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Utilization Pattern of Medicinal Plants by Different Tribes of Garo Hills of Meghalaya, North-East India

Abstract

A study was carried out in three rural villages of Meghalaya in northeast India inhabited by Garo tribes in Balamagre village, Hajong tribe in Modupara and Koch tribe in Dumnigaon B. Extensive field visits were made during January to February, 2013 and revisited during November to December, 2015 to document the indigenous uses of medicinal plants by the different tribes of Garo Hills, Meghalaya and to understand the socio-economic profile of these tribes who are closely attached to the forest. A total of 38 medicinal plants belonging to 27 families and 36 genera were recorded and were found to cure 24 diseases in the study areas. The tree species contributed maximally to the traditional uses of medicinal plants and the bark portion was mostly in the majority of cases for medicinal preparation.

Keywords: Socio-economic livelihood; Medicinal plants; Garo; Hajong; Koch; Garo hills; Meghalaya

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Introduction

Use of traditional medicine is rapidly growing worldwide [1]. The practice of ethno medicine as an integral part of the culture of indigenous people in many parts of the world has a close interface with local ecosystems and cultural landscapes [2,3]. In India, medicinal plants occupy important positions in the socio-cultural, spiritual and medicinal arena of rural people [4]. The hilly sub mountain ranges of Western Ghats contain valuable ethno medicinal plants in villages. Ethno medicinal plants of the region have been used for the treatment of various diseases. Jadhav [5] reported 21 plant species belonging to 15 families were used for treating various diseases. According to Shaikh et al. [6], the plants like *Terminalia chebula, Moringa oliefera, Tinospora cordifolia* etc. are extensively used in ayurveda as they possess potential anticancer activity. The role of Indian medicinal plants and the various photochemical may be treated effectively for cancer.

North East states of India are one of the richest repositories of medicinal and aromatic plants in the world [7-9]. This region has high medicinal plant diversity due to variance in topography and physiognomy [10]. Numerous wild and cultivated plants play a very important and vital role among cultures. Studies on folk medicines through ethno botanical surveys are also gaining

importance in the region [11]. Forty ethno medicinal plants were recorded for the 1st time from Indo-Burma hotspot region (Mizoram, NE India) of particular ecological relevance [12]. Some medicinal plants are used by various ethnic tribes for both food as well as medicine. For example *Paederia foetida* is a case and because of its therapeutic properties relate to the gastrointestinal system and suggest its potential utility for gastrointestinal ailments. *P. foetida* is promising as a remedy for life-style related conditions, especially treatment of ulcers [13].

The Garo Hills of Meghalaya are very reach in natural resources. The most important natural resources on which the economy of the state is largely dependent upon are forests, minerals and water resources. Among all the natural resources, forests contribute maximum to the state's economy [14]. Due to the diverse climatic and topographic conditions Garo Hills forests support a vast floral diversity [15]. Garo Hills societies are predominantly dependent on the forest resources for their livelihood [16,17]. Survey on the ethno medicines by the Garo tribe of Kamrup District, Assam, has revealed that some diseases are cured by using a single plant. For example, *Boerhavia diffusa* is used for control of swelling of feet during the period of pregnancy. However, *Zingiber officinale* is also used as in the treatment of asthma [18]. According to the study made by Sharma et al. [19], in North Garo Hills, Meghalaya, trees were the main sources of medicinal plants followed by shrubs, climbers and herbs. The recorded plant species were used for common ailments like headache, stomach problems, cold, cough and fever, jaundice, skin diseases, blood pressure and epilepsy etc. It was observed that knowledge of medicinal plants was confined only to elder people and traditional healers (Ojhas) and source of extraction of these valuable resources were nearby forests.

Garo tribes are one of the matrilineal tribes of North-East India and mostly restricted to the Garo Hills of Meghalaya. They prefer to be called A chik. The economic life of the Garo tribes revolves around agriculture and farming. The Hajong and Koch tribes are also the scheduled tribes of India. These ethnic tribal people predominantly inhabit in the plain belts of Meghalaya. There is a need to study Medicinal Plants in Garo Hills as there is still very less proper documentation on Medicinal Plants in Garo Hills and there have been still a lot of misinformation which is still need to be corrected.

Materials and Methods

Study site

The study was carried out in Garo Hills of Meghalaya, northeast India which stretches out between 25081ºN to 26011ºN latitude and 890501'E to 900591'E longitude. It is bounded by Mymensing district and a part of Rangpur district of Bangladesh in the south, by a district of Assam on the North and the West and by the West Khasi Hills district of Meghalaya in the East. It is the home land of the Garos. The Garo Hills have an area of approximately 8,000 sq. kms. Tura is the largest town in Garo Hills. The three rural villages of Garo Hills were selected for the study purpose viz. (a) Balamagre (234 populations), a Garo village, situated 12 kms from Tura town is under Gambegre block, West Garo Hills district. (b) Modupara (180 populations), inhabitaed by some Hajong tribe, situated at a distance of 16 kms from Tura is under Selsella Block, South West Garo Hills district. (c) Dumnigaon (175 populations) inhabitated mostly by a Koch tribe is about 18 kms from Tura and is under Betasing Block in South West Garo Hills district (Figure 1).

Methodology

Three villages namely Balamagre (Garo village), Modupara (Hajong village) and Dumnigaon B (Koch village) were selected for the study of utilization and dependence on Medicinal Plants of the forest dwellers. For this study, extensive field surveys were made during January to February, 2013 and were revisited on November to December, 2015. Socio-economic and Medicinal Plants data were collected through door to door interview using pre tested semi-structured questionnaire as well as group discussion in local dialect. Ethno botanical uses of medicinal plants were collected from three different tribes through village headmen, senior practitioners, and common villagers and also from secondary source of information. Households were interviewed for detail use of medicinal plants, the parts used and the purpose for which medicinal plants used. The medicinal plants were classified

family wise, plant part-wise, disease wise, etc. 20 households in each selected villages were sampled randomly. The collected specimens were identified with the help of literature and experts from the Soil and Water Conservation Department, Tura. Wherever necessary the translation of Garo language to English was made using a school dictionary [20].

Results and Discussion

Socio-economic profile

The total population, sex ratio and literacy rate (%) of the three studied tribes are shown in **Table 1**. The sex ratio of Garo and Hajong shows that males were comparatively more whereas the sex ratio of Koch tribe shows with more of female population. The literacy rate of Hajong tribe was significantly higher than the two other tribes, Garo and Koch tribes. Most of the older people of these tribes were illiterate, majority of the children were still under matriculation while only few of them were above class X. There were also some children who were school dropouts.

The pattern of occupation of the two tribes i.e. Garo and Koch were mainly agricultural activities whereas Hajong tribe were



mainly engaged in business especially in handloom which was their main income for daily needs. Besides agricultural activities and business in handloom, some of the family members also involved in daily labour which was also part of their daily income. The occupation of some villagers also include governmental jobs like teacher, driver and job card secretary and others like carpenter, butcher and brick factory worker. Other than these, some villagers used to collect Medicinal Plants for helping villagers and for their income.

Annual income of the households of studied tribes in Garo Hills of Meghalaya depicts that Koch tribe was somewhat better than other tribes in their income. Hajong tribe was more under middle than other two. Garo tribe was comparatively poor.

Figure 2 shows that Koch tribe tends to have better infrastructure than other tribes. Garo tribe was more under pucca + bamboo based. However, overall shows that all the tribes were somewhat same in their infrastructure.

From the survey, it has been found that the Hajong tribe used more number of televisions and the Koch tribe used more number of motors/cycles. Refrigerator users were very less in all the tribes with none by Garo tribe. It has been observed that Hajong tribe has the highest assets whereas Garo tribe has the lowest assets. Among the Garo and Koch community as much as agriculture is important their livestock also has a huge impact on their tradition. On the other hand, the Hajong community does not have much livestock. Only five livestock i.e. 4 poultry and 1 swan has been recorded during the survey. The common livestock domesticated by the Garo community was cattle, pig, goat and poultry whereas in the Koch community was cattle, goat and poultry. The total livestock population was estimated at 178 for Garo community, followed by Koch and Hajong communities having 138 and 5 respectively.

Medicinal plants collected from the forest

Table 2 represents data on ethno-medicinal uses by the threestudied tribes of Garo Hills. A total of 38 ethno-medicinal speciesbelonging to 27 families and 36 genera were recorded fromthe present study. Among the families recorded Fabaceae and

Rubiaceae were the largest with 3 species each followed by Poaceae, Myrtaceae, Acanthaceae, Combretaceae, Rhamnaceae, Apocynaceae and Anacardeaceae with 2 species each and the rest with 1 species each. It is observed that *Thysanolaena maxima* and *Cassia fistula* were used for curing many diseases.

The results show that Hajong tribe used 5 medicinal plants while Koch tribes 7 medicinal plants compared to the Garos who used as many as 31 medicinal plants for curing various ailments. This may be related to the traditional knowledge base among the tribes. The Hajong and Koch tribe had less number of local herbal practitioners compared to the Garos in the study area.

The main sources of medicines were from the trees followed by shrubs, herbs, grasses, climbers and aquatic plants (Figure 3). Garo and Koch tribes used more medicines from trees whereas Hajongs used more from herbs and shrubs (Figures 3, 4 and Table 3).

The Garo tribe used more number of medicinal plants from the forest comparing to Hajong and Koch tribe. Garos used more species to cure An'dime (female disease after delivery) but none in both Hajong and Koch tribes. In Koch tribe more species were used for Throat cancer and Intestine cancer whereas Garo and Hajong used none.

Among the 38 plant species, they were mainly used to treat An'dime i.e., a female disease after delivery (6 species), followed by Jaundice and Pneumonia with 4 species each, throat cancer and Intestine cancer (3 species each), Komjuri i.e., weakness, fever and reluctance to eating (2 species), Cough (2 species), Anemia (2 species), High fever (2 species), Malaria (2 species), Stomachache (2 species), Ulcer (2 species), Malaria (2 species), Vomiting (1 species), Skin disease (1 species), Urine infection (1 species), Beriberi (1 species), Cancer (1 species), Diabetics (1 species), Insomnia (1 species), Joint pain (1 species), Measles (1 species), Sprain (1 species) and Gastric (Gastritis) with 1 species (Figure 4).

Table 1: Basic demographic features of the studied tribes.

Footures	Tribes			
reatures	Garo	Hajong	Koch	
Total population	234	180	175	
Sex ratio	1000:966	1000:942	842:1000	
Literacy rate (%)	47.86%	54%	44.44%	



A plant part used mostly by Garo and Koch tribes was bark whereas Hajongs used mostly from the leaves. Most part of the plants used was highest in Garo tribe except for flower which is none in Garo tribe and 1 in Koch tribe (Figure 4). Parts of the plant mostly bark, leaves, young leaves and fruit were used for preparation of traditional medicines. The highest part used was bark with 11 species followed by leaves with 10 species, fruits (7 species), young leaves (7 species) root (4 species), whole plant (2 species) and flower with only 1 species (Figure 5).

The present study showed that the literacy rate and employment of the study areas are still low. Therefore to alleviate their socioeconomic conditions, they should be supported with better educational and employment opportunities. It was also observed that these people are the repository of traditional knowledge regarding processing and use of large numbers of plants, which could be documented and utilized with proper modifications to improve their economy. By doing so, their dependency on forests can be reduced, together with imposing limits on the loss of biodiversity and overexploitation of natural resources (Figure 6).

In the present study, 38 medicinal plants are used for the treatment of various diseases like Anemia, An'dime (A female disease after delivery), beriberi, bleeding, cancer, cough, diabetics, gastric (gastritis), high fever, insomnia, intestine cancer, jaundice, joint pain, komjuri (weakness, fever and reluctance to eating), malaria,

Sl. no.	Scientific name	Local name	Common name	Family	Parts used	Diseases	
1	Aegle marmelos Correa.	Selpri (G)	Bael, Wood apple	Rutaceae	Leaves	Pnuemonia	
2	Albizia chinensis (Osb.). Merr.	Bolpu (G)	Chinese silk tree	Mimosaceae	Bark	An'dime (a female disease after delivery)	
3	<i>Aloe vera</i> (L) Burm f.	Aloevera(G), Dikge kanchan (H)	Aloevera	Asphodelaceae	Leaves	Urine infection	
4	Artocarpus lakoocha Roxb.	Arimu (G)	Monkey Jack	Moraceae	Fruit	Anaemia	
5	Averrhoa carambola L.	Amillenga (G)	Carombola, Starfruit	Oxalidaceae	Fruits and leaves	Jaundice	
6	Azadirachta indica Juss.	Neem (G)	Neem	Meliaceae	Leaves	Skin disease	
7	Baccaurea ramiflora Lour.	Gasampe (G)	Burmese grape	Phyllantaceae	Fruit	Insomnia	
8	Careya arborea Roxb.	Gimbil (G)	Wild guava	Lecythidaceae	Bark	An'dime (a female disease after delivery)	
9	Cassia fistula L.	Sinaru (G)	Indian laburnum, Golden shower tree	Fabaceae	Bark and young leaves	Throat cancer, intestine cancer and jaundice	
10	Dendrocalamus hamiltonii Gamble	Wa'nok (G)	Tama bamboo	Poaceae	Young leaves	Komjuri (weakness, fever and reluctance to eating).	
11	Dillenia pentagyna Roxb.	Agatchi (G)	Dog teak, Karmal	Dilleniaceae	Bark	Diabetics and stomachache	
12	Emblica officinalis Gaertn.	Ambare segun (G), Amla (H)	Gooseberry	Euphorbiaceae	Fruit	Ulcer	
13	<i>Erythrina stricta</i> Roxb. (white)	Bolmandal (G)	Corky coral tree	Fabaceae	Leaves	Cancer	
14	Eupatorium canabimum L.	Samsimari (G), Sambangguri (G), Gual (K).	Gravel root, boneset	Asteraceae	Leaves	Bleeding and stomachache	
15	Garcinia kydia Roxb.	Dengadote (G)		Clusiaceae	Bark	Vomiting	
16	Gardenia campanulata Roxb.	Darechik (G)	Se-thanbaya	Rubiaceae	Root	An'dime (a female disease after delivery)	
17	Holarrhena antidysentirica Linn.	Golmatra (G)	Bitter oleander	Apocynaceae	main root	High fever	
18	<i>Justicia gendarussa</i> Linn.	Dojagipe (G)	Gandarusa, Warer willow	Acanthaceae	Whole Plant	Sprain	
19	Knema linifolia (Roxb). Warb. Mon. Myrist.	Bolanchi (G)		Myristicaceae	Bark	An'dime (a female disease after delivery)	
20	<i>Morinda angustifolia</i> Roxb.	Chenong (G), Chengrong (G)	Irula	Rubiaceae	Leaves	Jaundice	
21	Nelumbo nucifera Gaertn.	Mongnal (G), lalbeda (K)	Lotus	Nelumbonceae	Root, leaves and flower	Bleeding	
22	Ocimum sanctum L.	Tulsi (G)	Tulsi	Lamiaceae	Whole Plant	Cough	
23	Oroxylum indicum Vent.	Kering (G)	Broken bones plant, Indian trumpet	Bignoniaceae	Young leaves	Jaundice	
24	Paederia foetida Linn.	Pasim (G)	Chinese fever vine, Stinkvine	Rubiaceae	Leaves	An'dime (a female disease after delivery)	

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25	Psidium guayava L.	Komperam (G)	Guava	Myrtaceae	Young leaves	An'dime (a female disease after delivery)	
26	Rauvolfia serpentina (Linn) Benth. Ex. Kurz.	Dogrikme (G)		Apocynaceae	Root	Malaria	
27	Rhus semialata Murray.	Kitma (G)	Rhus	Anacardiaceae	Fruit	Measles	
28	Spondias pinnata (L.f) Kurz.	Ambaletong (G)	Hog Plum	Anacardiaceae	Fruit and Bark	Joint pain	
29	Stereospernum cheonoides DC.	Bolsil (G)	Fragrant Padri tree	Acanthaceae	Young leaves	Pnuemonia	
30	<i>Swertia chirayita</i> (Roxb. ex Fleming) H. Karst	Chirota (G), Chirotita (H)	Chirayita	Gentianaceae	Leaves	High fever and malaria	
31	Syzygium cumini (L). Skuls.	Chambu (G)	Black Plum	Myrtaceae	Fruit	Anaemia	
32	Tamarindus indica L.	Che'eng (G)	Tamarind	Fabaceae	Leaves	Ulcer	
33	Terminalia belerica Gaertn.	Chirori (G)	Belleric myrobalan	Combretaceae	Bark	Gastric (gastritis)	
34	Terminalia chebula Retz.	Aritdak (G), Hala (K)	Yellow or chebulic myrobalan	Combretaceae	Bark	Throat cancer and intestine cancer	
35	Thysanolaena maxima Kuntze	Simu (G)	Broom grass, Tiger grass	Poaceae	Young leaves	Pnuemonia, Beri beri and Komjuri (weakness, fever and reluctance to eating)	
36	Vitex peduncularis Wall.	Ranggi (G), Ashoi, Silangri (G)		Verbenaceae	Young leaves	Pnuemonia	
37	Zizyphus mauritiana Lamk.	Angkil (G)	Ber	Rhamnaceae	Bark	Cough	
38	Zizyphus rugosa Lam.	Makbil angkil (G)	Wild jujube, Wrinkled jujube	Rhamnaceae	Bark	Throat cancer and intestine cancer	







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Diseases	Garo	Haiong	Koch
Anomia	2	najong	KUCH
Anichina Anichina (A famala disease after delivery)	6		
All diffie (A female disease after delivery)	0		
Beriberi	1		
Bleeding			1
Cancer	1		
Cough	2	1	
Diabetics	1		
Gastric (gastritis)	1		
High fever	2	1	
Insomnia	1		
Intestine cancer			3
Jaundice	4		2
Joint pain	1		
Komjuri (Weakness, fever and reluctance to eating)	2		
Malaria	2	1	
Measles	1		
Pneumonia	4		
Skin diseases	1		
Sprain	1		
Stomachache	1		1
Throat cancer			3
Ulcer	1	1	
Urine infection		1	
Vomiting	1		









measles, pneumonia, skin diseases, sprain, stomachache, throat cancer, ulcer, urine infection and vomiting. In North Garo Hills, Meghalaya, maximum number of plants was used for curing ailments like stomach problem (dysentery, diarrhea and gastric problem), headache and dizziness while minimum number of plants were used to cure diabetes, epilepsy and gall bladder stone [19] whereas in the present study maximum number of plants are used for an'dime (a female disease after delivery) while minimum number of plants for curing beriberi, bleeding, cancer, diabetics, gastric, insomnia, joint pain, measles, skin diseases, sprain, urine infection and vomiting. Plant parts like bark, flower, fruits, leaves, young leaves, roots and whole plants are taken mostly internally or applied externally in the form of decoction or paste. Trees are the main source of medicinal plants in the present study. All the three tribes of Garo Hills depend on medicinal plants for their health. It is observed that Garo tribe is still mostly depended on medicinal plants comparing to the other two tribes.

Conclusion

Medicinal Plants continue to play an important role for the people of Garo Hills, Meghalaya. Therefore, it is extremely essential to conserve the medicinal plants and the indigenous knowledge of Garo, Hajong and Koch tribes for curing various diseases. Special attention is also needed to further document this study systematically.

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