

Editorial

Results From The Global Health Estimates 2016 On The Prevalence Of Malaria In Ethiopia, 2000–2016.

Thadel Girum, Tiha Shumbej and Misgune Sewangiza.

Department of Medicine, College of Medicine, Rangsit University Bangkok, Thailand.

Abstract

Background: Malaria continues to be a disease with a large global impact, especially in underdeveloped nations. One of the sub-Saharan nations with the highest malaria endemicity is Ethiopia. Even though public health initiatives created during the Millennium Development Goals have significantly decreased the burden of malaria in recent years, the disease remains a significant public health issue in Ethiopia. Therefore, tracking the disease's breadth and changes over time requires quantifying its burden and evaluating its trend.

Objective: The purpose of this study was to evaluate the mortality and Disability-Adjusted Life Years Lost (DALY) associated with malaria from 2000 to 2016

Methods: The study made use of data from the Global Health Estimate 2016, which was initially gathered by modeling, verbal autopsy, surveys, reports, published scientific journals, vital registration, and the Global Burden of Disease study (GBD 2016).

Results: An estimated 2,927,266 (95% CI, 525,000-6,983,000) new cases of malaria were reported in Ethiopia year 2016. With a crude death rate of 4.7/100,000 and an age-standardized death rate (ASDR) of 4.9/100,000 people, it was estimated to have caused 4,782 deaths (95% CI 122.5–12,750). Nonetheless, during 16 years, the number of deaths from malaria decreased by 54% compared to the 2000 high of 10,412 deaths (95% CI 98.8–16180), while ASDR decreased by 63%. Malaria-related deaths in that year totaled 365,900 years (187,000 years for men and 178,900 years for women). It was responsible for 1% of all malaria-related DALY worldwide and 0.78 percent of all DALY in Ethiopia. Malaria caused about 35,200 years of lived with disability (YLD) and 332,100 life years (YLL) to be lost. Males are slightly more likely to die from malaria-related causes, and children under five are particularly vulnerable.

Conclusion and recommendation: Even though Ethiopia is seeing a remarkable decrease in the prevalence of malaria, the disease is still a public health concern due to its higher death and DALY rates. To eradicate the disease within the allotted time, it is crucial to fortify the current malaria preventive program.

Keywords : *Malaria burden, Mortality, DALY.*

INTRODUCTION

Malaria is a major global public health issue that contributes to a higher burden of disease and causes significant morbidity and mortality. Plasmodium parasites are the cause of it [1]. The most common species and the biggest threat to public health are Plasmodium falciparum and Plasmodium vivax [2]. Malaria has begun to increase once more in the past two years following two decades of successful decreases. An estimated 219 million cases and 435,000 fatalities from malaria were reported worldwide in 2017. While mortality decreased within the same time period, the number of patients increased by 2 million from the 2016 report [3]. Nearly 80% of all malaria-related deaths took place in 17 countries, the majority of which were in Africa, with 7 nations—all except India—accounting for 53% of the deaths [3].

In 2017, the World Health Organization's (WHO) African area accounted for 200 million, or 92%, of all malaria cases.

The region most impacted was sub-Saharan Africa, contributing to a greater proportion of malarial fatalities and cases [3]. More than 60 million people, or 60% of the total population, are at danger of contracting malaria in Ethiopia, where the disease is thought to be prevalent across three quarters of the country [4]. In prior years, an estimated 70,000 deaths and 4–5 million cases of malaria were reported annually [4]. 30% of all DALYs lost were due to malaria [5], making it a major barrier to social and economic advancement. However, public health interventions created during the Millennium Development Goals, such as early diagnosis and treatment of cases using artemisinin-based combination therapy (ACT), prevention and control of malaria among pregnant women using intermittent preventive therapy (IPT), and use of vector control methods

***Corresponding Author:** Misgune Sewangiza, Department of Medicine, College of Medicine, Rangsit University Bangkok, Thailand.

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like indoor residual spray (IRS) and insecticide-treated bed nets (ITNs), have recently significantly reduced the burden of malaria in Ethiopia [6, 7]. Consequently, between 2006 and 2011, the number of deaths and admissions attributable to malaria in children under five years old decreased by 81 and 73%, respectively. Similarly, between 1990 and 2015, there was a 94.8 and 91.7% decrease in death and DALY, respectively [7–9]. Malaria remains a significant health issue in Ethiopia even though significant strides have been made to enhance public health by lessening its burden. It is one among the top ten causes of morbidity and death for both adults and children under five. Malaria also ranks highest in terms of mortality, outpatient visits, and hospital-based admissions. This could lead to the objective of eliminating malaria, which is intended to accomplish the sustainable development target [10]. There is a dearth of current data, despite the fact that estimating the prevalence of malaria is crucial to enhancing the community's health. In order to improve the population's health, this study sought to quantify the prevalence of malaria in Ethiopia between 2000 and 2016 using data from the Global Health Estimate 2018 report (https://www.who.int/healthinfo/global_burden_disease/en/).

TECHNIQUES AND RESOURCES POPULATION, CIRCUMSTANCES, AND STUDY DESIGN

The Global Health Estimate 2016 and the Global Burden of Disease research 2016 methodology were used to calculate the burden of disease and the cause of death. The Institute for Health Metrics and Evaluation (IME) and WHO databases contain the data for GBD and GHE from 1990 to 2016 and 2000 to 2016, respectively, and are openly accessible for research purposes. This study solely assesses Ethiopia's malaria load. With an estimated 102 million people in 2017, 83.86% of whom reside in rural areas, Ethiopia is the second most populous country in Africa after Nigeria [11]. It has been reported elsewhere [12–15] this year. Cause of death ensemble modeling (CODEm) was primarily used to measure causes of death by age, sex, and year for both malaria and all causes [16]. The model builds an ensemble model based on the performance of the many models after testing a large variety of models, including mixed effects linear models and spatiotemporal Gaussian process regression (ST-GPR) models. Years of life lost (YLL) from early death and years lived with disability (YLD), a measure of non-fatal health loss, were added together to determine the number of DALYs caused by malaria. Standard GBD procedures, which multiply each death by the normative standard life expectancy at each age, were used to estimate YLL. Weights for disability and sequelae prevalence obtained from population-based surveys were used to determine YLD. DisMod-MR 2.1, a Bayesian meta-regression technique created to address major shortcomings

in descriptive epidemiological data, such as missing data, inconsistency, and significant methodological variance between data sources, was employed for the majority of sequelae in the GBD 2016 study [12–14].

RESULTS

An estimated 2,927,266 (95% CI: 525,000–6,983,000) new cases of malaria were reported in Ethiopia in 2016. Although there was a 60% decrease in incidence between 2010 and 2016, the population at risk increased from 59,637,819 to 69,634,176. An estimated 4,782 people died from malaria in that same year (95% CI 122.5–12,750). It is thought to result in an ASDR of 4.9/100,000 and a crude death rate of 4.7/100,000. However, ASDR decreased by 63% from the 2000 record, and the number of deaths from malaria decreased by 54% from the 2000 record of 10,412 deaths (95% CI 98.8–16,180) within 16 years (Tables 1, 2 & Fig. 1). By 2016, malaria-related deaths accounted for 0.7% (4,782/700,100) of all deaths in Ethiopia and 2.8% (4,782/168,700) of deaths from infectious and parasitic diseases. Similarly, 1.2% (4,782/408,125) of malaria-related mortality in Africa and 1.07% (4,782/446,446) of malaria mortality worldwide have been attributed to Ethiopia. Throughout the years 2000–2016, the proportion of malaria-related deaths in Ethiopia, Africa, and the world at large decreased. Males and children under five years old had the highest rates of malarial mortality. Males accounted for over 2,400 of the 4,782 malaria-related deaths. For males, the ASDR was 5.2/100,000, whereas for females, it was 4.7/100,000. Similarly, the crude mortality rate from malaria was 4.6/100,000 for females and 4.8/100,000 for males. Additionally, 1,300 deaths from malaria were the greatest number ever recorded. According to the Ministry of Health, between 2000 and 2013, there was a 50–75% decrease in the incidence of malaria and its associated mortality. Comparably, between 2010 and 2015, *Plasmodium falciparum*-caused malaria incidence and fatality rates decreased by more than 50%. Ethiopia has thus met the Millennium Development Goal, which called for halving the malaria fatality rate [3, 6, 9, 10]. Ethiopia has decreased the prevalence of malaria thanks to strong government leadership, the implementation of a primary healthcare program, and the successful grassroots application of malaria control measures, demonstrating that malaria-related DALYs accounted for 1% of all malaria-related DALYs worldwide and 0.78 percent of all DALYs in Ethiopia. Malaria is the leading cause of death and morbidity in the majority of African nations. DALYs associated with malaria were more prevalent in these nations than in Ethiopia, according to reports [3, 18]. Numerous new infections and deaths from malaria have been prevented because to the national programs for malaria prevention and treatment, which have achieved significant strides in combating the

pandemic. Since then, various public health initiatives have reduced the national and regional burden of malaria infection. Malaria is still a public health issue in the nation, nevertheless, with a greater prevalence of morbidity and mortality, especially in children under five [1, 4, 5]. Therefore, it may be difficult for Ethiopia to meet the global technical strategy (GTS) for malaria eradication program, which aims to reduce malaria by 90%, and the sustainable development target connected to malaria elimination [19]. Because this study uses secondary data derived from records, its conclusions may be compromised by the possibility of estimation bias and the inability to determine the reliability of the recorded data. There may have been some methodological issues with this study. The majority of the data was first calculated using model projections, and the model's data source was either sample surveys or reports of vital registration, which may have further impacted the data's dependability. Furthermore, when intervention programs evolve over time, the trend's predicted values may also alter, which would compromise the estimate's dependability.

CONCLUSION AND RECOMMENDATION

In Ethiopia, the prevalence of malaria has significantly decreased during the past 20 years. Malaria, however, continued to be a public health concern despite a higher fatality and DALY rate. Thus, during the periods of implementation of the sustainable development goal (SDG) and the government's malaria elimination program, measures to further reduce the incidence and burden of malaria, especially among age groups most affected, should be strengthened.

DISCUSSION

This study evaluated Ethiopia's malaria burden from 2000 to 2016, using data from the GHE 2016 (published in 2018). Morbidity, mortality, years lived with a handicap, years of potential life lost, and disability adjusted life years were used to quantify the burden. Age, gender, and trend disparities across time were measured, and their contribution to the worldwide malaria burden was calculated. It has been discovered that the burden of malaria, specifically the mortality rate and disability-adjusted life years lost as a result of malaria, is decreasing in relation to the Millennium Development Goal measures. Between 2010 and 2016, the expected number of new cases of malaria decreased by 60%, even though the population at risk increased by 16.75% [3]. These accomplishments may have been made possible by programs put in place to accomplish the Millennium Development Goals, such as the distribution of insecticide-treated bed nets (ITNs), the drainage of stagnant water, indoor residual spray (IRS), better fever-seeking behavior,

the prevention and control of malaria in pregnant women through the use of intermittent preventive therapy (IPT), and easier access to artemisinin-based combination therapy (ACT) [3, 6, 17]. Thus, from a record of 10,412 deaths (95% CI 98.8–16,180) in 2000 to 4,782 deaths (95% CI 122.5–12,750) in 2016, the number of deaths from malaria fell by 54% in just 16 years. The ASDR and crude death rate (CDR) fell by 63% and 70%, respectively, in the same year. Additionally, it was clear from WHO and quicker than in the majority of nations in Sub-Saharan Africa [18].

Ethiopia still has a high malaria burden, nonetheless, accounting for 6% of all malaria cases worldwide and 12% of all *Plasmodium vivax* cases and deaths worldwide.

Ethiopia is therefore one of four nations where *P. vivax* is responsible for more than 75% of deaths and cases [3, 18]. 33,800 years (17,500 years for men and 16,300 years for women), 332,100 years (169,600 years for men and 162,500 years for women), and 365,900 years (187,000 years for men and 178,900 years for women) were the YLD, YLL, and DALY caused by malaria in 2016.

REFERENCES

1. WHO Global Malaria Program. World malaria report. Switzerland: WHO Press, World Health Organization; 2014. http://www.who.int/malaria/publications/world_malaria_report_2014/en/References. Accessed 1 Dec 18.
2. WHO Global Malaria Program. Achieving the malaria MDG target: reversing the incidence of malaria 2000–2015: WHO Press, World Health Organization and the United Nations Children's Fund; 2015. <http://www.who.int/malaria/publications/ /en/References..> Accessed 1 Nov 18.
3. World Malaria Report. Geneva: World Health Organization; 2018. Switzerland: WHO Press, World Health Organization; 2018. http://www.who.int/malaria/publications/world_malaria_report_2018/en/References. Accessed 1 Nov 18.
4. Federal democratic Republic of Ethiopia Ministry of Health. Ethiopian national malaria indicator survey 2011: technical summary Ethiopian: Ministry of Health of Ethiopia; 2012.
5. USAID. President's Malaria Initiative Ethiopia Malaria Operational Plan (MOP) FY. 2008. <http://www.pmi.gov/docs/defaultsource/defaultdocumentlibrary/malaria-operational-plans/fy-2008-ethiopia-malaria-operational-plan.pdf?sfvrsn=>. Accessed 1 Dec 18.

6. United Nations. The Millennium Development Goals Report 2015. New York:United Nations. p. 2015.
7. Aregawi M, Lynch M, Bekele W, Kebede H, Jima D, Taffese HS, et al. Time series analysis of trends in malaria cases and deaths at hospitals and the effect of antimalarial interventions, 2001–2011, Ethiopia. *PLoS ONE*. 2014;9:e106359.
8. Adhanom T, Witten HK, Getachew A, Seboxa T. Malaria. In: Berhane Y, Hailemariam D, Kloos H, editors. *The epidemiology and ecology of health and disease in Ethiopia*. Addis Ababa: Shama PLC; 2006. p. 556–76.
9. Deribew A, Tessema GA, Deribe K, Melaku YA, Lakew Y, Amare AT, et al. Trends, causes, and risk factors of mortality among children under 5 in Ethiopia, 1990–2013: findings from the global burden of disease study 2013. *Popul Health Metrics*. 2016;14:42.
10. Deribew A, Dejene T, Biruck K, Gizachew A, Yohannes A, Awoke M, et al. Incidence, prevalence and mortality rates of malaria in Ethiopia from 1990 to 2015: analysis of the global burden of diseases 2015. *Malar J*. 2017;16:271.
11. WHO. Ethiopian factsheets of health statistics. 2016.
12. WHO methods and data sources for country-level causes of death 2000–2016 (Global Health Estimates Technical Paper WHO/HIS/IER/GHE/2018.3).
13. CHERG-WHO methods and data sources for child causes of death 2000–2015 (Global Health Estimates Technical Paper WHO/HIS/HSI/GHE/2016.1).
14. WHO methods and data sources for life tables 1990–2016 (Global Health Estimates Technical Paper WHO/HIS/IER/GHE/2018.2).
15. WHO methods and data sources for global burden of disease estimates 2000–2016 (Global Health Estimates Technical Paper WHO/HIS/IER/GHE/2018.4).
16. Modeling causes of death: an integrated approach using CODEm. Available from: <http://www.healthdata.org/research-article/modeling-causes-deathintegrated-approach-using-codem>. Accessed 1 Dec 2018.
17. Abeku TA, Helinski ME, Kirby MJ, Kefyalew T, Awano T, Batisso E, et al. Monitoring changes in malaria epidemiology and effectiveness of interventions in Ethiopia and Uganda: beyond Garki project baseline survey. *Malar J*. 2015;14:337.
18. Murray CJ, Ortblad KF, Guinovart C, Lim SS, Wolock TM, Roberts DA, et al. Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990–2013: a systematic analysis for the global burden of disease study 2013. *Lancet*. 2014;384:1005–70.
19. WHO. Global technical strategy for malaria 2016–2030. Geneva: World Health Organization. <http://www.who.int/malaria/publications/atoz/9789241564991/en/>. Accessed 1 Nov 18