

Full Length Research Paper

Ethnobotanical survey of medicinal plants used for the treatment of diarrhoea and skin ulcer in the Brong Ahafo region of Ghana

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The indigenous people of Brong Ahafo Region of Ghana are reputed to have been treating many diseases effectively with herbs; however documentation of these herb uses is not available. The present study documented the medicinal plants used traditionally for the treatment of diarrhoea and skin ulcer in the Brong Ahafo Region of Ghana. Fifty-two traditional healers were interviewed with the help of a prepared questionnaire. Plants that were cited were coded in the field for identification later. Fourteen and ten plant species were cited for the treatment of diarrhoea and skin ulcer, respectively. Out of the fifty two respondents, forty six (88.5%) had knowledge of plants used in treating diarrhoea and forty (76.9%) had knowledge of plants for skin ulcer treatment. Fourteen recipes for diarrhoea and ten for skin ulcer were documented. The survey uncovered very important sources of cheap remedies for diarrhoea and more importantly, skin ulcer.

Key words: Diarrhoea, skin ulcer, medicinal plants, treatment, Ghana.

INTRODUCTION

Ethnobotany is the study of how people of a particular culture and region make use of indigenous plants. In the study, ethno-botanists gather data from the people with the view of understanding the ways by which they use plants for medicine, food, construction materials and as tools (Rates, 2001; Carrera, 2010). Before the advent of western medicine, indigenous people worldwide have been taking care of their health needs using plants (Carr, 1997; Evans, 1989; Rates, 2001). The African continent has a long history of the use of plants and in some African countries up to 80% of the rural population rely on medicinal plants as a source of remedies (Hostettmann et

al., 2000). In Ghana and generally in Africa, the knowledge about medicinal plant uses has been passed on mainly through folklore. Recently, however, a few have been documented in emerging publications such as the Floristic Studies of Ghana (Mshana et al., 2001). However, many more medicinal plants needs to be documented for follow up research, more so when, according to Omonike et al. (2010) plant use varies highly from place to place.

Diarrhoea is a serious health problem worldwide and causes 4% of all deaths. It is most commonly caused by gastrointestinal infections which kill around 2.2 million

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Figure 1. An example of skin ulcer (Source: www.byebyedoctor.com/skin-ulcer.htm).

people globally each year, mostly children in developing countries (World Health Organization (WHO), 2000). Severe diarrhoea leads to fluid loss and may be life-threatening, particularly in children and people who are malnourished. It is a common cause of death in developing countries and the second most common cause of infant deaths worldwide (Dryden et al., 1996; de Bruyn, 2008).

Traditionally, diarrhoea has been treated with plants in many parts of the world. Semenya and Maroyi (2012) conducted ethnobotanical survey of plants used to treat diarrhoea in the Limpopo Province of South Africa. A total of 20 plant species representing 16 families and 20 genera were found to be commonly used by the Bapedi traditional healers to treat and manage diarrhoea in the Province. The largest proportion of the medicinal plants belonged to the families Anacardiaceae, Asteraceae, Fabaceae and Malvaceae (10% each). The roots were the most commonly used plant part (50%), followed by leaves (20%), bark (15%), fruits (10%), pericarp, seed, tuber and whole plants (5% each). Preparations made from a single plant species were the most dominant, forming 90% of all the preparations. Also, Agunu et al. (2005) investigated five medicinal plants, *Acacia nilotica* (L.) Willd. ex Delile (Fabaceae), *Acanthospermum hispidum* D.C (Asteraceae), *Gmelina arborea* Roxb.(Lamiaceae), *Parkia biglobosa* R.Br. ex G.Don (Fabaceae) and *Vitex doniana* L. (Lamiaceae) used in diarrhoeal treatment in Kaduna State of Nigeria. The plants were found to reverse castor oil induced diarrhoea in rats in a dose-dependent manner.

Skin ulcer is a sore on the skin or a mucous membrane causing disintegration of tissue (Figure 1). Ulcers can result in complete loss of the epidermis and often portions of the dermis and even subcutaneous fat. Symptoms that may occur with a skin ulcer include pain, redness, swelling and tenderness around the ulcer. In some cases, ulcers can bleed and patients experience fever. Ulcers can be chronic, especially in people with diabetes. Skin ulcer is endemic in many places around

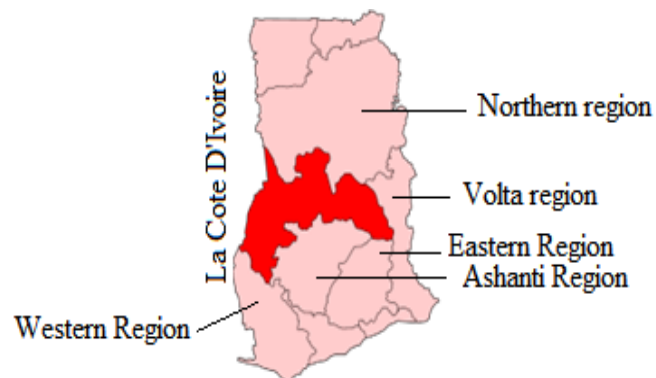


Figure 2. Brong Ahafo region of Ghana (Red) (Source: Wikipedia, the free encyclopedia).

the world especially tropical Africa, including certain districts of Ghana namely: Amansie, Bosomtwe and Ga West. The disease disables many people in Amansie, Bosomtwe and Ga West Districts of Ghana (Abayie, 2011). The underlying principle for skin ulcer treatments is healing of sore and regeneration of skin cover which involve using protective bandages, application of antibiotic cream or ointment and oral antibiotics. Skin ulcers have been treated with many plant preparations. For example, Moreno-Gimenez et al. (1990) used 'oil rose of mosqueta' from *Rosa rubiginosa* L. (Rosaceae) to treat ten patients with leg ulcers and observed very notable improvement on its healing compared with the control group and Sharma et al. (2012) successfully treated non-healing diabetic skin ulcer using plant sitosterol.

This survey aimed at documenting plants used for diarrhoea and skin ulcer among the indigenous people of Brong Ahafo Region of Ghana who are known to treat many intractable diseases with plants (www.ghanatravel/ghana/regions/brong, 2012).

METHODOLOGY

The study method followed a modification by Omonike et al. (2010).

Study area

The study area is the Brong-Ahafo region located in the middle belt of Ghana and lying within approximately latitudes 6.3° and 8.6°N and longitude 0.2°E and 3.1°W. The region shares common boundaries with five others namely: Northern region to the north, Ashanti and Western regions to the south, the Volta region to the east and the Eastern region to the south-east. It also shares an international boundary to the west with the Republic of Côte d'Ivoire (Figure 2). The region covers land area of 39,558 km² and an estimated population of 1,824,822. The region is inhabited mainly by the Brongs and the Ahafo, both of which belong to the Akan stock, and their languages are mutually intelligible. The region has vegetative cover ranging from forest to the south, forest-savanna transition and savanna proper to the north. The region has 17% of national stock of economic trees. The main occupation

of the people residing here is the farming and fresh water fishing (Ghana statistical services, 2011).

Informed consent

Informed consent was obtained orally from all participants made up of the traditional medicine practitioners, herbalists and herb sellers before inception of the interview.

Administration of questionnaire

Ethnomedicinal information on the plants used in the treatment of diarrhoea and skin ulcer were obtained by consulting Traditional Medicine Practitioners (TMP's), herbalists and herb-sellers in seventeen towns and villages, namely; Drobo, Kwasibuokrom, Japekrom, Botokrom, Bebianiha, Kwamesekrom, Dodosuo, Adamsu, Mpuasu, Katakayeikrom, Baano, Dwenem, Fawoman, Sebreni, Gonasua, Berekum and Techiman. With the exception of Berekum and Techiman which are urban in nature all others are rural. Questionnaire and oral interview were adopted to obtain the relevant ethnomedicinal data. The questionnaire was divided into two sections: (a) dealt with demographic information such as age, sex and duration of practice and (b) dealt with the information on the treatment of the pain, diarrhea and skin ulcer.

Sampling technique

The data collection method involved eliciting primary data from identified TMPs, herbalists and herb-sellers through interviews using questionnaires administered by trained aids including community level volunteers who were native resident in these selected communities. The data collection was carried out between June and August, 2012.

Sample authentication

Plant samples cited by respondents were collected and coded and authenticated by the Department of Forestry and Forest Research Institute of Ghana.

Data analysis

Data collected was analyzed using Microsoft Excel.

RESULTS

The survey attracted fifty-two respondents. The sex and age distribution of respondents are presented in Tables 1 and 2. Table 1 shows that more females (56.2%) practiced the use of herbs for medicinal purposes than males, and majority of the practitioners (78.9%) were 46 years and above, and 48% were above 50 years (Table 2). Again, a high percentage (42.3%) have practiced between 16 and 20 years (Table 3).

Treatment of diseases

Six and twelve respondents did not treat diarrhoea and skin ulcer, respectively (Table 4). Six respondents did not

Table 1. Sex Distribution of respondents in the survey.

Sex	Number of respondents	Percentage (%)
Males	21	43.8
Females	31	56.2
Total	52	100

Table 2. Age range of respondents in the survey.

Age range	Number of respondents	Percentage (%)
<30	0	0
31-35	3	5.7
36-40	4	7.7
41-45	4	7.7
46-50	16	30.8
>50	25	48.1
Total	52	100

Table 3. Length of time respondents have practiced.

Length of time (years)	Number of respondents	Percentage (%)
<5	3	5.8
5-10	8	15.4
11-15	11	21.2
16-20	22	42.3
21-25	2	3.8
26-30	2	3.8
>31	4	7.7
Total	52	100.0

Table 4. Distribution of healers who do not treat diarrhoea or skin ulcer.

Diseases	Number of healers who do not treat the diseases listed
Diarrhea	6
Skin ulcer	12

treat diarrhoea. Of the remaining 46 who treated diarrhoea, the frequency of receiving cases is presented in Table 5.

Twenty-eight respondents received one to five cases of diarrhoea every week. Twelve respondents did not treat skin ulcer. Of the remaining 40 respondents, the frequency of receiving skin ulcer cases is presented in Table 6 and the data showed that 28 respondents received one to five cases a week.

Table 5. Frequency of receiving diarrhoea cases.

Number of cases seen in a week	Number of healers
1-5	28
6-10	14
11-15	4
>16	0
Total	46

Table 6. Frequency of skin ulcer cases received by respondents in the study area.

Number of cases seen in a week	Number of healers
1-5	28
6-10	7
11-15	4
20-25	1
Total	40

Diagnosis of diarrhoea and skin ulcer by respondents of the survey

Two respondents (4.4%) gave description which did not fit exactly into the general diagnosis of diarrhoea, but the rest (95.6%) gave description that fitted well. None of the respondents that treated skin ulcer gave description of the disease that was far from the general description of skin ulcer (Table 7).

Plants cited by the respondents in the survey

Fourteen plant species from eleven families were cited for the treatment of diarrhoea (Table 8) and ten plants from eight families cited for skin ulcer (Table 9), indicating that plants for these two conditions are fairly distributed in the plant families of the area.

Recipes for diarrhoea

Fourteen recipes documented for diarrhoea were mainly decoction taken orally. However in one instance, fresh plant material was used. Single plant formulations were predominant (Table 8)

Recipes for skin ulcer

Ten recipes were documented for skin ulcer. Dosage form as paste prepared from single plants and used as bandage mostly formed the recipes for skin ulcer (Table 9). In three cases, pre-treatment of the ulcer sore with another plant preparation in the form of infusion or decoction

was carried out.

DISCUSSION

Ten recipes were documented for skin ulcer. Dosage form as paste prepared from single plants and used as bandage mostly formed the recipes for skin ulcer (Table 9), and this conforms to similar findings by Maroyi (2012). In three cases, pre-treatment of the ulcer sore with another plant preparation in the form of infusion or decoction was carried out. The study was conducted to collect information on plants traditionally used for the treatment of diarrhoea and skin ulcer in the Brong Ahafo Region of Ghana. Diarrhoea was described by respondents as a disease that causes someone to have loose stools within a short period of time. This description was in agreement with standard definition (WHO, 2000) and therefore their claim to treat diarrhea is credible. The respondents also had the notion that diarrhea is a 'disease of dirt in food and water' probably meaning contamination of food and water.

The skin ulcer was also diagnosed by the symptoms of pain, redness and swelling at the affected area. All the healers were accurate in the diagnosis of the skin ulcer but the approach to the treatment of the skin ulcer needs to be improved especially in the area of sterilization. Whereas a few gave an indication of disinfecting the sore and the plants, such as washing in hot water, majority did not have any idea of sterilization. However, their success in treating the disease is worthy of notice. Skin ulcer is a serious endemic disease disabling a large number of people in Amansie, Bosaomtwe and Ga West districts of Ghana that share the same climatic conditions as Brong Ahafo with large water bodies (Abayie, 2012). The disabling effect of the condition in the Brong Ahafo seems to be curtailed by the traditional medicine practitioners of the region. The results of this survey can form a basis for replicating the recipes to help the districts with endemic skin ulcers. Some plants have been documented for treating skin ulcer. The leaves of *Anogeissus leiocarpus* (Combretaceae) for example, is used externally as a decoction in Nigeria for washing in the treatment of skin ulcer and diabetic sores (Dalziel, 1956). The Negritos of the Philippines use *Artemisia vulgaris* (Asteraceae) in the form of decoction for bathing to treat skin ulcers (Eduardo, 1951).

Majority of the healers were aged 50 years and above, followed closely by those aged between 46 to 50 years. This result is not too surprising since the younger generation do not readily embrace traditional medicine because it is not very financially rewarding. The result is disturbing since knowledge of useful recipes for many diseases gets lost with passing away of every traditional medicine practitioner.

The study has also provided information about the species of plants and how they are used in the treatment of diarrhoea and skin ulcer. The species used for the

Table 7. Diagnosis of diarrhoea and skin ulcer in the study area.

Disease	Description of disease by respondents	Number of respondents	Percentage
Diarrhoea	Disease causing loose stool more than four in ten hours	27	58.7
	Disease causing three loose stools in a short time with abdominal pains	17	36.9
	Many loose stools sometimes with traces of blood	2	4.4
Skin ulcer	Spontaneous swelling, redness and pain at the affected area followed by sore on skin that will not heal easily	40	100

Table 8. Plants cited by respondents for the treatment of diarrhoea and how they are used.

S/No	Botanical name	Local name	Family	Mode of administration
1	<i>Parkia bicolor</i> (African locust bean)	Soronoo	Leguminosae	Stem bark decoction taken orally
2	<i>Anogeissus leiocarpus</i> (Anogeissus)	Kanne	Combretaceae	Stem bark decoction taken orally
3	<i>Alchornea cordifolia</i> (Alchornea)	Gyama	Euphorbiaceae	Leaf decoction taken orally
4	<i>Cnestis ferruginea</i> (Cnestia)	Apose	Connaraceae	Root decoction taken orally
5	<i>Morinda lucida</i>	Konkroma	Rubiaceae	Stem bark decoction taken orally
6	<i>Agerantum conyzoides</i>	Guakuro	Asteraceae	Leaf decoction taken orally
7	<i>Nauclea diderrichii</i> (Bilinga)	Briembe	Rubiaceae	Root decoction orally
8	<i>Psidium guajava</i> (Guava)	Gua	Myrtaceae	Leaf decoction or infusion taken orally
9	<i>Manihot utilissima</i> (tapioca)	Bankye	Euphorbiaceae	Leaf decoction taken orally, fresh tuber about 10 grams per adult chewed
10	<i>Talinum triangulare</i>	Nkodaabayere	Portulacaceae	Root decoction taken orally
11	<i>Borhaevia coccinia</i>	Kakawiedwe	Nyctaginaceae	Leaf decoction taken orally
12	<i>Terminalia ivorensis</i>	Emire	Combretaceae	Leaf decoction taken orally
13	<i>Chromolaena odorata</i>	Acheampong	Asteraceae	Leaf decoction taken orally and as enema for infants.
14	<i>Pentaclethra macrophylla</i> (Oil bean tree)	Ataa	Mimosaceae	Stem bark or fruit decoction taken orally.

treatment of diarrhoea formed 58.3% and that for skin ulcer, 41.7% of the total species cited. More important is the wide distribution of the species among the families, 14 plants among 11 families for diarrhoea and 10 plants among 8 families for skin ulcer which implies that it will be easy to locate and source for raw materials for any future research..

Conclusion

Fourteen and ten plant species belonging to eleven and eight families have been identified for the treatment of diarrhoea and skin ulcer, respectively. The respondents

who were TMPs, herbalists and herb-sellers appeared knowledgeable in the use of medicinal plants for treating the stated diseases. However, the scientific community needs to investigate the claims made by the respondents to unearth potentially useful drugs.

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Table 9. Plants cited by respondents for the treatment of skin ulcer and how they used.

S/No	Botanical name	Local Name	Family	Mode of administration
1	<i>Alstonia boonei</i> (Alstonia)	Sonuro/nyamedua	Apocynaceae	Stem bark paste is used to bandage the washed ulcer and changed every other day
2	<i>Cassia alata</i> (Alata leaf)	Yemnua/ Sempe	Caesalpindaceae	Leaf paste used to bandage ulcer
3	<i>Albizia zygia</i>	Nkroma	Mimosaceae	Roasted seed paste used to bandage the ulcer after washing ulcer with infusion of <i>Momordica charantia</i> leaf
4	<i>Alchornea cordifolia</i>	Agyama	Euphorbiaceae	Leaf paste used to bandage ulcer
5	<i>Manihot utilisima</i> (Cassava)	Bankye	Euphorbiaceae	Paste of leaf or tuber used to bandage ulcer after washing ulcer with infusion of <i>Vernonia amygdalina</i> leaf
6	<i>Ficus exasperata</i>	Nyankyerene	Moraceae	Leaf paste used to bandage ulcer
7	<i>Solanum erianthum</i> (<i>S. verbasifolium</i>)	Pepediewuo	Solanaceae	Leaf paste used to bandage ulcer
8	<i>Chromolaena odorata</i>	Acheampong	Asteraceae	Leaf is washed in hot water and made into paste and paste used to bandage ulcer
9	<i>Gossypium arboreum</i> (Cotton plant)	Asaawa	Asteraceae	Leaf is washed in hot water and made into paste and paste used to bandage ulcer
10	<i>Spathodea campanulata</i> (African tulip)	Kwakuo ninsuo	Bignoniaceae	Cotton wool is soaked in decoction of leaf or fresh stem bark to clean sore, paste of bark used to bandage ulcer

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