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Ethnomedicinal survey of plants used in the treatment of malaria in Southern Nigeria

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ABSTRACT

Ethnopharmacological relevance: Malaria is one of the most severe public health problems worldwide. It is a leading cause of death and disease in many developing countries, where young children and pregnant women are the groups most affected. Spread of multidrug-resistant strains of *Plasmodium* and the adverse side effects of the existing anti-malarial drugs have necessitated the search for novel, well tolerated and more efficient antimalarial drugs. This ethnomedicinal study surveyed the different types of medicinal plants used for the treatment of malaria in Southern Nigeria with the intent of identifying plants that are traditionally employed in the treatment of malaria across geopolitical boundaries.

Materials and methods: Data were collected from 79 respondents composed of 50 traditional herbsellers and 29 herbal practitioners using a semi-structured questionnaire. Data was analyzed using frequency and percentages.

Results: Of the 79 respondents interviewed, 24% were males while 76% were females. A total of 156 species belonging to 60 families were reported being used to treat malaria in the study area. Fabaceae was the most represented family having fourteen (14) plant species. Of the plants identified during the survey, *Azadirachta indica* was the species of highest relative frequency of citation (RFC – 1.0). The dominant plant parts used in the preparation of remedies were leaves (50.50%) and Decoction was the main method of preparation. Analysis of regional plant occurrence revealed that South-Western Nigeria represented the region with the highest plant occurrence (60.7%) followed by South–South (24%) and South–East (15.3%). Regional occurrence of plants used in the treatment of malaria in Southern Nigeria is reported here for the first time.

Conclusion: This study has documented a great diversity of plants used in the treatment of malaria in Southern Nigeria. Extracts prepared strictly according to the practitioners' recipes should therefore be screened for antiplasmodial activity and toxicity by *in vitro* and *in vivo* standard tests to justify their local usage. These studies might lead to the isolation and possible identification of potentially active compounds, which may be regarded as future promising phytomedicines in the treatment of malaria. Conservation of these plant species is also recommended to ensure their continuous availability for future use.

1. Introduction

Traditional medicine has been the focus for wider coverage of primary health care delivery in Africa and the rest of the world (Elujoba et al., 2005). According to WHO (1978), traditional medicine refers to the sum total of knowledge or practices whether explicable or inexplicable used in diagnosing, preventing or eliminating a physical, mental or social disease, which may rely exclusively on past experience or observation handed down from generation to generation, verbally or in writing. It comprises therapeutic practices in existence for hundreds of years before the development of modern scientific medicine and is still in use today without much documented evidence of adverse effects (Okigbo and Mmeka, 2006). Plants have always been a major component of traditional system of healing in developing countries, which have also been an integral part of their history and cultural practices. Medicinal plants offer alternative remedies with tremendous opportunities. Many traditional healing herbs and plant parts have been shown to have medicinal value especially in the rural areas and that these can be used to prevent and cure several human diseases. Even today, majority of the world population depends on herbal healthcare practice.

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Malaria disease is caused by parasites of the genus *Plasmodium* and is spread by the female anopheles mosquitoes. In adults, its common symptoms are headaches, weakness, fever, aches and pains, high body temperature (chills and rigors) and bitterness of the mouth (and loss of appetite) while in children, in addition to the above-mentioned symptoms, it may also manifest in more than normal sleeping, nausea and vomiting (Jimoh et al., 2007). Malaria is one of the most severe public health problems worldwide. It is a leading cause of death and disease in many developing countries, where young children and pregnant women are the groups most affected. According to the World Health Organization's Report, 2013 and the Global Malaria Action Plan, 3.4 billion people (half the world's population) live in areas at risk of malaria transmission in 106 countries and territories. In 2012, malaria caused an estimated 207 million clinical episodes, and 627,000 deaths. An estimated 90% of deaths in 2012 were in the African Region (WHO, 2013). In 2013, 97 countries had on-going malaria transmission. 80% of estimated malaria deaths occur in 18 most affected countries. About 40% of malaria deaths occur in just two countries: Nigeria and the Democratic Republic of the Congo (WHO, 2013). Spread of multidrug-resistant strains of *Plasmodium* and the adverse side effects of the existing anti-malarial drugs have necessitated the search for novel, well tolerated and more efficient antimalarial drugs (Olliaro and Trigg, 1995; Bickii et al., 2000). The need for an alternative drug has initiated intensive efforts for developing new anti-malarials from indigenous plants. Various studies have been documented with over 1200 plant species from 160 families used in the treatment of malaria or fever (Willcox et al., 2004). Similar investigations have been carried out in many African nations like Ethiopia (Bekalo et al., 2009), Kenya (Bussmann, 2006; Njoroge and Bussmann, 2006), Ghana (Asase et al., 2005), Cameroon (Titanji et al., 2008) and Nigeria (Odugbemi et al., 2007; Ajibesin et al., 2008; Olowokudejo et al., 2008; Idowu et al., 2009; Kayode et al., 2009; Dike et al., 2012). Most of the cited studies in Nigeria were mostly restricted to single states in the federation and this may have posed some limitations on them such as the exclusion of some potential antimalarial plants. The present study however covers the Southern region of Nigeria with the intent of filling these gaps and identifying plants that are traditionally employed in the treatment of malaria across geopolitical boundaries.

2. Materials and methods

2.2. Description of study area

The study area covers Southern Nigeria, comprising of three (3) regions (geopolitical zones) namely: the south–west region (comprising of Lagos state, Ondo state, Ogun state, Ekiti state, Oyo state and Osun state), south–south region (comprising of Delta state, Edo state, Bayelsa state, Rivers state, Cross rivers state and

Fig. 1. Map showing the states making up the Southern regions of Nigeria.