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## Does Primaquine Become The First Line in the Treatment of Uncomplicated Malaria in Coming Days?

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**Background:** Malaria is a major public health problem throughout human history, particularly in the tropical and subtropical countries. Primaquine, introduced in 1950, for preventing relapse and sterilizes infectious sexual plasmodia. **Methods:** A retrospective study was performed for 610 patients (250 were male and 360 were female), (all ages) to study the efficacy of Primaquine in the treatment of falciparum malaria after receiving this drug for five days. **Results:** Five hundred and ninety three patients (97.2 %) were completely recovered from malaria within 3 to 5 days after receiving Primaquine tablets. **Conclusion:** In our opinion Primaquine should become the first line as antimalarial drug soon later for uncomplicated malaria, because of its high efficiency against infections with *Plasmodium falciparum* and *P. vivax* active stages.

**Keywords:** Falciparum malaria, primaquine, treatment, first line.

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### INTRODUCTION

Malaria is a major public health problem throughout human history, particularly in the tropical and subtropical countries [1]. Malaria parasites of the Plasmodium genus are transmitted via the bite of infective female Anopheles species mosquitoes that can transmit four Plasmodium species that commonly cause malaria in humans: *P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*. Mixed infections with multiple species are possible and occur in areas where more than one species is found [2]. Resistance to antimalarial drugs is a common challenge in many malaria endemic areas worldwide [3]. Rapid diagnostic tests for malaria (RDTs) have recently emerged as an alternative to microscopy [4] and are recommended by the World Health Organization (WHO) when reliable microscopy is not available [5]. Primaquine is the only FDA licensed therapy to treat relapsing strains of malaria. These strains include *Plasmodium vivax* and *Plasmodium*

*ovale* and relapses are assumed to be caused by the re-activation of dormant liver forms of the parasites called hypnozoites [6, 7]. Primaquine, introduced in 1950, for preventing relapse and sterilizes infectious sexual plasmodia, and among the several widely used regimens, none has been adequately evaluated [8]. Primaquine, an 8-aminoquinoline, has been approved for treatment of malaria since 1952 by the Food and Drug Administration (FDA), United States. It is the only FDA licensed drug that can destroy all liver stages (hypnozoites and schizonts) of the parasite [9]. Shorter courses of primaquine (5 day therapy) and lower doses (15 mg/d) have been shown to be ineffective in preventing relapses [10-15]. Accurate diagnosis is necessary for starting adequate treatment. Microscopy is the gold standard for malaria diagnosis, and requires expertise personnel [16-19].

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## METHODS

A retrospective study was performed for 610 patients (250 were male and 360 were female), (all ages) (Figure 1). All patients had come to our clinic for checkup at Alrawda Private Hospital, Omdurman, Sudan after 5 days for requesting blood film for malaria for the second time for confirmation that there were no malaria parasites in their blood. After taking history, they demonstrated that they were febrile, and had different symptoms and signs of malaria. They said that went to nearest clinics and their blood had been

examined for malaria parasites so; thick and thin blood films were examined by expertise medical laboratory technologists. Examination of their blood films revealed that they infected with *Plasmodium falciparum* (554, 91 %) and *Plasmodium vivax* (56, 9 %). All patients already had received just Primaquine tablets (15 mg), two tablets daily for 5 days (for adults) (30 mg/day) and 0.5 mg/kg/day for 5 days for children (they requested primaquine tablets after asking for dose, and there was thought spread among them that this tablets was causing cure).

**Figure 1: Age groups for all patients**

Age	Number	Percentage %
Under 5 years	22	3.6
5 years and less than 18 years	95	15.6
18 years and above	493	80.8
<b>Total</b>	<b>610</b>	<b>100</b>

## RESULTS

Five hundred and ninety three patients (97.2 %) were completely recovered from malaria within 3 to 5 days after receiving Primaquine tablets. Blood films for malaria were performed for all patients; 593 (97.2 %) of them were clear and revealed no malaria parasites, 17 (2.8 %) were positive for *Plasmodium falciparum*. Also we observed that most of patients had been underwent C-reactive protein and D-dimer tests, both tests were high (more than 10 mg/L, more than 0.5 mg/L) respectively.

## DISCUSSION

The World Health Organization (WHO) demonstrated that in 2015 malaria caused 429,000 deaths, most of them were children under 5 years of age and they infected mainly with falciparum malaria [20]. Artemisinin-based treatments with artesunate, artemether or dihydroartemisinin are used as the first-line for *P. falciparum* malaria in most endemic areas and also used against the chloroquine resistant *P. vivax* malaria [21]. Although Tafenoquine new drug is given in a single dose, replaces primaquine (30 mg/day for 7 to 14 days) [22], but also primaquine treatment policy is safe rather than the efficacy [23]. Malaria elimination has been a global health priority but current therapies seem to be insufficient to do this. New drug is needed for this task. So accidentally we found out that Primaquine could be the best one in this retrospective study. All patients included in this study had received Primaquine for treatment of falciparum malaria and vivax malaria as the first line (for active blood stages of the parasites), and most of them completely recovered and all symptoms and signs disappeared within 3-5 days when we underwent blood films for them after taking history. So interestingly we found that Primaquine plays as the effective first line for both falciparum malaria and vivax malaria.

## CONCLUSION

In this study, Primaquine is clearly highly effective against active stages of *Plasmodium falciparum* and *Plasmodium vivax* infections (blood schizonts and trophozoites), and not just for dormant stages of *Plasmodium vivax*, although it is the only licensed drug in use against the intra hepatic forms (schizonts and hypnozoites) of *P. vivax*. So in our opinion Primaquine should become the first line as antimalarial drug soon later for uncomplicated malaria, because of its high efficiency against infections with *Plasmodium falciparum* and *P. vivax* active stages, also more studies should be conducted to establish this drug.

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