parous rates of *An. subpictus* after spraying with Bifenthrin 50 mg/m² were 44%, 19%, and 0% in April, June and August respectively, but the corresponding outdoor parous rates in the control village were 65%, 100% and 39% in April, June and August respectively.

Bioassay tests have shown that Bifenthin has a long residual activity on different surfaces and the residual effectiveness remained longer than 4 months after spray. The was a significant reduction in mortality rate over time (DF = 6, F = 4.452, P = 0.01343), (DF = 5, F = 22.093, P < 0.0004) and (DF = 5, F = 13.465, P =0.00036) after spraying with Bifenthin (50 Mg/M2), Bifenthin (50 Mg/M2), and Lambdacyhalothrin (25 Mg/M2) insecticides respectively.

The malaria prevalence rates among school children within 7 months after residual spray, were significantly reduced from 48% to 2%. Comparing to Lambdacyhalothrin (25mg/m²), the prevalence of malaria was reduced from 72% to 25%, therefore, there was a significant change with time (reduction) of malaria prevalence rates after spraying with Bifenthin insecticide (F = 5.1907, P = 0.0029, DF= 6).

Whereas, the prevalence rates of malaria in the control village remained high within the range of 76% to 60% for the entire period of 7 months (from February to August).

In conclusion therefore, *Bifenthin 10 WP* has shown potentially characteristics of public health applications as an indoor residual insecticide, suitable for control of Malaria vectors due to its:

1. Significant reduction of manlanding densities, infectivity and parity rates of malaria vectors.
2. High reduction of the local transmission rates of malaria.
3. Increased ability to bind tightly to organic surfaces resulting in longer residual.
4. Increased tactic availability to the vector from vapor pressure resulting in better efficacy.
5. Virtually insoluble in water resulting in less off-target contamination.
6. Classed as an alpha -cyano pyrethroid with less skin and respiratory irritation, hence acceptable to the society. These properties justify the inclusion of *Bifenthin 10 WP* for the control of malaria vectors.

References

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**ASSESSMENT OF THE EFFICACY OF IVERMECTIN IN THE TREATMENT OF HUMAN INTESTINAL HELMINTHS AND URINARY TREMATODE INFECTIONS IN NORTH-EAST TANZANIA**

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**ABSTRACT:** An open clinical trial was conducted in Amani, north-east Tanzania, to evaluate the efficacy of ivermectin in patients infected with either, intestinal helminths or urinary parasites. Stool specimens were examined by the McMaster's method, and urine was first centrifuged before the deposit was examined by the direct method. 103 patients with intestinal helminths and 22 with Schistosoma *haematobium* were treated with a single dose of oral ivermectin, given at a dosage of 150 μg/kg body weight. The drug was found to be very effective in clearing ascariasis and strongyloidiasis infections where by a 100% clearance rate was achieved. However, a mild to moderate activity was observed in Schistosoma *haematobium* and hookworm infections.

**Introduction**

Human geo- and intestinal helminth infections remain a public health problem in the tropics and subtropics because of poor sanitary conditions in these regions. The poor sanitation predisposes people to repeated infestations and hence the need for repeated dose of anthelmintic agents (Rajasekariah et al., 1989). In addition, some of the parasites are less responsible to most of the available anthelmintic agents. On the other hand, a number of anthelmintic drugs have toxic adverse effects which in a way, reduce compliance (Grove, D.I., 1982; Franz et al., 1985; Most et al., 1985; Al-Ani and Al-Weil, 1987).

Ivermectin, a fractional mixture of 22-23 dihydrovermectin B₁₇/B₁₉ in a 80-20%, was found to be well-tolerated and highly efficacious in treating human onchocerciasis as a single dose (Azizi et al., 1982) and had comparatively fewer and milder adverse reactions than counterpart, diethylcarbamazine citrate (Awadzi et al., 1986). The drug was also found to have a significant effect on head
lice while treating onchocerciasis skin disease (Dunne et al., 1991). Adverse reactions experienced by these patients are similar to those observed in onchocerciasis patients receiving the drug for the first time (De Sole et al., 1990). This drug is a broad-spectrum antiparasitic agent, being active against a variety of nematodes and arthropods in domestic animals (Campbell et al., 1983). Ivermectin has also shown to be effective against human strongyloidiasis and other intestinal helminths. However, it was observed that, in patient with heavy infections repeated or higher doses were necessary in order to achieve higher cure rates (Naquira et al., 1989). Hookworm was noted to be less affected by the drug. Although the drug has been distributed for the treatment and control of onchocerciasis in the affected areas, there has not been a well planned trial evaluating the activity of this drug on geo-helminths infections in the country. This study, therefore, tries to demonstrate the activity of this chemical compound on the common intestinal parasitic infections and urinary schistosomiasis.

Materials and Methods
The study was carried out at Amani staff Clinic which is situated at an altitude of about 1000 meters above sea level. It is located within the East Usambara Mountains, in the northeastern part of Tanzania. Study population comprised of patients seeking for treatment at the dispensary. Patients who presented with clinical symptoms suggestive of either gastro-intestinal or urinary tract infections and who gave informed verbal consent were recruited for the study. Excluded from the study were children under the age of five years, pregnant and lactating women, those weighing below 15 kg, concurrent anthelmintic drug administration, and patients with serious or chronic illness. One gram of formed faecal material was collected from each stool specimen provided, and was mixed with 58 millilitres (mls) of saturated sodium chloride solution and thoroughly stirred. The mixture was then filtered through a gauze in a funnel. Finally, the filtrate was charged through McMaster slide, and examined under the low power objective of the microscope for parasite egg identification. 100mls of urine were collected from every urine specimen delivered, and then centrifuged at 2000 rpm for 5 minutes. The sediment was then examined likewise under the microscope for the presence and counting of eggs of S. haematobium. Ivermecin was administered orally in tablet formulation and given as single doses. The dosages were calculated according to body weight, equivalent to 150 μg/Kg. The doses were taken in empty stomachs, and patient were advised not take anything orally for at least two hours following drug administration. Follow up was done on days 7, 14 and 21. Stool and urine specimens were collected for laboratory examination for the presence of helminth eggs or larvae. A total number of 125 patients, 75 males and 50 females, from the age of 7 to 68 years old, completed the study after been identified positive for the infestation.

One gram of faecal material was mixed with 58 mls of saturated sodium chloride solution. The mixture was then filtered through a gauze in a funnel. Finally, the filtrate was charged through McMaster slide for egg identification and quantification. Hundred mls of urine specimen from each patient with positive Schistosoma haematobium were collected and centrifuged at 2000 rpm for five minutes. The sediment was then put on a glass slide and examined under the low power objective for schistosome egg quantification.

Patients with positive stool for intestinal nematodes and urine for urinary trematodes were included in the study. Those individuals with severe hepatic, neurological diseases, concurrent drug therapy, pregnant and lactating women; children under five years of age, and those patients who received anthelmintic therapy within one month before reporting at the clinic form the beginning of the study were excluded from the study.

Ivermectin was administered orally in a form of tablets as a single oral dose at 3-12 mg in an empty stomach. Patients were their own control and were followed-up in order to monitor side effects on the first 3 consecutive days after ivermectin treatment. Stool and urine samples were collected and re-examined for helminths infestation at day 7, 14, and 21.

Results
One hundred and twenty five patients completed the study. Out of these, 103 (82.4%) had intestinal helminths and 22 (17.6%) had urinary schistosomiasis. All patients who had S. haematobium seen on day 7 of follow up remained positive for the infection. Only 4 out of 27 (14.8%) patients examined on day 14 had negative urine test for schistosomiasis; and no response recorded in 19 patients out of 22 (86.4%) with this trematode infection examined on day 21.

Ascaris lumbricoides and Strongyloides stercoralis showed a complete response, and the patients who had these two parasitic infections remained negative throughout the follow up period. On the other hand, the responses for Trichuris trichiura and the hookworms were rather disappointing. On day 7 follow treatment, 98.7% of the patients treated for hookworm were still positive for the infection, and 90% of those with T. trichiura were found positive. Up to day 21 of follow up there was no change in the response of were found positive. Up to day 21 of follow up there was no change in the response of these two parasites.

Discussion
Ivermectin administered as a single oral dose treatment was highly effective and tolerable in patients with ascariasis and strongyloidiasis. The efficacy-dose relationship demonstrated that a higher or repeated dose
of ivermectin is not required for the heavy infestation in both Ascaris lumbricoides and Strongyloides stercoralis. Nonetheless the cure rates after a single therapy with ivermectin was not sufficient to achieve reasonable cure rates in trichuriasis as the repeated doses observed by Naquira (1989). Moreover, there was no effect on hookworm, T. trichiura and S. haematobium after a single dose of ivermectin treatment.

It was therefore observed that, ivermectin could cure ascariasis and strongyloidiasis but not trichuriasis, schistosomiasis or hookworm infestation in the study area.

References
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Clinical trial of two regimens of albendazole and ivermectin to treat Tanzanian bancroftian filariasis and onchocerciasis


Abstract: The combination of antifilarial drugs is among the various new therapeutic strategies available for the control of lymphatic filariasis. This combination seems to be the most effective efficacious strategy. In this study we compare the efficacy and safety of albendazole alone and in combination with ivermectin for the treatment of co-infection of bancroftian filariasis and onchocerciasis and single infection of bancroftian filariasis. This is the first time a hospital based double blind placebo controlled clinical trial has been conducted. Forty-one individuals both sex, age between 15 and 55 years old (15 with co-infection of bancroftian filariasis and onchocerciasis and 26 single infection of bancroftian filariasis) with concentration of 108-2231 microfilariae/m of Wuchereria bancrofti and 5-206 microfilariae/m of Onchocerca volvulus. The study individuals were randomly assigned to receive single dose treatment of albendazole (400mg) with ivermectin (150mg/kg) or albendazole (400mg) alone. The combination of albendazole plus ivermectin was more effective in mf reduction in both Onchocerca volvulus and Wuchereria bancrofti than the placebo. In the single infection of bancroftian filariasis, a 99.8% mf reduction was achieved in the combination of albendazole and ivermectin while in albendazole alone a reduction of 69.3% was observed. The adverse reactions observed in this study (co-and single infections) were mild and tolerable. Combining treatment with albendazole and ivermectin was more effective and rapid in clearing microfilariae in bancroftian filariasis and onchocerciasis than treatment with albendazole alone. without increase in severity and frequency of adverse reactions. This combination is likely to be a way forward strategy towards elimination of bancroftian filariasis and onchocerciasis and if possible, loiasis when co-exist and that diethylcarbamazine (DEC) cannot be used because of the severe systemic adverse reaction.

Introduction
Lymphatic filariasis and onchocerciasis are vector-borne diseases transmitted by Wuchereria bancrofti (W. bancrofti) and Onchocerca volvulus (O. volvulus) respectively. These diseases persist as a major cause of clinical morbidity, deformity and disability in the developing world with more than 120 million people affected by W. bancrofti and 17.6 million by O. volvulus [1 & 2] The chronic pathologies caused by these diseases impose a significant impediment to socio-economic development in the tropics and sub-tropics [3, 4]. The widely used control measures in most endemic countries are vector management and chemotherapy. Currently the most common strategy adopted is the mass treatment of the whole population using either diethylcarbamazine (DEC) or ivermectin. In areas where