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J.A. Orwa, PhD (Pharm Chem), MSc (Pharm), B.Pharm, Principal Research Officer, P.G. Mwitari, MSc (Botany), BSc, Senior Research Officer, E.N. Matu, PhD (Ethnobotany and Plant Physiology), MSc (Botany), BSc (Hons), Senior Research Officer and G.M. Rukunga, PhD (Pharm Sci), MSc, BSc, Chief Research Officer, Centre for Traditional Medicine and Drug Research, Kenya Medical Research Institute, P.O. Box 54840-00200, Nairobi, Kenya

Request for reprints to: Dr. J.A. Orwa, Centre for Traditional Medicine and Drug Research, Kenya Medical Research Institute, P.O. Box 54840-00200, Nairobi, Kenya

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J.A. ORWA, P.G. MWITARI, E.N. MATU and G.M. RUKUNGA

ABSTRACT

Objective: **To document the ethnobotanical information on malaria treatment with the goal of eventually testing the medicinal plant extracts for antiplasmodial activity.**
Design: **A prospective study.**
Setting: **Informants from Kisumu city and its environs were gathered at the Kenya Medical Research Institute, Centre for Vector Biology Control Research, Kisian, Kisumu.**
Interventions: **Semi-structured Questionnaires were administered to 16 traditional health practitioners (THPs) to evaluate the THPs' perceptions and practice relating to causation and treatment of malaria.**
Main Outcome Measures: **The THPs described the signs, symptoms and cause of malaria. Details of the preparation and use of plants for management of malaria were recorded.**
Results: **Of the 16 respondents 12 (75%) knew that malaria is transmitted by mosquito bite and 12 (75%) recognised the main symptoms as fever. Of the 36 medicinal plants, claimed to treat malaria in Kisumu, 19 plants were identified at the East African Herbarium, National Museums of Kenya.**
Conclusion: **The ethnomedical and ethnobotanical data generated form the basis for pharmacological evaluation of the medicinal plants collected to establish their potential in the treatment of malaria.**

INTRODUCTION

Kisumu District is endemic for malaria, and malaria-related morbidity and mortality are important public health problems. Malaria is a parasitic disease and although there is much biomedical knowledge on causation, prevention, treatment and control, it still remains a public health problem particularly because of the rapid development of resistance to antimalarial drugs. Increasing *Plasmodium falciparum* resistance to chloroquine first, then now to sulphadoxine/pyrimethamine (SP) has led many countries in the East African region, including Kenya, to revise their treatment policy and adopt an artemisinin-based combination therapy (ACT) as first line drugs for treatment of uncomplicated malaria (1). However, ACT's are expensive and are still not readily accessible to the Kenyan rural population. Although artemisinin is a plant-based formulation, the combination therapy is still out of reach for the majority of the population due to economic factors. There is therefore an urgent need to continue the search for alternative, effective and affordable treatment.

Traditional medicine constitutes the main source of healthcare of about 80% of the rural people residing in the developing countries (2). In Africa, the use of traditional medicine has persisted over

the years despite its discouragement by colonialists and hence its going underground for most part of the 20th century. The last few decades have however, witnessed an upsurge of interest in traditional medicine and other alternative forms of healthcare in the developing and developed countries as well (3,4).

Research and other evidence have shown that there is widespread use of TM in Kenya (5). However, the exact proportion of Kenyans who make use of TM is largely unknown, but there are reports that 70-90% of the population make use of TM at one time or another (6). The practice is not only widespread in the rural but in urban areas as well as evidenced by increased activities of Traditional Health Practitioners (THPs) in both major and small towns in all the parts of the country (7).

One possible approach to the identification of new antimalarial drug candidates is to search for compounds that cure or prevent malaria in plants empirically used to treat malaria. Since knowledge about traditional medicinal practices and plants is currently transmitted from generation to generation principally by word of mouth, written information available about traditional Kenyan herbal medicine is only found in few books like that authored by Kokwaro (8). The main objective of this study was therefore to document the ethnobotanical information on malaria treatment with the goal of eventually testing the medicinal plant extracts for antiplasmodial activity in order to identify potential sources of novel antimalarial compounds

MATERIALS AND METHODS

Study site: This documentation study was carried out in Kisumu District which is endemic for malaria.

Study population: Traditional health practitioners (THPs) were recruited from among those practising within Kisumu city and the surrounding rural areas with assistance from the head of traditional health practitioners based in Kisumu.

Ethnobotanical Survey: A prior informed consent was obtained from the healers before interview. The healers signed the informed consent form after the purpose of the interview and their rights were explained to them. Sixteen THPs, aged between 19 and 68 years were interviewed by means of a semi-structured questionnaire developed by WHO/Afro. This involved an evaluation of the THP's perceptions and practice relating to causation and treatment of malaria. The questionnaire captured information relating to the collection of plants, their medicinal uses and the preparation of remedies. Details of the preparation and use of plants for management of malaria were recorded.

THPs' perceptions and practices relating to causation and treatment of malaria were evaluated. The focus was particularly on the information provided concerning the plants used to treat malaria. Botanical samples were taken and authenticated at the East African Herbarium, National Museums of Kenya.

RESULTS

Understanding traditional health practitioners (THPs) perceptions of malaria is a significant part of mounting a successful documentation of traditional medicine and malaria treatment. The THPs were asked to list signs, symptoms and cause of malaria; to describe medicinal plants they use for treatment and the mode of preparation of traditional medicines; and to state how they obtain the raw materials. Some socio-demographic data were also obtained. The findings are summarised below:

Marital status and age: More than 90% of the THPs interviewed were married. The majority (43.8%) were aged between 51-60 years and more than one third (37.5%) were 41 years and below.

Period of practice: Whereas 25% of the THPs interviewed had practiced for only five years or less, half had long term experience of more than 20 years, acquiring their knowledge through handing down from generations (100%).

Cause and diagnosis of malaria: Mosquitoes were perceived as the cause or transmitters of malaria by 75% or three out of four THPs interviewed. Chilly weather was quoted by 6.3% and the rest (18.8%) quoted other transmission modes different from biomedical facts. The clinical signs suggestive of malaria are principally fever, headache, backache, shivering and fatigue (9). The results showed that most (>80%) of the interviewed THPs were very familiar with the signs and symptoms relating to

malaria, as it is defined by conventional health practice. The THPs knew that malaria is transmitted by mosquito bite and recognised the main symptoms as fever. More than 75 % of THPs interviewed said they looked for signs of temperature or fever during diagnosis.

Medicine preparation and treatment: On the basis of information collected, roots, leaves, and bark are the popularly used parts of the plant species as they were quoted 12, 14 and 12 times respectively during the interviews. Concoctions (81.3%) were the most preferred mode of preparation of malaria remedies while only 18.8% of the THPs indicated that they prepared their malaria remedies in form of decoctions. A decoction is prepared by boiling plant parts of single species in water. To prepare a concoction, plant parts are obtained from more than one plant species. Most of the interviewed THPs (87.5 %) reported that they administered the traditional remedies using the oral route. In more than 60% of cases, treatment took 6-10 days.

Documentation of medicinal plants claimed to treat malaria: A total of 36 plant species, claimed to treat malaria were documented in the local Luo language and only 19 were botanically authenticated so. Botanical specimens for the rest were unavailable as the THPs claimed they obtain them from far places or purchase the plant parts from markets. Samples of the 19 plant species were collected and verified at the East African Herbarium, National Museums of Kenya where voucher specimens were deposited.

Vernacular and scientific names of plants claimed by THPs in Kisumu to treat malaria are presented in Table 1. Scientific reports on the pharmacological potential of these plants are also included where information was obtained in literature. The plants claimed by THPs to treat malaria included a large number of species from different families. *Toddalia asiatica* (Rutaceae) was most cited (37.5%) followed by *Catharanthus roseus* (31.3%) and then *Trimeria grandifolia* (18.8 %). The rest of the plant species were only mentioned by one or two THPs interviewed.

DISCUSSION

It is interesting to note that many young people are taking up traditional medicine practice thus ensuring its continuity and survival after the passing on of the older generation. Majority (>75%) of THPs interviewed were familiar with the cause and diagnosis of malaria and hence, the traditional therapy they use in the management of malaria is indeed used for the intended purpose. It is also interesting to note that the THPs' perception of typhoid as a disease related to malaria may be due to similarity in the symptoms. Concoctions (81.3%) were the most preferred mode of preparation of malaria remedies as indeed the use of concoctions in traditional medicine therapy is said to be useful in a number of ways. The different plant species may act synergistically to enhance the activity of one another. In another case one plant species may neutralise the toxic effects of other plant species while allowing the active portion to alleviate illness. Within the context of traditional practice, malaria (and/or malaria symptoms) is commonly treated by concoctions or infusions from bitter plants (10). Individual plants are rarely used alone. The more than 80% of THPs who indicated during this study that they used more than one plant species to prepare traditional remedies for malaria supports this perception. The use of oral route for traditional medicine administration is in line with conventional medicine where the preferred mode of medicine administration is oral.

Scientific work done on some of the plants identified confirms their medicinal potential. An alkaloid nitidine isolated from *T. asiatica* exhibited potent antimalarial activity (11) while in another study an antiplasmodial coumarin was isolated from the roots of *T. asiatica* (12). On the other hand no literature report was found for *Catharanthus roseus* as antiplasmodial, however the anticancer agents, vincristine and vinblastine are known to have been isolated from this medicinal plant (13). *Maytenus senegalensis* (14), *Clerondendrum myricoides* (15) and *Ximenia americana* (16) were shown to have potential antimalarial activity in *in vitro* studies using *P. falciparum.*

Antimicrobial properties of *Harrisonia abyssinica* leaves (17) and roots (18) and antifungal activity of *H. abyssinica* (19) have been reported. Other studies demonstrated antibacterial activities of *Euclea divinorum* (20) and *Grewia bicolor* (21), antiviral activities of *Carissa edulis* (22) and *Markhamia lutea* (23) and antidiabetogenic activity of *Tamarindus indica* (24). Antimalarial potential was found for more than 20% of the documented plant species, from the literature sources accessed.

Table 1

Plants traditionally used to treat malaria by the traditional health practitioners (THPs) interviewed in Kisumu

Plant species	Family	Local name (Luo)	% THPs who gave information (n=16)	Literature on scientific work on identified plants
Toddalia asiatica (L.) Lam	Rutaceae	Nyaluet kwach	37.6	Isolated alkaloid nitidine (11) and coumarine (12) showed potent anti-plasmodial activity
Catharanthus roseus (L.) G. Don	Apocynaceae	Akech madongo	31.3	Source of known anticancer agents vincristine and vinblastine (13)
Trimeria grandifolia (Hochst) Warb	Flacourtiaceae	Akech matindo	18.8	
Maytenus senegalensis (Lam.) Excell	Celastracae	Tido	12.5	Antiplasmodial activity (14)
Harrisonia abyssinica Oliv.	Simeroubaceae	Pedo	12.5	Antimicrobial (17,18) and antifungal activity (19)
Clerondendrum myricoides (Hochst) Vatke	Verbenaceae	Okwaro	6.3	Potential antimalarial (15)
Ximenia americana L.	Olacaceae	Olemo	6.3	Anti - *P. falciparum* ativity (16)
Euclea divinorum Hiern.	Enenaceae	Ochol	6.3	Antibacterial activity (20)
Grewia bicolor Juss.	Tiliaceae	Powo	6.3	Antibacterial activity (21)
Carissa edulis (Forssk.) Vahl	Apocynaceae	Ochuoga	6.3	Antiviral activity (22)
Markhamia lutea (Benth.) K.Schum.	Bignoniaceae	Siala	6.3	Antiviral activity (23)
Tamarindus indica L.	Caesalpinoideae	Chwa	6.3	Antidiabetogenic activity (24)
Celosia schweinfurthiana Schinz.	Amaranthaceae	Tungu	6.3	
Vangueria volkensii K. Schum	Rubiacea	Anyuka	6.3	
Leonotis neptifolia (L.) Ait.f.	Labiateae	Nyanyodhi	6.3	
Senna occidentalis (L.) Link	Caesalpinoideae	Oinglatiang	6.3	
Albizia coriaria Oliv.	Mimosoideae	Ober	6.3	
Melia azadirachta	Meliaceae	Dwele	6.3	
Commelina forskaolii Vahl.	Commelinaceae	Achak	6.3	

CONCLUSION

The ethnomedical and ethnobotanical data generated form the basis for pharmacological evaluation of the medicinal plants collected to establish their potential in the treatment of malaria.

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REFERENCES

1. WHO (2001) Antimalarial drug combination therapy. Report of a WHO Technical Consultation. WHO/CDS. RBM/2001/35.
2. Akerele O. WHO'S traditional medicine programme: progress and perspectives. *WHO Chronicle.* 1984; **38:** 76-81.
3. Zhang X. Traditional medicine and WHO. *World Health* (WHO Magazine). 1996; **2:** 4-5.
4. Craker L.E. Trends in medicinal and aromatic plant production in the United States. *Acta. Horticulturae.* 1999; **502:** 71-75.
5. Nyamwaya D. A case for traditional medicine in official health services. Flogging a dead horse? In: Sindaga I., Nyaigotti-Chacha C., Kanunah M.P. (Eds.). Traditional medicine in Africa. *East Afr. Edu.Publ. Ltd. Nairobi.* 1995.
6. Odera J. Traditional beliefs, sacred groves and home garden technologies: adapting old practices for conservation of medicinal plants. In: Kinyua A.M., Kofi-Tsekpo W.M. and Dangana L. (Eds.). Conservation and utilisation of indigenous medicinal plants and wild relatives of foods crops. UNESCO, Nairobi Office. 1997.
7. Aketch C.A. A preliminary survey of the conservation status of some plant species in Kenya. In: Edwards S. and Asfaw Z. (eds). The status of some plant resources in parts of tropical Africa. Botany 2000: East and Central Africa. NAPRECA monograph series No. 2. NAPRECA, Addis Ababa University, Addis Ababa, 1992.
8. Kokwaro J.O. Medicinal plants of East Africa. *East Afr. Lit. Bureau. Nairobi.* 1993.
9. Nuwaha F. People's perceptions of malaria in Mbarara, Uganda. *Trop. Med. Int. Hlth.* 2002; **7:** 452-470.
10. Randrianarivelojosia M., Rasidimanana V.T., Rabarison H., *et al.* Plants traditionally prescribed to treat *tazo* (malaria) in the eastern region of Madagascar. *Malar. J.* 2003; **24:** 25.
11. Gakunju D.M., Mberu E.K., Gray A.I., *et al.* Potent antimalarial acivity of the alkaloid nitidine, isolated from a Kenyan herbal remedy. *Antimicrob. Agents Chemother.* 1995; **39:** 2606-2609.
12. Oketch-Rabah H.A., Mwangi J.W., Lisgarten J. and Mberu E.K. A new antiplasmodial coumarin from Toddalia asiatica roots. *Fitoterapia.* 2000; **71:** 636-640.
13. Ram V.J. and Kumari S. Natural products of plant origin as anticancer agents. *Drug News Perspect.* 2001; **14:** 465-482.
14. El Tahir A., Satti G.M. and Khalid SA. Antiplasmodial activity of selected Sudanese medicinal plants with emphasis on Maytenus senegalensis (Lam.) *Exell. J. Ethnopharmacol.* 1999; **64:** 227-233.
15. Muregi F.W., Chhabra S.C., Njagi E.N., *et al.* Antiplasmodial activity of some Kenyan medicinal plant extracts singly and in combination with chloroquine. *Phytother. Res.* 2004; **18:** 379-384.
16. Benoit F., Valentin A., Pelissier Y., *et al. In vitro* antimalarial activity of vegetal extracts used in West African traditional medicine. *Amer. J. Trop. Med. Hyg.* 1996; **54:** 67-71.
17. Fabry W., Okemo P.O. and Ansorg R. Antibacterial activity of East African medicinal plants. *J. Ethnopharmacol.* 1998; **60:** 79-84.
18. Fabry W., Okemo P. and Ansorg R. Activity of East African medicinal plants against *Helicobacter pylori. Chemotherapy.* 1996; **42:** 315-317.
19. Fabry W., Okemo P. and Ansorg R. Fungistatic and fungicidal activity of East African medicinal plants. *Mycoses.* 1996; **39:** 67-67.
20. Homer K.A., Manji F. and Beighton D. Inhibition of peptidase and glycosidase activities of Porphyromonas gingivalis, Bacteroides intermedius and Treponema denticola by plant extracts. *J. Clin. Periodontol.* 1992; **19:** 305-310.
21. Jaspers M.W., Bashir A.K., Zwaving J.H. and Malingre T.M. Investigation of Grewia bicolor Juss. *J. Ethnopharmacol.* 1986; **17:** 205-211.
22. Tolo F.M., Rukunga G.M., Muli F.W., *et al.* Anti-viral activity of the extracts of a Kenyan medicinal plant Carissa edulis against herpes simplex virus. *J. Ethnopharmacol.* 2006; **104:** 92-99.
23. Kerman M.R., Amarquaye A., Chen J.L., *et al.* Antiviral phenylpropanoid glycosides from the medicinal plant Markhamia lutea. *J. Nat. Prod.* 1998; **61:** 564-570.
24. Maiti R., Jana D., Das U.K. and Ghosh D. Antidiabetic effect of aqueous extract of seed of Tamarindus indica in streptozotocin-induced diabetic rats. *J. Ethnopharmacol.* 2004; **92:** 85-91.