

# Malaria Infection Socio-Economic Factors in the Outpatients in District Hospitals, Sub-Saharan Africa

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**Abstract:** Malaria has become a threat in Namibia, more especially in Engela District since 2010, with cases being reported to increase and the number of deaths rising as well. With the rising of these cases, the economy was slowly decreasing due to purchasing of mosquito nets, repellents and others. Based on a malaria case investigation done in Namibia for 5 years, it is stated that the incidence fell from 53.6 to 3.6 cases per 1000 population, and then increased again to 47.3/1000. A preliminary search will be conducted in the databases such as: Google Scholar, the PubMed, and the Library. This scoping review was also conducted by using key words such as malaria, social factors, economic factors, effects and outpatients. Scoping review framework used in the study is by Joanna Briggs Institute that will be followed throughout the review process and the reporting of the main review will follow the PRISMA-ScR. The evaluation of the studies that have occurred some have indicated gaps in their research due to reasons unknown. The use of long lasting insecticide nets was indicated although not all were in accordance with the WHO requirements of malaria prevention. Lack of income, strong social support was also observed and indicated to be the major cause of Malaria in many areas of the world. This scoping review will assist in the mapping out of evidence on the socioeconomic factors of malaria effects on outpatients which can help out the Health Professional with the right approaches to be used in terms of elimination of malaria, educating the patients about malaria itself before prescribing them medications.

**Keywords:** Malaria, Transmission, Infection, Prevention

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## 1. Introduction

Malaria is a major public health problem in the world where cases are also increasing and recorded. Based on the latest World malaria report, released in December 2019, there were 228 million cases of malaria in 2018 compared to the 231 million cases in 2017. The estimated number of malaria deaths stood at 405 000 in 2018, compared with 416 000 deaths in 2017. [1, 12]

There were 228 million estimated cases malaria worldwide and the estimated number of malaria deaths stood at 405 000 in 2018 as well. Children with ages below 5 years are the most vulnerable group affected by malaria; in 2018, they accounted for 67% (272 000) of all malaria deaths worldwide. The African Region carries a disproportionately high share of

the global malaria burden. In 2018, the region was home to 93% of malaria cases and 94% of malaria deaths. Total funding of malaria control and elimination reached an estimated US\$ 2.7 billion in 2018. [2, 15] Contributions from governments of endemic countries amounted to US\$ 900 million, representing 30% of total funding. In 2018, 6 countries accounted for more than half of all malaria cases worldwide: Nigeria (25%), the Democratic Republic of the Congo (12%), Uganda (5%), and Cote d'Ivoire, Mozambique and Niger (4% each). Most importantly, malaria is typically found in tropical and sub tropical climates where the parasites can live. The WHO states that, in 2016, there were an estimated 216 million cases of malaria in 91 countries. In

the United States, the Centers for Disease control and Prevention (CDC) reported 1700 cases of malaria annually. Most cases of malaria develop in people who travel to countries where malaria is more common [1].

Malaria remains a major global public health concern, as in 2014, an estimated 214 million cases and 438 000 deaths were reported worldwide, hence the significance of the research is to improve and engage in more efficient solutions on how to eliminate malaria, to decrease the death cases of malaria and educate the population on the dangers of malaria and its prevention and control measures altogether. The research will also serve as an educational platform and implication of changes on how to control transmission of malaria from other African countries at the borders. [6, 14]

It appears that factors influencing malaria includes lack of long –lasting insecticide treated nets, poor hygienic surrounding with the presence of swamps, grass, and wastes, poor education on malaria. It is mostly believed to be influenced by the fact that some people are ignorant to signs of malaria, uneducated and also ignorant when it comes to taking prevention measures of malaria. Future consequences of Malaria may include severe malaria, which is deadly, increase in number of death cases and increased government expenditure towards malaria in terms of medication and nets. The other social and economic factors that can increase malaria and its cases include whether the outpatients are most likely to live in rural areas, they lack enough resources to acquire required protective gear of malaria like mosquito nets as mentioned earlier, it is also believed to be influenced by alcohol abuse by the people who in the end run out of money, use of traditional treatment of malaria is also believed to have an impact and lastly they might be uneducated. [2, 8, 13]

## 2. Methods

### 2.1. Study Design

It evaluates and assesses the socioeconomic factors of Malaria on outpatients. This qualitative scoping review protocol was done following the Joanna Briggs Institute, (Joanna Briggs Institute, 2015) methodology scoping reviews. Collection of information from the library books, journals and websites such as chrome, Google scholar will be used. This will be done following five stages such as: identifying the research question, identifying the relevant studies, study selection, charting of data and collating, summarizing and reporting the results and an optional step of a consultation which is to validate the findings from the scoping review.

### 2.2. Study Population and Period of Evaluation

The study population used included all those articles that ranged from 2006 to 2020 were included in the study. All articles that were written in English and were in correlation with the study's objectives, aims and title were included in the study. It considered also both the published and unpublished studies, and it was done using words like

socioeconomics, malaria, effects and outpatients. The databases used and chosen contained due studies relevant to the research question. [3, 13]

### 2.3. Study Sites

Amongst all those continents where Malaria existed, the articles done in Sub-Saharan Africa were used as a site due to the fact that it contained much cases and deaths due to Malaria. These articles all ranged or came from different departments including Epidemiology, Public Health, Economics, Science and many others. These sites were all part of the same continent that contained similar climates, weather and economic status, as they were easier to compare and locate. [4]

### 2.4. Descriptions of Interventions and Contributing Factors

#### 2.4.1. Education Level

This indicated that those who had formal education about malaria or just different types of diseases in particular are less likely to get malaria as they know all about its prevention measures, and those who lacked formal education tend to get more sick due to the fact that they might not get jobs to support their families and buy measures to prevent against malaria such as building houses with proper windows and doors.

#### 2.4.2. Age

The young people with ages between 15 and 27 are more at least of malaria as they tend to be more ignorant in its prevention, treatment and health education campaigns. Although all ages can be infected or can get malaria especially babies and the elderly or those with low immune system.

#### 2.4.3. Attitudes

Those with the wrong attitude towards malaria are more likely to suffer the consequences of malaria. This involves not taking part in any of malaria programs such as having your house sprayed against mosquitoes, not attending health education or so on.

More research needs to be done on the socioeconomic factors of malaria as malaria cases keep increasing every now and then as it has become an everyday thing or occurrence. Some studies focused on general factors of malaria only, others on socioeconomics whilst others focused on both the factors which results in less information being given to each of the factors individually. [5]

### 2.5. Data Collection Procedures

During the study period, all the articles with similarities with the title of the study were being recorded in a table form and described according to their findings and characteristics. In all the sites or articles, eligibility and screening was being used to identified the most needed and important articles.

**Table 1.** Articles with similarities with the study title recorded.

Author	Main characteristics and findings
Shr-Jie Wang	A cross sectional study, with a sample size of 200 and controls of 200 in total as well. The Plasmodium falciparum infection ranged in a total of 1 054 subjects and only 705 were mainly children under 5. 425 subjects declared having had a malaria attack within one month of the survey. Among them, 60.7% were treated by traditional herbs and healers, 27.8% in health facilities, while 5.2% of the sample population only purchased drugs in a pharmacy or a drug outlet. The prevalence of malaria parasites was low: 0.8%, 1.4%, 2.7% and 3.7% in the centre, intermediate, periphery and surrounding rural areas, respectively. Health facilities surveys showed that only 37/717 (5.2%) of presenting fever cases and 22/781 (2.8%) of non-fever cases. A remarkably high coverage of insecticide-treated nets and a corresponding reduction in malarial infection risk were found. [13]
Anne Caroline Krefis, Norbert Georg Schwarz	A diagnostic assessment with a sample size of 1496 children and adults. It was found that those factors indicating the family's socioeconomic status the proportion of literate fathers was very high (> 75%) and evenly distributed under children with and without malaria. Likewise, the variables "house type", "income manage", "membership in a health insurance", "existence of an indoor kitchen" and "mother's and father's occupation" did not show any distinct association with malaria (See additional file 1 describing characteristics of the study group). In the univariate analysis, the variables "existence of electricity", "indoor toilet", "use of freezing as food conservation", "mother's ability to read and write" and a "closed water supply" were negatively associated with malaria odds (OR = 0.72, OR = 0.67, OR = 0.63, OR = 0.68, OR = 0.70, respectively, all p-values < 0.01). Additionally, the variable "existence of a relative abroad" known to be indicative for a substantive contribution to the household income in Africa had a protective effect on malaria (p = 0.05). In conclusion, the malaria risk was highest in the age group of children between 1 and 5 years, compared to children below the age of 1 year and lower in children from families, which reported the use of mosquito protection measures
Ivan Mboambogoh Yakum, Godfrey Forgha Njimanted	A cross sectional study and indicator survey with a sample size of 400 households. This study found that amongst the respondents' knowledge of malaria prevention methods, 0.75% of the respondents indicated that they did not know how best malaria can be prevented, 25% of the respondents indicated good personal hygiene as the best way of preventing malaria, 18.3% of them indicated that malaria can be prevented by avoiding excessive heat, 0.3% of them said malaria can be prevented while 5% of them indicated that it can be preventing through eating balanced diet. Amongst all the respondents on ways to best prevent malaria, the study found that 56.6% indicated that the best way is to clear bushes around while 28.7% of them indicated creating a good drainage system as the best way to prevent malaria and 17% of them indicated the use of insect sprays to be the best practice to prevent malaria. Among the measures to prevent mosquito bites, 30.5% of the respondents indicated always closing doors and windows, 34.8% of them indicated the use of repellents, 15.8% of them indicated the fitting of nets on doors and windows (house modification) and 92% of them indicated sleeping under ITNs while 26% of them indicated the frequent use of anti-malaria drugs. However, among the measures indicated, measures best known by the respondents are firstly the use of ITNs, secondly clearing of bushes around and thirdly the use of repellents. The finding also involves the fact that many households chose malaria prevention options that is free (34.3%), seconded by those that are cheaper (26.5%), then those that choose because it is the one they know (20.8%), those that choose because it is readily available (19.3%), no particular reason (6.3%) and lastly those that prefer an option because it is effective (1.3%).
Pascalina Chanda, Marianela Castillo-Riquelme	An observational study, which had indicated that about 60% cases and 80% malaria mortality occurs in the Sub Sahara Africa. It found about 4million clinical cases and 8000 deaths occurred annually due to malaria, also it found that more than 23,600 suspected malaria visits were recorded at the 12 out-patient clinics in the four districts. Of these attendances, 6520 (28%) were reported at clinical facilities, 10460 (44%) at microscopy facilities and 6685 (28%) at the RDTs facilities.
M. Dufera, R. Dabsu, G. Tiruneh	A community based cross sectional study with 452 study participants. It indicated that the overall prevalence of malaria was 3.1%, with peak malaria at a percentage of 13.83 in 2013 and the lowest cases at 1.24% in 2017. It showed that overnight outdoor sleeping and improper utilization of mosquito nets were found to be statistically significant as malaria risk factors. The study was undertaken amongst sugar cane workers or laborers due to their seasonal activities and outdoor sleeping behaviors without bed nets, also majority of the 452 participants, (67.9%), were males with a mean age of 26.5 and a standard deviation (SD) of 12. Around 46% of the respondents were daily laborers and about 73% have no formal educational background or were educated up to the primary cycle.
Dr. Felix Ankomah Asante, Prof. Kwadwo Ansenso Okyere	A cross sectional field survey with a total of 600 households, with 200 coming from each of the three districts. It is stated that Sub Saharan Africa accounts for 90% of the world's 300-500 million cases and 1.5-2.7 million deaths annually. It is the number cause of morbidity in Ghana accounting for 40-60% of outpatients. It is estimated that malaria prevalence (notified cases) is 15,344 per 100 000 with a malaria death rate for all ages being 70 per 100 000. In the case of the 0 – 4 years, it is 448 per 100 000 reported for the year 2000.
Gloria Ankomah, Paul Ankomah, Trent Larson	An observational study as well as a community survey which identified majority of the socioeconomic factors of malaria in Sub Saharan Africa such as discouragement of foreign investment due to increased labor cost, treatment consume a large portion of household incomes, for instance in Malawi, malaria treatment takes as much as 32% of annual household incomes of the very poor.
Gabriel Carrasco-Escobar, Kimberly Fornace, Tarik Benmarhnia	A cross sectional study, with a total of 47 404 participants in 1874 primary sampling units that were analyzed across the 13 SSA countries. It stated that most of the world wide malaria cases (93%) and deaths (94%) still occur in the regions of sub Sahara, mainly (99.7%) caused by Plasmodium falciparum. The sample size ranged from 10 to 114 participants. Overall, a weighted prevalence of 36.44% was observed in all the SSA countries, ranging from 16.02% in Madagascar to 55.4% in Sierra Leone.
Abraham Degarege, Kristopher Fennie	A systematic review, meta-analysis and cross-sectional study with a total of 47 404 participants (a subset of 33 187 for the analysis of MHEL) in 1874 (MHEL subset: 1603) PSUs were analyzed across the 13 SSA countries. The sample size in the PSUs ranges from 10 to 114 participants. Overall, a weighted prevalence of 36.44% was observed in all the SSA countries, ranging from 16.02% in Madagascar to 55.4% in Sierra Leone. [6, 13]
Prathiba M. De Silva, John M. Marshall	An observational study and a systematic search with 800 participants, has indicated that the P. falciparum parasite rate has been estimated at 24.1% in the urban center, 38.6% in its peri urban surroundings and 68.7% in neighboring rural areas. Recent migrants from rural areas tend to bring their rural practices with them, creating a multitude of vector breeding sites, and poor quality housing provides less protection against mosquito bites. [7, 14]

### 3. Results

The findings of the study were presented in tables, narrative summaries as well as figures. The 10 used studies and their findings are summarized into different categories for easier identification and are denoted by descriptive labels.

The following tables and figures represent the possible contributing general factors and socioeconomic factors based on the number of studies that a certain factor has appeared in.

**Table 2.** Number of studies per age group of outpatients (n=10).

Age group	Number of studies
Under fives	2
15-20	3
21-26	2
27 plus	3

Sixty percent of the viewed studies studied and concentrated more on the working youth (table 2) and education level, making it a much contributing factor to malaria other others. Others also found that being unemployed contributes to malaria illness too.

**Table 3.** Number of studies focusing on marital status (n=10).

Marital status	Number of studies
Single	1
Living with partner	2
Divorce	0
Living without partner	0
N/A	7

Majority of studies included and concluded that whether being single, married or not, malaria does not discriminate (table 3), hence it can affect anyone, although the socioeconomic factors mostly affected single people.

**Table 4.** Education level on the symptoms and treatment of malaria (n=10).

	Number of studies
Formal education	4
No formal education	6

The lack of formal education on malaria has lead to the increase in malaria cases, the spread and deaths (table 4). Majority of those that lack knowledge on malaria have suffered the consequences.

**Table 5.** Actions taken against malaria (n=10).

	Number of studies
Mosquito treated nets	4
Water Ponds clearance	2
Educational campaigns	4

These actions have been indicated by many studies to be the contributing factors of malaria as they were never done or taken into consideration by community members (table 5).

**Table 6.** Sources of bed nets (n=10).

	Number of studies
Government	6
Own	4

Studies have found that majority of own nets that are used have contributed greatly to the spread and increase of cases of malaria in Sub-Sahara (Table 6).

### 4. Discussions

According to a research on “Cost effectiveness analysis of the available strategies for diagnosing malaria in outpatients”, and another research by Obumneke A. Obieche, it is stated that the treatments and diagnosis procedures of Malaria were too much expensive for the outpatients to undergo, hence the slow progression involved in eliminating the health condition for good. Furthermore, those patients with health care insurance found the treatments very affordable and others without the insurances thought otherwise. Based on certain read article, it is stated that the highest costs of malaria treatment done affected the patients in such a way that many failed to undergo for tests, days were lost for that and lastly, earnings were foregone. It also accounts for 15% of health related absenteeism from school. Malaria’s cost is not entirely due to the fact that the outpatients could not afford it, but it is also due to the fact that they do not necessary consider it to be that much of a problem or of higher concern for them, hence without malaria confirmation, it is difficult to exclude fevers, which are not due to malaria, thus the true burden of the disease proves difficult to quantify, while Obumneke A. Obieche stated that despite the provision of free malaria services, households incur significant direct and indirect costs associated with the disease. Lastly, once the bread winner of the family gets malaria, they might lose their jobs due to too much absenteeism and the family members fail to pay for health care spending for treating the person, lack of money to buy bread occurs. The malaria drains the resources of families and overall, households in Africa lose up to 25% of income to the disease. [8]

The mentioned and searched studies identified different socioeconomic factors of malaria, although there are some studies that found out same or similar factors such as low income level, low and lack of formal education, house qualities and geographical access to health care facilities. There are a number of increasing cases of malaria indicated in the studies which are caused mostly by lack of awareness to malaria, absence of treated mosquito nets, malaria campaign programmers in most affected and at risk communities and also negligence among the people. These studies were all done in similar regions or countries in the Sub-Sahara, which are all the risk of getting malaria and having low or moderate economic rates and other unmentioned characteristics. Malaria cases are tracked in different ways in order to treat, prevent or minimize the spread of its transmission through ways such as house visits of both the suspected and confirmed case by health professionals, outreach points such as health centers or community halls for health education and distribution of mosquito nets and spray days and finally also at the hospital were the victim goes him/ herself for tests.

When it comes to comparing these findings to Namibia, given that they were done in all the Sub-Saharan region of

which Namibia is a part of, we can conclude that these factors are also likely to occur in Namibia since they all share similar weather conditions, economic rates and developing nations. Although this was the case, some socioeconomic factors and study review of cases occurrence and knowledge done in

Namibia are not so similar or common in other countries, but this is not much of a bigger problem as they can be concluded to not being exactly the same, given that each of these countries have their own different climate conditions, healthcare systems and settings and also their profiles differs.

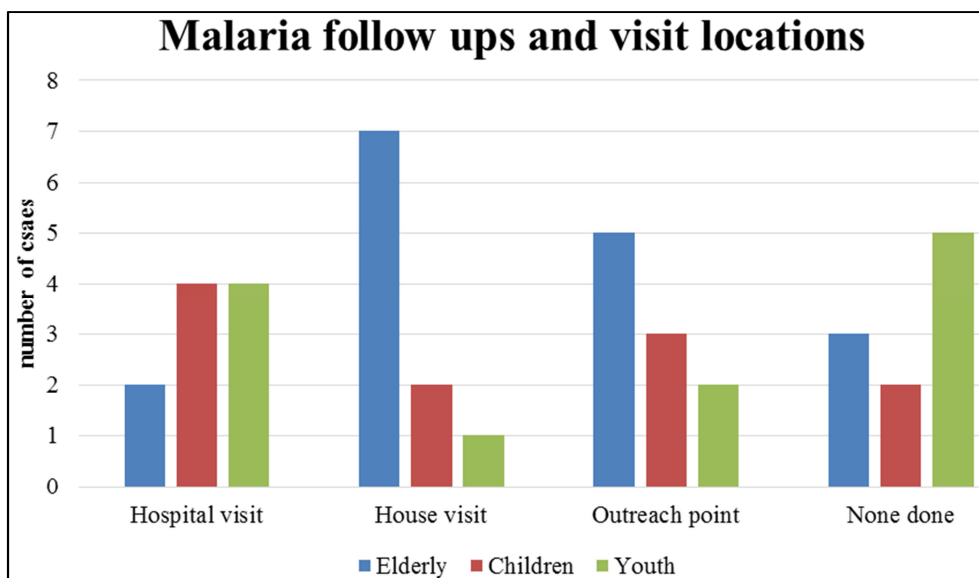


Figure 1. Malaria follows up visits.

Studies have shown that malaria cases or visits among the youth that have not been done are mostly the ones affected by malaria, but it does not mean that other age groups are safe. They too are at risk of getting malaria if no visits have been done at either health points.

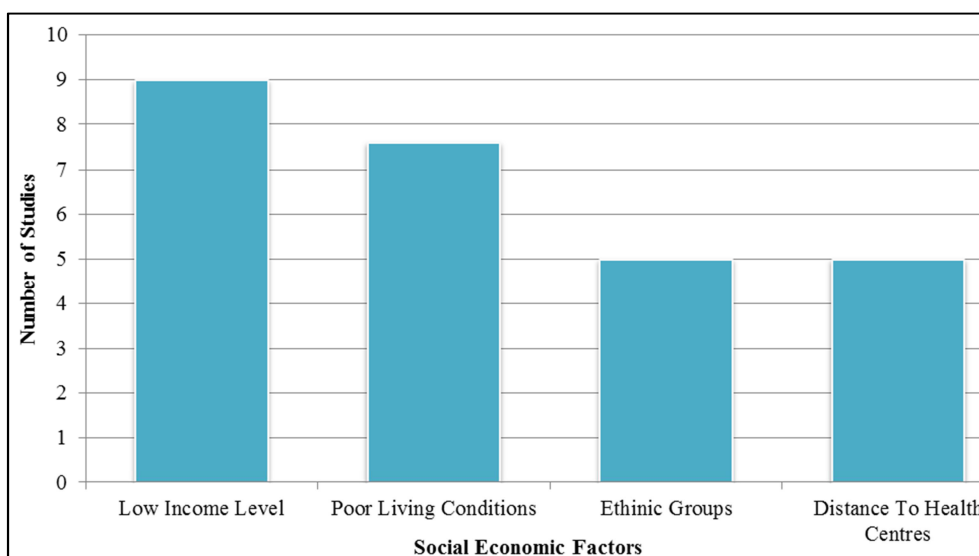


Figure 2. Socioeconomic factors of Malaria.

Studies have indicated and found that the above socioeconomic factors, although not all were mentioned, are the major causes of malaria in especially people living average lives and those that are considered to be poor.

## 5. Conclusion

In conclusion, research on socioeconomic factors of

malaria has increased although not only in sub Saharan regions but also in other parts of the world those have the mosquito Plasmodium that causes malaria, even though not all countries have really placed much effort in preventing or overcoming malaria. The focus of malaria should be more on the less advantaged groups such as those with low income levels or those that do not earn a thing, pregnant mothers and their unborn babies as they tend to be more at risk, also on

communities with the highest occurrence of malaria cases due to the presence of mosquitoes, the youth as well since they are more at risk due to their negligence and lack of participation in malaria control programs and also on other factors that were less considered in the reviewed studies. The governments of these countries need to be more effort and much money on carrying out prevention measures of malaria such as the provision of insecticides treated mosquito nets, giving out health education on how the communities can protect themselves from malaria, asking for loans for their malaria programs in case they do not have enough money to carry them out on their own. The researcher has concluded that there are many factors causing malaria, not only the socioeconomic ones but also the general ones. These factors include low income distributions, lack of formal education, low quality houses, negligence, cultural factors as well as the age. [10, 12, 14]

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