HEALTH INEQUALITY AND ILLNESS EXPERIENCE OF MALARIA PATIENTS IN NIGERIA: A REVIEW OF NIGERIA MALARIA INDICATOR SURVEY REPORT, 2021

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Abstract
Malaria remains a critical global health challenge, with Nigeria accounting for 27% of global cases and 31% of deaths despite the implementation of the National Malaria Strategic Plan (2021-2025). Persistent gaps between strategic goals and epidemiological reality highlight underexplored dimensions of health inequalities and illness experiences. The study seeks to analyse patterns of malaria prevalence and intervention coverage, examine and interpret the reported perceptions of malaria. Using the Social Determinants of Health and Fundamental Causes Theory frameworks, this study analysed the 2021 Nigeria Malaria Indicator Survey (NMIS) to examine these disparities. The study examined health inequalities across wealth quintiles, maternal education, residence, and geopolitical zones in malaria prevalence and intervention access. The findings confirm significant national progress, with overall malaria prevalence falling from 42% (2010) to 22% (2021). However, stark inequalities persist. Children in the poorest wealth quintile had a prevalence of 31%, compared to 5% in the richest. Prevalence was more than twice as high in rural versus urban areas, with wide variation across geopolitical zones. While access to Insecticide-Treated Nets (ITNs) showed a pro-rich bias, utilization was highest among the poorest quintiles who had access. The study concluded that perceptions of malaria susceptibility and severity varied systematically, with higher perceived severity linked to greater wealth and education. The study recommended that future research requires qualitative inquiry into illness experiences, geographically-targeted equity-focused interventions, culturally-adapted health education, and inclusion of hard-to-reach populations in surveys.
Keywords: Health inequality, illness experience, Malaria, Nigeria, Social Determinants of Health, intervention access, perception

Introduction
Malaria remains a severe worldwide health emergency, which entails a high rate of morbidity, mortality, and socioeconomic impacts, especially in low- and middle-income nations (Huang et al, 2025; Shi et al, 2023). Although the international and national efforts have brought significant success in malaria control over the last 20 years, recent statistics show that the progress has slowed down significantly and even reversed in certain regions. For instance, global malaria cases rose from 245 million in 2020 to an estimated 247 million in 2021 and further to 249 million in 2022, exceeding pre-COVID-19 pandemic levels (Shi et al., 2023; Venkatesan, 2024). The estimated number of cases for 2023 reached 263 million (Herd & Moynihan, 2025).

Malaria has been one of the most prevalent causes of mortality and morbidity in the world, particularly in tropical and subtropical areas where the environment has contributed to the spread of the disease (Huang et al., 2025). Although the age-standardized rate of malaria incidence for the general population decreased in 2021 to 3485.27 per 100,000 compared to 3789.28 per 100,000 in 2010. A negative tendency in the context of this disease was noted in 2019 when the age-standardized incidence rate changed to 3332.96 per 100,000 (Huang et al., 2025). This implies a complicated pathway in which the previous gains are jeopardized by the emergence or continued difficulties, such as the unexpected influence of world events, such as the COVID-19 pandemic, ineffective execution of treatment plans in different areas, and diverse cultural aspects affecting the use, acceptance, and effectiveness of treatment plans (Kardas et al., 2024). Other authors also point towards new threats, such as climate change, as significant contributors to the malaria trends and

control activities, as the vast majority of deaths caused by malaria still impact children under the age of five in the WHO African Region (Li et al., 024; Venkatesan, 2024).

The Nigerian fight against malaria has been seen through its numerous strategic plans and programs, with the recent being the National Malaria Strategic Plan (NMSP) 2021-2025 (Shekarau et al., 2024; Ujuju et al., 2023). This NMSP has ambitious goals in terms of reducing the prevalence of parasites to less than 10 percent and reducing under-five malaria deaths with intervention strategies that include mass distribution of long-lasting insecticidal nets, expanding seasonal malaria chemoprevention, and enhancing case management by using parasitological confirmation and artemisinin-based combination therapy (Mbishi et al, 2024; Venkatesan, 2024). Nonetheless, despite these long-term efforts, Nigeria has continued to record some of the largest malaria burden rates in the world with Nigeria alone adding an estimated 68 million cases and 194,000 deaths to the worldwide malaria burden, contributing 27 percent of the world's cases and 31 percent of the world's deaths (Omojuyigbe et al., 2023; Shekarau et al., 2024).

Despite the invaluable data provided by the NMIS 2021, a comprehensive review that critically integrates health inequality with the illness experiences of malaria patients from this recent national dataset remains an under-explored area. While the NMIS 2021 report presents disaggregated data on prevalence, interventions, and perceptions, a focused analytical synthesis that explores the intersections and implications of these two dimensions offers a novel contribution to the literature. This study aims to address this gap by systematically reviewing the NMIS 2021, moving beyond a purely descriptive account to provide a comparative and critical analysis. This approach is justified by the recognition that effective malaria control necessitates understanding not only where disparities exist but also how individual and community perceptions, beliefs, and behaviours shaped by these inequalities influence intervention uptake and health outcomes.

Concept of Health Inequality in Malaria

Health inequality is defined as unreasonable, systematic, and preventable disparities in health status and outcomes among various groups of people (Oke & Sibomana, 2025). These inequalities are multifaceted and ingrained in the sphere of infectious diseases, such as malaria, and are conditioned by socioeconomic, demographic, and geographic factors. One of the most widespread views is based on socioeconomic status, where people in the higher wealth quintiles are always less likely to be infected with malaria (Carrasco-Escobar et al., 2021; Wafula et al., 2023). Nevertheless, the definition and measurement of such disparities may depend on the studies; some of them measure economic inequality by wealth indices, whereas others analyse social inequalities by variables such as mothers' education (Carrasco-Escobar et al., 2021). It is hypothesized that education will increase health literacy, preventive behaviour, and access to care and decrease the risk of malaria (Atusingwize et al., 2025). There are also notable differences in the malaria prevalence and intervention access, which are manifested by diverse environmental exposures, healthcare infrastructure, and resource allocation (Abeles & Conway, 2020; Ogunsakin et al, 2024; Okoli et al.,2021).

The complexity of these inequalities is further explained through different methods of analysis. Measures such as the Gini coefficient are used to measure the degree of epidemiological inequality, and it indicates that malaria burden is highly disparate across regions and within nations, and Nigeria is no exception (Abeles & Conway, 2020). By using the Slope Index of Inequality and the Relative Index of Inequality, cross-population wealth and socioeconomic gradient comparisons in malaria can be made, which give complementary data on absolute versus relative disparities (Carrasco-Escobar et al., 2021). Although other studies point to specific interventions, e.g., insecticide-treated net distribution, being potentially pro-poor, enduring wealth inequity is often evident, and coverage may be biased towards wealthier households (Unwin et al, 2020). This implies that the very introduction of interventions does not necessarily ensure equitable access or impact, and it requires specific strategies that would respond to certain barriers experienced by disadvantaged groups (Edusei et al., 2025; Okova et al., 2024).

The interplay between cultural beliefs and traditional practices and biomedical recommendations can result in the non-adherence to prescribed treatments (Paudel et al., 2024; Uushona et al., 2022). In certain settings, certain diseases are associated with supernatural forces, and traditional medicine and herbs are seen as a superior treatment compared to modern medicine, which affects treatment adherence (Mhango et al., 2023). Patients can also distinguish between malaria types or form assumptions about certain drugs (e.g., blue drugs cure, brown drugs supplements), which affects their compliance with full treatment courses (Rahmalia et al., 2023; Win et al., 2023). These perceiving and interpreting differences also highlight the difficulty in achieving uniform compliance with medical recommendations. Additionally, practical obstacles like the affordability of preventative measures, high geographical distances to health care centers, and long queues can also undermine the capacity of an individual to act on health-related information, irrespective of the level of their understanding of the illness (Mhango et al., 2023; Uushona et al., 2022).

Theoretical Orientation

The Social Determinants of Health (SDH) and the Fundamental Causes Theory were used to offer comprehensive lenses through which to analyse disparities in health outcomes in this study. The Social Determinants of Health framework posits that health is shaped by a complex interplay of social, economic, environmental, and political factors beyond individual choices, including income, education, occupation, housing, and access to healthcare (Atusingwize et al., 2025; Oke & Sibomana, 2025). For instance, Oke and Sibomana emphasize that these determinants create differential exposures and vulnerabilities to diseases like malaria. In the context of malaria, socioeconomic factors, such as wealth and access to preventive measures, significantly influence an individual's ability to avoid infection and afford treatment. Disparities in household wealth, for example, have been linked to varied perceptions of malaria severity and differential access to protective measures like insecticide-treated nets (Duodu et al., 2021; Xing et al., 2024). The SDH framework, therefore, guides investigations into how societal structures and living conditions contribute to malaria disparities.

Complementing the SDH framework, the Fundamental Causes Theory, proposed by Link and Phelan (1995), argues that socioeconomic status remains a fundamental cause of disease disparities even when specific risk factors or disease mechanisms change. This theory suggests that individuals with higher economic status maintain better health outcomes because they have greater access to flexible resources such as money, knowledge, power, prestige, and beneficial social connections, which can be used to avoid risks and adopt protective strategies regardless of the prevailing health threats or available interventions (Emadi et al., 2021). In the context of malaria, this means that even with the introduction of new interventions, individuals with higher socio-economic status may disproportionately benefit due to their capacity to access, understand, and effectively utilize these innovations, thus perpetuating or even widening health gaps.

Methodology

This paper employs a secondary data analysis approach, utilizing the publicly available datasets from the Nigeria Malaria Indicator Survey 2021. This design enables a comprehensive review of existing national-level data to explore health inequalities and illness experiences related to malaria in Nigeria, without requiring new primary data collection.

Results

Overall Malaria Burden and Trends

The NMIS 2021 reveals encouraging improvements in overall malaria prevalence in Nigeria. The national malaria prevalence fell from 42% in 2010 to 22% in 2021. This represents a substantial reduction over the past decade.

Health Inequalities in Malaria Prevalence

The table below shows that Nigerian malaria prevalence declined significantly between 2010 and 2021. Despite this, stark inequality persists: in 2021, the poorest quintiles had 31% prevalence, while the richest had 5%. This highlights that socioeconomic status remains a critical factor in malaria risk. A clear inverse relationship exists between a mother's educational attainment and the prevalence of malaria among her children. Malaria prevalence has generally decreased across all maternal education levels between 2010 and 2021. The most significant reduction was noted among children whose mothers had no education, where prevalence decreased from 51% in 2010 to 30% in 2021. Malaria prevalence remains considerably higher in rural areas compared to urban areas. In 2021, the prevalence of malaria in children was more than twice as high in rural areas (27%) as in urban areas (11%). Both urban and rural areas experienced a decrease in prevalence between 2010 and 2021, with urban prevalence falling from 23% to 11% and rural prevalence from 48% to 27%. Marked variations in malaria prevalence were identified across Nigeria's geopolitical zones and individual states. All zones experienced a decrease in malaria prevalence between 2010 and 2021. The North Central zone showed the most significant decline, with prevalence decreasing from 49% to 17% during this period. At the state level, malaria prevalence ranged widely, from as low as 3% in Lagos to as high as 49% in Kebbi state.

Table 2: Health Inequalities in Malaria Prevalence (2010 vs. 2021)

Category Type	**Specific Category**	**Malaria Prevalence 2010 (%)**	**Malaria Prevalence 2021 (%)**
Wealth Quintile	Lowest	45	31
	Second	43	31
	Middle	38	23
	Fourth	24	13
	Highest	12	5
Mother's Education	No education	51	30
	Primary	35	20
	Secondary	19	8
	More than secondary	7	3
Residence	Urban	23	11
	Rural	48	27
Geopolitical Zone	North Central	49	17
	North East	44	25
	North West	49	32
	South East	30	16
	South South	37	18
	South West	18	7

Source: *NMIS Report, 2021*

Health Inequalities in Malaria Intervention Access

Table 3 below represents a higher percentage of existing Insecticide-Treated Nets (ITN) that were used the night before the survey in rural areas (76.8%) compared to urban areas (70.8%). Similarly, access to ITNs was higher in rural areas (44%) than in urban areas (41%). The percentage of existing ITNs used the night before the survey decreased as household wealth increased. The lowest wealth quintile reported the highest usage at 84.6%, while the highest wealth quintile reported the lowest usage at 57.6%. Access to an ITN also varied by wealth quintile, ranging from 36% among those in the highest wealth quintile to 49% among those in the second wealth quintile. The percentage of existing ITNs used the night before the survey ranged from 52.6% in the South West zone to 84.0% in the North West zone.

Table 3: ITN Use and Access by Socio-Economic and Regional Characteristics

Category Type	Specific Category	% Existing ITNs Used the Night Before	% Households with Access to ITN
Residence	Urban	70.8	41.0%
	Rural	76.8	43.9%
Wealth Quintile	Lowest	84.6	46.8%
	Second	81.8	49.0%
	Middle	78.4	43.0%
	Fourth	70.1	39.5%
	Highest	57.6	36.4%
Geopolitical Zone	North Central	77.4	–
	North East	82.0%	–
	North West	84.0%	–
	South East	57.0%	–
	South South	55.9%	–
	South West	52.6%	-

Source: *NMIS Report, 2021*

Illness Experience: Perceptions of Malaria Patients

The results show clear variations in perceived susceptibility to malaria across background characteristics. Rural women (71%) report higher perceived susceptibility than urban women (66%), reflecting greater exposure to malaria risk. Perceived susceptibility is highest among women in the lowest wealth quintile (74%) and declines steadily with increasing wealth, reaching 61% among women in the highest quintile. Similarly, women with no formal education (73%) and those with primary education (70%) report higher susceptibility compared to women with secondary education (65%) and more than secondary education (63%). Regionally, perceived susceptibility is highest in the North West (75%) and North East (72%), followed by the North Central (68%), while lower levels are observed in the southern zones, particularly the South West (60%). Overall, the findings suggest that perceived susceptibility is greatest among socio-economically and environmentally vulnerable groups and lowest in more advantaged and lower-prevalence settings.

Table 4: Perceived Susceptibility to Malaria

Category Type	Specific Category	% Women with Perceived Susceptibility
Residence	Urban	66
	Rural	71
Wealth Quintile	Lowest	74
	Second	72
	Middle	69
	Fourth	65
	Highest	61
Education	No education	73
	Primary	70
	Secondary	65
	More than secondary	63
Geopolitical Zone	North Central	68
	North East	72
	North West	75
	South East	62
	South South	64
	South West	60

Source**:** NMIS Report, 2021

Perceived Severity of Malaria by Background Characteristics

Table 5 above presents the perceptions regarding the seriousness of malaria consequences, which showed variations. A higher percentage of women in urban areas (62%) than in rural areas (59%) believed the consequences of malaria are serious. This perception also increased with increasing household wealth, from 54% in the lowest wealth quintile to 64% in the highest wealth quintile. Women with more than a secondary education (67%) were more likely to feel that the consequences of malaria are serious compared to women with no education (53%). Across geopolitical zones, the belief that malaria consequences are serious ranged from 53% in both the North East and North West to 77% in the South East

Table 5: Perceived Severity of Malaria by Background Characteristics

Category Type	Category	% Women with Perceived Severity
Residence	Urban	62
	Rural	59
Wealth Quintile	Lowest	54
	Second	57
	Middle	60
	Fourth	62
	Highest	64
Education	No education	53
	Primary	57
	Secondary	65
	More than secondary	67
Geopolitical Zone	North Central	61
	North East	53
	North West	53
	South East	77
	South South	68
	South West	65

Source: *NMIS Report, 2021*

Discussion

The findings unequivocally highlight profound health inequalities in malaria prevalence and intervention access across Nigeria, largely aligning with the Social Determinants of Health and Fundamental Causes Theory frameworks (Emadi et al., 2021; Oke & Sibomana, 2025). The inverse relationship between wealth quintile and malaria prevalence underscores the profound impact of socioeconomic status on health outcomes. This disparity is not merely a matter of individual choices but reflects systemic differences in living conditions, access to resources, and exposure to risk factors. Lower-income households often reside in environments more conducive to mosquito breeding, have less access to quality housing that offers protection, and face financial barriers to accessing preventive measures like insecticide-treated nets or timely treatment (Carrasco-Escobar et al., 2021; Wafula et al., 2023). Similarly, the strong inverse correlation between maternal education and child malaria prevalence reinforces the role of education as a critical social determinant of health. Mothers with higher education levels are generally better equipped with health knowledge, have greater agency in health-seeking decisions, and may reside in more advantageous socioeconomic circumstances that reduce their children's exposure to malaria (Atusingwize et al., 2025).

Geographical disparities further illustrate health inequalities as the stark difference between rural and urban malaria can be attributed to several factors, such as poorer infrastructure, limited access to healthcare facilities, and greater reliance on traditional practices, coupled with environmental conditions that favor vector breeding in rural areas (Ogunsakin et al., 2024). These disparities are not accidental; they are systematic and avoidable, reflecting an inequitable distribution of resources, power, and opportunities that are fundamental causes of health disparities (Emadi et al., 2021). Even as overall prevalence declines, the relative gap between the most and least affected groups can persist or even widen if interventions are not specifically designed to address these underlying social and economic gradients (Carrasco-Escobar et al., 2021; Unwin et al., 2021).

Interestingly, data on ITN use by wealth quintile shows a higher percentage of existing ITNs being used by the lowest wealth quintile compared to the highest. This suggests that while access to ITNs may still be unequal, those who have them in lower socioeconomic strata tend to utilize them more consistently,

possibly due to a greater perceived need or fewer alternative protective measures. This finding aligns with discussions that interventions like ITN distribution can be "pro-poor" in their utilization, potentially reducing inequalities if access challenges are overcome (Edusei et al., 2025; Unwin et al., 2021).

The variations in women's perceptions of malaria susceptibility and severity varied across geopolitical zones, with a higher perception of risk in some southern zones. This can influence the uptake of preventive measures; populations who perceive a lower personal or community risk may be less vigilant in adopting behaviours such as consistent ITN use or seeking early diagnosis for febrile illnesses (Hutchinson et al., 2023; Ngutu et al., 2025). This differential perception can perpetuate malaria transmission cycles, especially in areas with lower perceived risk but existing transmission. Perceived severity showed a clear positive correlation with socioeconomic status, education, and urban residence. Women in urban areas, with higher wealth and more education, were more likely to believe the consequences of malaria are serious. This suggests a greater understanding of the potential dangers of malaria within these groups, which can translate into more prompt and appropriate care-seeking behaviours. Conversely, lower perceived severity among less educated or poorer populations may lead to delays in seeking formal medical care, reliance on ineffective home remedies, or incomplete treatment courses, contributing to worse health outcomes and exacerbating inequalities (Mhango et al., 2023; Zou et al., 2023).

Limitations of the Study

This study is subject to several limitations inherent to its secondary data analysis design. The analysis is constrained by the variables, definitions, and survey instruments of the NMIS 2021, which may not capture important contextual or qualitative factors shaping illness experience and health-seeking behaviour. Key indicators, including ITN use and perceptions of susceptibility and severity, rely on self-reported data that are susceptible to recall bias, social desirability bias, and misreporting. While the NMIS provides useful perception metrics, its quantitative design cannot fully encapsulate the nuanced cultural, emotional, and situational dimensions of malaria illness experience, which are better explored through qualitative methods. Furthermore, although the NMIS employs a rigorous sampling approach, certain marginalized or hard-to-reach populations, such as nomadic groups or residents of conflict-affected zones, may be underrepresented, potentially limiting the generalizability of the findings.

Conclusion

There are enduring and considerable health disparities in malaria burden and access to interventions, and differences in the experience of the illness among women in Nigeria. Although some good strides have been achieved in Nigeria to curb the overall prevalence of malaria, the success has been unequally spread. The researchers found that children in the poorest 5th percentiles and those whose mothers are uneducated are still disproportionately affected by the disease. Malaria is always more prevalent in rural environments than in urban ones, and there are great differences in malaria rates across geopolitical boundaries and states, with certain areas having alarmingly high levels. Intriguingly, the poorer quintiles showed less use of the available insecticide-treated nets, indicating that the accessibility may not be fair, but the perceived necessity and compliance with the ITNs are high among the most at-risk populations who have access to these nets. Moreover, the research sheds some light on the way women think about malaria, its perceived vulnerability and severity, which also depends on their socioeconomic and educational status. Such differences in illness experience have the potential to significantly alter health-seeking behaviour, which may be one of the causes of the health inequalities.

Recommendations

Based on the findings of this study, several directions for future research are suggested:

- While the NMIS 2021 provided quantitative data on perceptions, qualitative research is needed to delve deeper into the nuanced illness experiences of different population groups to uncover the cultural, social, and personal factors that shape perceptions of malaria

- Given the stark disparities across geopolitical zones and between rural and urban areas, malaria control programs should adopt a geographically targeted and equity-focused approach.
- Community health education campaigns should be tailored to local contexts and languages, focusing on improving risk perception, early care-seeking, and treatment adherence.
- Surveys like the NMIS should strive to include hard-to-reach populations (nomadic, conflict-affected, and internally displaced persons) through adapted sampling methods.

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