Cases of Severe Malaria and Cerebral Malaria in Apam Catholic Hospital and Manhiya District Hospital

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QUESTION

What pediatric age group does malaria affect the most?

A) 0-2
B) 3-6
C) 7-10
D) 11-14
E) 15-18

BACKGROUND

- Malaria is an illness with a heavy global impact, killing an estimated 2.7 million people annually worldwide.

- Despite years of research on malaria, there is much to be learned about the human immune response to *Plasmodium falciparum* and *Plasmodium vivax*.

BACKGROUND (cont.)

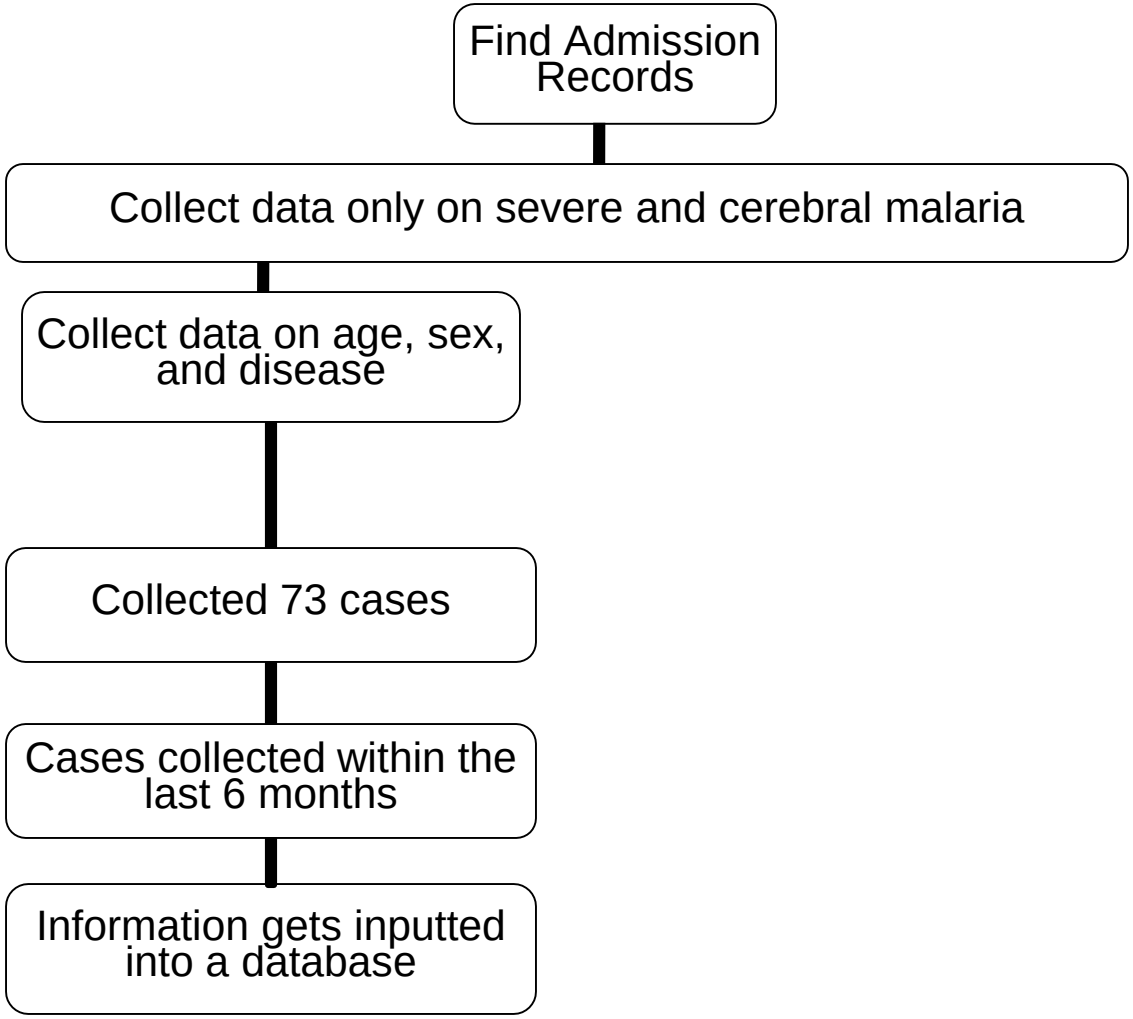
- Malaria is still one of the leading causes of death in Ghana

- In Ghana, over 40% of outpatient cases and over 60% of hospital admissions are due to malaria

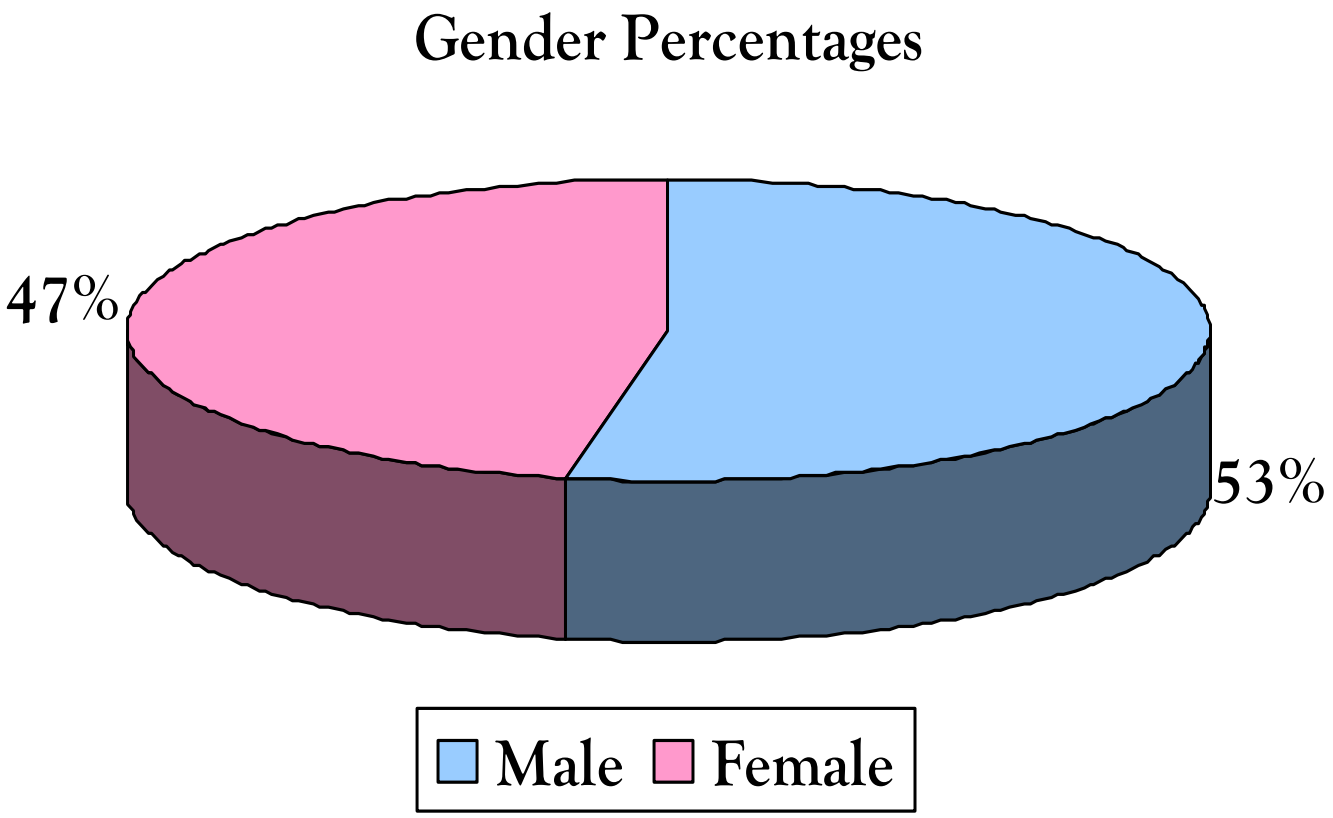
METHODS

- Data was collected from pediatric medical records at Apam Catholic hospital and Manhiya District Hospital from November 2007 through April 2008
- Only cases of severe and cerebral malaria were recorded
- The age, sex, and disease (severe malaria or cerebral malaria) were also recorded for those months

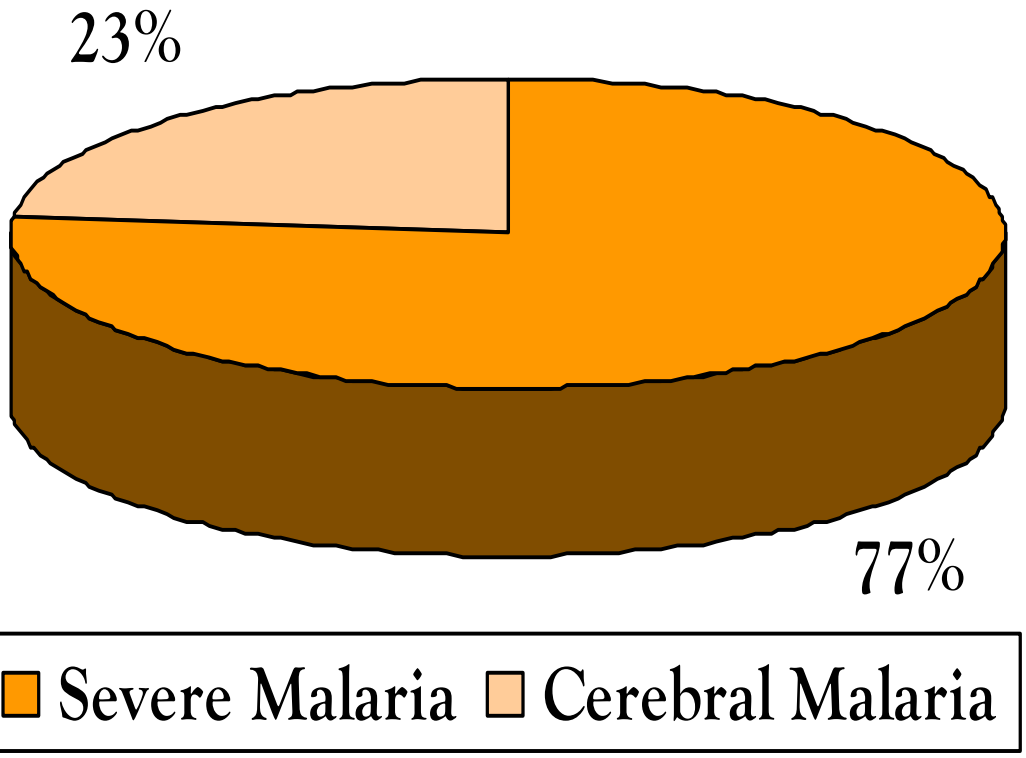
METHODS: Study Design

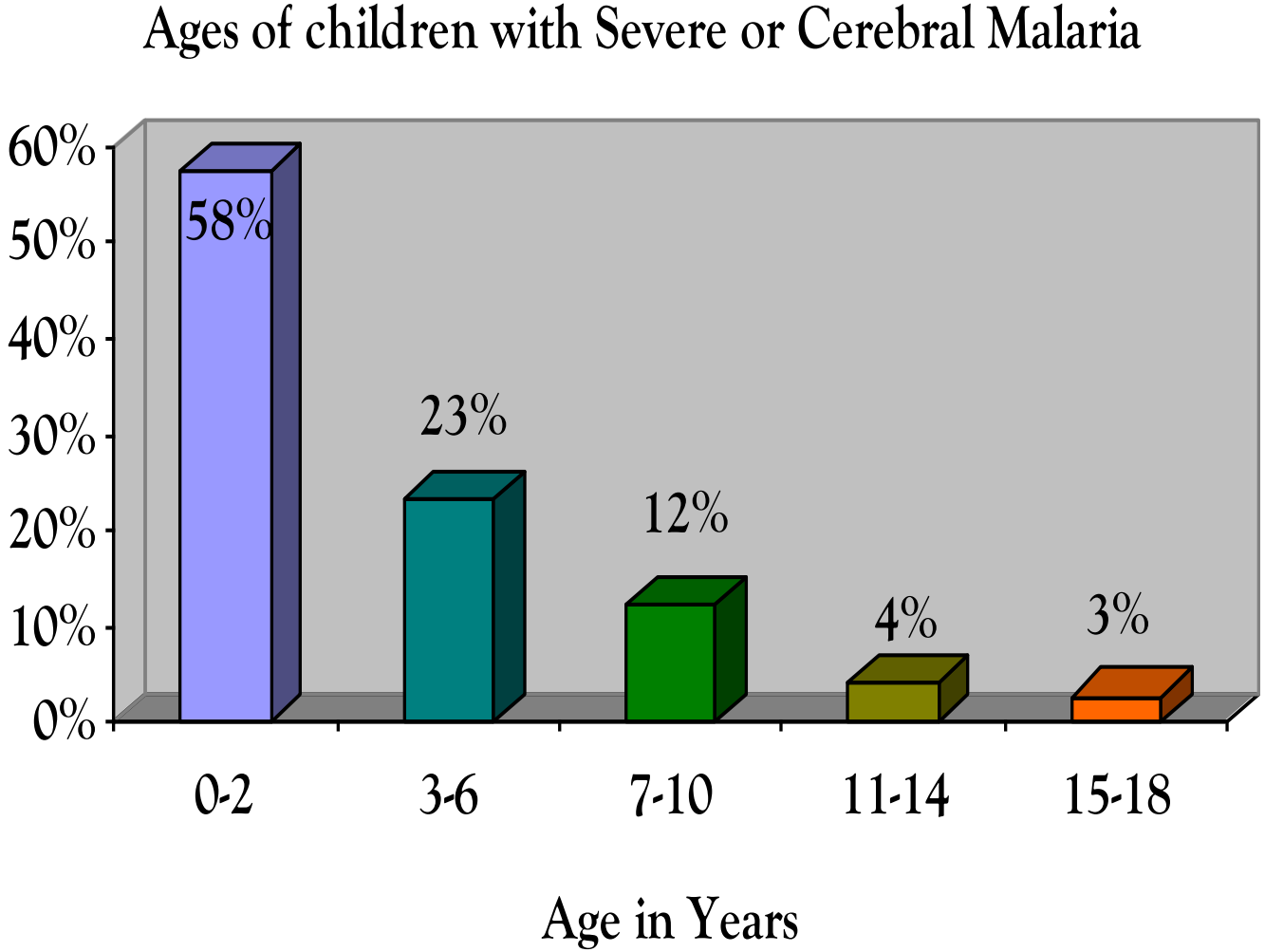


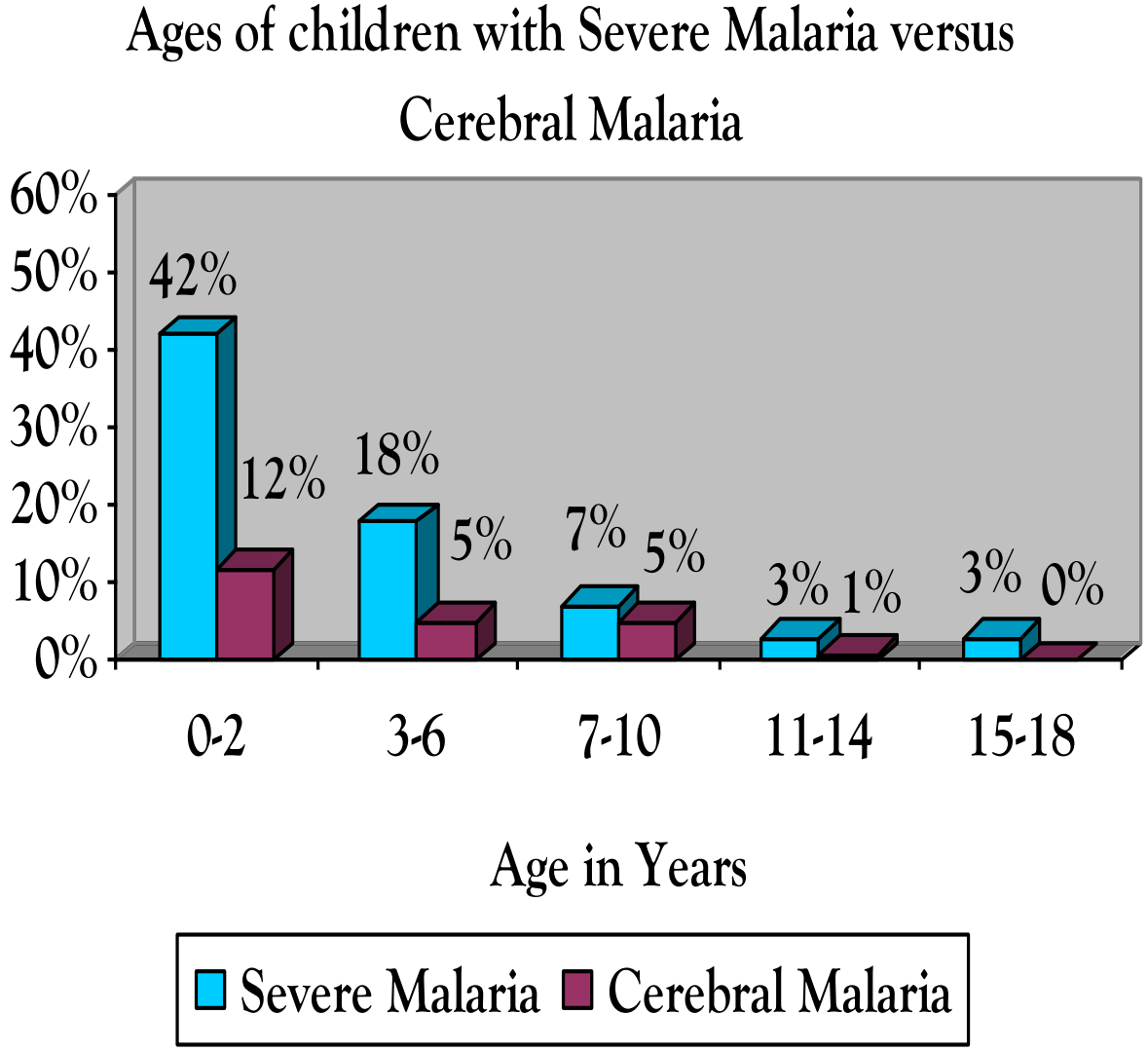
DEMOGRAPHICS



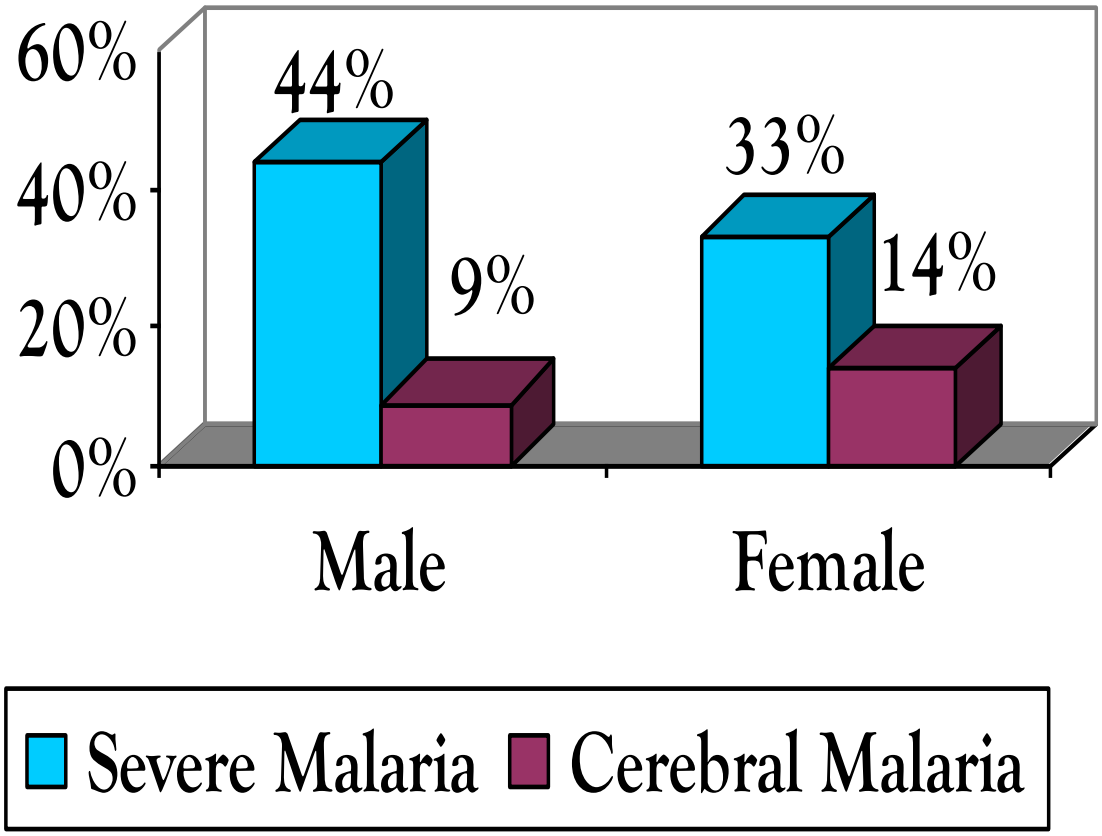
Percentage of all children with Severe or Cerebral Malaria




Ages of children with Severe or Cerebral Malaria
60%
50%
40%
30%
20%
10%
0%
58%
23%
12%
4%
3%
0-2
3-6
7-10
11-14
15-18
Age in Years


Ages of children with Severe Malaria versus Cerebral Malaria
60%
50%
40%
30%
20%
10%
0%
42%
12%
18%
5%
7%
5%
3%
1%
3%
0%
0-2
3-6
7-10
11-14
15-18
Age in Years
Severe Malaria
Cerebral Malaria

Gender Breakdown for Both Severe and Cerebral Malaria



CONCLUSIONS

- Pediatric children from ages 0-2 have the highest propensity to get cerebral or severe malaria.

- As the ages of the patients increased the incidence of cerebral and severe malaria decreased greatly. This trend could be explained by a natural or "induced" immunity.

- Many studies have shown that people living in endemic areas of malaria with extremely high transmission rates develop a natural immunity to infection

CONCLUSIONS (cont.)

- The current philosophy on induced immunity is upheld by the Malaria Immunity Paradigm (MIP), established via studies in areas of intense malaria transmission, mainly in sub-Saharan Africa

- The MIP upholds that induced immunity is difficult to achieve and is dependent upon frequent bouts of malaria for each individual within a given year.

- As defined by the MIP, the more transmission is intense and regular within a population, the higher the prevalence of asymptomatic infections indicative of clinical immunity

IMPLICATIONS

- We need to be able to comprehend what factors go into natural or induced immunity in order to construct a vaccine
- A vaccine to children, especially in the 0-5 age group range, would be greatly beneficial in reducing malaria morbidity and mortality
- Malaria prevention include insecticides, insecticide treated nets, closed gutters, prophylaxis (for travelers), and as discussed before vaccines

PROBLEMS

- Resistance to insecticides; a lot of families do not have nets, and failure to develop an effective vaccine
- Resistance to treatment; The introduction of artemisinin based combinations may reverse that trend, but resistance to these drugs will evolve eventually
- It is crucial to establish and maintain close surveillance as new drugs are introduced so that they will have the maximum useful therapeutic life

LIMITATIONS

- Records at Apam and Manhiya were not always the most reliable. In both cases sometimes cerebral malaria was listed as just severe malaria.
- Small sample size to accurately predict such an endemic disease.
- Study only took into account two hospitals in Ghana.
- The data collection period was only 6 months.

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REFERENCES

1. Carter, R., and Mendis, K.N. “Evolutionary and historical aspects of the burden of malaria.” Clin Microbiol Rev 15: 564-594. 2002.

2. Marsh, Kevin, Snow RW. “Host-Parasite Interaction and Morbidity in Malaria Endemic Areas.” Philosophical Transactions: Biological Sciences 352(1359): 1385-1394. 2005.

3. Snow RW, Omumbo JA, Lowe B, et al. “Relation between severe malaria morbidity in children and level of Plasmodium falciparum transmission in Africa.” Lancet 349: 1650-1654. 1997.

4. Bottius E, Guanzirolli A, Trape JF, Rogier C et. al. "Malaria: even more chronic in nature than previously thought; evidence for subpatent parasitemia detectable by the polymerase chain reaction." Trans R. Soc Trop Med Hyg 90 (1): 9-15. 1996.

5. Reyburn Hugh, Mbatia Redempta et. al. “Association of Transmission Intensity and Age with Clinical Manifestations and Case Fatality of Severe Plasmodium falciparum Malaria.” JAMA 293 (12): 1461-1470. 2005.

6. Mgobo, CN, Snow RW et. al. "Low-level Plasmodium falciparum transmission and the incidence of severe malaria infections on the Kenyan coast." Am. J Trop Med Hyg 49(2): 245-253. 1993.

7. Colbourne, M.J. “Malaria in gold Coast students on their return from the United Kingdom.” Trans R Soc Trop Med Hyg 49:483-487. 1955.

8. Greenwood, B.M. 1984. “The impact of malaria chemoprophylaxis on the immune status of Africans.” Bull World Health Organ 62:69-75. 1984.

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THANK YOU