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Journal of Natural Product and Plant Resources, 2017, 7 (4): 29-36

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ISSN:2231-3184

Indigenous Knowledge on Medicinal Plants Used for Treating Diarrhoea and Dysentery among the Garo Community, Meghalaya (North East India)

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ABSTRACT

The present study is the first hand information of the Garo community regarding the ethnomedicinal use of plants on diarrhoea and dysentery. It is designed to survey and document important medicinal plants from the real practitioners or oja, knowledgeable persons of tribal and rural by filling up the questionnaire, personal interviews who were experienced in practicing indigenous or folk medicine in the West Garo Hills district, Meghalaya. Ethno medically survey on plants was conducted during the year 2014-2016. The findings of the present study indicates that a total of 39 medicinal plants belonging to 38 genera and 29 families were recorded which includes botanical name of the plant, prevalent local name, uses, formulations and also mode of administration. This paper is part of an ongoing research and will contribute to create awareness and generate traditional knowledge associated with these practices.

Keywords: Diarrhoea, Dysentery, Garo, Oja, West Garo hills, Meghalaya

INTRODUCTION

The World Health Organization (WHO) defines dysentery as an episode of diarrhoea in which blood is present in loose, watery stools. The state has recorded that the diarrhoeal diseases ranked second having 20.44 percent share and 78.80 incidence rate [1]. As per the report diarrhoeal diseases were found as one of the top ranked diseases both among the mothers and children [2]. As per WHO report at present in the tropical belt 15-40 percent of all diseases among children less than five years of age are diarrhoea related. There were 6.27 lakh deaths annually which include 20% child population [3]. The use of traditional medicines and medicinal plants in most developing countries as therapeutic agents for the maintenance of good health has been widely observed [4].

Garos are indigenous people of Meghalaya, a tribe with a matrilineal society. They used locally available plants in a self-help mode. It is still trusted and affordable because sometimes modern medicines are not available mostly in rural areas when they need [5]. Traditional health-care system is an age-old performed since ancient time by the people in the West Garo hills district of Meghalaya. West Garo Hills is rich in traditional health practices. Search for new medicines for the prevention and cure of deadly diseases provide prospects for developing medicinal plants. The unique richness of ethno-culturo-biodiversity of the north eastern region is a great challenge to the scientist to explore the region [6]. Bikarma found that despite the increasing acceptance of traditional medicine in Meghalaya State, indigenous knowledge on traditional remedies is not adequately documented [7].

MATERIALS AND METHODS

Study area

A study on the ethno-medicinal plants used for treating diarrhoea and dysentery was conducted in predominantly Garo dominated area in the West Garo Hills district of Meghalaya (Figure 1). It is situated approximately between the latitudes 90°30' and 89°40'E, and the longitudes of 26° and 25°20'N and has an area of 3,677 Sq. Km. The population is pre-dominantly inhabited by the Garos, a tribe with a matrilineal society. The district is mostly hilly with plains

fringing the northern, western and south-western borders. There are three important mountain ranges in the districts viz., Tura Range, Arbella Range and Ranggira Range.

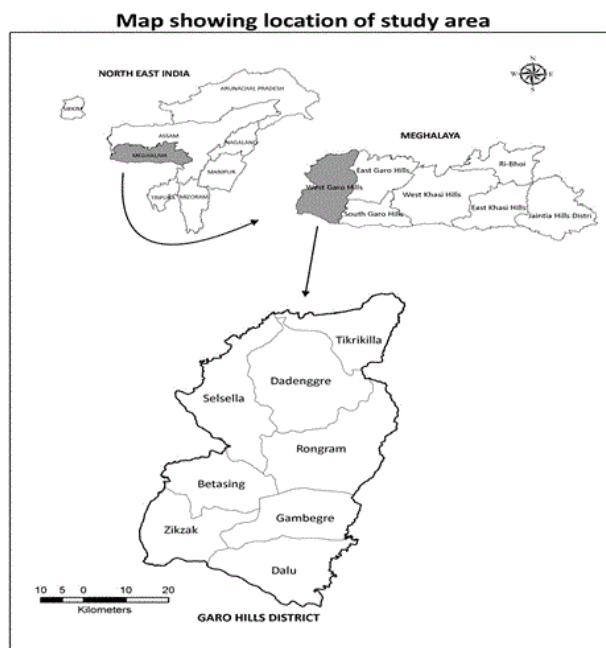


Figure 1: Map of west Garo hills

Methodology

The ethno-medicinal study was conducted in six developmental blocks of West Garo Hills district of Meghalaya predominantly inhabited by Garo community during the year 2014–2016. The study was based on the primary survey and data collected through conducting personal interviews or group interviews at different places, occasions and according to convenience. The chief informants in these interviews were real practitioners or oja, people who use their knowledge of medicinal plants on their immediate families and knowledgeable persons of men, women, young folks who had some knowledge on the subjects handed down by their parents and who were being treated with medicinal plants. A total of 20 individuals from each 20 villages were interviewed who were identified with the help of local administrators and community leaders. Some homoeopaths and faith-healers were also interviewed. All the information gathered at these interviews was carefully recorded and collected specimens were identified with the help of literature (Flora of British India, Indian Trees [8] Flora of Assam [9] Forest Flora of Meghalaya [10] and Botanical Survey of India, Shillong.

RESULTS

A total of 39 medicinal plant species (Table 1) which are used traditionally in treating diarrhoea and dysentery have been documented belonging to 38 genera and 29 families which includes botanical name of the plant, prevalent local name, uses, formulations and also mode of administration. Although numbers of families were quite high in relation to number of documented plants, many families were represented by single ethno medicinal plants (Figure 2). In terms of demographic profile (Table 2), most of respondents were male (65%) and mostly aged between 51–60 (45%). These informants were mostly herbal healers (42%) followed by farmers (35%), Government servants (30%) and birth attendants (10%). The study based on the plant parts used (Figure 3) reveals that leaves (32%) were most commonly used in the treatment, followed by fruits (23%), bark (11%), roots (9%), root-barks (6%), stem (4%), seeds (9%), shoots, root-stocks and flowers having (2%). In terms of medicinal preparations (Figure 4), people mostly used as juice (29%), followed by infusion (27%), decoction (15%), raw (13%), vegetables (4%), fruits, baked, pellets, poultice and massage service having (2%).

Table 1: Plants species used for diarrhoea and dysentery

Botanical Collection No.	Name/	Vernacular Name (Garo)	Locality	Family	Habit	Diseases	Parts used	Formulations
1. <i>Justicia gendarussa</i> Burm. f.-33552		Do'ja gipe	A'jrigre	Acanthaceae	Shrub	Dysentery	Leaves	Leaves are pounded and juice is extracted from it. This juice can be taken at 2 teaspoonfuls daily after food.
2. <i>Acorus calamus</i> L-33514		Pachi	A'jrigre	Acoraceae	Herb	Diarrhoea and dysentery	Leaves, root-stocks	Leaves and root-stocks are pounded together along with tender leaves of <i>Erythrina stricta</i> Roxb. and <i>Eryngium foetidum</i> . The fresh mixture is then filtered through a clean and fine cloth and is given orally at the rate of 1-2 teaspoonfuls twice daily after food. The pounded mixture can also be made into pellets and this has to be taken by soaking in hot water.
3. <i>Mangifera indica</i> L-47103		Te'gatchu	Balsri gittim	Anacardiaceae	Tree	Dysentery	Leaves	Leaves are crushed and juice is extracted. To that little amount of milk/or honey can be added. It should be taken 1 teaspoonful twice daily after food.
4. <i>Spondias pinnata</i> (L.f) Kurz-47136		Amblitong/ Ambaritong	A'jrigre	Anacardiaceae	Tree	Diarrhoea	Bark	Decoction of bark can be taken at 1 teaspoonful daily after food.
5. <i>Carum copticum</i> (L) Benth.Hook.f ex.C.B.Clarke-33597		Dhania dakgipa(N)	A'palgre	Apiaceae	Herb	Dysentery	Seeds	Seeds are soaked in a glass of water overnight and that water can be drunk against the dysentery.
9. <i>Centella asiatica</i> (L.) Urb.-33507		Manamuni	Am'panggre songgital	Apiaceae	Herb	Dysentery	Roots and leaves	Equal proportion of leaves and roots are pounded together and juice is extracted. The extracted juice can be taken at two teaspoonfuls daily morning and evening.
10. <i>Eryngium foetidum</i> L.-33513		Samskal	Tura Sampalgre	Apiaceae	Herb	Diarrhoea and dysentery	Leaves	Leaves are pounded along with tender leaves of <i>Erythrina stricta</i> Roxb. and 1-2 droplets of <i>Mucuna bracteata</i> . The mixture is then filtered and can be drunk at 1-2 teaspoonfuls twice daily after food.
11. <i>Alstonia scholaris</i> L.R.Br-33505		Sokchon	A'jrigre	Apocynaceae	Tree	Diarrhoea and dysentery	Root-bark	Root-barks are pounded and the juice is extracted by filtering through a fine and clean cloth. Juice can be taken at one tablespoonful twice daily till the patient recovers.
12. <i>Holarrhaena antidysenterica</i> Wall-33599		Gol'matra/ Bol'matra	Kongsi	Apocynaceae	Tree	Diarrhoea and dysentery	Bark	About ½ kg of bark can be boiled with 2 litres of water till it becomes concentrated. This water can be taken at 1 cup daily till the patient becomes normal.
13. <i>Rauvolfia serpentina</i> (L) Benth ex.Kurz-33554		Do'grikme	Kongsi	Apocynaceae	Shrub	Dysentery	Roots	Roots are crushed properly and a juice is extracted from it. The juice can be taken at

							3 teaspoonfuls daily depending on the severity of the diseases.
14. <i>Calotropis gigantea</i> (L.) Dryland R.Br.-33508	Akon/Sengrip	Rongbakgre	Asclepiadaceae	Shrub	Dysentery	Root-bark	Dried matured root-bark is to be pounded until it becomes powder. The powder can be taken by adding little amount of water twice daily.
15. <i>Chromolaena odorata</i> (L.) R.M. King and H. Rob-33577	Sambangguri/ Amok	Galwanggre	Asteraceae	Herb	Dysentery	Leaves and shoots	Leaves and young shoots are pounded properly and a juice is extracted. This juice can be taken at one teaspoonful daily after food.
16. <i>Oroxylum indicum</i> (L.) Kurz-33517	Kering	Gambegre	Bignoniaceae	Tree	Diarrhoea	Root-barks	Root-barks are grinded properly and a juice is extracted from it. The extracted juice can be taken orally at the rate of one cup twice daily till the patient recovers.
17. <i>Garcinia kydia</i> Roxb-33509	Dengga doti	Rangwalkam gre	Clusiaceae	Tree	Dysentery	Fruits	Fruits can be eaten raw. Fruits can be preserved by sundried and during the off season dried fruits can be boiled with water and that juice can be taken orally twice a day after food.
18. <i>Terminalia chebula</i> Retz-47137	Aritak	A'jrigre	Combretaceae	Tree	Diarrhoea and dysentery	Fruit	Decoction of fruits can be taken orally at 2 teaspoonfuls daily after food. Sometimes fruits are also eaten as raw.
19. <i>Dillenia indica</i> L.-47105	Agatchi	A'jrigre	Dilleniaceae	Tree	Diarrhoea	Fruits	Fruits are steeped in water for whole day and that water can be drink at thrice daily. Fruits can also be eaten raw against diarrhoea.
20. <i>Diospyros embryopteris</i> Pers-33576	Bolkisin	Guna gittim	Ebenaceae	Tree	Dysentery	Fruits, Leaves and Bark	Equal proportion of fruits, leaves and bark are boiled in water for 10-15 min. The decoction can be taken orally at 2 teaspoonfuls thrice daily.
21. <i>Gaultheria fragrantissima</i> Wall-47108	Tangsim bite (N)	Tura Range	Ericaceae	Shrub	Diarrhoea	Leaves	Dried or fresh leaves are grinded and mixed with water. The mixture can be taken at 2 teaspoonfuls till the patient recovers.
22. <i>Rhododendron arboretum</i> SM-33578	Bibal gitckak (N)	Tura range	Ericaceae	Tree	Dysentery	Flowers	The flowers are used in the form of vegetables.
23. <i>Jatropha curcas</i> Linn-33524	Bolmandal/ Bolbandong	Chigisil	Euphorbiaceae	Shrub	Dysentery	Branches/ Stem	Milky juice or latex is extracted by cutting the branches and 1-2 teaspoonful of water is added to it. The mixture can be taken at ½ cup twice daily.
24. <i>Jatropha gossypifolia</i> L.-	Bolmandal gitckak	Jengjal	Euphorbiaceae	Shrub	Dysentery	Stem	Fresh latex is extracted from the stem and mixed with water. The mixture can be taken orally at the rate of 2-3 teaspoonfuls twice a day.

25. <i>Albizia lebbbeck</i> Benth-47104	Siris	Chigitchak	Fabaceae	Tree	Diarrhoea	Bark	Barks are pounded by adding a little amount of water and filtered it. The extracted juice can be taken at 2 teaspoonfuls twice daily after food.
26. <i>Erythrina stricta</i> Roxb-33512	Mandal gitchak	Chenggalgre	Fabaceae	Tree	Dysentery	Leaves, Roots	Tender leaves and roots are crushed and a little amount of hot water is to be added. The mixture can be drink at 2 teaspoonfuls daily after food.
27. <i>Ocimum basilicum</i> L.-47189	Tulsi	Turam	Lamiaceae	Herb	Diarrhoea and dysentery	Leaves	Leaves are crushed and a juice is extracted from it. It should be taken at 3 teaspoonfuls daily.
28. <i>Litsea subifera</i> Pers-33553	Adakakki dal'gipa (N)	Chigitchak	Lauraceae	Tree	Dysentery	Leaves and bark	Equal proportions of leaves and bark is boiled together till it becomes concentrated. This mixture can be taken at ½ cup thrice daily. Infusion of the bark can also be taken.
29. <i>Asparagus officinalis</i> L.-33503	Me'mang ta'matchi	Chibonggre	Liliaceae	Herb	Dysentery	Roots	Roots are pounded until it becomes powder. To that one cup of water is added and juice can be taken at 2 teaspoonfuls twice a day. For children one teaspoonful adding with half cup of water is recommended.
30. <i>Punica granatum</i> L.-33598	Dallim	Modilgre	Lythraceae	Tree	Diarrhoea and dysentery	Leaves and fruits	Tender leaves can be eaten as raw. Sometimes fruits also recommended against diarrhoea.
31. <i>Hiptage madablota</i> Gaertn.-47125	Du'grak budu/ Du'grak	Arbella Range	Malpighiaceae	Shrub	Diarrhoea	Fruits	Fruits are made into a paste by grinding it. The paste can be taken at 1-2 teaspoonfuls daily. Fresh fruits also can be taken raw.
32. <i>Ficus benghalensis</i> L.-47107	Gonok/Prap dal'gipa	Lower Sampalgre	Moraceae	Tree	Diarrhoea	Leaves	Leaves are pounded mixing with a cup of curd and rice-gruel. The mixture can be taken twice daily after food.
33. <i>Musa sapientum</i> L.-47200	Te'rik atigola	A'jrigre	Musaceae	Herb	Diarrhoea and dysentery	Fruits	Unripe fruits are baked inside the ember and it is recommended to eat to cease the loose motion. Boiled fruits are also recommended to use.
34. <i>Myrica Nagi</i> Thunb.-47194	Bolmeseng	Tura Range	Myricaceae	Tree	Dysentery	Fruits	Juice is extracted by grinding the fruits. The juice is to be taken at ½ cup twice daily.
35. <i>Oxalis corniculata</i> L.-47139	Me'kampret chongipa	Balsri gittim	Oxalidaceae	Herb	Diarrhoea and dysentery	Fruits	About 2-3 numbers of fruits can be eaten as raw.
36. <i>Sesamum indicum</i> L. 33596	Spin	Dadeng- Ampanggre	Pedaliaceae	Shrub	Dysentery	Seeds/ grains	Grains are to be fried for few minutes and pounded properly. A little amount of salt is added and the powdered mixture can be eaten orally at 2-3 teaspoonfuls.

37. <i>Ziziphus mauritiana</i> Lam-33510	Angkil/ Kangkil/ Te'engki	Dadeng- Ampanggre	Rhamnaceae	Tree	Dysentery	Leaves	Tender leaves are crushed by adding little amount of salt and a juice is extracted from it through a clean and fine cloth. The mixture is to be taken at 2-3 teaspoonfuls daily after food.
38. <i>Rosa indica</i> Lindl.-33583	Golap	Selsella	Rosaceae	Shrub	Dysentery	Seeds	Infusion of powdered seeds is to be taken at 1 teaspoonful morning and evening till the patient recovers.
39. <i>Paederia foetida</i> L.-47135	Pasim	Kongsi	Rubiaceae	Climber	Diarrhoea and dysentery	Leaves	Leaves are taken as vegetables or juice extracted by pounding it. The juice is to be taken at 2 teaspoonfuls daily.
40. <i>Aegle marmelos</i> L.Correa-33506	Selpri/ Belati/Bel	Modilgre	Rutaceae	Tree	Diarrhoea and dysentery	Fruits	Fully ripe fruit mixed with a cup of curd can be taken at three times daily. The unripe fruit can also be used either by boiling or roasting with a pinch of sugar and a cup of water. The mixture can be taken at two teaspoonfuls two times a day after food.
41. <i>Citrus maxima</i> (Burm.)Merr.-33587	Jambura	A'jrigre	Rutaceae	Tree	Diarrhoea and dysentery	Fruits	Extracted juice adding with little amount of salt is recommended at 2 times a day or 3 times a day if the patient is severe.
42. <i>Zanthoxylum budrunga</i> Wall-33517	Me'cheng	A'jrigre	Rutaceae	Tree	Diarrhoea and dysentery	Seeds	Seeds are to be crushed and mixed with water. The mixture can be taken orally or it can also be used as a massage service in toe and a finger nail.

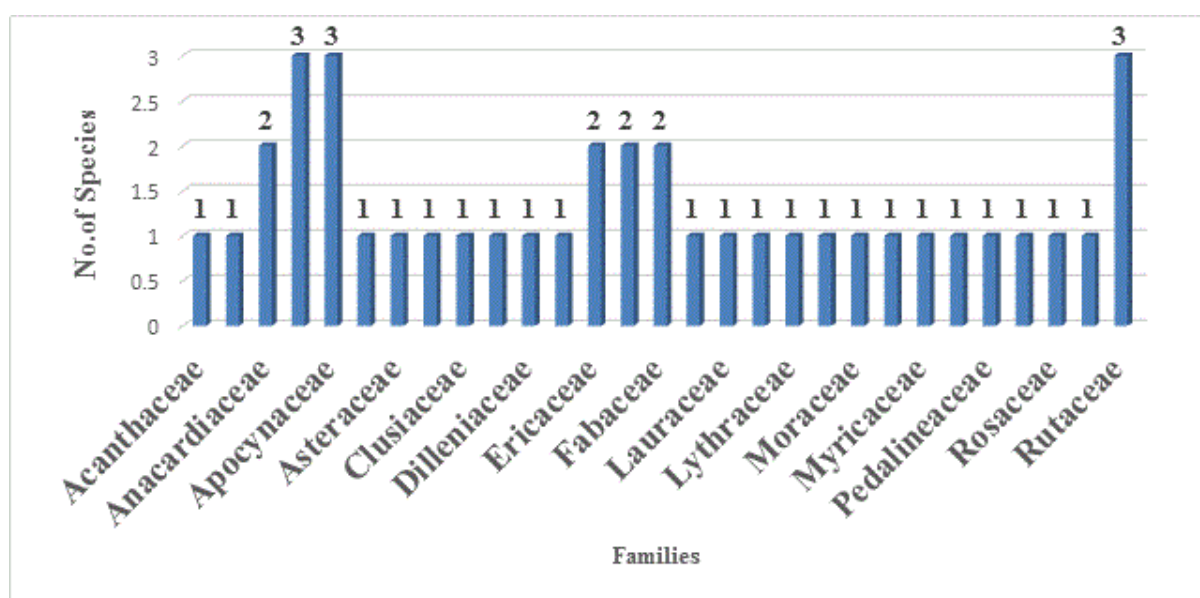


Figure 2: Family wise arrangement of species

Table 2: Demographic profile of the informants

Characteristics		Count	Percentage (%)	Characteristics		Count	Percentage (%)
Gender	Male	13	65	Occupation	Farmer	7	35
	Female	7	35		Herbal Healer	39	42
Age groups	41-50	5	25		Birth attendant	2	10
	51-60	9	45		Government servant	6	30
	61-70	2	10		Mode of acquisition of knowledge	Inheritance	15
	71-80	1	5	Proper training		5	25
	81-90	3	15				

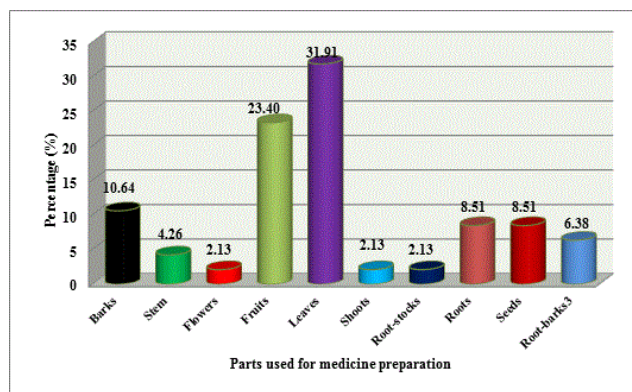


Figure 3: Bar diagram showing number of plant species used

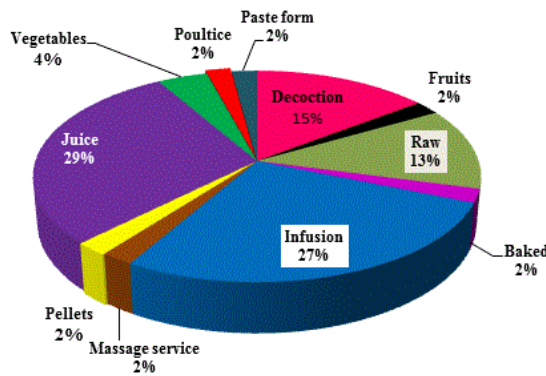


Figure 4: Showing mode of application of Ethno-medicinal plants

DISCUSSION

A study on ethno-medicinal plants used for treating diarrhoea and dysentery was conducted in predominantly Garo dominated area in west Garo hills district of Meghalaya. From the study based on the plant parts used in Figure 3 shows that leaves (39.91%) were most commonly used in the treatment thereby it will directly affect the photosynthesis, interchange of gases, floral induction, transpiration and storage of water because leaves are the most important life giving part of the plant body. The tribal communities were very knowledgeable about the medicinal plants and still depending on the herbal products for treatment of their common ailments and diseases like diarrhoea

and dysentery. Some healers collected medicinal plants from the wild and domesticated in their home gardens. The incidence of diarrhoea and dysentery may be related to changing of seasons, warm climate, poor environmental sanitations, and non-availability of potable water during floods and rainy seasons. An enumerated medicinal plant is essential to evaluate pharmacological investigations so that it may have the potential to discovery of new drug and better use of resources as well. The potential success of the ethno medicine approach to drug discovery can no longer be questioned due to historical and current discoveries to test its power [3]. It will also help in preserving biological diversity. Dosages were prescribed in terms of cups, teaspoons or tablespoons, depending on the age of the patients, disease and level of its severity.

CONCLUSION

The data presented in this paper is the first hand information and tradition of health care based on folk medicine is widespread and popular among the Garo community. The ethno-botanical information is declining day by day and with generations, so it is a high time to strengthen and document and also to evaluate this traditional information before they are completely lost. The villagers may be encouraged to use medicinal plants for their health care particularly in case of diarrhoea and dysentery and may also be made aware of scientific collection and mode of preparation for further conservation issues. Thus, conservation of biodiversity along with ethno bio culture of indigenous people is imperative [6]. Since the district is amongst region which receives highest rainfall in the world, supply of potable water to all the villagers must be ensured in an effective manner. Most of the villagers do not have proper water supply connectivity. Therefore, proper strategies should be made by the administration and allied line departmental for providing necessary water supply. Improvement in awareness of water sanitation behaviour for ensuring improved livelihood to the rural people in the area.

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