

**MALARIA IN HIV/AIDS: A STUDY OF ANTI-RETROVIRAL DRUGS ON
MALARIA PARASITAEMIA**

**A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES,
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PHARMACOLOGY**

BY

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DECLARATION

This work titled “**MALARIA IN HIV/AIDS: A STUDY OF ANTI-RETROVIRAL DRUGS ON MALARIA PARASITAEMIA**” submitted to the School of Postgraduate Studies, University of Lagos, Lagos, Nigeria for the award of Doctor of Philosophy in Pharmacology was an original research carried out by AKINYEDE, Akinwumi Akinyinka in the Department of Pharmacology, College of medicine of the University of Lagos, under the supervision of Prof. Alade Akintonwa, Dr. (Mrs.) E. O. Agbaje and Prof. C. C. Okany.

This work has not been submitted previously elsewhere, in whole or part, to qualify for any other academic award.

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CERTIFICATION

This is to certify that the thesis:

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MALARIA PARASITAEMIA**

Submitted to the School of Postgraduate Studies, University of Lagos

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is a record of original research work carried out

By

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DEDICATION

I dedicate this research to the Almighty God: the Omniscient, the Immortal, Invisible, only wise God.

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ABSTRACT

The Centre for Disease Control has reported that at least 500 million people suffer from malaria every year. The situation is worse in Africa which accounts for at least 300 million of those with malaria fever (WHO, 2006). The problem of malaria on the health of Africans has been compounded by HIV/AIDS, a leading cause of death in the region, especially since the two diseases co-exist in some individuals. A structured questionnaire was used to assess the knowledge, preventive and treatment seeking practice in respect of malaria among 469 patients attending the Human Immunodeficiency Virus (HIV) Clinic at the Lagos University Teaching Hospital. Also, the prevalence of malaria parasitaemia among patients without clinical malaria as well as the relationship between clinical diagnosis of malaria and malaria parasitaemia was investigated in 100 patients, respectively, attending the HIV Clinic by microscopic examination of blood smears for malaria parasites. Microscopic examination of blood smears of 100 patients was also carried out for malaria parasites, while hematological parameters were tested to determine the relationship between malaria parasitaemia and these hematological parameters. One hundred HIV infected patients were surveyed for their drug use and malaria parasitaemia probing for antiplasmodial effects of these drugs. Furthermore, the antiplasmodial effects of antiretroviral drugs, lamivudine, zidovudine, nevirapine and stavudine on *plasmodia berghei* inoculated into mice were investigated.

Out of the respondents, 235 (47.6%) respondents did not know how malaria could be prevented. Only 42(8.5%) respondents knew of prevention by insecticide treated bed nets, while 138 (27.9%) had knowledge of non-insecticide treated bed nets. Sulphadoxin/pyrimethamine was the commonest known antimalaria, followed by

chloroquine and artemisinin based combination therapy representing 28.5%, 15.4% and 11.7% respectively. Also, 34.8% of the respondents knew the appropriate antimalaria drug dosage. Most of the patients visited the HIV/AIDS Clinic, General hospitals or private hospitals whenever they perceived an attack of malaria fever representing 17.8%, 15.2% and 18.6% respectively. Only 244 (52%) of the patients used insecticide treated bed nets for prevention of malaria. There was significant association between the patients' level of education and use of prophylactic antimalaria $P=0.01$. There was no demonstrable malaria parasitaemia in the blood smears of 91 out of the 100 HIV infected patients who had been clinically diagnosed as malaria fever, malaria parasitaemia among these patients was significantly less than it was in the control group, $P = 0.000$.

The patients with the highest CD₄ count, >350 had the highest malaria parasite density, while the remaining 2 groups with CD₄ values of <200 and 200-350 had lower parasite densities. The patients with the lowest viral load <20, 000 had significantly higher malaria parasite density compared with the groups with viral load 20,000-40,000 and 60,000-80,000, $P=0.18$, 0.021 respectively. These patients, with <20, 000, were on antiretroviral drugs, while those with the higher viral load and less densities were not. Three of the patients on co-trimoxazole, in the last 28 days, had malaria parasitaemia, while malaria parasitaemia was not found in the blood smears of those on other antimalaria drugs during the period. There was significant dissociation between the use of antiretroviral drugs and the presence of malaria parasitaemia, $P=0.006$.

Zidovudine as a single therapy and triple drugs combination of lamivudine, zidovudine, nevirapine completely eliminated *plasmodia berghei* infection in mice, when these drugs were given as prophylactic and curative regimens. The findings reveal the need to improve on the health education of patients infected with the Human Immunodeficiency Virus in respect of malaria and to carry out laboratory diagnosis of these patients before antimalaria therapy is administered. Also, the antiplasmodial effect of zidovudine and lamivudine, zidovudine, nevirapine combination has been shown.