

Traditional Healer's Medicinal Practice Survey and Clinical Evidence Assessment of "YIKI": An Antimalarial Phytomedicine Recipe from Bobo-Dioulasso, Burkina Faso

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How to cite this paper: Kabre, Z., Yerbanga, R.S., Fofana, A., Meda, R.N.-T., Some, A.F., Haro, A., Boro, N.A.J.A., Ye, F.B., Koama, B.K., Kam, S.E., Zongo, E., Belèm, H., Kagambèga, W., Fournet, F., Ouedraogo, G.A. and Ouedraogo, J.-B. (2024) Traditional Healer's Medicinal Practice Survey and Clinical Evidence Assessment of "YIKI": An Antimalarial Phytomedicine Recipe from Bobo-Dioulasso, Burkina Faso. *Pharmacology & Pharmacy*, 15, 248-267.

<https://doi.org/10.4236/pp.2024.157015>

Received: June 7, 2024

Accepted: July 27, 2024

Published: July 30, 2024

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Abstract

YIKI is an antimalarial phytomedicine used by a traditional healer to treat malaria in Bobo-Dioulasso. However, there is no scientific evidence to support its use by local populations. The aim of this study was to identify the medicinal practices of the healer holder of YIKI and assess the clinical evidence of its phytomedicine in the uncomplicated malaria treatment. Ethnomedical survey based on a semi-structured and open questionnaire was conducted from October to December 2019 with the healer. Malaria knowledge and diagnosis methods, patient treatment and monitoring, and recipe formulation steps were surveyed. Moreover, thick and thin blood smears were taken, haemoglobin levels and temperature of consenting patients were measured before treatment, mid-treatment and at the end of treatment. The survey revealed that the healer has a good knowledge of malaria symptoms and his diagnosis is based on observation and physical examination of patients. The healer's malaria diagnosis was rudimentary and had accuracy problems, with only 62.79% of malaria cases confirmed by microscopy. The formulation of YIKI and its use to treat malaria follow a standard process for plant harvesting, powder quantities and posology, but do not use any reproducible parameters for dose adjustment. Forty-three patients diagnosed and treated by the healer partici-

pated in the study. Laboratory results revealed 27 *Plasmodium falciparum* infection cases, including 2 with parasitaemia $\geq 200,000$ p/ μ l blood. 25 patients were selected for therapeutic evidence assessment. There was a 48% elimination of parasites, a 28% parasitaemia decrease without complete cure, with gametocytogenesis in some patients, and a 24% parasitaemia increase. Haemoglobin and temperature results suggested that YIKI was not cytotoxic and reduced fever. Encouraging preliminary results have been obtained, but in view of the low number of patients, further YIKI efficacy and toxicity studies will be necessary for patient safety.

Keywords

Antimalarial-Phytomedicine, Efficacy, Traditional Practices, Bobo-Dioulasso

1. Introduction

Malaria is a major public health challenge with an estimate of 249 million cases and 608,000 deaths reported in 2023 in the WHO African region [1]. In Burkina Faso, with 11.1 million cases and 4243 deaths, including 2925 children under 5 years old, malaria remains the leading cause of morbidity and mortality with an estimate of nearly 37.3% of clinic consultations and 15% of deaths reported in 2022 [2]. Since 2005, artemisinin-based combination therapies (ACTs) have been approved to treat uncomplicated malaria [3]. Several studies have reported excellent efficacy of ACTs in Burkina Faso [4]-[6]. However, a recent study reported low efficacy of AL (artemether + lumefantrine) [7]. Furthermore, the efficacy of ACTs is jeopardized by the emergence and spread of resistance to artemisinin and its partner drugs [8]-[11]. Medicinal plants are a validated source of drug development as was the case with quinine and artemisinin [12]-[14]. In low-resource countries like Burkina Faso, medicinal plants are widely used to treat a variety of illnesses, including malaria [15] [16]. In these contexts, traditional healers play an important role in the treatment of malaria by providing populations with antimalarial phytomedicines [15]. Unfortunately, most of these phytomedicines, which are generally prepared in the form of herbal teas, have never been scientifically tested for efficacy and safety before being used as alternative medicines in the treatment of malaria [17]. One example is YIKI, an antimalarial recipe based on seven medicinal plants used by a traditional health practitioner (THP) in Bobo-Dioulasso, Burkina Faso. This study was conducted firstly to determine the traditional medicinal practices used by the healer to formulate the recipe, diagnose and treat malaria, and secondly to assess the recipe's clinical evidence in treating uncomplicated malaria.

2. Material and Methods

2.1. Study Area

The present study was conducted in Bobo-Dioulasso, the second-largest city in

Burkina Faso [18] (Figure 1). The town covers an area of 1805 km², with South Sudanese vegetation consisting of wooded savannahs and shrubs. There are 4 classified forests and numerous gallery forests along the watercourses, sheltering a wide variety of fauna. Its climate is South Sudanese, with a long dry season lasting 5 to 6 months (November/December to April) and a rainy season lasting 6 to 7 months (May to October/November). The dry season consists of a cold period (November to January) and a hot period (February to April). Rainfall is relatively abundant, but unevenly distributed in time and space [19].

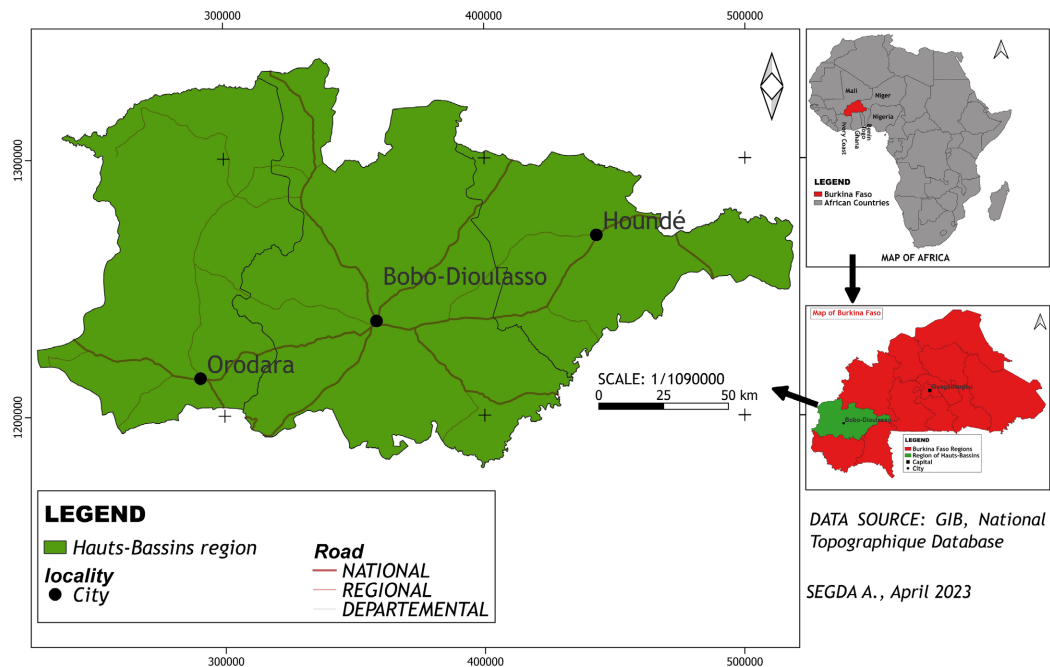


Figure 1. Study site [20].

2.2. Traditional Healer Biography and Facility Organization

The company holding the patent for the manufacture of “YIKI” is called “Entreprise Keneya Yiriwasso” (EKY). It was created in Bobo-Dioulasso under the authorization of the Ministry of Health by decision no. 2021.00559/MS/SG/ANRP specialising in hepatitis B, malaria and haemorrhoids.

The founder (Figure 2) is a 54-year-old literate traditional healer, a Muslim from the Mossi ethnic group. He converses with patients in local languages (Dioula, Mooré, San, etc.) and in French. He became a healer 33 years ago through family initiation, and traditional medicine constitutes his only activity. He is president of a traditional health practitioners’ association created in 1989 and named “Pharmacopée Relwende Djigui-sèmè du Houet”. He is also a non-scientific member of the institutional ethics committee of the “Institut de Recherche en Sciences de la Santé, Direction de l’Ouest (IRSS DRO)”.

ETK is located at THP’s home in a two-room building with a hangar. The hangar served to receive patients, and the building to provide consultation, treatment administration, storage and selling various phytomedicines (Figure 3).



Figure 2. OUEDRAOGO Soumaila, the traditional healer.



Figure 3. ETK's facility.

ETK is located around 600 metres from a community health facility. Patients came from Bobo Dioulasso and Burkina Faso's other towns. The healer saw 12 patients a day on average, and the reasons for consultation were generally malaria, stomach aches, urinary infections, articular pains, fever, jaundice, diabetes, haemorrhoids, etc. During the survey, two categories of patients were observed. The first category was that of people coming to health facilities after a diagnosis of illness, while the second category was that of people coming for a medical consultation without prior illness diagnosis. At the THP facility, the consultation was free but the treatment is subject to a charge depending on the illness. For example, malaria treatment (1 bag of YIKI) cost 1000 FCFA (~2 \$ US) to

patients.

2.3. Phytomedicine YIKI

YIKI is a combination of seven medicinal plants powders. The powder mixture is packaged in bag and weighs 40 g (**Table 1**).

Table 1. The plants constituting the YIKI recipe.

Scientific names	Family	Plants local names (Bambara/Mooré)
<i>Anogeissus leiocarpus</i> (DC) Guill et Perr.	Combretaceae	N'galama/Siiga
<i>Cassia sieberiana</i> DC	Fabaceae	Sindjan/Koumbrissaka
<i>Cochlospermum planchonii</i> Hook f. ex Planck	Cochlospermaceae	N'dribala/Sonsé
<i>Securidaca longepedunculata</i> Fres.	Polygalaceae	Djoro/Pelga
<i>Trichilia emetica</i> Vahl	Meliaceae	Soulafissan/Kikristaaga
<i>Ximenia americana</i> L.	Olacaceae	N'donguè/Leenga
<i>Zanthoxylum zanthoxyloides</i> (Lam.) Zep et Timl.	Rutaceae	Wo/Rapeoko

2.4. Traditional Healer's Ethnomedical Survey

A semi-structured ethnomedical survey was conducted with the THP holder of the YIKI phytomedicine in October-December 2019 at Bobo-Dioulasso. The survey consisted in administering a questionnaire focusing mainly on the healer malaria knowledge and diagnosis methods, patient treatment and monitoring, and recipe formulation steps.

2.5. Clinical Efficacy Assessment

2.5.1. Participants Recruitment Process

The study included adults and children of both sexes attending the THP facility. Participants were selected from among those diagnosed with malaria by THP, who verbally agreed with him to participate in the study and who met inclusion criteria. They were included in the study after signing an informed consent form. Inclusion criteria were as follows: having malaria according to THP's diagnosis and no modern or traditional antimalarial treatment in the two weeks prior to inclusion. Microscopic malaria results (positive or negative) were therefore not an inclusion criteria. After inclusion, axillary body temperature was recorded and a blood sample was collected to check parasitaemia and to measure hemoglobin levels prior to administration of YIKI by the THP. Samples were then transported to the laboratory for analysis and patients with a parasitaemia superior to 200,000 parasites/ μ l of blood were withdrawn from the study via the healer (**Figure 4**). The other participants (positive and negative parasitaemia according to microscopy) were followed until the end of treatment, so as to avoid any interference

between THP and its patients. But only patients with positive parasitaemia were considered to assess YIKI's efficacy.

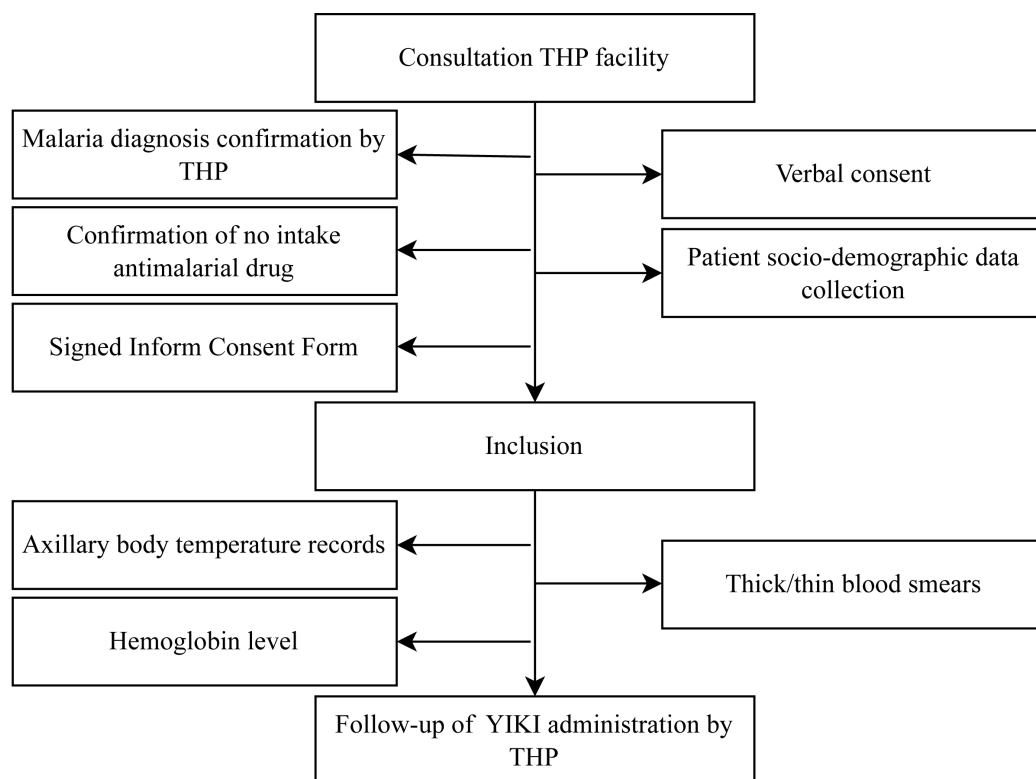


Figure 4. Inclusion process.

2.5.2. Data Collection

Giemsa-stained thick and thin blood smears were performed to assess parasite density and *Plasmodium* species at day 0 (D0) (before treatment), day 2 (D2) and day 6 (D6). Hemoglobin level was also measured using HemoCue 301. Blood films were read under a 100× objective light microscope (LEICA 1000) with immersion oil by two independent qualified microscopists and parasite densities were calculated as the number of asexual parasites per 200 leucocytes assuming a count of 8000 per microliter. The presence and quantity of gametocytes were assessed per 1000 white blood cells. Parasite density, expressed as the number of parasites per microliter (μL) of blood, for the asexual parasite and for the number of gametocytes. In case of discrepancy between the two readers (differences between the two microscopists in species diagnosis, or differences in parasite density of >50%), a third reading was done by another independent microscopist for reconciliation. Axillary temperature was also measured using a fever electronic thermometer at all timepoints (Figure 5).

2.5.3. Patient Treatment

All patients diagnosed with malaria by THP were provided with 40 g of the YIKI in a plastic bag for a 4-day course of treatment. During the first two days of treatment, around 20 g of the YIKI were macerated in half a liter of water by

THP, and respectively 100 ml and 50 ml (traditional Sahelian tea cup) were administered orally twice a day for adults and children. The second half is used in the same way for the remaining two days of treatment. **Table 2** summarises recipe posology.

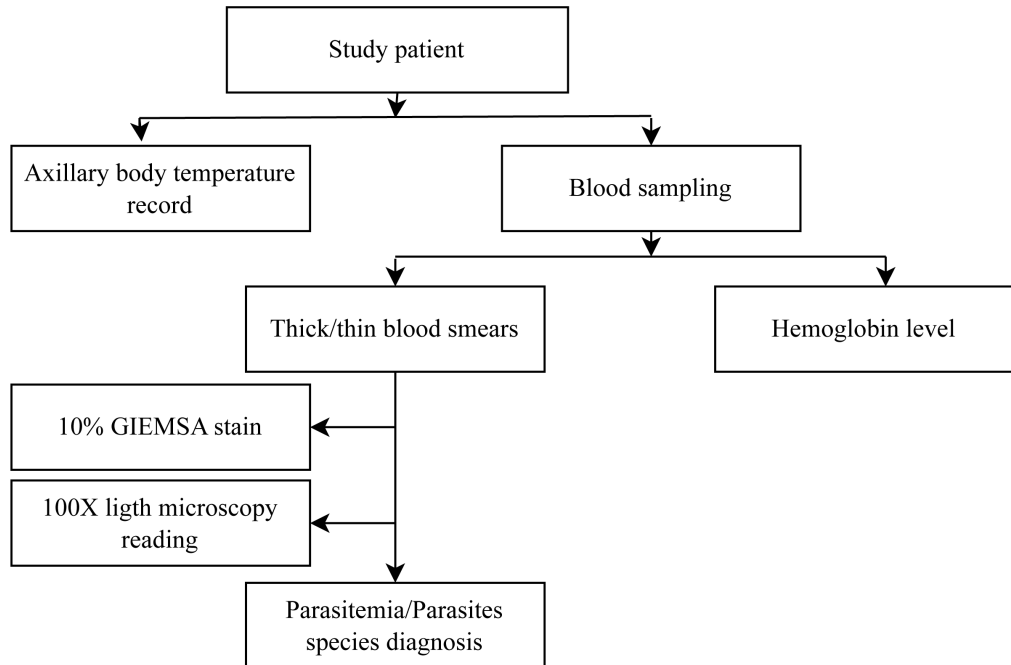


Figure 5. Data collection process.

Table 2. YIKI’s posology.

			40 g of YIKI powder			
			~20 g macerated in 500 ml of water		~20 g macerated in 500 ml of water	
Days (D) of treatment			D0	D1	D2	D3
YIKI tea (ml)	Morning and evening	Adults	100	100	100	100
		Children	50	50	50	50

2.6. Ethical Considerations

This study protocol and related documents were approved by the national ethical committee (reference N°20189-118). The holder of the phytomedicine has authorised the scientific assessment of his recipe. The association of health traditional practitioners of the Hauts-Bassins region named “Pharmacopée Relwend djigui-sèmè du Houet” also supported the study.

2.7. Data Analysis

Excel 2016 was used for data entry, and R (version 4.1.3) and Stata 16.0 (StataCorp, College Station, TX, USA) were used for analysis. Continuous variables were summarized using standard statistical parameters such as mean and

median. The Kruskal-Wallis test was performed to compare the means of haemoglobin levels and temperatures. Following this, we performed the Dunn test (a post hoc test) to identify which pairs of means are significantly different from each other. We used Bonferonni method to adjust by the alpha level (the level of statistical significance) to account for the number of pairs of means being compared. P values < 0.05 were considered statistically significant unless otherwise stated.

3. Results

3.1. Malaria Symptoms Knowledge and Diagnosis Process by the Traditional Healer

According to the healer, symptoms suggestive of malaria are summarised in **Table 3**.

Table 3. Malaria symptoms according to THP.

Malaria typs	Symptoms
Uncomplicated	Fever, headaches, nausea, vomiting, dizziness, joint and muscle pain, aches and pains, and above all the patient's general physical condition.
Severe	Frequent vomiting, dehydration, yellowing of the eyes and palms or whitening of the eyes.

The healer uses no specific method for diagnosing malaria that is scientifically reproducible. However, a physical examination and clinical parameters, including signs and symptoms, are considered by the healer for diagnosis. Consultation always begins with questions about the reasons for patient's visit, followed by a physical examination. The traditional healer assesses the patient's temperature with the palm of his hand, touching the cheeks and neck. He examines the eyes, eyelids and skin colour. At the end of the physical examination, malaria or another pathology is diagnosed.

3.2. Patient Monitoring

The majority of the healer's patients are people who have been treated by him for several years. They are familiar with the treatment and use it whenever they are ill. Some patients admit that their whole family visits the THP for consultations and treatment. In addition to consultations, some people buy YIKI for patients living in other towns. In case of malaria, only the first dose of the medicine was usually administered by the traditional healer when the patient is present, and always takes the time to explain how to use the drug. All patients undergoing treatment are advised to return for check-ups.

3.3. YIKI's Formulation

All plants are harvested in the Bobo-Dioulasso area, specifically in the Baré forest, about 20 km away. The material from each plant is harvested, washed, dried in a dark place and reduced to powder. The powders are then mixed in well-defined

quantities (Table 4). The THP packages around 40 g of the powder mixture (the powder quantities of each plant were estimated by the laboratory team using a precision balance) in plastic containers. According to the healer, it is his plant's therapeutic properties knowledge and experience in treating patients that help him select plant parts and adjust the quantity of powder needed to formulate an efficacy dosage of YIKI. He uses half the quantity of *S. longepedunculata* powder to avoid adverse effects, because this plant is effective but high doses cause diarrhoea and vomiting.

Table 4. YIKI's composition (40 grams).

Scientific names	Parts	Quantity (g)
<i>A. leiocarpus</i>	Barks	6.16
<i>C. sieberiana</i>	Roots	6.16
<i>C. planchonii</i>	Roots	6.16
<i>S. longepedunculata</i>	Roots	3.08
<i>T. emetica</i>	Roots	6.16
<i>X. americana</i>	Barks	6.16
<i>Z. zanthoxyloides</i>	Roots	6.16

3.4. Therapeutic Efficiency Results for YIKI

3.4.1. Study Patients

From October to December 2019, a total of 43 participants diagnosed with malaria by the THP were included in the study. Among them, 60.5% were women and 39.5% were men and the mean age was 21.86 ± 14.42 years (range from 5 - 60 years old) (Figure 6).

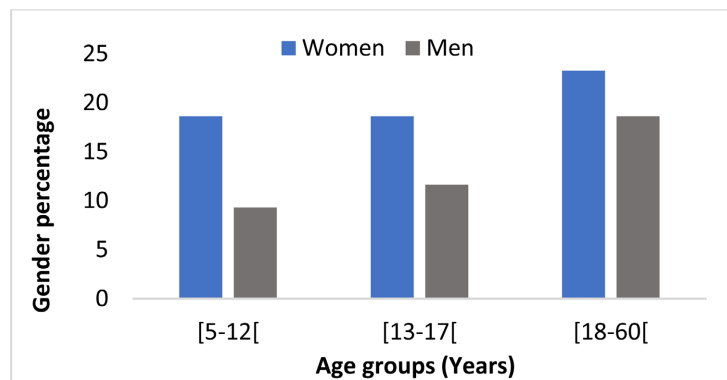


Figure 6. Patient age and gender distribution.

3.4.2. Microscopy Malaria Results

Microscopy was positive for 27 participants (62.79%), 2 of whom were excluded for parasitaemia greater than 200,000 p/ μ l and referred to a health facility for appropriate care. Two other participants (malaria negatives) withdrew their consent to take part in the study (Figure 7).

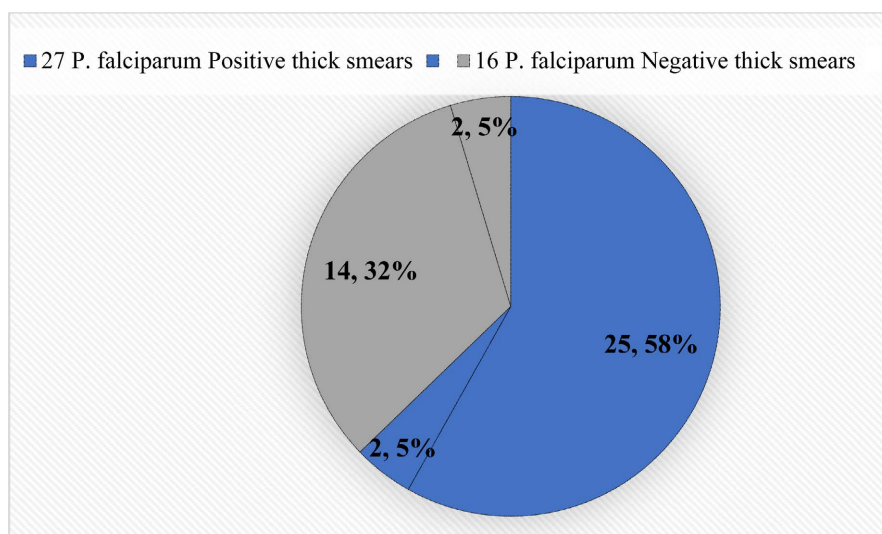


Figure 7. Microscopy inclusion results.

In order to preserve impartiality, the results of the microscopic diagnosis were not communicated to the TPH or to the patients. The remaining 39 participants (25 malaria positive and 14 malaria negative), were all considered for the rest of the study. At days 2 and 6 of the follow-up, all patients with negative blood films remained negative. No life-threatening signs were observed in patients diagnosed as positive for malaria parasites.

3.4.3. YIKI's Clinical Efficacy Results

Patient follow-up showed that after treatment with half of YIKI, 5 (20%) of the 25 patients with positive microscopy were negative on day 2 (PD2 = 0), 14 (56%) showed a decrease in parasite density (P) (PD2 < PD0) and 6 (24%) showed an increase in parasitaemia (PD2 > PD0). The latter were then referred to the hospital centre for appropriate care. On day six, after treatment with all the phyto-medicine, parasitaemia was negative in 7 patients and parasite density was reduced in the remaining 7. Evaluation of clinical efficacy showed 48% cure, 28% parasitaemia reduction and 24% therapeutic failure (**Figure 8**).

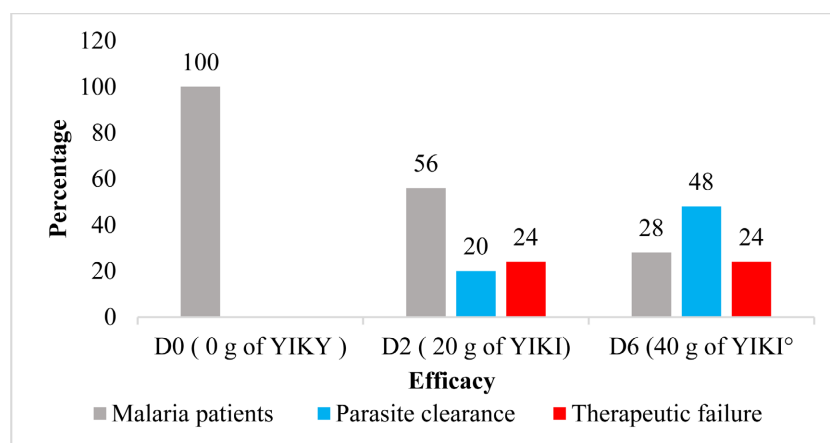


Figure 8. Clinical efficacy results depending on the treatment.

When assessing parasite densities, treatment was found to induce gametocyte production in a number of patients. Indeed, no gametocytes were identified at inclusion, but at D2, gametocytes were produced in a patient with treatment failure (PD2 > PD0), and at D6 gametocytes were produced in 4 non-cured patients (PD6 < PD2). The number of gametocytes was recorded in **Figure 9**.

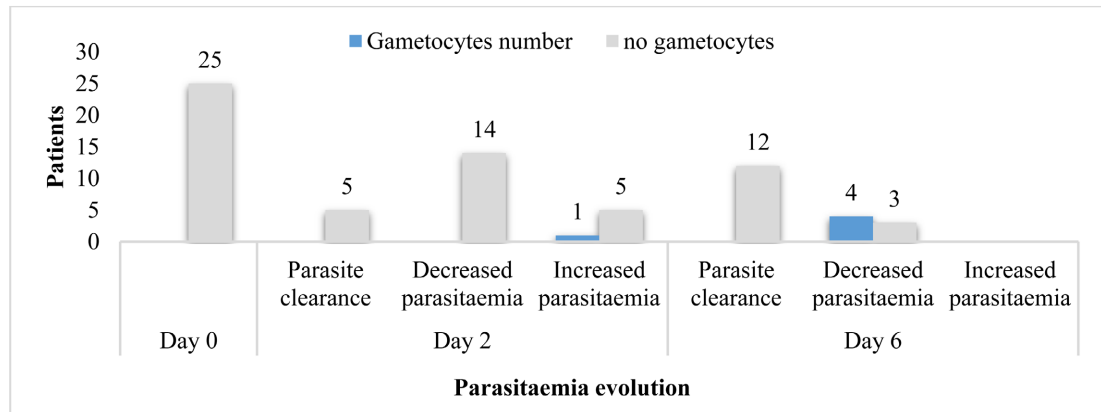


Figure 9. Gametocytogenesis during patients follow-up.

3.4.4. Hemoglobin Level Variation

To assess the treatment's potential cytotoxicity on red blood cells, patients' mean haemoglobin levels before treatment were compared to mean haemoglobin levels of the same patients at D2 and D6. Data from 19 patients with malaria and 14 patients without malaria who completed all visits were analysed separately. Statistical analysis indicated that no significant difference existed between mean haemoglobin levels before versus after treatment for without malaria patients. However, a significant difference was observed in the mean haemoglobin level before treatment compared with D2 and D6 for malaria patients. For patients without malaria, haemoglobin levels tended to increase, while those with malaria tended to decrease (**Figure 10**).

3.4.5. Temperature Variation

The mean temperatures of the 19 malaria patients and the 14 non-malaria patients at inclusion and who attended all visits were compared separately to assess the treatment impact on patient fever. Statistically, there was a significant decrease in pre-treatment temperature compared to post-treatment temperature. However, there was no significant difference between the mean temperatures at D2 and D6. The overall post-treatment mean temperature was approximately 36.4°C (**Figure 11**).

4. Discussion

This study was carried out in an urban centre in Burkina Faso, where modern health facilities are easily accessible to the local population. Despite this proximity, some patients showed a preference for traditional medicine. One of the reasons for this could be the low cost of YIKI's treatment, but another may be

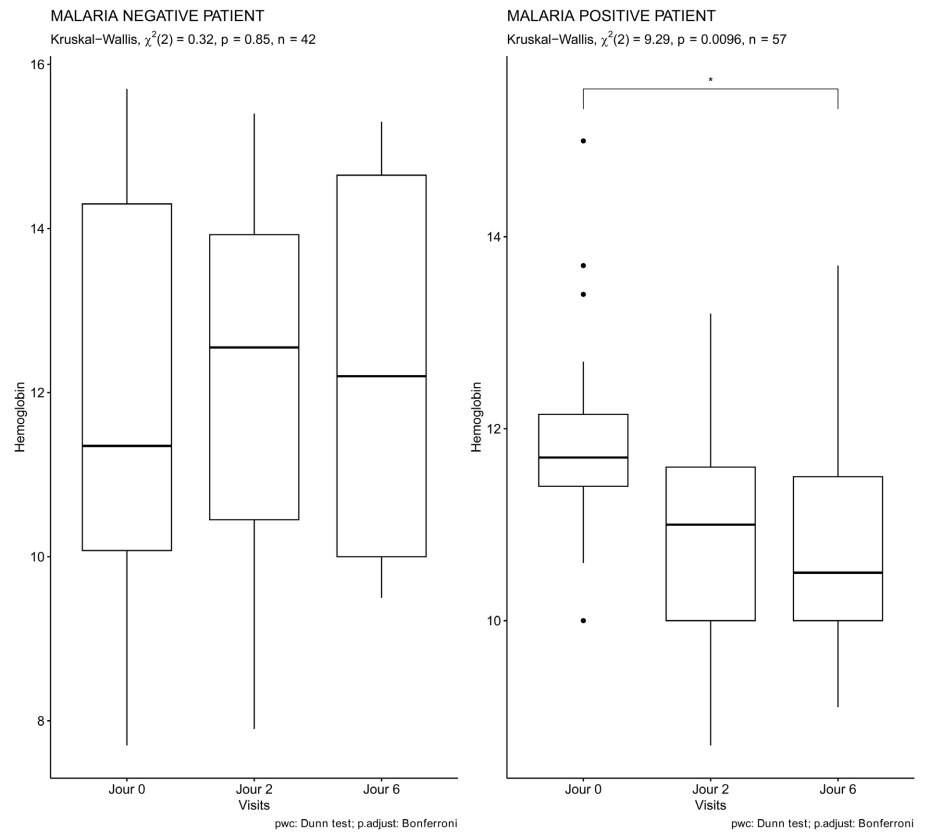


Figure 10. Hemoglobin levels during the follow-up.

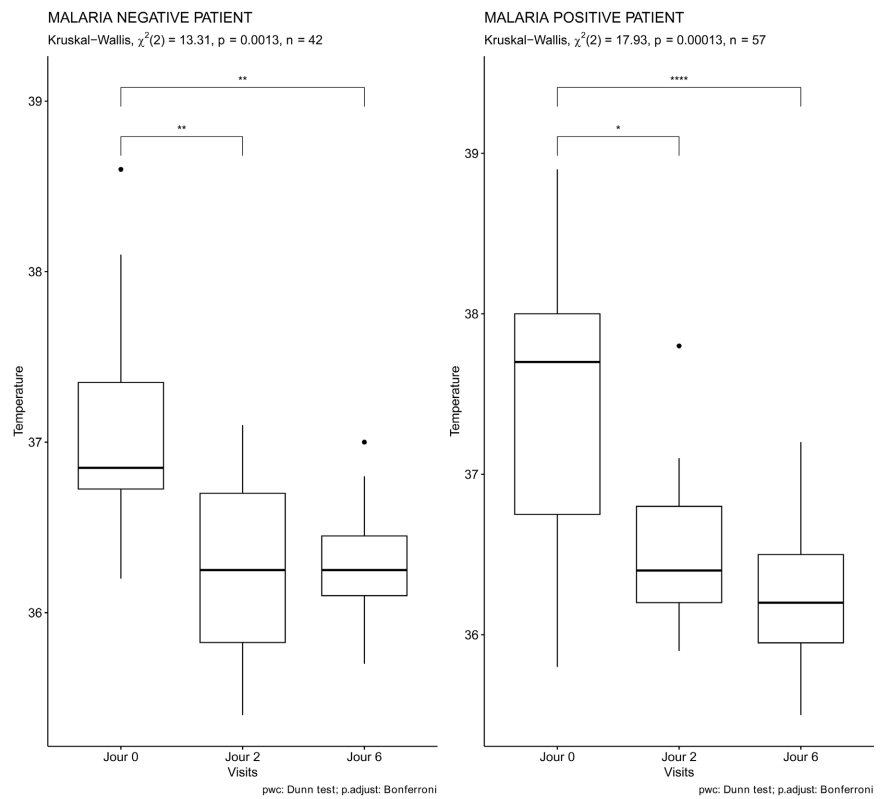


Figure 11. Mean temperatures during the follow-up.

satisfaction with the service provided by traditional healer. Traditional practitioners are very close to their communities and experience the same socio-cultural realities encountered by the population on a daily basis. This type of medicine takes a more holistic approach, which makes it easier to integrate into people's habits. Among the 43 cases of suspected malaria diagnosed by the traditional healer, 62.79% were confirmed as positive under the microscope. These results confirmed a certain knowledge of malaria symptoms by the healer but they also showed the limits of traditional diagnostic methods. The healer didn't use any modern diagnostic tools even though the malaria's clinical manifestations are non-specific [21] [22]. This situation could have serious consequences for some patients who don't have malaria. Their real illness could deteriorate for lack of appropriate care.

YIKI is a mixture of *A. leiocarpus*, *C. sieberiana*, *C. planchonii*, *S. longipedunculata*, *T. emetica*, *X. Americana* and *Z. zanthoxyloides*. These plants are widely used individually by West African populations to treat various illnesses including malaria [23]-[27]. Numerous studies have also shown that these plants are rich in antioxidants and possess a large variety of active molecules [28]-[37]. Indeed, a study conducted in Burkina Faso showed that *C. planchonii* dried rhizomes had very good anti-plasmodial activity (IC₅₀ 2.4 µg/ml) with Methanol fraction in Dichlorométhane (DCM) extract. In the same study, carotenoids such as cochloxanthin and dihydrocochloxanthin were isolated from *C. planchonii*, with IC₅₀ values of 6.8 µg/ml and 6.9 µg/ml respectively in the chloroquino-sensitive *P. falciparum* strain 3D7 [38]. Another anti-plasmodial test carried out *in vitro* with *C. planchonii* roots (IC₅₀ 4.4 lg/ml) and *A. leiocarpus* leaves (IC₅₀ 3.8 lg/ml) on *P. falciparum* K1 strains resistant to chloroquine, pyrimethamine and proguanil showed very strong anti-plasmodial activities [39]. In Burkina Faso, similarly research results using the MeOH extract of *A. leiocarpus* leaves (IC₅₀ = 4.9 µg/mL) and the alkaloid extract of *Z. zanthoxyloides* trunk bark (IC₅₀ = 1.2 µg/mL) showed good anti-plasmodial activity against multi-resistant *P. falciparum* W2 strain [40]. Another *in vitro* study that evaluated the activities of root and stem bark extracts as well as compounds isolated from *Z. zanthoxyloides* against susceptible (3D7) and resistant (Dd2) *P. falciparum* strains showed good antiplasmodial activity of the extracts. In the same *in vitro* study, DCM extracts of root and stem bark and MeOH extract of stem bark of *Z. zanthoxyloides* showed antiplasmodial activity against both strains, with IC₅₀ values ranging from 1 to 10 µg/mL. In addition, some compounds isolated from *Z. zanthoxyloides* such as bis-dihydrochelerythrinic ether, buesgenin, chelerythrin, γfagarin, skimmianin and pellitorin were also highly active against Dd2 and 3D7 strains, with IC₅₀ values less than 5 µg/mL [41]. *In vivo* antimalarial activity evaluation of the ethanolic extract of *C. sieberiana* root and stem bark against the chloroquine-sensitive strain of *P. berghei* NK65 in mice showed that the plant had interesting antimalarial properties [42]. Other reports evaluating the antiplasmodial activities of *S. longipedunculata* and *T. emetica* have also shown that these plants have antimalarial properties [43]-[45].

These various results show that the anti-plasmodial activity of the plants composing YIKI has been assessed individually, and the interesting results obtained encourage further research with a view to developing effective medicines. However, there is no scientific data to demonstrate the efficacy of these plants when used traditionally by local populations, and especially when used in combination. For this reason, the therapeutic evidence of the YIKI recipe has been evaluated in malaria positive patients. The protocol established to assess the clinical evidence of YIKI's efficacy was not a non-inferiority study involving the use of a standard antimalarial drug as control. But antimalarial activity was assessed by considering patients taking YIKI alone versus patients taking no antimalarial drug, in order to verify the capacity of the recipe alone to cure malaria. Results showed that YIKI's tea cured 48% of malaria patients. These results could be due to the secondary metabolites associated with the anti-plasmodial activities of YIKI plants. However, majority of patients were not cured (52%) and produced gametocytes for the most part. Gametocyte production during an episode of malaria can be considered a spontaneous process. A change in the parasite's environment that introduces a state of stress can cause asexual parasites to escape by producing gametocytes, the parasite's sexual form [46]. Several factors may explain the incomplete recovery associated with gametocyte production in patients. Firstly, an insufficient dosage of the drug may be suspected that could force the asexual parasites to undergo gametocytes production. Exposure of trophozoite to sub-curative doses of a first-line antimalarial drug, such as dihydroartemisinin, has been shown to result in an approximately four-fold increase in the rate of sexual parasite production [47]. Experimental studies with sub-curative doses of antimalarials such as ferroquine, artesunate and chloroquine have also shown similar results with high gametocytogenesis [48] [49]. On the other hand, combining several plants in a recipe is generally intended to achieve efficacy through their synergistic action. However, the combination of several plants, and therefore of several secondary metabolites, could also lead to antagonism between the different compounds, reducing their antiplasmodial activities [50] [51].

Therapeutic failure with YIKI was manifested by an increase in parasitaemia without the patient showing any signs of aggravation of disease. The protocol established for this study does not permit specification of the reasons for therapeutic failures, but they could be linked to incorrect dosage of the medicine, poor compliance with dosage by the patient, a problem of metabolism with YIKI, etc. The absence of any signs of aggravation in patients may also indicate that the therapeutic properties of YIKI are not solely anti-plasmodial. Research has shown that these plants are also used as anti-inflammatories, to treat fevers, pain, vomiting, etc. [43]. This can result in malaria complications, with patients thinking they've been cured while the disease is silently worsens.

Malaria infection destroys blood cells, resulting in low haemoglobin levels known as anaemia, which is one of the main causes of death in vulnerable people such as children and pregnant women [52] [53]. It is therefore necessary to use

medicines that do not have a cytotoxic effect that destroys red blood cells [54] [55]. Haemoglobin levels were unchanged during treatment in patients without malaria, which implies that YIKI does not induce anaemia. In contrast, patients who had malaria showed a significant decrease in haemoglobin levels, which could be associated with parasite and not drug damage, as some patients could not be cured. However, the haemoglobin level data analysed are not sufficiently large to conclude on the cytotoxicity of YIKI, but overall the results give an indication.

Overall, the results of this study, particularly the cure of certain patients and the fact that certain patients feel well despite not being cured, could justify the use of YIKI by the general public. However, there are some limits to its efficacy in malaria treatment. Further studies are needed to suggest ways of improving its efficacy. In fact, according to study results, 20 g of YIKI resulted in 20% cures and 56% parasitaemia decrease, while 40 g of YIKI increased the number of cures to 48% of patients, with 28% parasitaemia decrease. Consequently, YIKI's efficacy could be improved by increasing the drug quantity, and therefore the number of treatment days, but also by improving the herbal tea dosage.

5. Conclusions

The aim of this study was to determine traditional healer's medicinal practices and assess the efficacy of his YIKI antimalarial recipe. The healer is authorised by the Ministry of Health to use medicinal plants to treat malaria. He had a certain knowledge of malaria symptoms but his malaria diagnosis was rudimentary and suffered from precision problems. Recipe formulation and patient treatment followed a standard process, but THP does not use any reliable and reproducible dose adjustment parameters. Our results demonstrated that YIKI is capable of curing malaria and suggested that it has no cytotoxic effects. However, therapeutic failures and gametocytogenesis were observed in some patients. Furthermore, the number of patients included in the study was not sufficient to reach robust conclusions about the treatment's efficacy and safety.

In view of the promising results obtained, but also of the limitations observed, further studies are needed to improve the posology and galenic presentation of the YIKI. Preclinical efficacy studies, as well as efficacy assessments involving a large number of patients, are needed to appreciate and improve the recipe. Also, certain biochemical parameters (transaminases, bilirubin, creatinine, alkaline phosphatase, etc.) and haematological data could be investigated for a better assessment of toxicity.

Acknowledgments

The study was funded by LAMIVECT (Laboratoire Mixte International sur les Maladies à Vecteurs).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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