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Epidemiological Trends of Malaria in Mogadishu, Somalia: A Retrospective Analysis

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Abstract

Background: Malaria remains a significant public health challenge in Somalia, with varying prevalence influenced by environmental, demographic, and regional factors. Mogadishu, as a major urban center, presents unique malaria dynamics requiring localized data for effective control. This study analyzes malaria prevalence and testing patterns at Kalkaal Hospital, using gold standard diagnostic test microscopy and malaria rapid diagnostic tests, from January to October 2024. ***Methods:*** A retrospective analysis was conducted on malaria diagnostic records, including 11,497 tests performed at Kalkaal Hospital's hematology department. Data collected included test results, patient demographics, service settings (inpatient/outpatient), and department-specific testing patterns. Standard microscopy and malaria rapid diagnostic were employed for diagnosis. Statistical analysis assessed positivity rates and identified testing trends. ***Results:*** Out of 11,497 tests, 10 cases (0.087%) were confirmed positive, while 11,487 (99.913%) were negative. The outpatient department accounted for 80% of positive cases, with obstetrics and gynecology contributing the highest proportion (30%), followed by internal medicine/cardiology and pediatric services (20% each). The highest testing volumes were recorded in emergency (3,247 tests) and pediatric services (2,683 tests). Monthly data showed a peak in positive cases during January (6 cases) and April (2 cases), suggesting seasonal influences on malaria transmission. ***Conclusions:*** This study found an exceptionally low malaria prevalence in Mogadishu, reflecting low malaria infection rates in Mogadishu Somalia. This is in coherence with recent studies that suggest Mogadishu, Somalia, may be transitioning towards a non-malaria zone. However, the low positivity rate suggests potential overuse of malaria testing for febrile illnesses in this urban setting.

Keywords: Malaria, Somalia, Mogadishu, rapid diagnostic tests, prevalence, public health, malaria control.

INTRODUCTION

Malaria remains a significant global health challenge, particularly in sub-Saharan Africa, which accounted for approximately 95% of cases and 96% of deaths in 2020 [1,2]. This persistent burden is exacerbated by the complex interplay of various factors, including socioeconomic status, environmental conditions, and biological challenges, creating a multifaceted landscape that complicates malaria control efforts.

Children under five years old are especially vulnerable to malaria, representing about 80% of malaria deaths in the region [1]. This demographic is at a heightened risk due to their developing immune systems and limited access to preventive measures. Despite ongoing interventions such as the distribution of insecticide-treated nets (ITNs) and the implementation of indoor residual spraying (IRS), the disease burden persists. Low-income families face higher risks, as they often lack access to effective prevention and treatment options, further deepening health disparities in the region [3].

Moreover, the increasing resistance of malaria parasites to artemisinin-based therapies poses a significant threat to malaria control efforts. This resistance undermines the effectiveness of treatment regimens that have been foundational in managing the disease [1]. Similarly, vector resistance to commonly

used insecticides has been reported, reversing some of the progress made in malaria control strategies. These challenges necessitate a reevaluation of current approaches and the development of new strategies to combat malaria effectively.

The waning efficacy of the RTS,S malaria vaccine further complicates efforts to meet the World Health Organization (WHO) targets for malaria reduction.[1] While the vaccine was heralded as a breakthrough, its limited effectiveness underscores the need for complementary interventions and a multifaceted approach to malaria prevention.

Addressing environmental factors and understanding the agent-host-environment nexus are crucial for effective malaria control in sub-Saharan Africa. [4]Environmental conditions, such as climate variability and land use changes, significantly influence mosquito breeding and malaria transmission dynamics. Therefore, a comprehensive understanding of these factors is essential for developing targeted interventions that are context-specific and culturally appropriate.

Past studies indicated that malaria remains endemic in Somalia, with Plasmodium falciparum as the predominant species causing severe disease.[5] The disease continues to affect vulnerable populations, with pregnant women and men showing higher infection rates.[5,6] Ongoing support from international organizations remains crucial for achieving malaria elimination in Somalia and mitigating the disease's adverse effects. [6] However, recent studies indicate a decreasing trend in malaria cases, likely due to effective national and international interventions. [6]

Key contributors to the persistence of malaria in Somalia include seasonal rainfall patterns that create favorable breeding conditions for the Anopheles mosquitoes, which are the primary vectors of the disease. Additionally, the country's fragile healthcare infrastructure poses significant challenges in terms of disease management and prevention. Limited access to quality healthcare services undermines timely diagnosis and treatment, exacerbating the burden of malaria in affected communities. The emergence of chloroquine resistance has further complicated treatment efforts, diminishing the effectiveness of one of the historically cornerstone antimalarial therapies. [6]

Considering these complexities, this study analyzes malaria testing and prevalence patterns at Kalkaal Hospital in Mogadishu, Somalia. By examining local epidemiological trends, we aim to provide valuable insights that can inform public health strategies and optimize case management in this urban setting. The findings are expected to contribute to a broader understanding of malaria dynamics and enhance efforts to reduce malaria-related morbidity and mortality in the region.

METHODS

A retrospective analysis was conducted on malaria diagnostic records at Kalkaal Hospital's hematology department, focusing on a total of 11,497 tests performed between January and October 2024. This study aimed to analyze malaria prevalence and testing patterns utilizing both standard microscopy and malaria rapid diagnostic tests (RDTs), which are crucial for timely and effective malaria diagnosis.

Data Collection

Data were systematically extracted from the hospital's electronic health records (EHR), which provided comprehensive information on the following variables:

- **Demographics**: Patient demographics included age, gender, and clinical departments. This information allows for a better understanding of the population affected by malaria and helps identify any demographic trends in infection rates.
- **Service Settings**: The classification of services as either inpatient or outpatient was documented. Understanding the service setting helps in assessing the burden of malaria on hospital resources and identifying which patient groups are more affected.
- **Test Results**: Recorded test results included both positive and negative malaria cases. This information is critical for calculating the overall positivity rate and understanding the extent of malaria prevalence within the hospital.

The diagnostic methods employed included thick and thin blood smears, which are the gold standard for malaria diagnosis, and malaria antigen tests (RDTs). These methods are essential for accurate identification of malaria species and for determining the severity of infections.

Statistical Analysis

Prevalence was calculated as the proportion of positive malaria cases out of the total number of tests conducted. This metric provides a clear indicator of malaria burden within the hospital during the specified timeframe.

Subgroup analyses were performed to examine testing patterns based on several factors, including:

- **Department**: Different clinical departments (e.g., pediatrics, obstetrics, internal medicine) were analyzed to identify variations in testing and positivity rates among different patient populations.
- **Service Setting**: Patterns were examined separately for inpatient and outpatient services to understand where the majority of cases are being diagnosed and treated.
- **Month**: Monthly trends in positivity rates were analyzed to assess any seasonal variations in malaria transmission, which can inform targeted interventions during peak periods.

Statistical analyses were conducted using SPSS software, which facilitated the computation of descriptive statistics, chi-square tests for categorical data, and regression analyses where appropriate. This comprehensive analysis aimed to identify significant associations and trends in malaria testing and prevalence.

Ethical Considerations

Ethical approval for the study was obtained from Kalkaal Hospital Ethics Committee (Ref. KH-9001) ensuring compliance with institutional guidelines and ethical standards. Patient confidentiality was maintained by anonymizing data and ensuring that no personally identifiable information was included in the analysis. All procedures adhered to ethical guidelines for research involving human subjects, emphasizing respect for patient rights and welfare throughout the study process.

This robust methodological framework aims to provide valuable insights into malaria epidemiology in Mogadishu, ultimately contributing to improved public health strategies and interventions for malaria control in the region.

RESULTS

A total of 11,497 malaria tests were conducted, with 10 positive cases (0.087%) and 11,487 negative results (99.913%). Outpatient services accounted for 80% of positive cases, while inpatient services contributed 20%. The monthly distribution of cases is presented in Table 1. 6(60%) of the cases were recorded on January

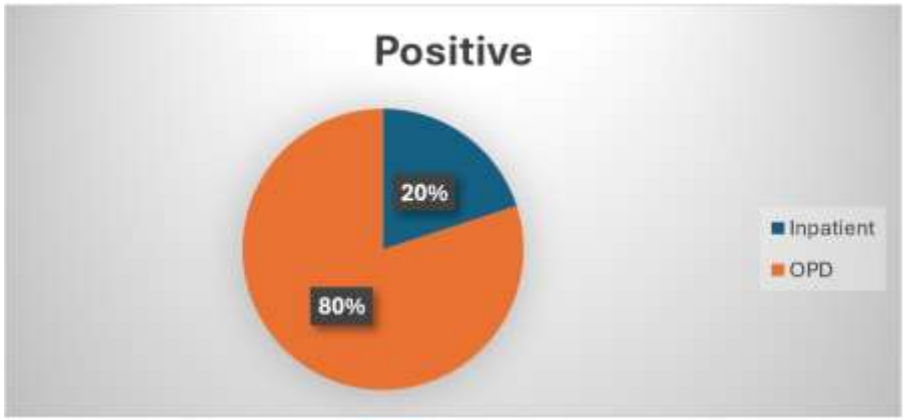
Table 1: Monthly Malaria Testing Results (2024)

Month	Negative	Positive	Total
January	1,128	6	1,134
February	1,073	0	1,073
March	1,436	1	1,437
April	1,446	2	1,448
May	1,361	0	1,361
June	1,076	0	1,076
July	1,209	1	1,210
August	998	0	998
September	949	0	949
October	811	0	811
Total	**11,487**	**10**	**11,497**

Positivity by Department

Department	Positive	Grand Total
Emergency	1	10%
Internal medicine and cardiology	2	20%
Obstetrics & Gynecology	3	30%
Pediatric Consultant	2	20%
Others	2	20%
Grand Total	**10**	**100%**

- Obstetrics and gynecology had the highest positivity rate (30%).
- Internal medicine and pediatrics each accounted for 20% of positive cases.



Positivity by Service Setting

- Outpatient services identified 8 positive cases (80%).
- Inpatient services identified 2 positive cases (20%).

DISCUSSION

The results of this study indicate an exceptionally low malaria prevalence of 0.087% among patients tested at Kalkaal Hospital in Mogadishu, reflecting a significant shift in the epidemiology of malaria within this urban environment. This low positivity rate supports recent observations suggesting that Mogadishu may be moving towards a non-malaria zone, which could have important implications for public health strategies in the area. Recent research has shown a decreasing trend in malaria cases, likely attributable to effective national and international interventions. For instance, a study by Osman and colleagues analyzed malaria test results from a tertiary care hospital in Mogadishu, covering a total of 54,748 tests conducted between 2015 and 2019. Their findings demonstrated a steady decline in malaria case rates over the years, with recorded rates of 4.95% in 2015, followed by 0.39% in 2016, 0.15% in 2017, 0.13% in 2018, and dropping to 0.1% in 2019.[6]

1. Interpretation of Results

The overall reduction in malaria cases could be attributed to various factors, including effective national malaria control interventions such as the distribution of insecticide-treated nets (ITNs) and the implementation of indoor residual spraying (IRS). These interventions have been pivotal in reducing mosquito populations and minimizing human-vector contact, thereby lowering transmission rates. The increased accessibility to artemisinin-based combination therapies (ACTs) has also likely contributed to the observed decline in malaria morbidity and mortality.[7]

Interestingly, the data showed significant seasonal variations in malaria cases, with notable peaks occurring in January and April. This trend likely reflects environmental factors, such as fluctuations in rainfall and temperature, which affect mosquito breeding and lifecycle dynamics. Future research should delve deeper into these climatic influences, as comprehending the seasonal patterns of malaria transmission could improve the timing and effectiveness of control measures. Additionally, one study noted that malaria cases were reported throughout the year, but there was a distinct surge in the number of cases between October 2015 and January 2016.[6]

2. Clinical Implications

The elevated positivity rates found in the obstetrics and gynecology department (30%) highlight the increased vulnerability of pregnant women to malaria, aligning with global studies that indicate pregnancy heightens the risk of severe malaria. The prevalence of malaria during pregnancy can vary significantly; for instance, a study in Uganda reported a 7.8% rate among antenatal care attendees (Moses, 2024). This finding underscores the urgent need for targeted interventions for this high-risk group, including improved antenatal care services that focus on malaria screening and prevention. Strengthening these services could help avert adverse maternal and fetal outcomes while contributing to broader efforts to reduce malaria transmission.

3. Public Health Recommendations

Given the findings, it is imperative to optimize malaria testing strategies across all clinical departments. Training healthcare providers to recognize malaria's clinical manifestations and to apply evidence-based guidelines for testing could enhance the efficiency of malaria diagnostic processes. Additionally, the integration of rapid diagnostic tests (RDTs) with clinical evaluations could streamline the diagnosis and treatment of malaria, ensuring timely and appropriate care for patients.

Furthermore, public health campaigns focusing on community awareness about malaria transmission and prevention should be intensified. Engaging local communities through education about the importance of ITN usage, the significance of seeking timely medical care, and the benefits of preventive measures can empower individuals to take charge of their health and contribute to malaria control efforts.

4. Limitations and Future Research

While this study provides valuable insights into malaria trends in Mogadishu, it is crucial to acknowledge its limitations. The data were derived from a single tertiary hospital, which may not fully represent the broader population in Mogadishu or other regions of Somalia. Future research should involve multi-center studies that encompass diverse geographical areas to enhance generalizability.

Additionally, while this study analyzed trends over a single year, longitudinal studies are needed to assess long-term patterns and the impact of ongoing malaria control interventions. Investigating potential environmental factors—such as changes in land use, urbanization, and climate change—will be vital for understanding the dynamics of malaria transmission in the region.

CONCLUSION

In summary, this study highlights the remarkable decline in malaria prevalence in Mogadishu, reflecting the effectiveness of ongoing public health interventions. However, it also underscores the necessity for continued vigilance and adaptation of strategies tailored to the unique epidemiological landscape of urban settings. Strengthening targeted interventions for vulnerable populations, optimizing testing protocols, and enhancing community engagement will be essential in sustaining these gains and ultimately achieving malaria elimination in Somalia.

REFERENCES

1. Ladipo HJ, Tajudeen YA, Oladunjoye IO, Yusuff SI, Yusuf RO, Oluwaseyi EM, *et al*. Increasing challenges of malaria control in sub-Saharan Africa: Priorities for public health research and policymakers. Ann Med Surg [Internet]. 2022 Sep [cited 2025 Mar 26];81. Available from: https://journals.lww.com/10.1016/j.amsu.2022.10436
2. World Malaria Report 2014 [Internet]. [cited 2025 Mar 26]. Available from: https://primarysources.brillonline.com/browse/human-rights-documents-online/world-malaria-report-2014;hrdhrd98412014002
3. School of Natural and Applied Sciences Kampala International Uganda, Katu AH. Socioeconomic and Environmental Risk Factors for Malaria in Young Children: A Review. INOSR Exp Sci. 2024 Sep 13;13(2):44–8.
4. Abdullahi AA, Abubakar AD. Why It Is Difficult to Eradicate Malaria in Sub-Sahara Africa. Perspect Glob Dev Technol. 2019 May 17;18(3):269–85.
5. Faisal M, Abdimalik Mohamed Y, Md. Akram H, Golam Sattar C. Prevalence of Plasmodium Falciparum Among Pregnant Women in Yaqshid District of Somalia. DIU J Health Life Sci. 2016 Jul 30;3(1 & 2):61–8.
6. Abdullahi Ali M, Bashir AM, Nur Adan F, Sümbül HE, Sherani MH, Sağlık MKE, *et al*. Investigation of the Annual and Periodic Distribution of Malaria Cases in Mogadishu, Somalia: A Retrospective Analysis of Four-Year Data. Life Med Sci. 2021 Dec 8;1(2):47–54.
7. WHO EMRO | 'No fly zone' for mosquitoes: controlling malaria in Somalia | News | Somalia site [Internet]. [cited 2025 Mar 26]. Available from: https://www.emro.who.int/somalia/news/no-fly-zone-for-mosquitoes-controlling-malaria-in-somalia.html