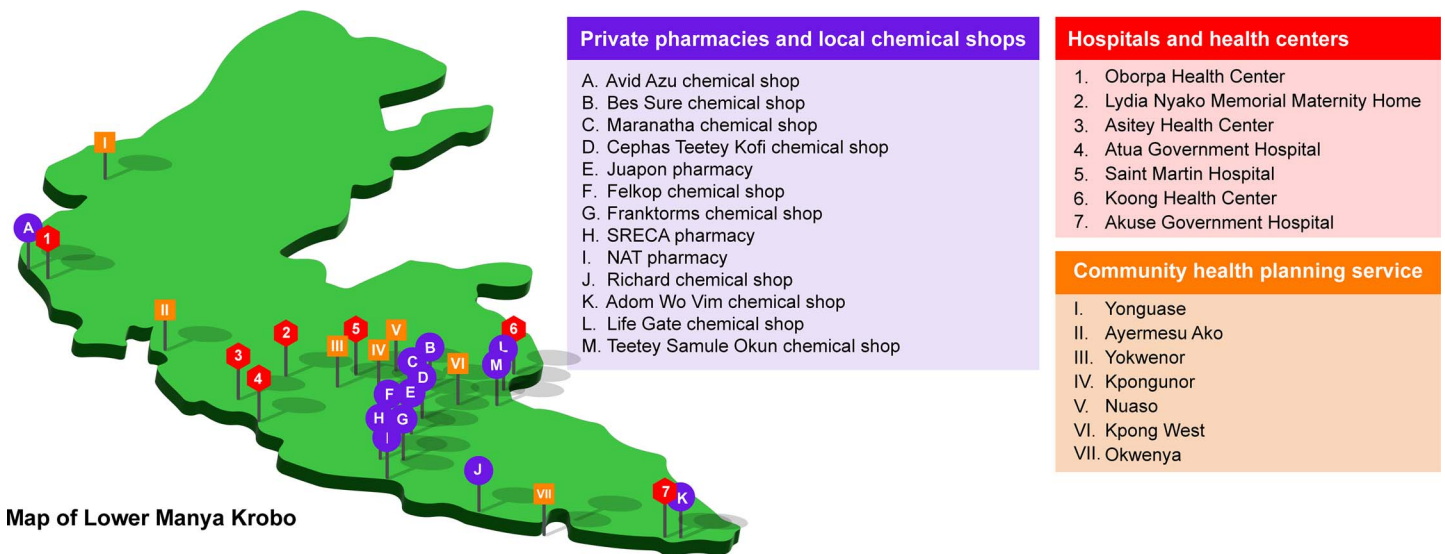
### Hospitals and Health Centers

There were two government hospitals and one mission hospital in the LMKM. The map in Figure 2B displays an uneven distribution of hospitals across the LMKM. The northern and southern parts of the municipality also have fairly low socioeconomic status hospital distribution, with virtually no hospital located in the northern sector of LMKM. The Kpong, Oborpa, and Asitey subdistricts

**Table 2.** Distribution of main health facilities per subdistrict

	Hospitals	Health Centers	CHPS	Clinics	Maternity Home	Total
Akuse	1	0	1	0	0	2
Agomanya	1	0	2	1	0	4
Asitey	0	1	1	0	0	2
Kpong	0	1	2	0	0	3
Oborpa	0	1	1	0	0	2
Odumase	1	1	0	0	1	3
<b>TOTAL</b>	<b>3</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>16</b>

CHPS: community-based health planning service.



Map of Lower Manya Krobo

**Figure 2.** Distribution of health resources in the Lower Manya Krobo Municipality in Eastern Ghana.

each have one health center. The other three subdistricts do not have health centers, which are some of the most affordable and accessible health services available to community members.

**Pharmacies and Chemical Shops**

A licensed pharmacist works in pharmacies that are often bigger than drugstores and provides a broader variety of services that qualified pharmacists deliver. Unlike the pharmacy, a licensed chemicals shop is licensed to sell only specific approved medicines or drugs.

Pharmacies are the most essential health support services. Despite its importance, LMKM needs more, making them unequally distributed across the municipality. As shown in Figure 2C, the northern and southern parts of the municipality require more pharmacies, making access to medication exceedingly difficult. Two of the pharmacies in the municipality are in Odumase; one is in Kpong, and the other is in Agomanya. Almost all the chemical shops are clustered in Agomanya and Odumase.

**Healthcare Workers**

As shown in Table 4, for a population of 105,604, there were 285 healthcare workers, comprising 9 (3%)

**Table 3.** Ratio of primary health facilities to population per subdistrict

Subdistrict	Hospitals	Health Centers	CHPS
Akuse	26,788:1	0	26,788:1
Agomanya	30,731:1	0	15,366:1
Asitey	0	5703:1	5703:1
Kpong	0	24,500:1	2042:1
Oborpa	0	5965:1	5965:1
Odumase	28,935:1	26,935:1	0
<b>TOTAL</b>	<b>35,201:1</b>	<b>26,401:1</b>	<b>15,086:1</b>

CHPS: community-based health planning service.

doctors, 203 (71%) nurses, 65 (23%) midwives, and 8 (3%) physician assistants. Odumase and Akuse had the highest number of health personnel, 107 and 91, respectively. Agomanya, the most populated subdistrict, had less personnel of 47 than 107 for Odumase. The doctor-to-population ratio in the LMKM was 11,734:1, a figure significantly less than the regional average of 17,438:1.<sup>[12]</sup> Subdistricts, such as Coiong, Oborpa, and Asitey, had extremely low doctor-to-population ratios. The nurse-to-population ratio in the municipality was 520:1, which is significantly better than the regional average, which is 701:1.

There were no significant differences in the population size and number of doctors, midwives, and physician assistants ( $p > 0.05$ ). However, the relationship between population size and the number of nurses was statistically significant ( $r = 0.87, p < 0.05$ ).

**DISCUSSION**

**Distribution of Health Facilities**

As a fundamental human rights component, equity is necessary for fairness in health access and healthcare resource allocation. Reasonable healthcare resource allocation is crucial to achieving health service equity, contributing to public health outcomes, and mitigating social conflict.<sup>[10]</sup>

**Table 4.** Distribution of healthcare workers per subdistrict

Subdistrict	Doctors	Nurses	Midwives	Physician Assistants	Total
Akuse	4	63	20	4	91
Agomanya	2	27	18	0	47
Asitey	0	7	1	0	8
Kpong	0	16	5	1	22
Oborpa	0	9	1	0	10
Odumase	3	81	20	3	107
<b>TOTAL</b>	<b>9</b>	<b>203</b>	<b>65</b>	<b>8</b>	<b>285</b>



A study by Korah et al<sup>[11]</sup> analyzed spatial accessibility to primary, secondary, and tertiary health facilities in Ghana. They found that 61% of the population could access primary healthcare facilities, 81% could access secondary healthcare facilities, and 48% could reach tertiary medical centers within recommended standards.<sup>[11]</sup> On the other hand, the Eastern region needs health facilities, especially for hospitals, for easy access to healthcare. In the current study, the distribution of CHPS indicates a disparity in the distribution of health resources among subdistricts in LMKM.

Hospitals are more concentrated in Ghana's eastern region's southern and middle sections than in northern areas.<sup>[6,12]</sup> Similarly, hospitals in LMKM are not evenly distributed, inhibiting good access to healthcare, especially in the southern part of the municipality. This finding is consistent with a study on health care access in rural Ghana, which found that only a few communities (4%) have good access to district hospitals due to the lack of healthcare facilities in those rural areas.<sup>[13]</sup>

Pharmacies are essential health support services. However, LMKM needs more. The northern and southern parts of the municipality completely lack pharmacies, and almost all chemical shops are clustered between Agomanya and Odumase. Most of the LMKM's population is in rural areas.<sup>[6]</sup> Rural areas tend to be characterized by a need for more infrastructural development, such as road networks.<sup>[14,15]</sup> Although the unequal distribution of pharmacies and chemical shops is expected,<sup>[16,17]</sup> there is a need to address the situation.

### Distribution of Healthcare Workers

This study found a disparity with the distribution of healthcare workers in LMKM, which is consistent with the study by Manortey and Acheampong, in which nurses represented 77% of workers and doctors represented a meager 3% of the health labor force.<sup>6</sup> It is prudent to address the unequal distribution of doctors and physician assistants to facilitate better healthcare service delivery.

Healthcare reforms are needed to improve the allocation of healthcare resources to provide universal and equitable access to healthcare as a critical human right. The fair allocation helps deliver healthcare resources to those most in need and ensures accessibility to essential health services and fairness for vulnerable populations.<sup>[18]</sup> Otherwise, inequality in healthcare resources incurs adverse consequences; for example, uneven distribution of healthcare resources could lead to growing disparities between the rich and poor concerning health and the economic burden of disease.

### CONCLUSION

This study revealed disparities in the distribution of health facilities and healthcare workers in the LMKD. The government must speed up efforts in renovating, building, and equipping more health centers, especially in predominantly rural districts, and redistributing healthcare workers to achieve social justice and reduce disparity among community members. This could be achieved by motivating the healthcare workers living in rural areas.

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