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Ethno-medicinal knowledge and plants traditionally used to treat anemia in Tanzania: A cross sectional survey

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ABSTRACT

Background: Ethnopharmacological relevance: Indigenous communities have often served as rich repositories of empirical knowledge on medicinal plants used for anemia. Use of these plants need to be validated with respect to their efficacy and safety so as to provide scientific basis of their use. Quantifying presence of medicinal plants used for anemia treatment, validating indigenous knowledge and extent of its use in rural Mkuranga district, Tanzania is the main focus of this paper.
Methods: A cross sectional study conducted in May and December 2013 at Mkuranga District of Coastal region of Tanzania. Forty key informants including traditional healers, religious leaders, community members and healthcare workers were interviewed using semi structured questionnaire. Eight focus group discussions were also conducted. Both interviews and focus group discussion gathered data on socio-demographics, general knowledge of anemia and plants used to correct anemia. In a brief field visit, all plants mentioned during the interview were collected and later identified. Both NVivo 10 and STATA softwares were employed for statistical analysis.
Results: Out of 40 participants, 31 were traditional healers, majority were male (77.4%). Mean age of the participants was 55.7 ± 15 years. About 45% had no any formal education and majority (80%) were married. Twenty eight plant species are used to treat anemia. *Hibiscus sabdariffa* was the most mentioned species. The species belongs to 24 families, with Euphorbiaceae (14.3%) having the largest number. *Lawsonia inermis, Aloe sp, Uvaria acuminata, Parinari curatellifolia, Ozoroa reticulata, Manihot esculenta, Canthium sp and Afzelia quanzensis* were the plant species in which their claimed use for anemia were novel.
Conclusions: People in rural areas of Mkuranga district possess a rich traditional knowledge of medicinal plants species for anemia treatment. Researches on these plants showed promising anti-anemic activity. Analysis and documentation of this knowledge has not only helped the analysis and recognition of novel information, it also contributed to conserving it for future generations.

1. Introduction

The oldest recorded uses of medicinal plants in the treatment of human ailments and maintenance of health are found in the Sumerian clay slab from Nagpur, approximately 5000 years old, the Babylon circa 1770 B.C in the Code of Hammurabi and in ancient Egypt circa 1550 B.C (Petrovska, 2012). Much of the world's populations, especially in developing countries depend much on medicinal plants for primary health care requirements. Indigenous people have been the custodians of traditional knowledge passed down from one generation to another on plant species used for different purposes such as medicine, pesticides, food, beverages, dyes, fragrances, resins, gums, arrow poisons and other purposes (Petrovska, 2012). Such ethno-medical knowledge in indigenous communities is on threat of disappearing. The threat is especially acute in cultures where information is passed orally rather than written and is exacerbated by modernization.

Anemia, one of the oldest, most common and widespread blood disorder, is a public health problem in both developing and developed countries (WHO, 2008; Domínguez-Rodrigo et al., 2012). Globally, there are approximately 1.62 billion people having some form of anemia. Africa has disproportionately higher proportion of individuals affected by anemia, with prevalence of 67.6% in 2005 (WHO, 2008). Although anemia affects all individuals at all stages of life cycle, preschool children and women of reproductive

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age are the most vulnerable population groups (WHO, 2001). At least 59% of Tanzanian children between 6 and 59 months and 40% of women of reproductive age are anemic (Bureau of al., 2011).

Iron deficiency which is a result of low intake of bioavailable dietary iron, is considered as the major causes of anemia (McLean et al., 2009). It was estimated that, 60% of all anemia cases are due to iron deficiency in non-malaria area while 50% in malaria endemic area (Stoltzfus, 2003). While iron deficiency contributes to most of the anemia cases, other causes should also be recognized. These include infection with hookworms, schistosomiasis, Malaria and HIV, other micronutrients deficiency, trauma and blood loss (WHO, 2001). In Tanzania, the major cause of iron deficiency anemia (IDA) are poor diet and low bioavailability of dietary iron (Tatala et al., 1998). Like other developing countries, large section of Tanzanian population is poor. Their staple foods are mainly cereals: maize, sorghum or rice, and in some areas the starchy tuber cassava. Although this diet met the energy and protein requirements to support an adequate growth rate, it obviously does not provide enough absorbable iron (Tatala et al., 1998). Inadequate consumption of meat, fish, or poultry, especially in poor families contribute substantially to iron deficiency anemia (Bhargava et al., 2001).

Iron deficiency anemia has been considered as the most important contributing factor to the global burden of disease (WHO, 2002). It also has profound consequences on socio-economic development. Anemic adults and adolescents have reduced physical capacity and work performance (Edgerton et al., 1979). IDA has been known to negatively affect cognitive performance, behavior and physical growth of infants, preschool and school-aged children. In addition it has been recognized as the major risk factor for maternal and child mortality as well as negatively affect immune status and increase morbidity from infections in all age groups (Theresa and Scholl, 1994; WHO, 2001).

Interventions to combat IDA in Tanzania have been implemented with little health gain. Inadequate access to quality medicine for anemia among the poor, unpleasant odor and adverse effects mainly constipation, diarrhea and epigastric pain associated with ferrous supplements contribute significantly to the limited success of the present interventions (Ekstrom et al., 1996; Ariani Impieri et al., 2009). Therefore, the need to search for better alternative therapy is evident.

In Tanzania, interest in traditional medicine has appreciably increased in recent years as indicated by number of Tanzanian particularly rural dwellers use of traditional medicines (Wenzel, 2011). The gained popularity in traditional medicines could be because the medicines are easily accessible, associated with less adverse effects and economically affordable to the rural people (Eto, 2013). Although rural communities in Tanzania largely depend on traditional medicines to correct anemia, less attention has been paid to the immense wealth of knowledge about the medicinal uses of the local flora which exists amongst ethnic groups. The irretrievable loss of large amounts of this knowledge due to the extinction of plant species caused by climate change, urban expansion and destruction of habitat could be prevented to a large extent by proper documentation. In addition, documentation of this indigenous knowledge could also be an important step towards identifying the most promising medicinal plants that can be used against anemia at primary health care level. Therefore, this study aimed at quantifying presence of medicinal plants used for anemia treatment, validating indigenous knowledge and extent of its use in rural Mkuranga district, Tanzania.

2. Methods

2.1. Study design and setting

A cross sectional study was conducted between May and December 2013 at Mkuranga District which is located between 7° 08′ 52″ S latitude and 39° 11′ 46″ E longitude (Fig. 1). Administratively, the district is divided into 18 wards with a total of 121 villages. According to the 2012 census, Mkuranga had a population of 222,921. The inhabitants are largely subsistence farmers with few engaged in fishing industries along the Indian Ocean. The staple foods are mainly starchy tuber cassava and cereals, maize or sorghum prepared as a stiff porridge (*ugali*). A variety of green vegetables, legumes, and occasionally fish also form a part of the diet. While the national prevalence of iron deficiency anemia among women of reproductive age is about 40%, the prevalence in Coastal region is unacceptably high (70.9%) (Bureau et al., 2011). In 2012 anemia was reported to be among the top ten causes of hospital admission in both pediatric and adult female wards in Mkuranga district hospital. Besides poor diet; the rich culture of depending on traditional medicines to treat various ailments makes Mkuranga the ideal study area. Two wards namely Magawa and Kiparang'anda (Fig. 1) were conveniently selected and a total of eight villages (Makombea, Magawa, Msonga, Nasibugani, Mdimni, Kiparang'anda, Kibululu and Magoza) were visited. Besides easy to reach, the selected villages share similar socio-demographic features with the rest of the villages in other wards.

2.2. Study participants and data collection

A total of 40 key informants were interviewed using semi-structured questionnaire. They were purposively selected to represent different groups within the population. The groups represented were traditional healers, knowledgeable individuals in the community, religious leaders and community health workers. In this community, traditional healers were regarded to possess extensive knowledge of traditional medicine. Focusing on local healers was therefore more likely to yield greater results. In addition, eight (8) focus group discussions (FDGs) were conducted. Prior to the survey, researchers requested community leaders to identify FGD's participants amongst community members. Then the researchers selected participants from the identified ones. The selected participants were believed to have information on medicinal plants and were likely to share. Both in-depth interviews and FDGs were conducted in Swahili, the Tanzania's official language. The principle of saturation determined number of FGDs. There were separate FGDs for both men and women. Each group comprised of 8–12 participants (Marshall & Rossman, 1999) and lasted between 1 and 1.30 h. All FGDs were tape recorded. Refreshments (soft drinks and snacks) were served to all discussion participants.

Data collected were socio-demographics of the informants, general knowledge on anemia, plants used to treat anemia including local name, plant parts used, method of preparation, dosage and dosing frequency. The knowledge about anemia was assessed based on three items as follows: the causes, symptoms of anemia and diagnosis. Results were scored 0–3. Zero score means no knowledge while 3 means high knowledge. Besides interviews, brief field visits were organized with the informants and research team to collect plants mentioned during the interview. The collected plants were later taxonomically identified by a taxonomist and voucher specimens were deposited at the herbarium of department of botany in the University of Dar es Salaam in Tanzania.

Literature search to establish proof of claims was done using different key words. Published journal articles were retrieved from google, googlescholar, Pubmed and Science direct. The strength and validity of information obtained from the informants was established based on similar ethnomedical claims in the literature or evidence of laboratory results of phytochemicals or pharmacological evidences that supports the claims.