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Research Article

ETHNOBOTANICAL KNOWLEDGE USED FOR PRIMARY HEALTH CARE IN LOHARBOND REGION OF INNERLINE RESERVE FOREST

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ABSTRACT

The role of Traditional Ethnobotanical Knowledge (TEK) for primary healthcare was carried out in the community of Loharbond region of Innerline Reserve forest, North-Eastern India. Using an intensive field participant observation methodology, we listed about 61 taxa of medicinal plants belonging to 43 families. Although Lamiaceae and Cucurbitaceae were mostly used but a large number of families contributed through single and double plants in each. *Mikania micrantha, Azadirachta indica, Centella asiatica* etc. had highest fidelity level (100%) and *Dillenia indica* (65%) had lowest fidelity level among most common species. Leaves (44%) were the most preferred plant parts and gastro-intestinal disorders was the commonest disease that was treated using TEK. There was huge agreement among ethno-medico-botanical informants by Factor of Informants Consensus (F_{ic}) value ranging from 0.58 to 0.88, with an average value of 0.80. The knowledge on medicinal plants used by the people of Loharbond region seems to be well known to its culture and tradition.

INTRODUCTION

Ethnobotany is the scientific study of relationships and interactions that exist between plants and people. The term ethnobotany is derived from the terms "-ethnology"- study of community culture and "-botany"- study of plants. Ethnobotany may be defined as an anthropocentric approach to study the complex relationships among plants, people and their cultures associated with them (Harshberger 1895, Balick and Cox, 1966; Rao and Henry, 1997; Rahman, 2009). The interactions between plant and people has been in existence since the history of human but it has been studied as a separate field with the introduction of the term ethnobotany by Dr. John Harshberger in 1895. He explained ethnobotany as "the study of plants by aboriginal people" (Harshberger, 1895). Since then the scope of the ethnobotany has extended and now a days it is linked with almost all fields of studies. There are many components of ethnobotany, including medicine, religion, mythology, food, shelter, fishing and hunting etc. Thus ethnobotany, is its totality, an old field with new dimension of research and if this field is explored thoroughly and systematically, it will yield results of great value linking the archaeologists, ethnobotanists, anthropologists, plant-geographers, linguists and eventually to pharmacologists and phyto-chemists. It will emerge to be a bridge among variety of field of studies.

According to WHO, 80% of world's population depend on traditional medicines for their primary health care needs (Azaizeh *et al*., 2003). Especially in the developing countries, traditional plant based medical practices play an important role in the primary healthcare system (Sheldon *et al*., 1997). It is believed that these traditional medicines can give good effect against disease without causing any side effects. The search for new plant compounds for therapeutic and other uses continues throughout the world, specially the major rain forest areas, but deforestation and other factors may eliminate many plants before detection of their properties. Also, slow pace of ongoing research has resulted in the identification of only10% of known plant species that have been studied in laboratories to determine their therapeutic potential (Kinghorn, 1994).

In India, interaction of plants and people has been prevalent as early as 5000 BC with the emergence of the Indus Valley Civilization. Out of 45000 known plants in the country, 1500 plants that have medicinal properties, comprises of; 2000 for Ayurveda, 700 for Unani, 600 for Siddha, 450 for Homoeopathy and 30 for modern medicines (Baishya *et al*, 2013). Majority of the tribal communities in India are still

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utilizing their Traditional Ethnobotanical Knowledge (TEK) to cure various ailments (Jain and Dam, 1979; Kshirsagar and Singh, 2001; Jagtap *et al*., 2006; Kala and Sajwan, 2007; Katewa, 2009). However, TEK of those people are closely linked with geography as well as ecological and cultural factors (Gesler, 1992; Wiley, 2002). Northeast Indian part of the country is endowed with a great harbor of biodiversity due to its geographical situation. The region is considered as one of the biological hotspot for its high ethnicity and biological diversity (Ramakrishnan, 1984; Myers *et al*., 2000). The large biodiversity coupled with indigenous tribes and their folklore medicinal them made the region congenial for ethnobotanical research.

Several ethnobotanical studies have been conducted by various workers in different tribal communities from Northeast India, the Jaintias of north Cachar hills (Sanjem *et al*, 2008), Bodo communities of Goalpara district, Assam (Basumatary *et al*., 2004), Assamese people against skin diseases (Saikia *et al*., 2006), Dimasa tribe of Barak Valley (Nath *et al*., 2011), medicinal plants used by different tribes of Cachar district, Assam (Das *et al*., 2008). However, there has not been any work from the Loharbond region of Innerline Reserve Forests. The aim of the present study is not only the documentation of traditional ethno-medico-botanical plants but also giving a brief idea about their mode of preparation that may be helpful in future pharmaceutical research.

Study Area

The study **was conducted in** the Loharbond region of Innerline Reserve Forest (IRF)**,** located in the North Eastern region of India in between 92°35' E - 95°44'E longitudes and 24°19' N - 27°07' N latitudes. The region is located in south corner of Cachar district, at a distance of 35 km from the Silchar town. The altitudinal elevation of the reserve forest is 47 msl. Annual average rainfall is about 2500 mm (Das and Das, 2005). The warm humid climate is characterized by; a dry winter from November to February, hot dry summer from March to May, and a long rainy season from May to October. The driest month is December but the average relative humidity never falls below 40%. The average annual humidity is 78%. The soil ph of the area is 4.5-5.5. The reserve forest is characterized by tropical evergreen forest with a large variety of trees, birds, insects, and mammals**.** Currently, the original forest has declined drastically by human **activities.**

Fig. 1 Map of the Study Area (*denotes the study area)

Considerable area of the reserve forest is covered by *Dillenia indica* (L.) vegetation which along with trees like, *Toona ciliate Roem., Terminalia chebula* Retz, *Shorea robusta* Gaertn. etc., while bamboo species includes *Bambusa vulgaris* Schrader, *B. cacharensis* Majumdar, *B. nutans* Wall. etc. According to 2001 census, the population of the Loharbond Gaon panchayat is 6594 which constitutes an important part of the studied region. The communities are H'mar, Kuki and Bengali. Bengali are mainly living at the vicinity of forest region. Though H'mar, Kuki tribes have their own dialect but majority of them communicate through Bengali as it is the common language of the region. The H'mar and Kuki tribes have very rich cultural and traditional practices which is unique from one tribe to the other. They have a great heritage of oral traditions which involves beliefs and practices associated with nature, plants and animals. Their principal means of livelihood is Betel leaf farming (Pan Jhum), fuelwood collection and livestock rearing. The most common cash crops are betel leaf, Maize, Chilli, Pumkin, Beans, Peas, Ginger, Garlic etc. The commonly available fruits in the region are Banana, Mango, Guava, Lemon, Litchi, Cucumber etc.

METHODOLOGY

Extensive field trips were organized during the December 2014 to August 2015 in Loharbond region of Innerline Reserve Forest, Cachar district of Assam, India. Forest areas and villages of such regions were frequently visited, to collect the medicinal plants and their pertinent information such as the different plant parts in use, methods of preparation and consumption for specific disease. Experienced informants, elderly people, school teachers, village head men (*Gaon Burah*), Vaids, hakims and traditional health care practitioners, forest dwellers were contacted as they were utilizing the plant species to cure diseases. Every effort was made to identify the persons with proven knowledge of medicinal plants. Special attention was given to the elderly persons of the community. The documentation process included information gathered from individuals through detailed questionnaire, and focused participatory rural appraisal (PRA). The questionnaire was administered to 30 informants to collect traditional ethnobotanical information (TEK) for informant consensus factors (F_{ic}) and fidelity level (FL) analysis. The common species were classified on the basis of people respondents for FL analysis. The information regarding TEK and their relevant information such as vernacular names, organ used, and methods of preparation for specific diseases were recorded. The recorded plant specimens were identified with the help of different flora and monographs (Kanjilal *et al*., 1936, Kanjilal *et al*, 1938, Kanjilal *et al*., 1940; Schultes, 1960; Schultes, 1962).

Data Analysis and Quantitative ethnobotany

Fidelity Levels (FL): Fidelity Levels (FL) is the percentage of informants claiming the use of certain plants species for the same major purpose was calculated for the most frequent reportedly diseases or ailments as:

$$FL\ (\%) = (Np / N) \times 100,$$

Where, Np is the number of informants that claim a use of plant use to treat a particular disease, and N is the number of informants that use the plant as a medicine to treat any given disease (Alexiades, 1996).

Table 1 The Medicinal Plants Used for Various Diseases in Loharbond region of Innerline Reserve Forest

Scientific Name	Family	Local Name	Part Used	Preparation	Uses
Adhatoda vasica Nees.	*Acanthaceae*	Bashok	Leaves	Juice	Asthma, chronic bronchitis
Aegle marmelos (L.) Corr.	Rutaceae	Bel	i) Leaves ii) Green fruits	i) Juice + Black piper ii) Fresh Pulp	i) Piles. ii) Stomach problem.
***Allium sativum* L.**	Amaryllidaceae	Piaj	**Bulb**	**Paste is edible**	**High blood pressure.**
Alstonia scholaris (L.) R. Br.	**Apocynaceae**	Chatni	Stem & Leaves	Juice	Headache, malaria, dysentery.
Ananas comosus (L.) Merr.	Bromeliaceae	Anaros	Roots	Juice	Urinary trouble.
Andrographis paniculata (Burm.f.) Nees	*Acanthaceae*	Kalomeg/ Chirta	Stem & leaves	Juice	Chronic fever, deworming.
Annona squamosa L.	Annonaceae	Atafol	Bark	Juice	Diabetes
Argemone mexicana L.	Papaveraceae	Siyalkata	Stem & Leaves	Juice	Scabies.
Averrhoa carambola L.	Averrhoaceae	Theiher-awt, Kamranga	Fruit	Fresh	Jaundice.
Azadirachta indica L.	Melicaceae	Nim	Leaves	Decoction	Small pox, Eczema
Baccaurea ramiflora Lour.	Euphorbioceae	Bhubi	**Young fruit**	Fresh	**Jaundice.**
Basella alba L.	Basellaceae	Puishak	i) Leaves ii) Roots	i) Juice ii) The root paste *B. Alba* +rice washed	i) Hypertension ii) Irregular menstruation.
Cajanus cajan (L) Millsp.	Papillionaceae	Arhar	Leaves	Juice	Jaundice
Calotropis gigantea (L.) Dryand.	Asclepiadaceae	Akand	i) Leaves ii) Latex	i) Poultice ii) Fresh	i) Muscular pain, rheumatism ii) Toothache
Cassia alata. L.	Caesalpiniaceae	Dudloti, Duidubi	Leaves	Paste of *C. alata* L. + *Allium sativum* L.	Ringworm
Catharanthus roseus (L.) G. Don	Apocynaceae	Nayanthara	Leaves	Juice	Diabetes.
Centella asiatica (L.) Urb.	*Apiaceae*	Tankuni	Whole plant	i) Juice ii) Leave paste	i) Dysentery, Stomach problem ii) Skin diseases.
Cinnamomum tamala (Buch.-Ham.) T. Nees. & Eberm.	Lauraceae	Tejpata	Leaves	**Juice**	**Gonorrhoea, diarrhoea.**
Citrus aurantifolia (Christm.) Swing.	Rutaceae	Kagjilebu	Fruit	Juice	Stomach problem, headache
Clerodendrum infortunatum L.	Lamiaceae	Batigas	Leaves	i) Juice ii) Decoction *Clerodendrum viscosum*+ *Azadirachta indica*	i) Diabetes, dysentery, Stomach problem, ii) Skin disease.
Clitoria ternatea L.	Fabaceae	Aparajita	**Leaves**	**Juice on the skull**	**High blood pressure**
Corchorus capsularis L.	Malvaceae	Naliya Sag / Nalia Pata	Leaves	Decoction	Liver disorders
Coriandrum sativum L.	Apiaceae	Dhonia	Leaves	Paste	Skin infections
Cucumis sativus L.	Cucubitaceae	Shosha, / Kheera	Fruits	Pulp	Diarrhoea, piles, leprosy, menstrual disorder.
Cucurbita maxima Duchesne	Cucubitaceae	Kumra	Leaves & fruits	Paste	Ascariasis, schistosomiasis
Curcuma domestica Valeton	Zingiberaceae	Haldi	Rhizomes	Paste	Staunch bleeding, wound
Cuscuta reflexa Roxb.	Convolvulaceae	Shnayalath	Whole plant	**Decoction**	**Jaundice**
Datura stramonium (L.)	Solanaceae	Dutra	Leaves	Poultice	Muscular pain
Dillenia indica L.	Dilleniaceae	Choilta	Green fruits	Juice	Dandruff.
Drynaria quercifolia L.	Drynariaceae	Bonfaloi	Leaves	Paste, and juice	Cough, diarrhoea, jaundice, skin infections.
Emblica officinalis Gaertn.	Euphorbiaceae	Amloki	Fruits	Fresh	Stomach problem
Ficus benghalensis L.	Moraceae	Bot	Bark	Juice	Gonorrhoea, boils.
Flacourtia jangomas (Lour.) Raeus.	Salicaceae	Luk-Luki	Fruit, leaves	Paste	Tumor
Gmelina arborea Roxb.	Lamiaceae	Gamari	**Leaves**	Poultice	Headache.
Gnetum montanum Markgr.	Gnetaceae	Mitar	Leaves	Juice	Muscular pain.
Hibiscus mutabilis L.	Malvaceae	Sthalpadma	Leaves, flowers	Paste	Swellings, skin infections.
Hibiscus rosa-sinensis L.	Malvaceae	Jaba ful	Flower	Paste	Staunch bleeding
Homalomena aromatica Schott.	Araceae	Gandhi kachu	Rhizome	Juice + water	Promoting urination.
Houttuynia cordata Thunb	Saururaceae	Tangapata	**Leaves**	Paste is edible	**Heart problem.**
Lagenaria sicerararia (Molina) Standl.	Cucurbitaceae	Panilau	Fruit, Stem	Fruit juice + little salt is taken orally	Heart problem, weakness, stroke.
Lagerstroemia reginae Roxb.	Lythraceae	Jarul / Jaroil	Leaves	Juice	Diabetes
Leucas aspera (Willd.) Link	Lamiaceae	Donkolsh	Leaves	Juice	Cough, stomach problem.
Mentha arvensis L.	Lamiaceae	Pudina	i) Leaves ii) Roots	i) Juice of young leaves ii) Decoction	i) Diabetes. ii) Diarrhea.
Mesua ferrea L.	Calophyllaceae	Nageshor	i) Flowers ii) Seeds	i) Juice ii) Paste	i) Piles, dysentery, leucorrhoea ii) Rheumatism.
Mikania micrantha L.	**Asteraceae**	Rupujiloth / Germoniloth	**Leaves**	i) Paste is used to poultice ii) Juice + milk taken orally	i) Staunch bleeding. ii) Blood dysentery.

Mimosa pudica L.	Mimosaceae	Lojjabothi / Soiamora	Whole plant	Paste	Pain killer, tumor.
Mussaenda roxburghii Hook. f.	Rubiaceae	Baibhone	Leaves	Paste	Snake-bite.
Neolamarckia cadamba (Roxb.) Bosser	Rubiceae	Kodom	Bark	Infusion	Snake-bite, vomiting
Nyctanthes arbor-tristis L.	Oleaceae	Shefali	Leaves	Leaf extract	Fever, liver-trouble.
Ocimum sanctum L.	Lamiaceae	Barpai, Tulsi	**Leaves**	i) Juice is taken orally ii) Leaves juice + lemon juice are applied externally iii) Drop	i) Cough, malarial fever. ii) Skin diseases. iii) Earache
Oxalis corniculata L.	Oxalidaceae	Amrulsak	Whole plant	Extract	Stomach trouble, colic.
Piper betle L	Piperaceae	Pan patha	Leaves	Paste	Tumor, staunch bleeding.
Saccharum officinarum L.	Poaceae	Kushiar	Stem	juice + water	Jaundice
***Saraca asoca* (Roxb.) Wild.**	**Caesalpiniaceae**	**Maikampar, Ashok**	Bark	Juice	**Leucorrhoea, blood dysentery.**
Solanum anguivi Lam.	Solanaceae	Tethbaigon, Rambegun	Root	Juice	Colic.
Syzygium cumini (L.) Skeels.	Myrtaceae	Kalojam	Seed	Powder + water is taken orally	Diabetes.
Terminalia arjuna (Roxb.) Wieght & Arn.	Combretaceae	**Arjun**	Bark	Infusion	Heart problem
Terminalia chebula Retz.	Combretaceae	Hartaki	Fruit	Fruits are chewed	Piles, small pox.
Tinospora cordifolia (Willd) Miers	Menispermaceae	Gulmoris	i) Stem ii) Leaves	i) Juice + warm water ii) Juice	i) Dysentery, gastric. ii) Diarrhoea, vomiting
Wedelia chine nsis (Osb.) Merr.	Asteraceae	Vringaraj	Leaves	Juice	High blood pressure, cough, hair growth, menorrhagia & uterine haemorrhages
Zingiber officinale Roscoe	*Zingiberaceae*	Ada	Rhizome, leaf	Paste, juice	Headache, rheumatic pain, dysentery, asthma

Informant Consensus Factor (F_{ic}): The level of homogeneity among collected information was calculated by informant consensus factor (F_{ic}). It highlights plant of particular cultural relevance and agreement in the use of plants. Informants' consensus within a community and between cultural groups indicates which plants are widely used and thus aids in the selection of plants for pharmacological and phytochemical studies (Giday *et al*., 2007).

In order to use this tool, illnesses were classified into categories, as plants with high F_{ic} are likely to be more pharmacologically efficient as compared to plants with low F_{ic}. The F_{ic} can be calculated using the formula as follows:

F_{ic} = Nur-Nt / Nur-1

Where Fic = informants consensus factor, Nur = number of use citation in each category, and Nt = number of species used.

RESULTS AND DISCUSSION

61 plants belonging to 43 families of ethnobotanical significance were listed. The plants used for medicinal purposes are listed in Table 1, arranged in alphabetical order along with their botanical names, families, vernacular names, plant parts used for specific disease and their preparatory practices.

The family, Lamiaceae contributed to the highest number of medicinal plants, followed by Cucurbitaceae whereas Acanthaceae, Apiaceae, Fabaceae, etc. families were represented by two species each. The remaining families contributed single species as medicinal plants. (Table 1). The families represented a single plant in each (29) was significantly higher than families that contributed two plants (13), three plants (1) and four plants (1) (χ^2 = 48, df=3, p<0.01). The results are in line with other ethnobotanical studies conducted in the region (Nath *et al*., 2011, Pfoze *et al*., 2014).

Table 2 Categories of ailments and informant consensus factor (F_{ic}) for each category

Disease Category	Number of use reports (Nur)	Number of taxa (nt)	Consensus Factor (F_{ic})
Gastro-intestinal	189	23	0.88
Cough	31	5	0.87
Fever	15	3	0.86
Piles	22	4	0.86
Dermatological	98	15	0.85
High blood pressure	21	4	0.85
Jaundice	38	7	0.84
Headache	19	4	0.83
Urinary trouble	7	2	0.83
Staunch bleeding	24	5	0.82
Skeleto-muscular	29	6	0.82
Cardiovascular	21	6	0.75
Gynacological	19	8	0.61
Diabetes	13	6	0.58

Table 3 Fidelity Level of most common species

Species	Local names	Uses	Fidelity Level (FL) (100%)
Centella asiatica (L.) Urb.	Tankuni	Gastro-intestinal	100
Clerodendrum infortunatum L.	Batigas	Gastro-intestinal	100
Azadirachta indica L.	Nim	Dermatological	100
Ocimum sanctum L.	Tulsi	Cough	96
Averrhoa carambola L.	Kamranga	Jaundice	95
Mikania micrantha L.	Rufujilot, Jarmonilot	Staunch Bleeding	89
Aegle marmelos (L.) Corr.	Bel	Gastro-intestinal	88
Mimosa pudica L.	Lojjaboti, Soiamora	Tumor bursting	88
Zingiber officinale L.	Adha	Skeleto-muscular	87
Calotropis gigantea (L) R.Br	Akondpata	Pain	84
Curcuma domestica Valeton	Haldi	Wounds	83
Saccharum officinarum L.	Kushiar	Jaundice	82
Terminalia arjuna (Roxb.)	Arjun	Heart problem	76
Dillenia indica L. 65	Choilta	Dermatological	65

All the parts of the plants were used for medicinal purposes. A significantly higher usage of leaves was observed (χ^2 = 40.45, df = 4, p<0.01), followed by fruits, barks, and stems (Fig.2). Similar types of results were also obtained by other researchers

(Mahishi *et al*., 2005; Abo *et al*, 2008; Lokho, 2012). Leaves are the main photosynthetic organs having photosynthates which might be responsible for medicinal values (Ghorbani, 2005). Digging out roots might be the cause of death of the plant and putting the species in a vulnerable condition, so it might be the another reason of using leaves so as to help in conservation of plants (Zheng *et al*., 1999; Rehecho *et al*., 2011).

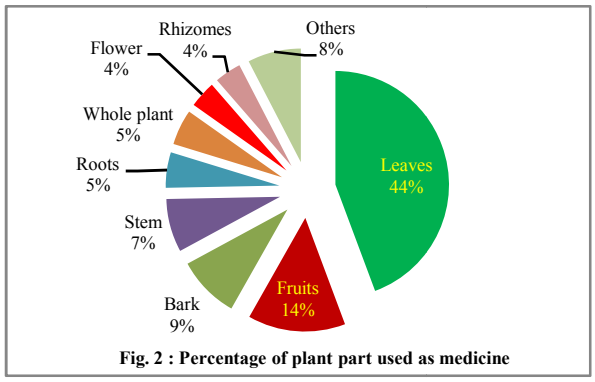

Fig. 2 : Percentage of plant part used as medicine

The local people used other ingredients such as salt, water etc. along with the plant parts to prepare their remedies. The most preferred ways of applying plant parts for diseases are; taken juice of plant parts (especially leaves and fruits), decoction of the usable parts, homogenizing in water and applying a poultice on the surface of the affected body. Fascinatingly, it was found that the most available species such as *Clerodendrum infortunatum L.*, *Calotropis gigantea* (L) R.Br, *Averrhoea carambola* L., *Ocimum sanctum* L., *Centella asiatica (L.) Urb., etc.* were most frequently used. Also, these species has highest fidelity level (FL) as majority of the people were conscious about their medicinal properties (Table 1).

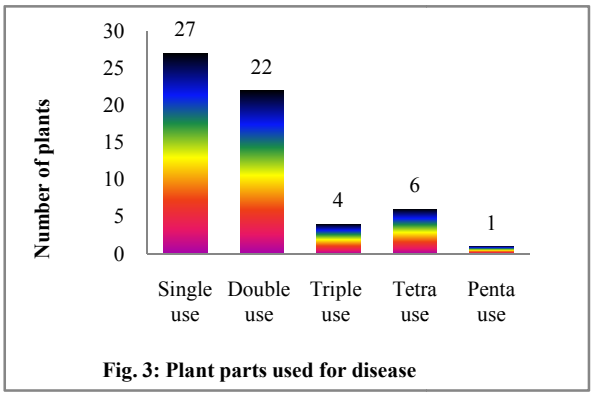

Fig. 3: Plant parts used for disease

The number of plants having a single use (27) was significantly highest among all the plants (χ^2 =45.5, df=4, p<0.01). The species *Wedelia chinensis* (Osb.) Merr. Had maximum uses but low fidelity level owing to a small number of informants claiming these uses. The most frequent species such as *Centella asiatica (L.) Urb., Clerodendrum viscosum* Vent. *Cucumis sativus* L., *Drynaria quercifolia* L., etc. were immensely important species because of their uses as drug for four types of ailments (Table 1). These medico-botanical knowledge is passed through generation to generation through oral communication (Das *et al*., 2008). They also sacrifice domestic animals such as hens, fowls, goat etc. to cure diseases as they believe disease are the result of evil spirits and sacrificing animals would mollify the evil spirits.

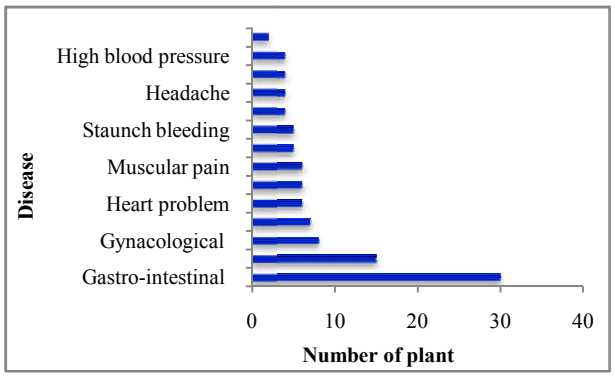

Fig. 4 Number of plants used for various primary healthcares

The local people use 61 plants for the treatment of various disorders in the studied region. The diseases were grouped into 14 major categories such as gastrointestinal, dermatological, gynecological, and so forth. For treatment of the diseases particular or mixture of plant species were used. Similarly, each plant was used for specific or multiple ailments (Table 1). Majority of people were aware of either one or two types of medicinal properties among multiple uses species. Analysis revealed that the native people of the forest region use the plants highly for Gastro-intestinal disorders, followed by dermatological, gynecological and other ailments (Fig. 4). Similar results were also observed in other studies (Das *et al*., 2007; Tolossa *et al*., 2013).

The Informant Consensus Factor (F_{ic}) values are presented in the table 2. It has been shown that F_{ic} values ranges from 0.58 to 0.88 with an average value 0.80. Gastrointestinal has highest F_{ic} value (0.88) with 189 use reports from 23 plants, followed by cough (F_{ic}=0.87, 31 use reports, 5 species), fever (F_{ic}=0.86, 15 use reports, 3species), piles (F_{ic}=0.86, 22 use reports, 4 species) and dermatological ailments (F_{ic}=0.85, 98 use reports, 15 species). The least agreement (F_{ic}=0.58) between the informants was observed for plants used to cure diabetes. This low F_{ic} value could be due to the less number of people affected by this disease and also the communication gap among people in different areas. The high F_{ic} value of Gastro-intestinal and dermatological disorders give an indication that these ailments are prevalent in the Loharbond region. This could be indicative of the poor socio-economic and sanitation conditions. Analysis on various types of diseases reveals that people have clear idea on the uses of plants for primary healthcare by traditional herbal medicines over centuries. To determine culturally importance species Fidelity Level (FL) has been calculated. Analysis shows that *Centella asiatica* (L.) Urb., *Clerodendrum infortunatum L.* Vent.etc. (100%) had highest FL among most preferred species and *Dillenia indica* L. (65%) had lowest fidelity level. F_{ic} and FL analysis revealed that the most common used species were used for gastrointestinal disorders (Table 2 & Table 3).

The people, particularly those residing near the reserve forest (H'mar and Kuki tribes) are still largely dependent on traditional ethnobotanical knowledge (TEK) for their primary health care, as modern heath facilities are deficient there. TEK is quite frequent in the region inspite of increased medical advancements in recent generations. H'mar tribe uses wild plants not only for household consumption, but also a good amount of the resources collected are sold as non-timber forest

products such as fuelwood, bamboo stick etc. to the local markets, thereby complementing to their household income. This is a serious concern from the point of conservation and sustainability of these bio resources because such harvesting from the wild may lead to depletion of the population or even their extinction. If such extraction goes unabated, these species would be on the verge of extinction. However it was observed during the study that a few villages were conserving such resources by domesticating them.

CONCLUSION

Joint cooperation among practitioners, community and research institutes and a long-term sharing of benefits arising from the discovery of medicinal properties is essential. The survey pointed out that most of the informants were ready to co-operate and share their traditional ethnobotanical knowledge with the researchers. The medicated asserts incorporated in the study need to be examined through phytochemical and pharmacological analysis to discover their potentiality as drugs. This report may represent a valuable and long-lasting document, which can contribute to preserve traditional ethnobotanical knowledge in this region and also stimulate the interest of future generations on traditional healing practices. The study provided personal connections of the natural areas which not only give scope as learning opportunities but also highly encourage people to conserve and protect their environment, as proposed by Miller (2005). The positive aspect of the study was that the local communities were enthusiastic about the conservation of resources in Loharbond region.

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