

Epidemiological Assessment on Intensity of Malaria Among Under Five Malaria Positive Children in Mayo-Belwa L.G.A of Adamawa State, Nigeria

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Abstract: Malaria is a major cause of illness and death especially among children under 5years. This survey is aim at undertaking a review of malaria intensity among under five malaria positive children in the study area. A retrospective comparative study design was employed using data from Local Health Services from 2012-2016 for under five malaria in Mayo belwa LGA, Adamawa state. 2012 showed moderate malaria to be highest in the month of August (15%) while, severe malaria in September (15.8%). In 2013, moderate malaria was highest in the month of August (19.4%) and severe malaria in the month of September (18.7%). Similarly 2014, showed moderate malaria to be highest in the month of September (20.0%) while severe malaria in October (20.4%). 2015, showed October (19.3%) had the highest severity and moderate malaria. In 2016, August (13.8%) had the highest moderate malaria. The highest intensity was observed in 2012 for both moderate and severe malaria and it drops at 2016 respectively. The review showed that both moderate and severe malaria was seen in male and female respectively. Chi-square statistical analysis showed a significant difference in the intensity of malaria infection in relation to months in a year, but the intensity across the different years in relation to gender is insignificant ($p>0.05$). More effort need to put in place to reduce the rate of malaria infection among under five years children.

Keywords: Malaria, Intensity, Under-five, Transmission, Infection

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I. Introduction

Malaria is a major cause of illness and death in children. It is estimated that more than one million children living in Africa die yearly from direct and indirect effects of malaria infection [1]. This preventable disease has reached epidemic proportions in many regions of the world and continues to spread unchecked [2]. African children under five years and pregnant women are most at risk of malaria. Fatally afflicted children often die less than 72 hours after developing symptoms. In those children who survive, malaria drains vital nutrients from them impairing their physical and intellectual development [2].

In Nigeria, malaria is holoendemic in the rural areas and mesoendemic in the urban areas. In the southern part of the country the transmission rate is approximately uniform throughout the year. In the far North there is a marked difference between the high transmission rate in the short wet season and low transmission rate in the long dry season [3]. Valid quantitative estimates of malaria mortality are useful for monitoring the impact of prevention and control activities, targeting interventions, and advocacy. Unfortunately, vital registration systems in most countries in sub-Saharan Africa have low coverage and do not producedependable estimates.1–3 To fill this gap, a variety of estimates have been made, but most are simplistic or lacked documentation of the methods and data.[2,4–7]. WHO in 2011 recommended prompt parasitological confirmation by microscopy or Rapid Diagnostic Test (RDT) for all patients with suspected malaria before treatment begins. Artemisinin-based combination therapy (ACT) is the standard treatment of uncomplicated malaria. Prevention programs focus on the distribution and use of bed nets, called Long Lasting Insecticidal Nets (LLINS), including evidence-based health communication programs on the mode of malaria transmission and the importance of sleeping under ITNs [3]. This survey is aim at undertaking a review of malaria intensity among under five malaria positive children in the study area.

II. Materials And Methods

1.2.3 Study settings

This record review comparative study was conducted in Mayo-belwa Local Government Area (LGA) of Adamawa state. The Primary Health Care Development Agency (PHCA) in the Mayo belwa LGA was used which is where all the other health centers submit their monthly report on malaria. The health centres are usually staffed by middle level health professionals, including laboratory technicians and technologists, thus cases with fever are often tested for malaria. The health posts are staffed by health extension workers; and they could perform rapid diagnostic tests for malaria suspected cases and treat uncomplicated malaria cases.

1.2.4 Study design

A retrospective comparative study design was employed using data from local health services (Health Centres and health posts). This was done by reviewing malaria morbidity records of local health facilities pertaining to villages which are all submitted to the PHCDA located in the local Government secretariat.

1.2.5 Source of data and sample size

In Nigeria, malaria cases are treated both clinically and as confirmed malaria accordance to national guideline [6,26] depending on the degree of diagnostic capabilities at different levels of the healthcare system. Both the presumptive and confirmed cases are registered on preformatted registration books (log books) at health care levels and reported both weekly as well as monthly to next higher level of health management system. The present study included all malaria records of the local primary healthcare units that were within Mayo belwa LGA environ and control villages registered by the primary health care units between January 2012 and December 2016 were reviewed. In Mayo belwa there were eleven health posts and three health centres from where records of malaria cases visited the health services were submitted to the PHCDA in the LGA. The timeline consideration was based on data availability in the health records in the PHCDA in the Local Government Area.

1.2.6 Data collection techniques

A format was prepared on a computer spreadsheet (Excel) to collect the secondary data from log books of local government primary health care units of the LGA. Individual level data on malaria morbidity; such as, diagnosis results (positives cases only); dates of diagnoses; available demographic data (age, sex) were registered on the computer spreadsheet. All records of patients who visited the health institutions during the timeframe considered and treated as malaria patients were included in the study. Records of cases with incomplete records, such as dates of health service visit, age, address, results of diagnosis, were excluded from the analysis.

1.2.7 Data management and processing

The data on malaria case records of different local healthcare institutions of the study sites were transferred to Excel spreadsheet, checked for completeness (date of diagnosis, test results, patient age and address), coded and combined on the same spreadsheet; then, prepared data of malaria cases were exported to SPSS statistical software version 20 for Windows. Subsequent analyses were performed using the SPSS statistical software. Results were summarized using tables and figures were used to estimate the level of difference.

1.3 Ethical considerations

Ethical clearances were obtained from Adamawa State ministry of health and District Health offices as well as local administrators were communicated by formal letters written from Zoology Department ModibboAdama University of Technology. Individual information was kept confidential and the names of individuals were removed from data of health services and identified only by identification numbers and the results were communicated in an aggregated manner.

14. Statistical Analysis

The epidemiological data obtained were analyzed using Chi-Square (χ^2) statistical analysis. $P < 0.05$ was regarded as an acceptable level of significance while $p > 0.05$ is insignificant and results obtained were represented in graphs and charts.

III. Results

A retrospective studies on the prevalence of malaria from 2012 to 2016 in Mayo Belwa Local Government Area of Adamawa State was carried out. The records of 2012 showed that moderate malaria was highest in the month of August (15%), followed by October (12.2%), June (11.6%), September (11.2%) and February (3.8%) had the lowest intensity. However severe malaria was different in which September (15.8%) had the highest intensity followed by October (15.4%), August (13.3%) and April (4.0%) had the lowest intensity (Figure 1). Also 2013 showed that moderate malaria was highest in the month of August (19.4%), followed by September (19.0%), July (10.7%), and March (3.3%) had the lowest intensity. In the case of severe malaria was different in which September (18.7%) had the highest intensity followed by August (17.9%) and January (3.3%) had the lowest intensity (Figure 2).

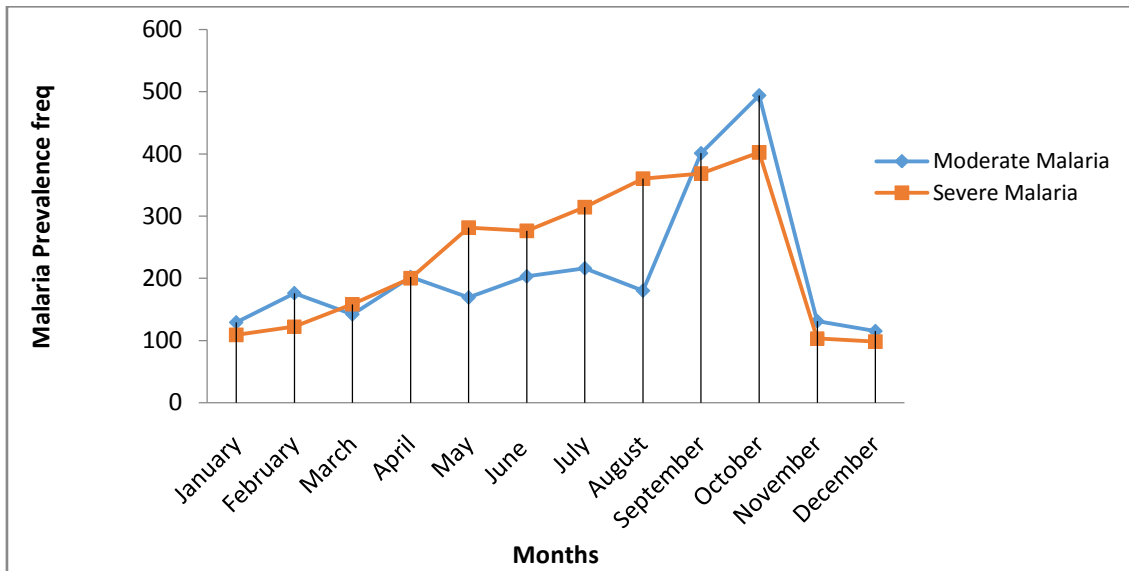


Figure 1: The figure above shows the intensity of malaria among under five Children at the year 2012 in the study area

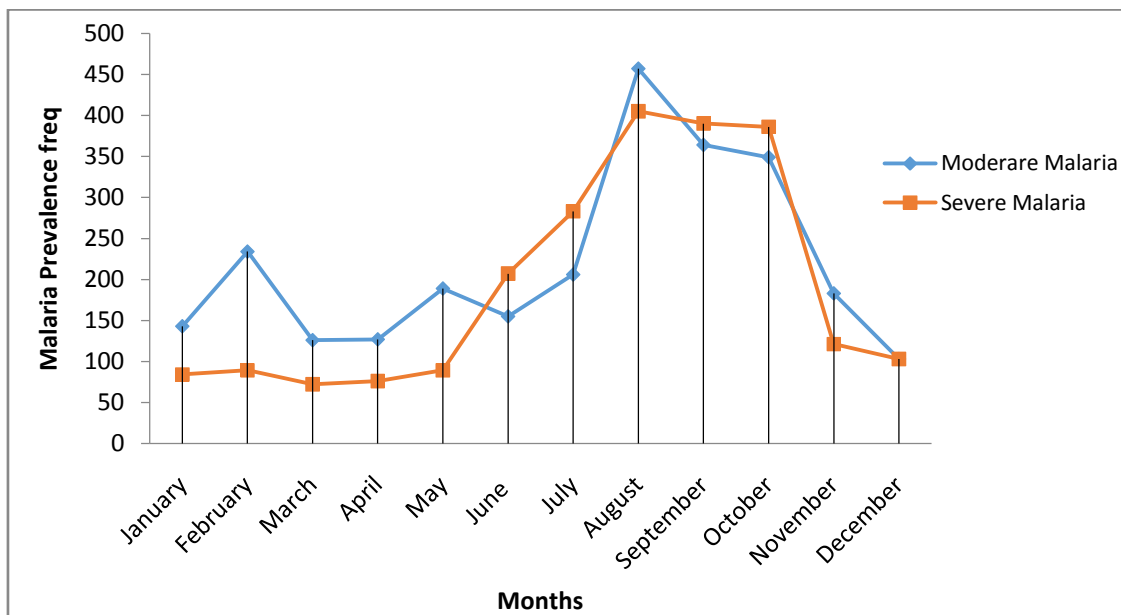


Figure 2: The figure above shows the intensity of malaria among under five Children at the year 2013 in the study area

In the 2014, showed that moderate malaria was highest in the month of September (20.0%), followed by August (17.4%), October (13.0%), July (9.7%), and November (4.0%) had the lowest intensity. However severe malaria was highest in October (20.4%), and April (3.3%) had the lowest intensity (Figure 3). In year 2015 October (19.3%) had the highest severity and December had the lowest (4.5%), while the intensity is

severe in the month of October (14.0%) followed by September (13.2%) and December (3.5 %,) had the lest severity (fig. 4).

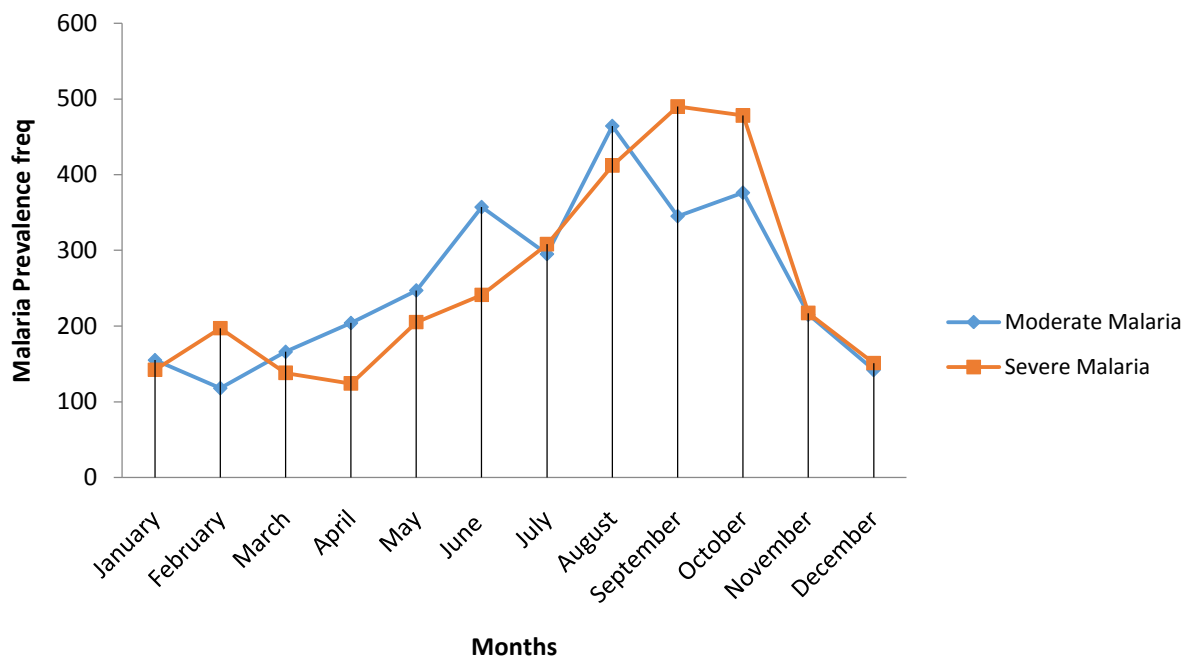


Figure 3: The figure above shows the intensity of malaria among under five Children at the year 2014 in the studyarea

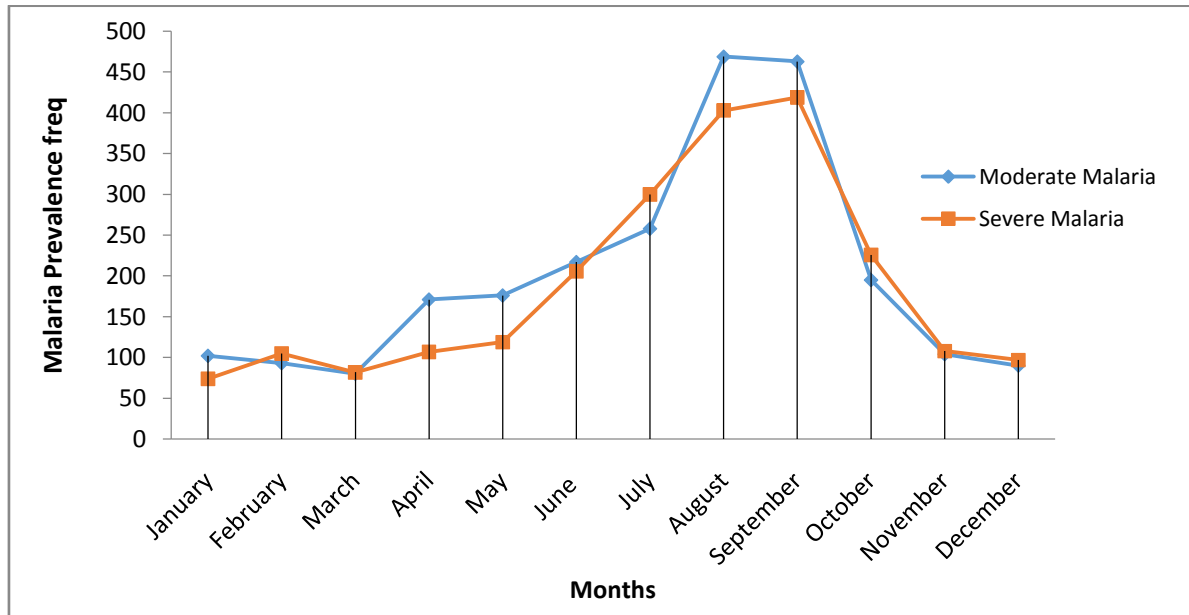


Figure 4: The figure above shows the intensity of malaria among under five Children at the year 2015 in the study area

Figure 5 depict the trends in the year 2016 where August (13.8%) had the highest in case of moderate malaria, followed by September (11.2%) and December (3.9 %,) had the lowest. However severe malaria was in the same month as moderate malaria August (13.8%) had the highest in case of moderate malaria, followed by September (11.2%) and March (3.0 %,) had the lowest severity of malaria.

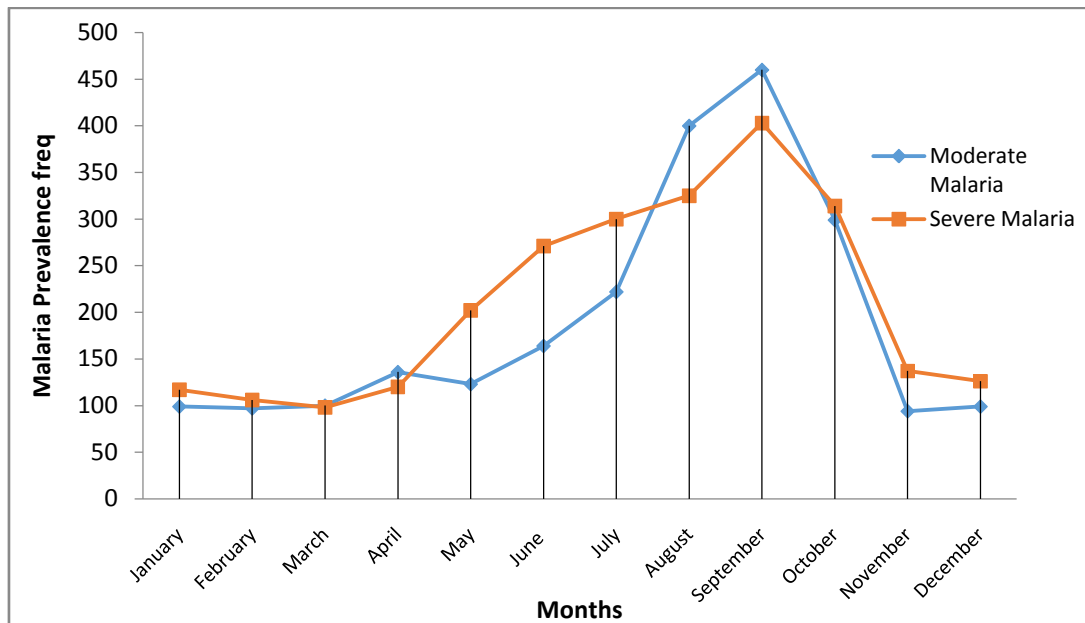


Figure 5: The figure above shows the intensity of malaria among under five Children at the year 2016 in the study area

Also from 2012 – 2016, the months of September, October and August had the highest prevalence of moderate malaria infection (9.5 %) followed by July and June (8.8 %) December (8.5 %), January 7.8 %, February 7.5 % May 7.4 %, March 7.3 % and April 6.5 % (Figure 6). There was 52.3 % and 47.7 % severe malaria during rainy season (January, February, March) and 42.3 % and 58.7 % severe malaria during the dry season.

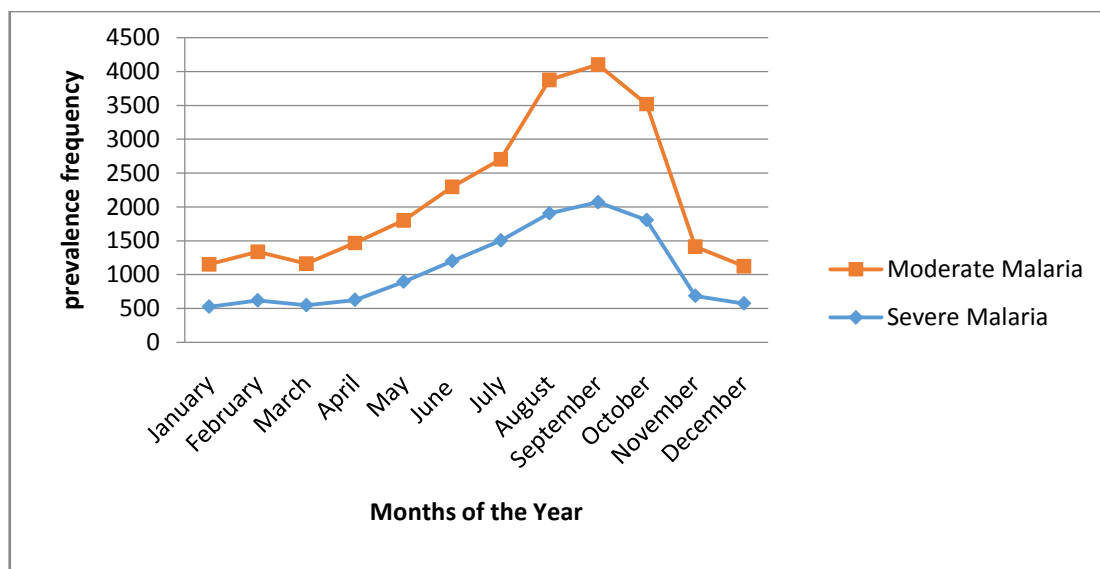


Figure 6: The figure above shows the trends of malaria intensity among under five Children in all the months of the years (2012-2016).

Combined years of the trends of monthly prevalence of malaria intensity in the year under review showed that there was high rate of the intensity in 2012 for both moderate and severe malaria cases and it drops at 2016 for both moderate and severe malaria cases. The lowest prevalence (6.5 %) was recorded in the year 2013 (Figure 7).

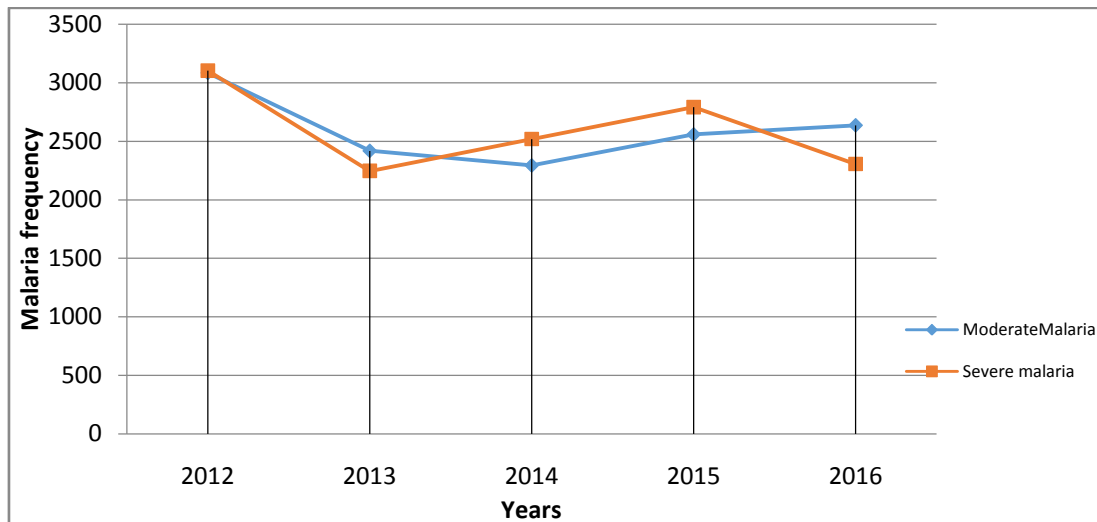


Figure 7: The figure above shows the trends of malaria intensity among under five Children from 2012-2016.

Combined sex monthly prevalence of the intensity of under 5 malaria infection in the year under review showed that moderate malaria of male and female in 2012 was 56.4% 54.10 % respectively and severe malaria in male (43.46%) and female (45.90%). Statistical analysis shows that the difference is significant at $p < 0.05$ (Figure 8). Likewise 2013 showed that moderate malaria of male and female 45.40%, 53.34 % respectively and severe malaria in male (54.6%) and female (46.60%). Statistical analysis shows that the difference is significant at $p < 0.05$

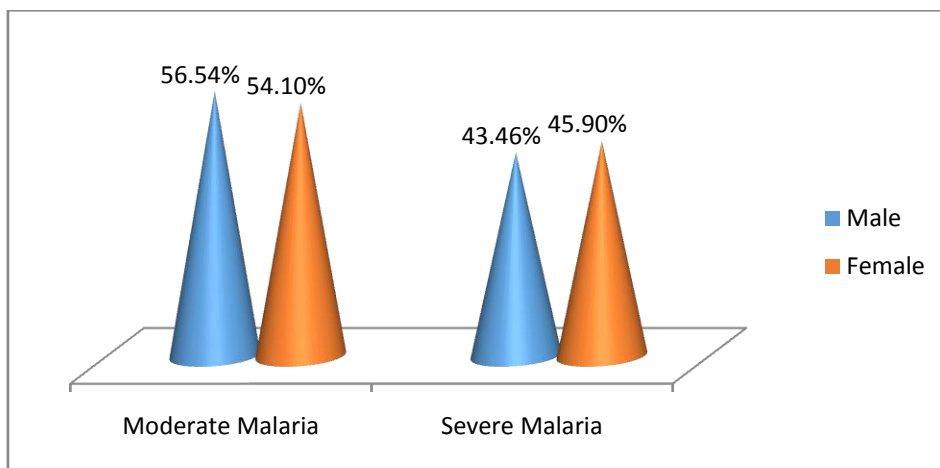


Figure 8: The figure above shows the intensity of malaria among under five Children base on gender in the year 2012

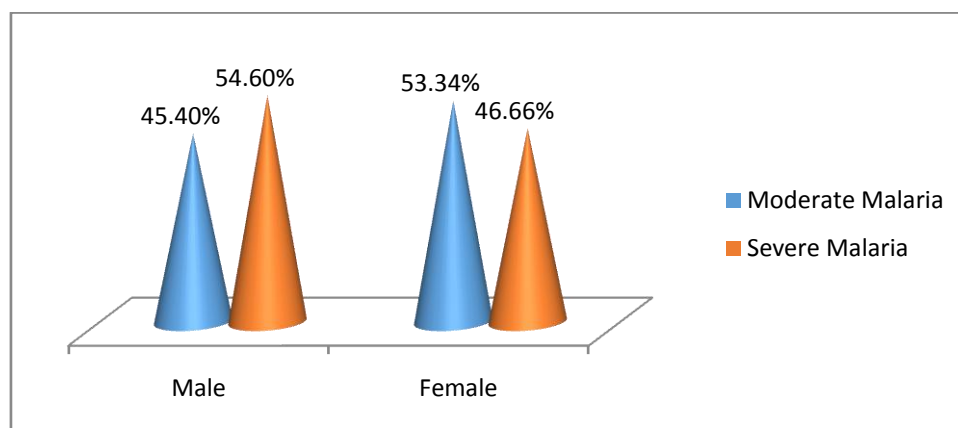


Figure 9: The figure above shows the intensity of malaria among under five Children base on gender in the year 2013

The intensity of under 5 malaria infection in the year under review showed that moderate malaria of male and female in 2014 was 49.07% 54.86 % respectively and severe malaria in male (50.93%) and female (45.14%). Statistical analysis shows that the difference was no significant differences between male and female (Figure 10). However 2015 showed that moderate malaria of male and female 47.20%, 52.8 % respectively and severe malaria in male (49.55%) and female (50.45%) (fig. 11).

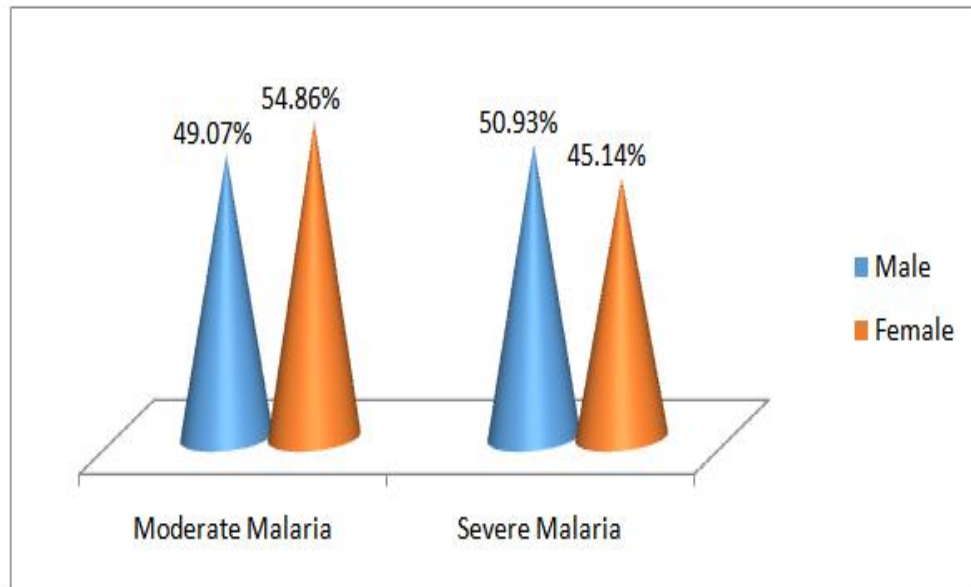


Figure 10: The figure above shows the intensity of malaria among under five Children base on gender in the year 2014

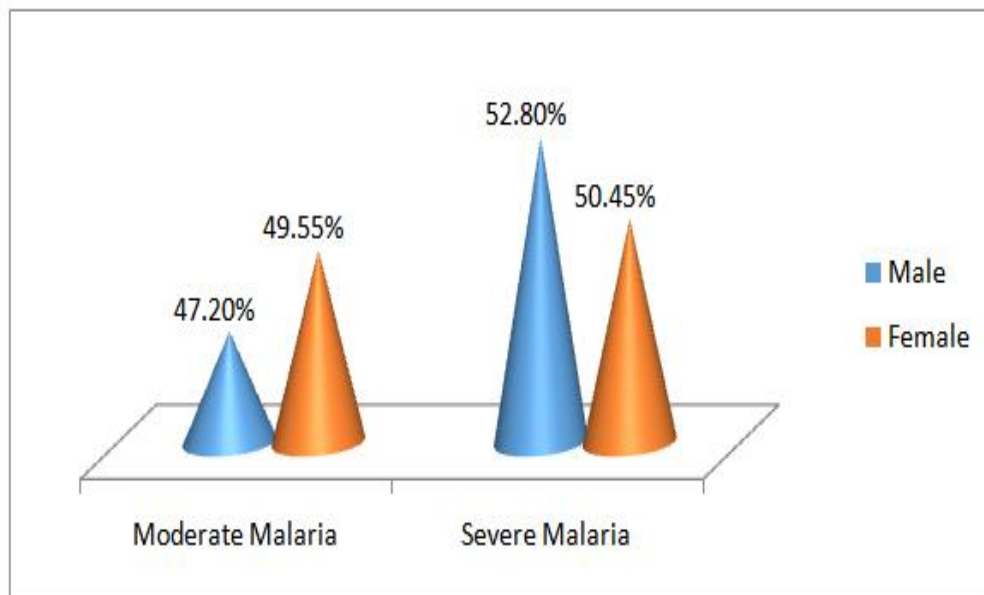


Figure 11: The figure above shows the intensity of malaria among under five Children base on gender in the year 2015

However in the year 2016 the trend showed that moderate malaria of male and female 58.24%, 43.79 % respectively and severe malaria in male (41.76%) and female (56.21%). Statistical analysis shows that the difference was no significant differences between male and female $p>0.05$ (fig. 12).

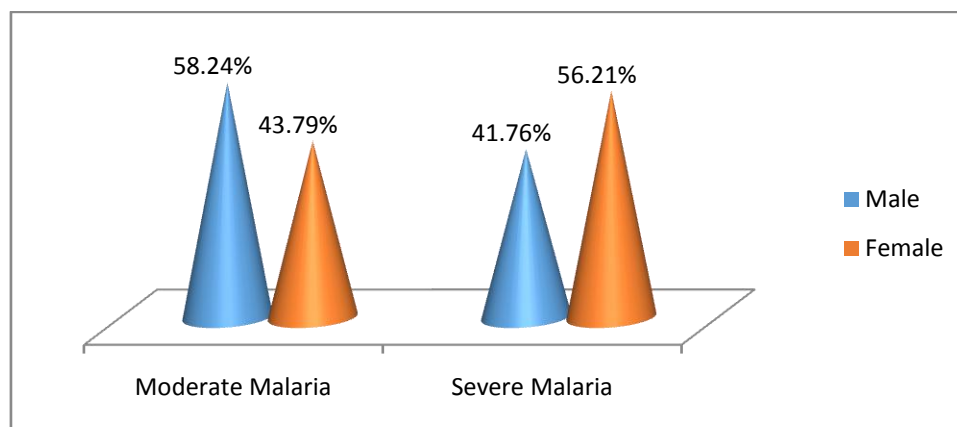


Figure 7: The figure above shows the intensity of malaria among under five Children base on gender in the year 2016

IV. Discussion

Findings of the assessment of epidemiological trends of malaria in Mayo belwa have shown a general decrease in both morbidity and mortality of malaria from 2012 to 2016. There was progressive decrease in the trends of malaria intensity among under children from and this may be directly related to upward movement of years under review. This was in line with the study of okeke et al. (2015) [8]. on study that examined the trends of malaria infection among children in the paediatric unit of some tertiary and secondary health outlet in Anambra State, Nigeria over a six year period. Also, Ralph and Akyea who reported a similar trend in a five year review of in-patient cases of malaria at the Children's Ward of Volta River Authority (VRA) Hospital, Akosombo, Ghana [9]. This may be attributed to the malaria advocacy and education embarked upon by Adamawa State Government in line with the Federal Government policy to ensure effective control of malaria especially among the vulnerable groups (children under five years and pregnant women). Also this showed that there was significant improvement in the referral practices by the health workers at different levels of health care in the state [2].

The monthly prevalence of malaria infection over the years in focus showed that the months of January to December through July, August, September and October are suitable for malaria transmission in Mayo belwa LGA, this was contrast to the study by Okeke et al in Anambra State.[8] [10] [11]. who reported the presence of malaria infection in both wet and dry season. This is influenced by the availability of conditions suitable for malaria parasite transmission in July, August, September and October. The conditions that are suitable for both the development of *Plasmodium* and mosquitoes were defined as the coincidence of precipitation accumulation greater than 80 mm, mean temperature between 18⁰ C and 32⁰ C and relative humidity greater than 60%. [8]

However, malaria among under 5 children shows that both male and female trends of intensity is almost the same these is no significant difference between sexes through all the years under review, this is in line with several studies [12] [13]. Steketee, (2001) reported that in areas of stable malaria transmission, very young children are the population group at highest risk for malaria morbidity and mortality, and that most children experience their first malaria attack during their first or two months of life, when they have not yet acquired adequate immunity[14].

V. Conclusion

Malaria is an ancient scourge of humanity. Although almost eradicated from industrialized nations, malaria continues to extract a heavy toll of life and health in a substantial part of the world. Almost half the world's population lives in countries where the disease is endemic, and almost every country in the world encounters imported malaria. Children are the worst affected, especially children aged 6 months to 5 years. However was a significant reduction in the burden of malaria in Mayo belwaLGA from 2012 to 2016. During this period. However, malaria remains a major cause of morbidity and mortality in Adamawa state especially in Mayo Belwa LGA though the peak of infection was observed in the months of July, August, September and October. Therefore, more effort of malaria intervention should be put in place in these months.

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