

THE PREVALENCE OF AND FACTORS CONTRIBUTING TO COMPLICATED MALARIA IN CHILDREN UNDER 5 YEARS.

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ABSTRACT

The main objective for this study was to determine the prevalence of complicated malaria in children under five years and assess the common complications and risk factors contributing to complicated malaria.

Method: It was a retrospective cross sectional study as data was obtained from inpatient files between August 2011 to December 2011 (age, sex, complications, preventive measures, discharge status). After data collection, statistical analysis was performed using the SPSS (Version 21.0) statistical package. Descriptive and analytical statistical tests were applied. Results were then expressed as minimum, maximum, mean \pm standard deviation (SD) and median with lower and upper quartiles.

Results: In this study, there was a high prevalence rate (13%) of complicated malaria in children under 5 years whilst most male children got complicated malaria as compared to female. It was also noted that the three most common complications of malaria were convulsions (69%), hyperparasitemia (67%) and hypoglycaemia (59%) in children under 5 years. Complicated malaria has high mortality rate with 28 (14%) deaths of the total 200 cases while most deaths were noted in male children despite the high frequency of preventive measures used.

Conclusion: Complicated malaria commonly affected children of age group two to three years while male children from low socioeconomic were most affected in this study.

Recommendations: Reduced prevalence and improved outcomes can be achieved by giving special attention to specific age groups, early management, preventive measures and more health workers to reduce complicated malaria.

Key words: Malaria, Prevalence, Children.

1.1 INTRODUCTION

Malaria is a major contributor to child mortality in sub Saharan Africa (Rowe *et al.*, 2006). Over 40% of the world's children live in malaria-endemic countries. Most of the 1-3 billion die due to Malaria has been a major public health concern worldwide especially in the tropics and subtropics. The disease has been eliminated in many Western countries but has resurged in many parts of the tropics due to:

- Resistance to chemotherapy
- Resistance of vector to insecticides
- Ecologic and climatic changes
- Population migration

In Uganda, the groups in the population most vulnerable to malaria are:

- Children aged 6 months to 5 years
- Pregnant women, especially during the 1st & 2nd pregnancies
- Travellers' from non-endemic areas
- People living with HIV/AIDS
- Sickle cell disease patients (Kilian *et al.*, 1999)

In Uganda the burden of malaria accounts for 9-14% of in-patient deaths and of these deaths 20-23% is among admitted children below the age of 5 yrs. These percentages have increased even with improved anti-malarial use and remain a serious illness requiring hospitalization. Malaria contributes to poor academic performance due to neurological and cognitive sequelae in some children who recover from cerebral malaria and this may affect their learning abilities (Kilian *et al.*, 1999).

Moreover sick children don't attend classes and teachers who are sick don't teach thus level of education reduces. Malaria is a major contributor to poverty because it causes loss of days of gainful work for the patient and

the caretakers, furthermore about 10% or more of family income goes to the management of a single patient in the family. Malaria remains high in people at risk due to reduced immunity and some of the following factors.

- Mixed infections or other illnesses
- Inaccessibility to health facilities and insufficient treatment
- Malnutrition (Lindblade *et al.*, 1999)

The research intends to verify and evaluate how these factors contributing the lack of effective measures can be modified and provide interventions that would possibly give lasting solutions.

Despite the government's efforts to provide health education and treated mosquito nets during seminars, workshops and outreaches on Malaria the prevalence in children is still increasing and yet these children are an integral part of the future development socially and economically. The study will provide interventions to supplement the current efforts being used to fight Malaria both at community and hospital in order to reduce the high prevalence of malaria in children under the age of 5 years. The study will provide baseline information that can be used by other researchers.

With this in mind, the main objective of this study was to assess the prevalence of and factors contributing to complicated malaria in children under 5 years in Kampala International University Teaching Hospital (KIUTH), and determine the most common complication of malaria in children under five years attending KIUTH.

MATERIALS AND METHODS

This was a cross sectional retrospective study in Busheyi District, Western Uganda. Patient's files in the wards were used to collect data in terms of age, geographical location and prevalence of complicated malaria. Samples of patient's files taken in the two departments between August and December 2013 were used as study specimens. A sample size of 200 respondents was determined using Fisher's *et al* (1990) formula whilst files with incomplete data and children above 5 years were not included in this study.

A data form was used to enter raw information from the file's records this form contain the patients age, address, complications of malaria, weight of the child, laboratory diagnosis, mortality rate and the prognosis of complicated malaria. Data was then analyzed and computed using SPSS version 21, and a *p* value of 0.05% was regarded as significant and correlation between the data was determined using Pearson's correlation.

RESULTS

(1) Age distribution of the respondents

Most (26%) of the respondents were within the age range of 3 years while the least (13%) were within the age range of 5 years (Figure 1)

(2) Gender distribution of the respondents

Most 114 (57%) of the cases were males while only 86(43) were females (Figure 2)

(3)Frequency distribution of the type of malaria

The majority of the subjects presented with complicated malaria in this study (Figure 3)

(4) Frequency of complicated malaria

The highest frequency of complicated malaria was reported in children around the age of three years at 26%, whilst the lowest was at 13% in children aged 5 years of age (Figure 4)

(5) Symptoms of complicated malaria

In this study, Convulsions was the most common complication of malaria at an incidence rate of 69%, whilst shock was the least common at an incidence rate of 27% (Figure 2).

(6) Cross tabulation between gender and immediate outcome

With regard to mortality rates, 11% of the males were diseased as compared to 6% of the females who died after complicated malaria (Figure 6).

DISCUSSION

In the current study, 20% of the cases were under one year of age, 22% were between one and two years, 26%. This indicates that the majority of children between 1 and 2 years got complicated malaria during the study period, this finding may agree favorably with a previous report which stated that most children under one year rarely get complicated malaria as compared to those above one year (Gilles, 1991).

With respect to gender, most male children (57%) got complicated malaria as compared to female children this may be supported by one of the authors (Warrell *et al.*, 1990) who quoted that males had higher risks of fever, including from infections transmitted by mosquitoes, ticks or other such "vectors," such as malaria, dengue and rickettsia while women were more likely than men to come down with bouts of diarrhea or other gastrointestinal problems.

From the data analysis it was observed that most of the cases 15% within the age range of three years had hyperparasitemia, convulsions, and severe anaemia as the most common complications of malaria. In Ghana (Warrell *et al.*, 1990) most children under one year develop shock and convulsions due to complicated malaria while those above one year develop severe anaemia and jaundice as the common complication of malaria. Similarly in Ethiopia (Kassahun, 2002) reported that the most common complications in children under five years were coma, hypoglycemia and severe anemia. This report may not be conclusive given that the exact type of malaria was not given and also the difference in environmental status may bring about different types of complications.

All patients involved in the study had a degree of moderate wasting, this was evident on the anthropometric evaluation of the expected weight for age that ranged from 70% to 78%. These findings were significant at a *P* value of 0.024.

Convulsions were the most common complication at 69%, while hypoglycemia was the least common by 27%. This result does not agree with World Health Organization (WHO, 2008) report that states that hypoglycaemia, is a prerequisite for convulsions and the two complications are the most common complications of malaria. These overlapping features do occur but on the other hand most children brought in for treatment of complicated malaria are always given intravenous dextrose and mothers are even encouraged to give high energy food. This may account for the contrast in hypoglycaemia both on admission and on the ward.

The mortality rate of complicated malaria was high in this study. It accounted for 28 deaths at 14% of the study case. With a previous literature, (Müller *et al.*, 2009) which stated that of 1000 cases of malaria in equatorial region, 152 (15%) ended into death. Therefore more attention is needed to reduce this high mortality rate.

The incidence of complicated malaria was more severe in males than female cases, and the mortality rate is high in males than females this was concluded after the study showed that most males died (22) 11% as compared to females 12 (6%) after an attack of complicated malaria. this was in tandem with a previous stud (Chuma *et al.*, 2009), that reported similar findings.

From the study findings, it was noted that there was a significant correlation between the cases which had convulsions, shock and hyperparasitemia majority 78(39%) of respondents who had shock and hyperparasitemia also progressed convulsions. Rabbo, in his journal stated that to prevent convulsions in malaria, hyperparasitemia and high fever needs to be controlled immediately (Abdo-Rabbo, 2000)

CONCLUSIONS

After in-depth discussion of the analyzed data, the following conclusions were made

- Most of the cases were underweight after correlating the expected and the actual weight of the patients. This indicates that complicated malaria mainly occurs in children with some form of malnutrition.
- Convulsions were the most common sign of complicated malaria presenting in 69% of children with completed malaria. Hypoglycemia was the least common (27%) although it's still controversial given that some researchers noted it as one of the most common.
- Complicated malaria has high mortality rate at 28 (14%) deaths of the total 200 cases. the disease should be given high priority in management especially in children.
- On mortality rate, it was noted that most males (22) 11% were diseased as compared to females; this was supported by some researches who also found out that males were more

RECOMMENDATIONS

Local authorities should provide insecticide treated mosquito nets to all pregnant mothers to help in the control of the spread of malaria; it would be effective to put these nets in the antenatal clinics so that they pick them as they go for ANC. Male children are more susceptible to complicated malaria therefore they need special attention in terms of early management and control of the disease.

Febrile convulsions being the most common cause of death in children should be handled with a maximum priority in bid of saving lives and ensuring healthy growth of children, in addition, the health workers should be educated about febrile convulsions to enhance their response in case such incidences arise.

REFERENCES

1. Chuma, J., Abuya, T., Memusi, D., Juma, E., Akhwale, W., Ntwiga, J., Nyandigisi, A., Tetteh, G., Shretta, R., and Amin, A. (2009). Reviewing the literature on access to prompt and effective malaria treatment in Kenya: implications for meeting the Abuja targets. *Malar J*, 8(1), 243.
2. Hill, A. H. (1939). Fetal age assessment by centers of ossification. *Am J Phys Anthropol*, 24(3), 251-272.

3. Kassahun, M. (2002). Pattern of severe and complicated malaria in children admitted to Gondar Medical College Hospital during 1995-2000. *Ethiopian Journal of Health Development*, 16(1), 53-59.
4. Kilian, A., Langi, P., Talisuna, A., and Kabagambe, G. (1999). Rainfall pattern. El Niño and malaria in Uganda. Lindblade, K. A., Walker, E. D., Onapa, A. W., Katungu, J., and Wilson, M. L. (1999). Highland malaria in Uganda: prospective analysis of an epidemic associated with El Niño.
5. Müller, O., Yé, M., Louis, V. R., and Sié, A. (2009). Malaria in sub-Saharan Africa. *Lancet*, 373(9658), 122-122.
6. Rowe, A. K., Rowe, S. Y., Snow, R. W., Korenromp, E. L., Schellenberg, J. R. A., Sachs, J. D. (2002). A new global effort to control malaria. *Science*, 298(5591), 122-124.
7. Warrell, D. A., Molyneux, M., and Beales, P. (1990). Severe and complicated malaria. World Health Organization Division of Control of Tropical Diseases.
8. White, N., Dondorp, A., Faiz, A., Mishra, S., and Hien, T. (2012). New global estimates of malaria deaths. *The Lancet*, 380(9841), 559-560.
9. WHO. (2008). *World malaria report 2008*: World Health Organization.