Journal of Ethnopharmacology 185 (2016) 347–360

Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Ethnomedicinal survey of medicinal plants used in the management of sickle cell disorder in Southern Nigeria

O.O. Amujoyegbe [a,*], M. Idu [a], J.M. Agbedahunsi [b], J.O. Erhabor [a]

[a] Department of Plant Biology and Biotechnology, Faculty of Life Sciences, University of Benin, Benin City, Nigeria
[b] Drug Research and Production Unit, Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria

ARTICLE INFO

Article history:
Received 25 September 2015
Received in revised form
16 March 2016
Accepted 16 March 2016
Available online 21 March 2016

Keywords:
Ethnomedicine
Euphorbiaceae
Fabaceae
Fidelity value
Medicinal plants
Nigeria
Sickle cell disorder
Use value

ABSTRACT

Ethnopharmacological relevance: The present study entails the medicinal plant species used to manage sickle cell disorder in Southern States of Nigeria.
Materials and methods: The ethnomedicinal information was gathered through multistage approach from three geopolitical zones of Southern Nigeria, which were purposively selected. Semi-structured questionnaires were administered on 500 respondents in 125 locations. The ethnomedicinal data collected were analyzed using quantitative value indices such as fidelity level (percentage) and use value. The information got was cross checked using literature search and other related materials.
Result: Five hundred respondents comprising 53.12% females and 46.88% males were observed. It was noted that 26.70% were illiterate while 73.30% had formal education. Seventy-nine percent is traditional healers, 27% herb traders and the other 4% are those who have awareness of sickle cell disease . One hundred and seventy five plant species belonging to 70 families, of which Fabaceae made up 26.76% and Euphorbiaceae 16.90% forming the highest occurrence. It was observed that leaves were the most common plant part used (69.10%) followed by root (15%) and stem bark (14%) in the preparation for sickle cell management. Majority (48.57%) of these plants were harvested from wild with 38.86% being trees. *Citrus aurantifolia* and *Newbouldia laevis* had highest use values of 0.69 and 0.64 respectively. Plants with the least use value (0.001) include *Abrus canescens, Acacia xanthophloea, Aerva lanata and Axonopus compressus.* The result of fidelity level values of the plant species for the management of Sickle Cell Disorder (SCD) revealed that *Citrus aurantifolia* had the highest value of 70.2% while *Angraecum distichum* and *Axonopus compressus* had the lowest Fidelity Level value of 0.18%.
Conclusion: The study revealed that people in the studied areas were well grounded in the medicinal plants used to manage sickle cell disease. This study reported for the first time 102 plant species having anti-sickling potentials with Fabaceae and Euphorbiaceae as the most dominant plant families. Many of the claimed plants were harvested from the wild showing threat thus providing needs for conservation of plants. The documented plants had high use value and fidelity level that provided quantitative and qualitative ethnomedicinal evaluation within and across the plant families. These give room for further scientific investigations in pharmacological profiles.

1. Introduction

Sickle cell disorder (SCD) or sickle cell anemia is an autosomal recessive genetic blood disorder with over-dominance characterized by red blood cells with abnormal, rigid, sickle shaped. This is one disease afflicting the population living in Africa, South America and Asia. It occurs in other ethnic groups including Mediterranean and Middle Eastern descent (WHO, 2007). Sickling of red blood cells occur because of the polymerization of deoxygenated Hbs. This abnormality characterized by painful episodes, chronic anemia, enlarged spleen, serious frequent infections and damage to vital organs (Balgir, 2006). The sickled red blood cells have small oxygen contact that increased blood viscosity and impede normal circulation in small blood vessels resulting in ischemia and infarction (Carl and Ashwood, 1996). As a result, micro-vascular occlusion arises which may lead to serious, sometimes fatal crises (Mehanna, 2001). Over 50 million people were affected throughout the world (Diop et al., 2000; Gulbism et al., 2005). African continent remains the most affected by this disease with the highest prevalence in its West and Central parts. In Nigeria, the number of occurrence is believed to be up to four million and at least 12 million people suffer from sickle cell disease

* Corresponding author.
E-mail address: olayinkaamujoyegbe@gmail.com (O.O. Amujoyegbe).

http://dx.doi.org/10.1016/j.jep.2016.03.042
0378-8741/

worldwide (Ibrahim et al., 2007). Treatment of SCD required that one focus on ways of inhibiting sickle cell haemoglobin polymerization and prevention or repair of red cell dehydration. SCD treatment also requires interrupting the interaction of sickle cells with the endothelium (Brugnara et al., 1993; Charache et al., 1995; Kinney et al., 1999; Claster and Vichinsky, 2003; Vadolas et al., 2004). Hydroxyurea is a known inhibitor of sickle cell polymerization and various drugs containing it has an ability to increase fetal hemoglobin concentration (Mcgoron et al., 2000; Sauntharajah et al., 2009).

Veeramuthu (2006) noted that more than 80% of the world population relies on traditional medicine for their primary health care. The World Health Organisation (WHO, 2002) estimated 90% of the population of developing countries relied on medicinal plants to help meet their primary health care needs. In developing countries, medicinal plants used to treat sickle cell crises associated morbidities among the less privileged classes of the society. Treatment and management of diseases such as HIV/AIDS, malaria, diabetes, sickle-cell anemia and mental disorders involve the use of medicinal plants (Elujoba et al., 2005). Medicinal plant extracts were found to have ability to prevent the erythrocytes from deforming and losing its integrity. Adejumo et al. (2010) reported the *in vitro* antisickling activities of crude methanol extracts and aqueous fractions of roots of *Plumbago zeylanica* and *Uvaria chamae*. Result of the antisickling assay of root of *P. zeylanica* and *U. chamae* showed the abilities to inhibit sickling under hypoxia condition. *Terminalia catappa* could be effective antisickling agents that inhibit induced hemolysis of human erythrocytes (Mgbemene and Ohiri, 1999). Traditional healers and local folks have knowledge of the indigenous and healing properties of various herbs common to their locality. These herbs may not be documented and could be lost in near future. The need to gather knowledge from various geographical areas and collate information necessary for database of medicinal plants used to manage SCD in those areas is the aim of this paper.

2. Materials and methods

2.1. Description of the study area

The survey was carried out within the forest agro-ecological region of southern part of Nigeria (Fig. 1). The basic occupation of the people in the study areas are more of agrarian. The selected state includes- Osun, Oyo, Ondo in Southwestern Nigeria, Edo in South South zone of Nigeria, and Enugu State in Southeastern Nigeria. The agro-ecology areas experiences eight months (March–October) of bimodal rainfall and five months (November–March) of dry season each year with irregularity in the rainfall distribution. Vegetation in the study area is rainforest with patches of guinea savanna in Ondo state. The survey covered nine months (July 2014–March 2015).

2.2. Ethnomedicinal data collection

Multistage sampling procedure was used to select respondents

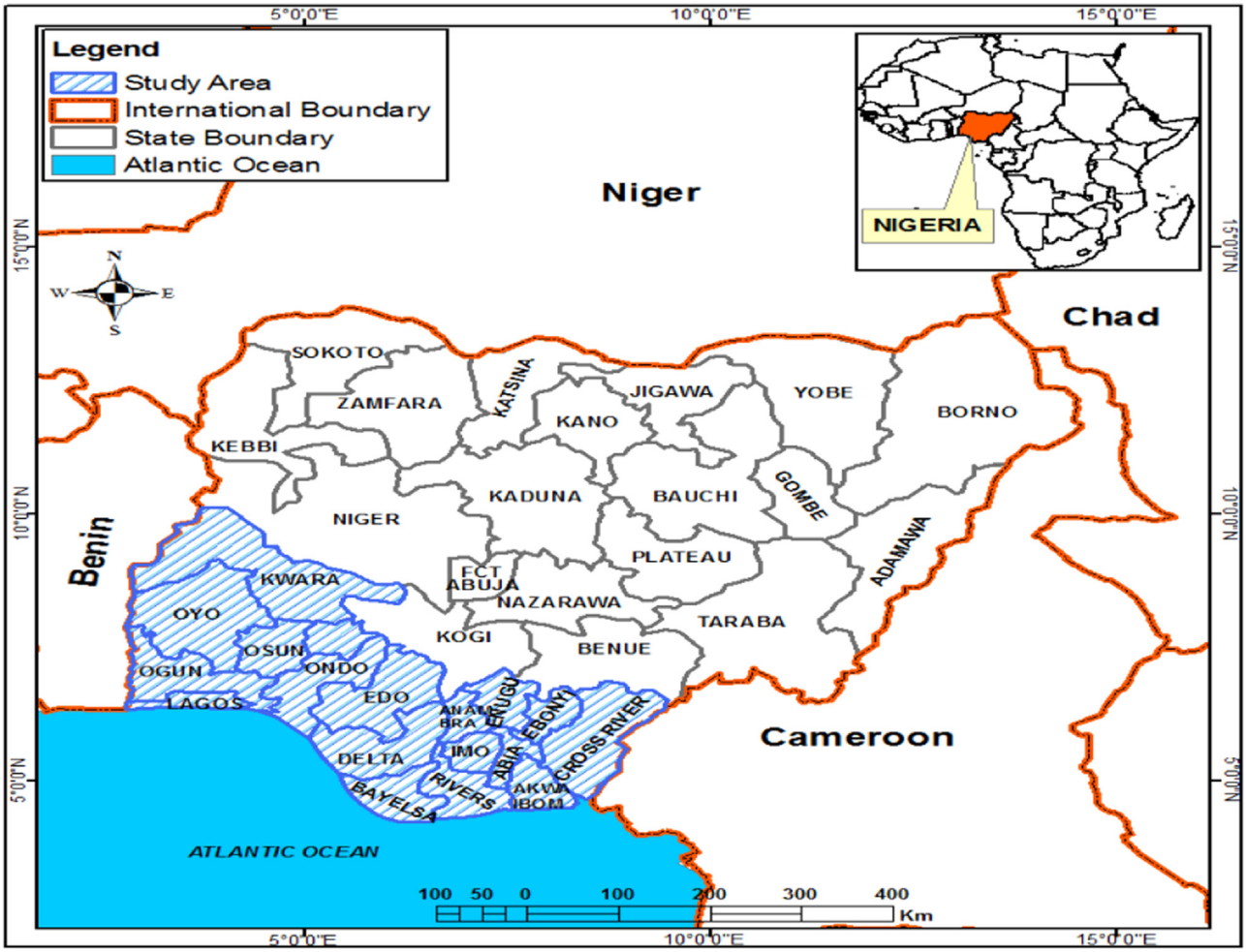

Fig. 1. Location map of the study area consisting of South West, South East and South South regions of Nigeria (West Africa).