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Folk-Medicare System of Chakpa community of Andro Village of Manipur in Northeast India

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ABSTRACT

Background: This present study aims to explore and document the folk-medicare system of primary health ailments of a very small indigenous Meitei schedule caste community called Chakpa residing at Andro Village (having population of around 8300) of Manipur in Northeast India. As this small village is fairly isolated and having unique culture and lifestyle from the rest communities, the traditional knowledge system is still in prominence and intricately associated with culture and religion.
Methods: Field survey and data collection was conducted during 2011-2013 in Andro village of Manipur, Northeast India on monthly basis with main objective to collect ethno medicinal data. The data were collected through open-ended semi-structured interviews, informal meeting and personal observation of 21 traditional herbal healers and 63 elderly knowledgeable people of the Chakpa community. Market survey to assess availability and pricing was conducted in Thoubal market. The voucher specimens were collected for all the species and deposited in the CSIR-NEIST Branch Laboratory, Imphal, Manipur, India.
Results: We recorded 63 plant species belonging to 56 genera and 41 families which were used by Chakpa community in traditional health care system to treat over 25 diseases and ailments where highest number of 10 species and 9 species were used in treatment of menstrual disorder and kidney problem, respectively. Most of the plants are herbs (27 species) followed by trees (17 species), shrubs (15 species) and only 5 species climbers. Most remedies were prepared by simple boiling or cooked of the ingredients and mode of administration was in liquid or concoction forms. Honey was used in most of the preparations. Around 56% of the plants were collected from wild habitat, 24% cultivated while rest species were from both wild habitat and cultivated. Around 57% of the species were sold in local markets, amongst, the flower of *Iris bakeri* was most expensive (₹ 380/kg). Amongst, 10 species were rare while rest species were commonly

available. Around 41% of the ethno medicinal plant species were eaten as vegetables / spices / snacks / fruits by Chakpa community.
Conclusions: The Chakpa community prefers and frequently used herbal formulations mainly based on 63 plant species in their day-to-day health care and treatment due to its readily available, rich knowledge system and low cost and also due to lack of availability of modern medicines in the vicinity of the villages. Substantial local economy was generated through selling of these plants. A sizeable number of species were cultivated in private lands thus sustaining the medicinal plants.

Keywords-: Andro village, Meitei Chakpa community, Folk-medicare, Medicinal plants, Dietary use, Cultivation, Conservation.

BACKGROUND

Ethno-medico-botany is one of the tools that deal with the direct relationship of plants and men to prevent and cure ailments[1,2]. The rich and diverse traditional knowledge on the uses of medicinal plants and its practices in health care by the various ethnic communities of Northeast India remains as poorly documented. Manipur one of the eight states of Northeast India being under the 'Indo-Burma' biodiversity Hotspot region and Eastern Himalayas[3] is blessed with rich and diverse bioresources including wild edibles and medicinally important plants. The diverse rural communities depend mainly on plants and animals to fulfillment of their basic need of food and healthcare and support significant local economy. They collect useful plants resources from various habitats and utilize them using indigenous knowledge and practices [4]With the advancement of science and technology, changing of surrounding habitats and environment, traditional practices and uses of bioresources is still alive in rural and remote corners, where people are still by and large dependent on traditional medicines as the first line of defense for various ailments[5]. The diverse traditional knowledge system leads to discovery or development of numerous medicine or drugs used in this modern era[6]. Human dependence on wild edible plants for dietary requirements throughout the world is well known. Many of today's cultivated high yielding crops were one time grown in the wild. Wild edible plants play a vital role in compaction of nutritional requirements especially for those inhabitants in hilly regions where agricultural productions are less. In the recent years, the importance and need of proper documentation of traditional knowledge system is realizing and study survey works are taken up from different parts of the world[7].

In many smaller pockets of India particularly in northeastern region, the traditional knowledge system of health care and healing practices are still prominent. The people of Manipur have traditionally been dependent on the wild plants and animals for various cultural and religious purposes for Centuries[8] and many of these species are sold in local markets thus provide means of livelihood and local economy. The communities are closely associated with wild plants and animals from birth of a child to death of a person. It is ironical to note that dead of a person at home of Manipur is still authenticated and declared by local practitioners (locally called Maiba/Beita) not by medical doctors. Due to rapid declination of medicinal plants

due to extraction pressure in wild habitat and inclination of its demand, now people have started cultivation of some of these species in their private lands and farms for personal use and local trade.

A sizeable ethnomedicinal reports of Manipur state particularly for Meitei community are available[9-18]. No documented report on ethnomedicinal uses of *Meitei* Schedule Caste Chakpa community of Manipur is available. We felt that Andro being a fairly isolated village at the foothill of Nongmaiching and the Chakpa community inhabited there is one of the oldest settlers of the state are having unique culture and lifestyle, the ethnomedicinal knowledge system and practices might have unique characteristics and of interest. The present study is attempted to document the folkmedicare system of Chakpa community of Manipur in northeast India which will be the first hand baseline data and documented report on the above.

MATERIALS AND METHODS

Study Area & Chakpa Caste

The Andro is a tiny and fairly isolated village situated at 94° 2′ 47″ E and 24° 44′ 27″ N in the eastern border of Imphal East district of Manipur state, northeast India (Figure 1). The village is situated at the foot hill of Nongmaiching / Baruni hill which is about 25 kilometers away from Imphal, the state capital of Manipur and extends a geographical area of about 4 km^2. The people of Andro belong to Scheduled Caste (SC) community commonly known as *Chakpa,* and are one of the 7 schedule castes present in the state. The village is broadly divided into 3 settlements namely, (i) Andro-Machingpat, (ii) Andro-Khunjao and (iii) Andro-Khuman (Figure 1). No proper market(s) exist inside the Andro village. Marketing (selling and purchasing) of items are generally done in Yairipok Keithel which is about 4 km away from Andro village. According to 2001 Census, the human population of Andro village was 8316 (Male - 4176, Female - 4140) with an average literacy rate of 47% which is fairly lower than the Indian national average of 59.5%. Around 16% of the population was under 6 years of age [19]. The area received an average rainfall of 200 cm with temperature range between 1-38°C in a temporal cycle.

The *Chakpa* is one of the indigenous communities and oldest settler of Manipur which is still following their indigenous socio-religious customs and practices which are very much peculiar with the rest communities of the state. They got their own traditional system of food habit and largely depend upon wild vegetables and animals. Pork is a favourite dish among the meats. Local wine (rice beer locally called as *Yu*) is generally offered to God and Deities and people are permitted to drink the wine during festivals. The traditional system of local wine preparation was generally practiced in around 70-80% families. A glass of wine is generally offered to guests as a customary practice and respect of the guest. Pottery is another traditional knowledge and practice of the community and majority of the villagers are engaged in this profession which is another major source of livelihood and local employment. In this modern age, the housing technology is based on the advice of traditional scholars locally called *Maiba/Panji*, with certain principle like houses are generally facing towards east direction and are mostly made of mud-wall, roofed with thatch materials locally called *Ee* (*Imperata cylindrica*). Foundation stone of a house is done by *Maiba* on selected days with certain ritual functions. Each family of Chakpa community is worshiped the *Sanamahi-Laiingthou* (home deity) which is designated at the south-western corner of the house.

At this age of modern medical sciences, the Chakpa community is still

practicing the traditional system of health care and healing by using medicinal herbs and other components. Modern medicines of allopathy and family planning programme are less popular in this community. They depend significantly upon wild plants for treatment of various ailments and diseases and have a rich traditional knowledge system of using medicinal plants. Traditionally used medicinal plants are conserved *In-situ* in sacred grooves locally called *Chakpa Panam Ningthou, Pureiromlaba*, *Chingsomba* and *Amamlok.* Moreover, medicinal plants were cultivated and conserved *ex-situ* in their home gardens prominently by traditional herbal practitioners. Over 90% of villagers consult these traditional healers before attending Government established health centers except in critical health conditions.

The Chakpa caste of Andro village, regardless of having a rich and profound traditional knowledge on folk medicine does not have any written document or coded form about the traditional uses of medicinal plants and health care and practices. The mode of transfer of this traditional knowledge has been by words from one generation to another. Thus, considering the threat of being diffused and lost of these important information and knowledge, the present study aims at proper documentation of the unexplored rich folk medicinal plants and knowledge of treatment practices by Chakpa community.

Methods

The methods employed in this study were designed with the purpose of providing baseline information on the use of plants by Meitei schedule caste Chakpa of Andro village through detailed survey during 2011-2013. Before undertaking the study Prior Informed Consent (PIC) was taken from the community leaders and elderly persons to conduct surveys in the Andro village on holistic profile study on community medi-care system based on plant species. In the PIC, the community was assured to provide the documents / published data resulted from the present study to preserve in their local community library. Open-ended and semi-structured interviews were taken on monthly basis (second Saturday of every month) visiting their home of each professional traditional healers (n=21; 7 each from 3 settlements) and elders of both men and women (n=63; 21 each from 3 settlements) who have significant knowledge on medicinal plants and healthcare. Ethnomedicinal information on broad themes like dermatological problems (boils, skin itching, leprosy, face burnt), dental (mouth freshener, toothache), respiratory problems (cough, dry cough, fever, high fever, typhoid, tonsils, pneumonia), gastrointestinal (dysentery, diarrhoea, stomach complaints, constipation, piles, jaundice), gynecology problems (white discharge, irregular menstruation), urological problems (stone case, kidney problems), diabetes, cut and wounds, malaria, hypertension, orthopadetric and others (revitalization of child, body weight reducing) were recorded by visiting the houses of the informants and also group discussion with the herbal healers. Collection of such data were followed some standard methods[20-22]. The ethnomedicinal data were collected from 3 settlements namely, (i) Andro-Machingpat (ii) Andro-Khunjao and (iii) Andro-Khuman who shared a common language, culture and tradition. The data on ethnomedicinal uses of the plants collected were cross-checked amongst these 3 settlements and consensus information/data were recorded as final data.

For assessing collection 'Source' of raw medicinal herbs ranking was done with the resource persons and community members as 'Wild', 'Cultivated' and both 'Wild+Cultivated'. For 'Availability' status the species was ranked based on field observations of the authors, market

availability trend and interaction with collectors and the user groups as 'Extensively available', 'Commonly available', 'Available but not so common' and 'Rare'. Market survey was conducted in *Yairipok Keithel* (around 4 km away from the Andro village and having around 110 vendors) which is the biggest and nearest market to the Andro village for record of sellable species and pricing. Market prices were recorded 6 times (January, March, May, July, September and November) during the year 2013 and the mean value was calculated. Market prices were pooled into per kilogram basis.

The samples of all the species were collected and identified as to their scientific names and families with the help of experts and through the Botanical Survey of India, Northeast Circle, Shillong, India and scientific literatures[7,23-27]. The vouchers were collected for all species, prepared herbarium following standard techniques[28] and deposited in the herbarium of CSIR-NEIST Branch Laboratory, Imphal, Manipur, India.

RESULTS

Ethnomedicinal Uses

A total of 63 plant species belonging to 56 genera and 42 families were recorded which are used for medicinal purpose in traditional system by the Chakpa caste of Andro village in Manipur, Northeast India (Table 1). Amongst these plants the most dominant species were by the family Lamiaceae (5 species), followed by Verbenaceae (4 species), Acanthaceae, Liliaceae, Rutaceae, Solanaceae and Zingiberaceae (3 species each), Asteraceae, Combretaceae, Euphorbiaceae, Meliaceae and Poaceae (2 species each) while the rest 29 families are represented by single species (Figure 2). These medicinal plants are herbs, shrubs, trees and climbers (Table 2). More than 40% of the species are herbs which are followed by trees (17 species), shrubs (15 species) and climbers (5 species) (Figure 3a). Amongst the plant parts used for medicinal purposes, the use of leaf was most common (42.9%), followed by fruits/seeds (9 species). The other plant parts used were whole plant (8 species), shoot (6 species), rhizome (5 species), flower/inflorescence, bark, stem and roots (2 species each) while single species *Allium ascalonicum* in case of use of bulb (Figure 3b). The people collected these medicinally used plants from (i) wild habitat (ii) cultivated or (iii) both cultivated and wild habitat (Table 2). More than 55% of the plants were solely collected from wild habitat, 15 species were solely cultivated in private lands/home gardens while the rest 13 species were both collected from wild habitat as well as cultivated (Figure 4a). Out of the 63 ethnomedicinal plants, 29 plants were generally sold in local markets (Table 2). The two plants namely, *Allium ascalonicum* and *Centella asiatica*, the whole plant parts were sold whereas other plants were sold by their parts like shoot, leaf, fruit, rhizome, stem, flower/inflorescence, etc. (Table 2). *Dendrocalamus hamiltonii* was sold by their culms. The highest price was fetched by flowers of *Iris bakeri* (₹ 380/kg), followed by the price of pods of *Parkia timoriana* (₹ 270/kg), leaf of *Piper betle* (₹ 230/kg), rhizome of *Zingiber cassumunar* (₹ 200/kg), etc. while the cheapest was by shoot of *Rhus succedanea* (₹ 25/kg) (Table 2). The flowers of *Iris bakeri* were sole only during the Manipuri New Year locally called *Sajibu Cheiraoba* (which generally falls during early part of April month). This flower is must used in celebration of Manipuri New Year symbolizing peace and prosperity. Availability status study of species showed 16 species extensively available, 17 species were commonly available, 20 species were available but not so common while the rest 10 species showed as rare species (Figure 4b). Amongst the rare species, *Artocarpus*

lakoocha, *Celtis timorensis*, *Gonostegia* sp. and *I. bakeri* were reported more critical. The *I. bakeri* locally called *Kombirei* is now completely vanished in the wild habitat, only small population are maintained in home gardens and pots.

It is significant to note that 63 plant species were used to treat over 25 diseases and ailments (Figure 5). Amongst these plants, 15 species were used in treatment of multiple diseases while rest 48 species were used to treat single disease. *Acorus calamus* was used in treatment of highest number of diseases like viral fever, piles, vomiting and diarrhea followed by *Oroxylum indicum* that was used to treat 3 diseases like fever, hypertension and jaundice. The highest numbers of 10 species were used in treatment of menstrual disorder, followed by 9 species to treat urinary disorder and kidney problems (Figure 5). The other uses were burnt/boils (7 species), fever and tonsillitis (6 species each), piles (5 species), cuts/wounds, diabetes, diarhoea/dysentery and toothache (4 species each), cough, hypertension and stomachic (3 species each), bone fracture and skin diseases (2 species each) and the diseases like constipation, health tonic, jaundice, leprosy, malaria, mouth freshener, obesity, pneumonia, typhoid and vomiting were treated by single species (Figure 5). In around 20% of the herbal preparations, honey was used as an important ingredient. Traditionally prepared common salt locally called *Meitei-Thum* was also used in some formulations. Some formulations were prepared by using single plant while some were prepared by more than one plant. Some of them are *Achyranthes aspera*, *Verbena officinalis* and *Scutelleria discolor* together in treatment of menstrual disorder; *Arundo donax*, *Phlogacanthus thyrsiflorus* and *S. discolor* together in treatment of obesity; *Clerodendrum siphonanthes* and *P. betle* together in treatment of tonsillitis and sinusitis; *Jasminum multiflorum* and *Nelumbo nucifera* together in treatment of diabetes; *Mentha spicata* and *Zanthoxylum acanthopodium* together in treatment of tonsillitis; *P. thyrsiflorus*, *S. discolor* and *Swertia chirata* together in treatment of menstrual disorder (Table 1). In some peculiar cases, mercuric chloride locally called *Lupa-hidak* was added as an ingredient with pounded leaves of *Solanum anguivi* for treatment of severe pneumonia. In another case leaves of *J. multiflorum* was boiled with marble (white stone) for treatment of calculi.

Edibility of ethnomedicinal plants

Out of the 63 ethnomedicinally used plants by the Chakpa community, 26 species were used as food in traditional cuisines in the form of vegetables, spices, snacks and fruits (Table 3). The main traditional cuisines of Chakpa community were *Eronba*, *Kangsoi*, *Singju*, *Oottii*, *Ametpa*, *Kangou*, *Pakoura*, etc. (Table 3). Amongst the uses, 17 species were used as vegetables, 11 species as spices, 3 species as fruits and 2 species used as snacks (Figure 6a). Some of the plants like *Allium ascalonicum*, *Allium odorum*, *Alpinia allughas* and *Mentha spicata* were used as both spices and vegetables. Twenty one species were consumed occasionally (consumed not more than once in a week or in certain occasions) while the rest 5 species namely, *A. odorum*, *Capsicum annum*, *Citrus macroptera*, *Musa paradisiaca* and *Nelumbo nucifera* were frequently used (Table 3). In a single plant, more than one parts were eaten like stem and inflorescence in case of *M. paradisiaca*; shoot, root and fruit in case of *N. nucifera*; leaf and inflorescence in case of *Ocimum basilicum* and *Phlogacanthus thyrsiflorus*; fruit and inflorescence in case of *Parkia timoriana* (Plate 1a); fruit and leaf in case of *Punica granatum* and *Zanthoxylum acanthopodium*; fruit and shoot in case of *Rhus succedanea* (Table 3). Edible parts of the plant were fruit (11 species), leaf (6

species), flower/inflorescence (5 species), rhizome and shoot (3 species each), whole plant (2 species each), stem and root (single species each) (Figure 6b). In around half of the food preparations, dry fish (locally called *Nga-akangba*) or smoked fish (locally called *Nga-ayaiba*) or fermented fish (locally called *Nga-ri*) were used. Some of the edible plants were cuisine-specific like leaf of *Z. acanthopodium* (Plate 1b) in preparation of snails; fruit cover of *Citrus macroptera* (Plate 1c) used in fish cooking, inflorescence of *Elsholtzia blanda* in preparation of *Eronba* and *Ametpa*; leaf of *Murraya koenigii* in beans preparation locally called *Hawai-thongba*; leaf of *P. granatum* in *Ootti* preparation; and rhizome of *Zingiber cassumunar* was in meat cooking (Table 3). The rhizome of *Z. cassumunar* used in meat cooking especially for big animals not only for aroma / flavour but also for softening of the meat. Leaf of *Z. acanthopodium* was must in snail cooking. The tender pods of *Oroxylum indicum* (Plate 1d) cooked with smoked / dried fish and served as a delicacy. The rhizome of *Alpinia galanga* (Plate 1e) along with little quantity of fermented fish smashed together and prepared a dish called *Ametpa* and served with pungent taste. In many of the cuisines like *Eronba*, *Ametpa*, *Kangsoi*, *Chamthong*, *Singju*, etc., edible oils are not used. The cuisine namely, *Nongmangkha-soutani* was served during traditional/religious feasts only (Table 3).

DISCUSSION

Atleast 63 plants were used by Chakpa community of Manipur in health care and treatment of diseases/ailments. A total of 361 medicinal plants are reported from Manipur[7]. A report of 51 economic plants (medicinal and food) from the wetlands of Manipur is available[29]. Treatment of 21 types of disease and complicacies using 23 spices and aromatic plants by ethnic people of Manipur were studied[16]. Around 2.4% of the land area of Manipur is under wetlands[30] supports varieties of economic plants including medicinal and aromatic plants. A study on wetland bioresources of Manipur highlighted 38 plant species having ethnomedicinal properties for treatment of 22 diseases and ailments[29]. This community has skill in formulations of herbal medicines for local applications.

According to 2001 Census, there are limited healthcare centers and doctors in the state of Manipur. Population served per medical centre was 4213; 954 person per hospital bed and 2517 person per doctor. Most of the healthcare centres are and hospitals are mainly concentrated in Imphal (state capital) and medical facilities in remote areas are very limited. On the other hand, local healers have considerable role and reputation in village healthcare[31].

Most remedies were prepared by simply boiling the ingredients (26 species). Regarding part used leaves, whole plant, shoots, fruits and rhizome were the most frequently used plant parts while bark, root, stem, seed, culm, flower and inflorescence used to a lesser extent. Maximum number of mode of administration of Chakpa caste is in liquid form while solid form is very less. Honey played a vital role in healthcare of Chakpa as more than half of the herbal formulations honey was used as an important ingredient. Honey bee culture was observed in Andro village.

Wild edible species form a good source of minerals for the local residents at different parts of the globe[32-34]. Also reported that wild edible plants form a good source of protein, fat, vitamins, sugars and minerals and interestingly they are available during different months/seasons of the year[35]. Out of 63 plant species, 26 plants were reported consumed as food by Chakpa community in various forms like vegetable, fruit, spices, snacks, etc. It is significant to

note that Chakpa community regularly consumed many of the medicinal herbs in their diet with the very concept "wild food plants as medicine and medicinal plants as food". Substantial quantity and varieties of wild edible and medicinal plants are generally sold in local markets of Manipur.

Ethnobotanical studies not only identify products which may have local or national commercial value[36], but more importantly they provide a framework for the integration of such knowledge into development initiatives [37], and identification of key habitats for conservation[38]. In the recent times, the collection of medicinal plants has not only been for personal use but also to sell to local markets or to suppliers which in tern sell them in bigger markets[39]. Frequent harvesting of these medicinal plants often resulted in overexploitation. The rate of harvesting has been increasing day-by-day due to increase in human population and also collection for local trade. Moreover, due to shrinkage of natural habitats the availability of plant resources has been registering a declining trend during recent years[29]. It has also been observed that natural habitats are destructed due to land development like urbanization, house construction, road development and establishment of schools, colleges and other departments. Frequent and overexploitation of species may lead a threat to their survival in near future as was observed for some species in Northeastern States[40]. Community dependence on surrounding bioresources in terms of food and medicine in Manipur are paramount[41]. Overexploitation due to the unprecedented interest and demand for plants with medicinal properties and potency for treatment of various ailments as reported in the Borno State of Nigeria[42], contrary to it, for the Chakpa community of Manipur, it was encouraging because more than 40% of the medicinal and edible plants had already started cultivation in their private lands. In-situ conservation in the form of sacred grooves locally called *Panam Ningthou*, *Pureiromlaba*, *Chingsomba* and *Amamlok* is an excellent example of Chakpa community's traditional knowledge, skill and practices in conservation of biodiversity. As reported in other part[43], medicinal plants will continue to play an important role in primary healthcare sector in Andro village due to the peoples strong tradition and faith on the practice. But how long this conservation practice could continue is a big question that needs to be addressed immediately. Now, people have realized the need for conservation and cultivation of these life saving plants and commercial scale cultivation has been started in recent times. The present study findings may provide valuable insight for proper management and future planning of bioresources mainly medicinal and edible plants for Andro village.

CONCLUSIONS

In the present documentation, the close association of the Chakpa caste with their natural environment and their awareness of the usefulness of the rich 63 medicinal and edible plant resources are highlighted. Around 40% of the species were cultivated in private lands which is a good indication for sustainable management of these plant species. The study findings provide a valuable insight into the potential utilization and production of species and such information may be used to identify particular species worthy of further investigation, while contributing towards the local and national sustainable exploitation of biodiversity database particularly medicinal herbs and food plants. Some of the medicinal-cum-food plants may undergo further investigation to evaluate nutritional values that may further developed into economically viable crops. The tradition use of plants as medicine is still practiced in these remote area and they prefer the use of

folk medicare system instead of going to the hospital except in critical health conditions. The result could be due to easily availability of medicinal plants as the study area is at the foot hill of Nongmaiching hill and moreover most of the folk medicare systems were based on home prepared remedies. Other than the home prepared remedies this people turn to the traditional healers for treatment of severe health condition with medicinal plants because of low cost and readily available. Poor economic condition is taken as another factor for use of medicinal plants in day-to-day health care and treatment as modern treatments are fairly expensive.

It is of interest to know that some of the plants have their new medicinal uses. For instance, *Allium ascalonicum*, *Scutellaria discolor* and *Musa paradisiaca* were used to treat white discharge problem, *Artemisia nilagirica* for dysentery, *Mentha spicata, Zanthoxylum acanthopodium* for treatment of tonsillitis, *Oroxylum indicum* for blood pressure reduction, *Paederia foetida, Phoenix humilis* for boils, *Crataeva nurvala* for bone fracture healing, *Jasminum multiflorum* for stone case (calculi), *Xylosma longifolia* for skin itching, *Ricinus communis* for piles and *Arundo donax* for reducing body weight. But there is a need to determine the active components of these medicinal plants and perform bioassays to test its efficacy. This paper is the first hand database of medicinal plants of Chakpa community of Manipur, India and will be made it available in the Community Library of Andro village.

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Authors' contributions

ST carried out surveys at Andro village and organized interview schedules with local traditional healers and collected information on medicinal plants, their use pattern and processing. He also compiled and designs the manuscript. **DSN** and **ChC** participated in market surveys and surveys at Andro village. They also prepared vouchers specimen of all medicinal plant species into the herbarium and identified them to species level. **HBS** participated in the design and coordination of the study, species identification and compiled the information in the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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Table 1: Ethnomedicinal uses of plants by the *Chakpa* community of Andro village of Manipur

Scientific name (Local name)	Family	Parts used	Disease / Illness (Local name)	Ethno medicinal uses
Achyranthes aspera Wall. (Khusumpere)	Amaranthaceae	Leaf	White discharge (Nupigi figou chatpa)	Leaves of *Achyranthes aspera*, *Verbena officinalis* & *Scutellaria discolor* 50 g each boiled in 500 ml of water. 200 ml of the filtrate after sweetening with little honey was taken twice daily for a week period.
Acorus calamus L. (Ok-hidak)	Acoraceae	Rhizome	Viral fever (Lai hou)	The filtrate of fresh rhizome infusion in water sweeten with honey and 2 ml of it was taken daily for 3-4 days.
			Piles (Nungsang)	50 g rhizome boiled in 500 ml of water till to reduce the volume to 1/5. The concentrated liquid applied to the anus with the help of cotton.
			Bleeding Piles (Nungsang E-taba)	20 g rhizome boiled in 500 ml of water. 100 ml of the filtrate sweeten with honey was taken once daily for 5 days.
			Vomiting-diarrhoea (Oba phaiba	Rosary made of fresh rhizome beads was tied round the neck of the ill person.
Allium ascalonicum L (Meitei telhou)	Liliaceae	Bulb	White discharge (Nupigi figou chatpa)	The concoction made of 3 bulbs of this plant, yolk of one hen egg and 3 ml of honey was taken daily for 3-4 days.
			Dysentery (Eton phaiba)	Bulb decoction of this plant mixed with honey in equal proportion and 10 ml of the concoction was taken orally twice daily till recovered.
Allium odorum L. (Maroi nakuppi)	Liliaceae	Whole plant	Kidney problems / urinary problems (Esing mari bera touba)	500 g of the whole fresh plant boiled with 3 litres of water. 500 ml of the filtrate after sweetening with honey/sugar candy was taken orally once in a day till cured.
Aloe barbadensis Mill (Ghrita kumari)	Liliaceae	Leaf	Face burnt (Mai sagatpa)	Leaf gel was applied to the affected area twice a day.
			White discharge (Nupigi figou chatpa)	Leaf gels mixed with pasteurized cow milk in 1:3 ratio and 100 ml of the concoction was taken twice daily for 5 days.
Alpinia allughas Roscoe (Pullei)	Zingiberaceae	Rhizome	Viral fever (Lok laihou)	20 g crushed rhizome infused in 500 ml of water. 50 ml of the filtrate was added with 20 ml honey and the concoction was taken daily for 3-4 days.
Alpinia galanga Willd (Kanghoo)	Zingiberaceae	Rhizome	Viral fever (Lok laihou)	The rhizome harvested preferably on a particular day of Meitei calendar (*Kalen tutia*) which generally falls during summer prepared paste with chilli and the paste was taken with meals till cured.

Andrographis paniculata Nees (Bhupati)	Acanthaceae	Leaf	Cough (Lok kangkhu)	50 g leaf boiled in 500 ml of water along with little sugar candy and 50 ml of the filtrate was taken orally twice daily for 3 days for adults while 10 ml was recommended for children.
Argyreia nervosa (Burm.f) Bojer (Pungding uri)	Convolvulaceae	Leaf	Boils (Yairong)	Hot fomented leaf was applied as bandage on the boils leaving a small hole on the tip. Replace it twice daily.
Artemisia nilagirica (C.B. Clarke) Pamp. (Laibakngou)	Asteraceae	Shoot	Dysentery (Eton phaiba)	Crushed extract of young shoot mixed with water in the ratio 1:5 and 100 ml of the solution was orally taken daily for 3 days.
			Cough (Lok kangkhou)	10 ml of the crushed extract of young shoot was taken daily for 5 days.
Artocarpus lakoocha Roxb. (Karikhothong)	Moraceae	Fruit	Boils (Yairong)	Latex extracted from the tender fruit was applied in cotton and used as bandage on boils.
Arundo donax L. (Yenthou)	Poaceae	Shoot	Reduce obesity (Hukchang yangnaba)	Tender shoot of *Arundo donax*, leaves of *Phlogacanthus thyrsiflorus* and *Scutellaria discolor* 100 g each boiled in 3 litres of water and the steam liberated out of it was exposed to all the body part once a day for 7 days. The solution also took bath.
Bryophyllum calycinum Salisb. (Manahidak)	Crassulaceae	Whole plant	Kidney / urinary problem (Esing mari bera touba)	250 g of the plant along with little sugar candy boiled 1 litre water and 200 ml of the filtrate was consumed daily till cured.
Capsicum annuum L. (Morok)	Solanaceae	Fruit	Boils (Samu Uring)	Matured fruit partially roasted and was applied to the affected part thrice a day till cured.
Cedrela toona Roxb. (Tairen)	Meliaceae	Leaf	Gastric problems (E nungsit nungaitaba)	100 g of fresh leaf boiled with 500 ml of water for 30 minutes in a closed container and 50 ml of the filtrate after sweetening with little honey was taken daily till cured.
Celtis timorensis Span. (Heikreng)	Ulmaceae	Leaf	Kidney problems / urinary problem (Esing mari bera touba)	300 g of fresh leaf along with little sugar candy boiled with 2 litres of water and 1 litre of the filtrate was taken daily till cured.
Centella asiatica (L) Urban (Peruk)	Apiaceae	Whole plant	Cut & wounds (Thangna tenna shokpa)	Fresh plant paste was applied as poultice on the cut parts.
Citrullus colocynthis (L) Schrad. (Tayal)	Cucurbitaceae	Seed	Cough and throat irritation (Lok kangkhu)	Sun-dried seeds were chewed regularly.
Citrus macroptera	Rutaceae	Fruit	Stone case (Nung leiba)	Infusion of ashes of pea plant kept overnight in water was mixed with

Montrouz. (Heiribob)				fruit pulp of *Citrus macroptera.* 20 ml of the filtrate was taken daily for 5 days.
Clerodendrum colebrookianum Walp (Khuthap mana)	Verbenaceae	Leaf	Hypertension (Beepee)	2-3 fresh leaves of the plant were taken as salad.
Clerodendrum siphonanthus [R. Br.] (Charoi utong)	Verbenaceae	Shoot	Tonsillitis and sinusitis (Ngou pomba)	The cigarette made of semi-dried shoot of *Clerodendrum siphonanthus* and semi-dried leaf of *Piper betle* in equal proportion smoked thrice daily for 3-4 days.
Crassocephalum crepidioides S Moore (Tera paibee)	Asteraceae	Leaf	Cut and wounds (Thang tenna shokpa)	Fresh leaf paste was applied as poultice to the injured parts. It quickly stops bleeding.
			Hypertension (Beepee)	2-3 fresh leaves were taken as salad before meals.
Crataeva nurvala Buch- Ham (Loyumba lei)	Capparidaceae	Leaf	Healing bone fracture (Saru tekpa oysanaba)	Fresh leaf paste was applied as poultice around the fracture portion.
Cyperus rotundus L. (Sembang kaothum)	Cyperaceae	Rhizome	Typhoid (Phuri nungshit)	4-5 rhizomes were crushed with little honey and the paste was taken twice a day for 3 days.
Dendrocalamus hamiltonii Nees & Arn. (Unap)	Poaceae	Stem	Tooth strengthening (Ya mapangal kalhanba)	Tender culm splits were used as toothbrush regularly.
Elsholtzia strobilifera Benth (Lomba)	Lamiaceae	Inflorescence	Tonsillitis (Gnou naba)	The dried inflorescence soaked in honey for 7 days and the concoction was chewed.
Gonostegia sp. (Sabal tenkha)	Urticaceae	Leaf	Healing bone fracture (Saru tekpa oysanaba)	Leaf paste along with little common salt was applied as bandage around the fracture portion replacing daily for about 1-2 week period.
Iris bakeri Wall. (Komberei)	Iridaceae	Leaf	Cut & wounds (Thang tenna shokpa)	Fresh leaf paste was applied as poultice to the injured parts.
Jasminum multiflorum Roth (Kundo)	Oleaceae	Root	Urinary stone case (Nung leiba)	50 g dried root power and 10 g sugar candy boiled in 1 litre of water; then 300 ml of the syrup so prepared was taken twice daily for 4-5 days. 200 g of leaf together with 50 g of marble (small white stone) boiled in 2 litres of water and 500 ml of the filtrate was taken daily till cured. It was observed that calculi was broken into small pieces and passed out through urination.
			Diabetes (Eshing	Root of the plant and flower of *Nelumbo nucifera* 20 g each was boiled

			puchat)	in 300 ml of water and the concoction was taken daily till cured.
Jatropha curcas L. (Awa Kege)	Euphorbiaceae	Whole plant	Cut and wounds (Thang-tenna- sokpa)	Latex of the plant was applied as poultice on injured parts.
Justicia adhatoda L. (Nongmangkha angouba)	Acanthaceae	Leaf	Tonsillitis (Gnou naba)	Crushed leaf mixed with honey in the ratio 3:1 was taken orally twice daily till cured.
Lantana camara L. (Therei mana)	Verbenaceae	Stem	Tooth ache (Ya chickpa)	30 g of tender stem pounded with little kerosene and the mixture was applied on the affected tooth till recovered.
Melia azedarach Blanco (Seizrak)	Meliaceae	Leaf	Internal piles (Nung phuri)	20 g of the leaf crushed with little common salt and the poultice was slightly inserted inside the anus.
Mentha spicata L. (Nungshi hidak)	Lamiaceae	Shoot	Tonsillitis (Gnou naba)	Shoot of *Mentha spicata*, leaf of *Zanthoxylum acanthopodium* and traditional common salt (locally called Meitei thoom) pounded together and made into pellets of 5 g weight. The pellets were taken along with luke-warm water twice daily.
Murraya koenigii Spreng. (Kamini-kushum)	Rutaceae	Leaf	Diabetes (Eshing puchat)	Fresh leaves were taken regularly as salad along with meals.
Musa paradisiaca L. (Laphu)	Musaceae	Leaf	Toothache (Ya chickpa)	The leaf remains after making of traditional common salt (locally called Meitei thoom*)* was applied on the affected tooth.
		Leaf	White discharge (Nupigi figou chatpa)	Fresh mid rib of leaf lamina was cut into pieces and curry cooked with fresh indigenous small fishes (locally called Ngasang / Phabounga) and the food stuff was taken daily till cured.
Nelumbo nucifera Gaertn. (Thambal anganba)	Nelumbonaceae	Flower	Diabetes (Eshing puchat)	50 g of lotus petal, 100 g of fresh prawn and a pinch of common salt were cooked together in 500 ml of water. 100 ml of the soup thus prepared was taken daily before meal. Flower of *Nelumbo nucifera* and leaf of *Jasminum multiflorum* 20 g each boiled in 200 ml of water and 40 ml of the soup was taken daily.
Ocimum basilicum L. (Naoseklei)	Lamiaceae	Shoot	Piles (Nungsung)	Fresh 5 -10 young shoots were taken orally as salad till cured.
Ocimum sanctum L. (Tulsi)	Lamiaceae	Leaf	To increase immunity in children (Angang nadanaba)	20 g leaf decoction infused in 30 ml water. Add 5 ml honey and the concoction was taken early morning once a week.
Oroxylum indicum Vent. (Shamba)	Bignoniaceae	Bark	Viral fever (Laihou)	Barks peel off upwards are dried and powdered; 2 g of the powder was soaked in 10 ml water for 2 hours and the concoction taken twice

				daily for 2 -3 days.
			Hypertension (Beepee)	100 g of the bark powder boiled with 1litre water and 100 ml of the soup was taken once a day.
			Jaundice (Napu kaba)	150 g of the bark powder boiled with 1 litre water and 300 ml of the soup was taken daily for 3-4 days.
Paederia foetida Thunb. (Uri-Oinam)	Rubiaceae	Whole plant	Boils (Yairong)	20 g of the plant and 3 g common salt boiled in 100 ml water and the poultice was applied on the affected part for 3-4 days.
		Leaf	Skin irritation (Hakajaba)	200 g of leaf boiled in 3 litres of water and the solution was taken as bath.
Parkia timoriana (A.DC) Merr. (Yongchak)	Mimosaceae	Fruit	Constipation (Khong hamba yadaba)	Tender pod boiled in water and taken orally twice a day till cured.
Phlogacanthus thyrsiflorus (Roxb. ex Hardw.) Mabb. (Nongmangkha)	Acanthaceae	Leaf	Irregular women menstrual problem (Nupi gi thagi khong kap kaiba)	Leaves of *Phlogacanthus thyrsiflorus*, *Scutellaria discolor* and *Swertia chirata* 40 g each boiled in 2 litres water in a closed vessel and the steam so liberated exposed to abdominal portion. 5 ml of the concoction was also taken orally once a day for 3 days. Leaf of *P. thyrsiflorus*, *S. discolor* and tender shoot of *Arundo donax* in the ratio 40 g each boiled in 2 litres of water and the steam liberated exposed to all body parts for a week period.
Phoenix humilis Royle (Thangtup)	Arecaceae	Seed/Fruit	Boils (Yairong)	The pounded seed endosperm boiled with water and the steam liberated was exposed to the affected portion thrice a day till cured.
Piper betle Blanco (Kaw)	Piperaceae	Leaf	Tonsillitis and sinusitis (Ngou pomba)	The cigarette made of semi-dried leaf of *Piper betel* and semi-dried shoot of *Clerodendrum siphonanthus* were smoked for 3-4 days.
Plantago erosa Wall. (Yempat)	Plantaginaceae	Leaf	Boils (Yairong)	Fresh leaf paste was applied as poultice at the infected part replacing everyday till cured.
Plumeria alba Aubl. (Khagi leihou angouba)	Apocynaceae	Root	Malaria (Arum leihou)	Root decoction juice prepared in water was taken a glassful daily for a week period.
Pratia nummularia Benth. ex Kurz (Kihomman)	Campanulaceae	Whole plant	Urinary stone case (Nung leiba)	The food stuff prepared with this plant and dried fish (locally called Ngashang / Phabounga) was consumed regularly.
		Whole plant	Urinary problems (Esing-mari-bera-	150 g of the whole plant boiled in 2 litres of water till to reduce the volume to half. The filtrate after sweetening with sugar candy was

			touba)	taken daily.
Punica granatum L. (Kamphoi)	Punicaceae	Leaf	Dysentery for children (Angang eton phaiba)	The mixture of 5 g fresh leaf of *Punica granatum* and one hen egg wrapped with leaf of *Curcuma domestica* are roasted in hot pan. The omelet thus prepared was eaten till cured.
Rhus succedanea L. (Heimang)	Anacardiaceae	Leaf	Urinary problems (Esing-mari-bera-touba)	250 g of the leaf boiled in 2 litres of water to reduce the volume to half. Add little sugar candy and the filtrate was taken daily.
Ricinus communis L. (Kege)	Euphorbiaceae	Leaf	Piles (Nungsang)	350 g of the leaf boiled in 2 litres of water in a closed vessel and the steam liberated was exposed to anus.
Scutellaria discolor Colebr. (Yenakhat)	Lamiaceae	Leaf	White discharge (Nupigi figou chatpa)	Leaves of *Scutellaria discolor*, *Achyranthes aspera* and *Verbena officinalis* 50 g each boiled in 1 litre of water. 200 ml of the filtrate after sweetening with little honey was taken twice daily for a week period.
			Irregular women menstrual problem (Nupi gi thagi khong kap kaiba)	Leaves of *S. discolor* and *Phlogacanthus thyrsiflorus* 40 g each and 20 g of *Swertia chirata* boiled together in 2 litres of water in a closed vessel and the steam liberated was exposed to the abdominal parts. The above cooked material was also eaten. Leaves of *S. discolor* and *P. thyrsiflorus* 100 g each and 80 g tender shoot of *Arundo donax* boiled in 1 litre of water and the steam liberated was exposed to the abdominal parts.
Solanum anguivi Lam. (Singhkhanga)	Solanaceae	Fruit	Pneumonia (Daiphat)	20 g of the pounded fresh fruit mixed with 1/3 ml of Lupa-hidak (Mercuric chloride) and 5 ml of honey and the tincture so prepared was taken daily with a dose of 5 ml.
			Viral fever (Lok laihou)	Fresh fruit decoction paste mixed with honey in the ratio 2:1 was taken a table spoonful thrice a day.
Solanum erianthum D.Don (Lam khamen)	Solanaceae	Fruit	Tooth ache (Ya chikpa)	The fruit roasted in burning charcoal was applied on the effected tooth.
Swertia chirata C. B. Clarke (Chirata)	Gentianaceae	Whole plant	Irregular women menstrual problem (Nupi gi thagi khong kap kaiba)	20 g of *Swertia chirata* and leaves of *Phlogacanthus thyrsiflorus* and *Scutellaria discolor* 40 g each boiled in 1 litre of water in a closed vessel and the steam liberated was exposed to the abdominal parts. 5 ml of the concoction was also taken daily for 3 days.
Terminalia chebula Retz. (Manahi)	Combretaceae	Fruit	Mouth freshener (Chin ya nungainaba)	Dried fruits were chewed regularly.

Terminalia tomentosa Roxb. ex Flem. (Mayokpha)	Combretaceae	Bark	White discharge (Nupigi figou chatpa)	20 g of bark of the tree peel off upward boiled in 100 ml of water till to reduce to half the volume and the solution thus obtained was taken daily till cured.
Tinospora cordifolia (Willd.) Miers ex Hook.f. & Thomson (Ningthoukongli)	Menispermaceae	Shoot	Stone case (Nung leiba)	Shoot of the plant cooked with pasteurized cow milk and the concoction was taken regularly.
Vallisneria spiralis L. (Laikreng lairencha)	Hydrocharitaceae	Leaf	Diabetes (Eshing puchat)	40 g of the leaf and 2 g sugar candy boiled in 500 ml of water and 20 ml of the decoction was taken daily.
Verbena officinalis L. (Tharoi phijub)	Verbenaceae	Whole plant	Viral fever (Laihou)	Plant extract was applied to all body parts except head.
			Stomach complaints (Puk-saogutpa)	Plant paste was applied externally as poultice on the stomach portion.
			White discharge (Nupigi figou chatpa)	Plant of *Verbena officinalis*, *Achyranthes aspera* & *Scutellaria discolor* 50 g each boiled in 500 ml of water. The filtrate after sweetening with honey was taken a glassful a day for a week period.
Xylosma longifolia Clos (Nonleishung)	Flacourtiaceae	Leaf	Skin itching (Unsha gi leina)	500 g of the leaf boiled in 10 litres of water and the solution was taken as bath.
Zanthoxylum acanthopodium DC. (Mukthrubi)	Rutaceae	Leaf	Gastric problems (Nungshit asaba kaba)	100 g of the leaf boiled in 1 litre of water and the filtrate was taken orally once a day for 3 days.
			Tonsillitis (Gnou naba)	Leaf of *Zanthoxylum acanthopodium* and shoot of *Mentha spicata* pounded together in same proportion. Added a pinch of traditional common salt (locally called *Meitei-thoom*). A table spoonful of the preparation was taken twice daily.
Zingiber cassumunar Roxb. (Taekhou yaikhu)	Zingiberaceae	Rhizome	Leprosy (Agnouba pakpa)	Fresh rhizome paste was applied regularly as poultice on the affected parts.
			Revitalization of children (Angang masha kanaba)	100 g rhizome of this plant, one eel fish and 200 ml cow milk cooked together and the food stuff prepared was taken twice a week.

Table 2: Habit, source of collection, marketability and availability status of 63 medicinal plants used by Chakpa community

Scientific name	Voucher No.	Habit	Source	Marketability (₹/kg)	Availability
Achyranthes aspera	NEIST(BLIM)-101	Herb	Wild	Non-marketed	∫∫∫
Acorus calamus	NEIST(BLIM)-185	Herb	Wild	Non-marketed	∫∫
Allium ascalonicum	NEIST(BLIM)-089	Herb	Cultivated	40 (Plant)	∫∫
Allium odorum	NEIST(BLIM)-085	Herb	Cultivated	35 (Shoot)	∫∫∫∫
Aloe barbadensis	NEIST(BLIM)-191	Herb	Cultivated	Non-marketed	∫∫
Alpinia allughas	NEIST(BLIM)-199	Herb	Wild	50 (Rhizome)	∫∫
Alpinia galanga	NEIST(BLIM)-140	Herb	Cultivated/Wild	60 (Rhizome)	∫
Andrographis paniculata	NEIST(BLIM)-084	Herb	Wild	Non-marketed	∫∫
Argyreia nervosa	NEIST(BLIM)-281	Climber	Wild	Non-marketed	∫∫
Artemisia nilagirica	NEIST(BLIM)-192	Herb	Wild	Non-marketed	∫∫∫∫
Artocarpus lakoocha	NEIST(BLIM)-148	Tree	Wild	Non-marketed	∫
Arundo donax	NEIST(BLIM)-206	Shub	Cultivated/Wild	Non-marketed	∫∫∫
Bryophyllum calycinum	NEIST(BLIM)-218	Herb	Wild	Non-marketed	∫∫∫
Capsicum annuum	NEIST(BLIM)-063	Shrub	Cultivated	55 (Fruit)	∫∫∫∫
Cedrela toona	NEIST(BLIM)-341	Tree	Cultivated/Wild	Non-marketed	∫∫∫
Celtis timorensis	195 NEIST(BLIM)	Tree	Wild	Non-marketed	∫
Centella asiatica	NEIST(BLIM)-098	Herb	Wild	40 (Plant)	∫∫∫∫
Citrullus colocynthis	NEIST(BLIM)-100	Climber	Wild	Non-marketed	∫
Citrus macroptera	179 NEIST(BLIM)	Tree	Cultivated	120 (Fruit)	∫∫∫
Clerodendrum colebrookianum	NEIST(BLIM)-241	Shrub	Wild	Non-marketed	∫∫∫∫
Clerodendrum siphonanthus	NEIST(BLIM)-322	Herb	Wild	Non-marketed	∫∫
Crassocephalum crepidioides	NEIST(BLIM)-161	Herb	Wild	Non-marketed	∫∫∫∫
Crataeva nurvala	NEIST(BLIM)-125	Tree	Wild	Non-marketed	∫
Cyperus rotundus	NEIST(BLIM)-093	Herb	Wild	Non-marketed	∫∫∫∫
Dendrocalamus hamiltonii	NEIST(BLIM)-077	Tree	Cultivated	100/Culm	∫∫∫∫
Elsholtzia strobilifera	NEIST(BLIM)-122	Herb	Cultivated	140 (Inflorescence)	∫∫
Gonostegia sp.	NEIST(BLIM)-177	Shrub	Wild	Non-marketed	∫
Iris bakeri	NEIST(BLIM)-169	Herb	Cultivated	380 (Flower)	∫
Jasminum multiflorum	NEIST(BLIM)-229	Shrub	Cultivated/Wild	190 (Flower)	∫∫∫
Jatropha curcas	NEIST(BLIM)-226	Shrub	Wild	Non-marketed	∫∫∫∫
Justicia adhatoda	NEIST(BLIM)-159	Shrub	Wild	Non-marketed	∫∫∫
Lantana camara	NEIST(BLIM)-092	Shrub	Wild	Non-marketed	∫∫∫∫
Melia azedarach	NEIST(BLIM)-063	Tree	Wild	Non-marketed	∫∫∫
Mentha spicata	NEIST(BLIM)-900	Herb	Cultivated	60 (Shoot)	∫∫∫∫

Murraya koenigii	NEIST(BLIM)-310	Tree	Cultivated	50 (Leaf)	∫∫
Musa paradisiaca	NEIST(BLIM)-138	Herb	Cultivated/Wild	35 (Inflorescence) 30 (Pseudostem)	∫∫∫
Nelumbo nucifera	NEIST(BLIM)-016	Herb	Cultivated	80 (Flower) 30 (Tender leaf) 130 (Root)	∫∫∫
Ocimum basilicum	NEIST(BLIM)-301	Shrub	Cultivated	Non-marketed	∫∫
Ocimum sanctum	NEIST(BLIM)-048	Shrub	Cultivated/Wild	Non-marketed	∫∫
Oroxylum indicum	NEIST(BLIM)-143	Tree	Wild	100 (Pod)	∫∫
Paederia foetida	NEIST(BLIM)-200	Climber	Wild	Non-marketed	∫∫
Parkia timoriana	NEIST(BLIM)-340	Tree	Cultivated	270 (Pod)	∫∫∫
Phlogacanthus thyrsiflorus	NEIST(BLIM)-177	Shrub	Cultivated/Wild	60 (Inflorescence)	∫∫∫
Phoenix humilis	NEIST(BLIM)-082	Tree	Wild	45 (Fruits)	∫
Piper betle	NEIST(BLIM)-078	Climber	Cultivated	230 (Leaf)	∫∫∫
Plantago erosa	NEIST(BLIM)-018	Herb	Wild	Non-marketed	∫∫∫
Plumeria alba	NEIST(BLIM)-123	Tree	Cultivated/Wild	210 (Flowers)	∫∫∫
Pratia nummularia	NEIST(BLIM)-218	Herb	Wild	Non-marketed	∫∫
Punica granatum	NEIST(BLIM)-164	Shrub	Cultivated	120 (Fruit)	∫∫∫
Rhus succedanea	NEIST(BLIM)-302	Tree	Wild	40 (Fruit) 25 (Shoot)	∫∫
Ricinus communis	NEIST(BLIM)-170	Shrub	Wild	Non-marketed	∫∫∫
Scutellaria discolor	NEIST(BLIM)-162	Herb	Wild	Non-marketed	∫∫∫
Solanum anguivi	NEIST(BLIM)-220	Shrub	Wild	30 (Fruit)	∫∫∫
Solanum erianthum	NEIST(BLIM)-236	Shrub	Wild	30 (Fruit)	∫∫∫
Swertia chirata	NEIST(BLIM)-297	Herb	Wild	Non-marketed	∫
Terminalia chebula	NEIST(BLIM)-314	Tree	Cultivated/Wild	160 (Fruit)	∫∫
Terminalia tomentosa	NEIST(BLIM)-221	Tree	Cultivated/Wild	Non-marketed	∫∫
Tinospora cordifolia	NEIST(BLIM)-330	Climber	Cultivated/Wild	80 (Stem)	∫∫
Vallisneria spiralis	NEIST(BLIM)-212	Herb	Wild	Non-marketed	∫∫∫
Verbena officinalis	NEIST(BLIM)-353	Herb	Wild	Non-marketed	∫∫∫
Xylosma longifolia	NEIST(BLIM)-308	Tree	Wild	Non-marketed	∫∫
Zanthoxylum acanthopodium	NEIST(BLIM)-345	Tree	Cultivated/Wild	180 (Fruit) 35 (Leaf)	∫∫
Zingiber cassumunar	NEIST(BLIM)-048	Herb	Cultivated/Wild	200 (Rhizome)	∫

∫∫∫∫=Extensively available, ∫∫∫=Commonly available, ∫∫=Available but not so common, ∫=Rare; 1 $ = ₹ 59 (at the time of survey)

Table 3: Ethnomedicinal plants which are used as food by *Chakpa* community

Scientific name	Parts Eaten	Mode of Uses	Edibility mode*	Use Status
Allium ascalonicum	Whole Plant	Vegetable/Spices	Prepared *Kangsoi*	Occasionally
Allium odorum	Whole Plant	Vegetable/Spices	Prepared *Pakoura* and *Ametpa*	Frequently
Alpinia allughas	Rhizome	Vegetables/Spices	Prepared *Eronba*	Occasionally
Alpinia galanga	Rhizome	Spices	Prepared *Ametpa*	Occasionally
Artocarpus lakoocha	Fruit	Fruits	Ripe fruit as snacks	Occasionally
Capsicum annuum	Fruit	Spices	In many of the food preparations	Frequently
Centella asiatica	Whole Plant	Vegetables	Prepared *Kangsoi*	Occasionally
Citrus macroptera	Fruit cover	Spices	Fruit cover is added in meat cooking specially in fish cooking	Frequently
Clerodendrum siphonanthus	Shoot	Vegetable	Shoot is prepared *Oottii*	Occasionally
Crassocephalum crepidioides	Leaf	Vegetable	Cooked with smoked / dry fishes	Occasionally
Elsholtzia strobilifera	Inflorescence	Spices	Add in traditional *Eronba*	Occasionally
Justicia adhatoda	Leaf	Vegetables	Coked with dry fishes	Occasionally
Mentha spicata	Leaf & Shoot	Vegetables/Spices	As salad, fried with beans	Occasionally
Murraya koenigii	Leaf	Spices	Add in beans preparation	Occasionally
Musa paradisiaca	Stem/Inflorescence	Vegetables/Fruit	Both stem and inflorescence prepared *Eronba*. Stem is cooked with *Pisum sativum* seeds. Inflorescence prepared *Singju*	Frequently
Nelumbo nucifera	Shoot/Root/Fruit	Vegetables/Snacks	Root cooked with sugar or molasses, Shoot eaten as green salad and prepared *Eronba*. Fruits eaten as snacks.	Frequently
Ocimum basilicum	Leaf/Inflorescence	Spices	As salad	Occasionally
Oroxylum indicum	Fruit	Vegetable	Cooked with dry fishes	Occasionally
Parkia timoriana	Fruit/Inflorescence	Vegetable	Fruits prepared *Eronba* and *Shingju*	Occasionally
Phlogacanthus thyrsiflorus	Leaf/Inflorescence	Vegetable	Leaf prepared *Soutani*. Inflorescence fried with edible oil and potato slices	Occasionally
Punica granatum	Fruit/Leaf	Fruits/Vegetables	Leaf prepared *Oottii*	Occasionally
Rhus succedanea	Fruit/Shoot	Fruits	Shoot prepared *Shingju*. Fruit coked with molasses and eaten as snacks.	Occasionally
Solanum anguivi	Fruit	Snacks/Vegetable	Fruit fried in edible oil	Occasionally
Solanum erianthum	Fruit	Vegetable	Fruit fried in edible oil	Occasionally
Zanthoxylum acanthopodium	Leaf/Fruit	Spices	Leaf is cooked with snails. Fruits are prepared *Ametpa*.	Occasionally
Zingiber cassumunar	Rhizome	Spices	Add rhizome in meat cooking	Occasionally

* *Ametpa* = Smashed boiled vegetables together with chilli and fermented fish, *Eronba* = Smashed boiled vegetables, potato, chilli and fermented fish with soup based, *Kangsoi* = Varieties of vegetable are cooked together with dried / smoked fished without edible oil, *Oottii* = Cooked vegetables with a pinch of soda (sodium bicarbonate), *Pakoura* =

Vegetables mixed with gram flour are deep fried in edible oil and the same is cooked based on soup; *Shingju* = Many vegetable cut pieces are smashed together with seed powder of *Anisomeles indica*, chilli and fermented fish; *Soutani* = Leaf / shoot of *Phlogacanthus thyrsiflorus* with sugar candy deep cooked

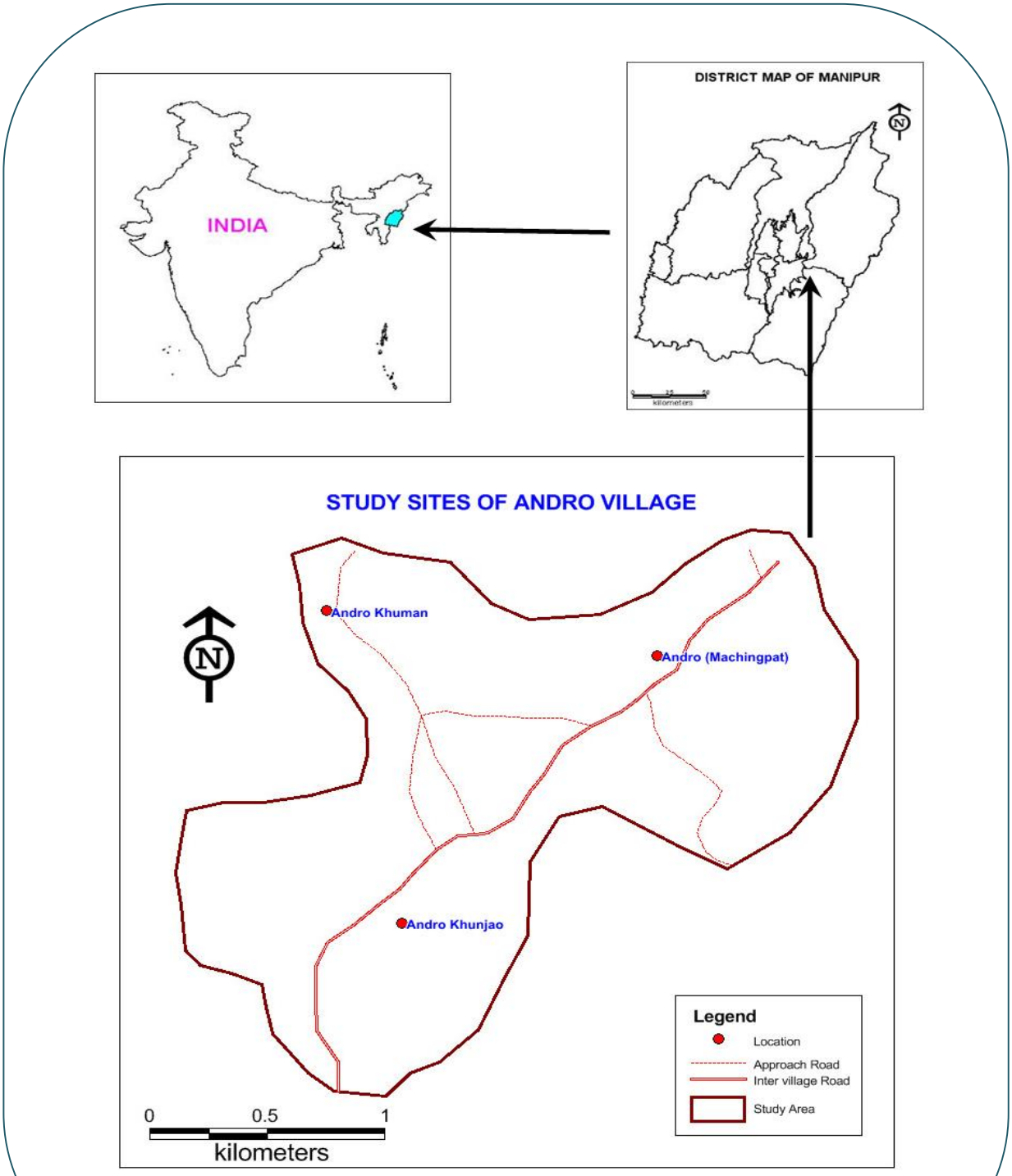

Figure 1: Location map of the study sites

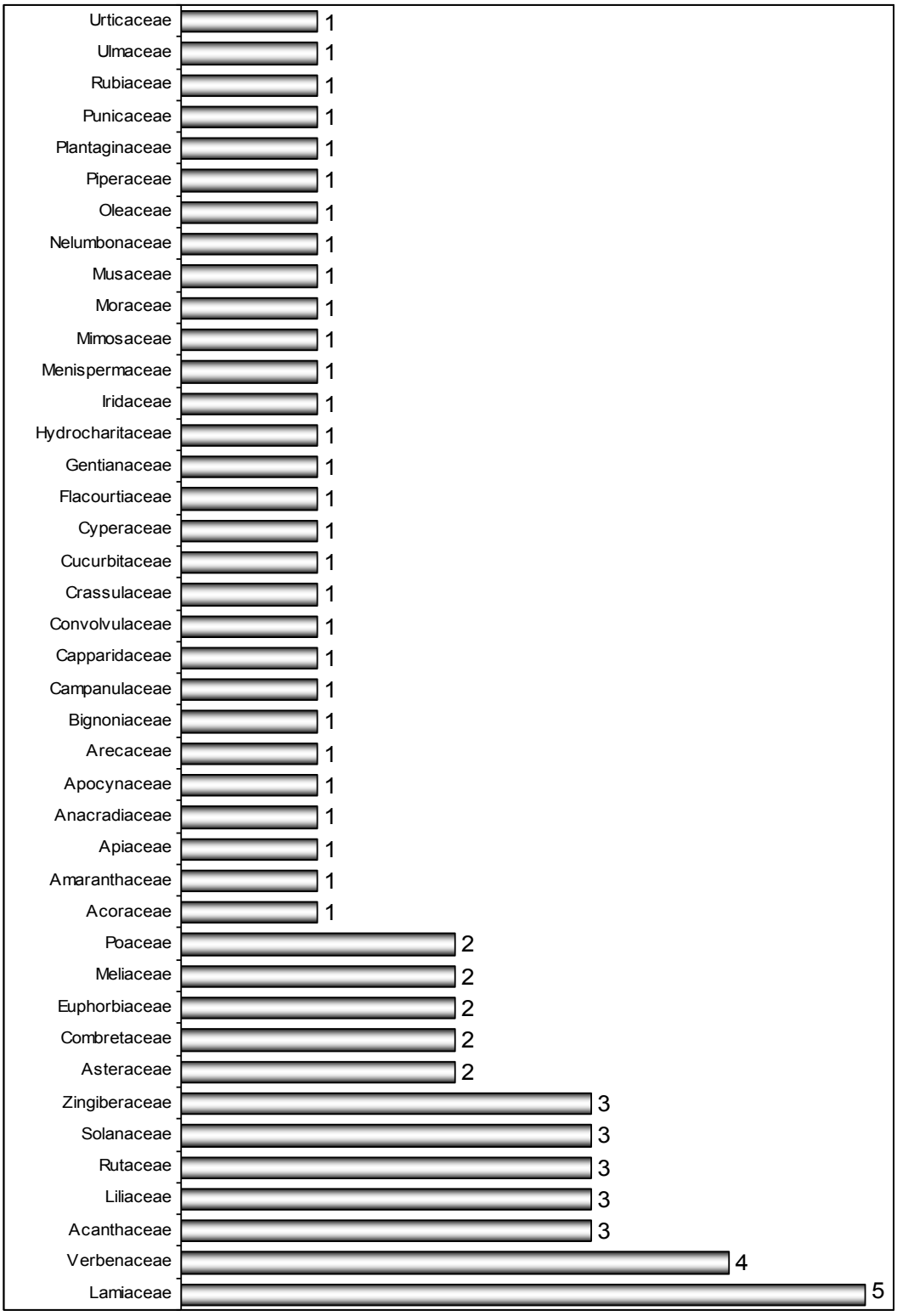

Figure 2: No. of ethnomedicinally used plant species represented in families

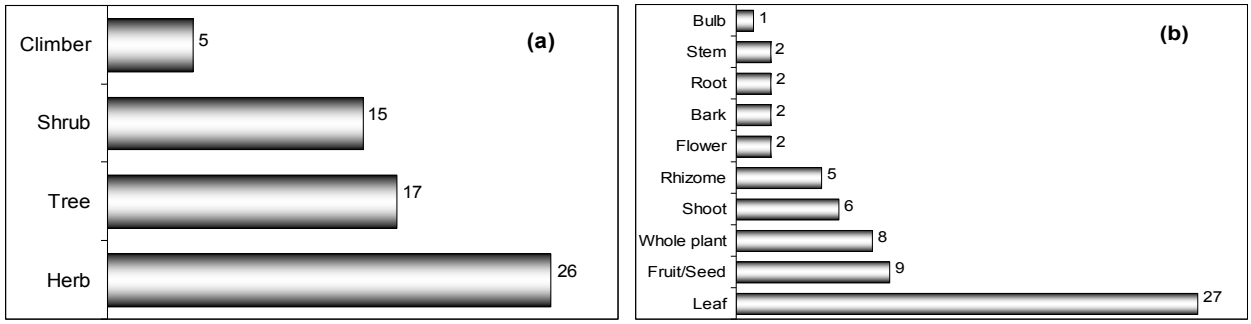

Figure 3: No. of ethnomedicinal species representation **(a)** Plant habit **(b)** Parts use

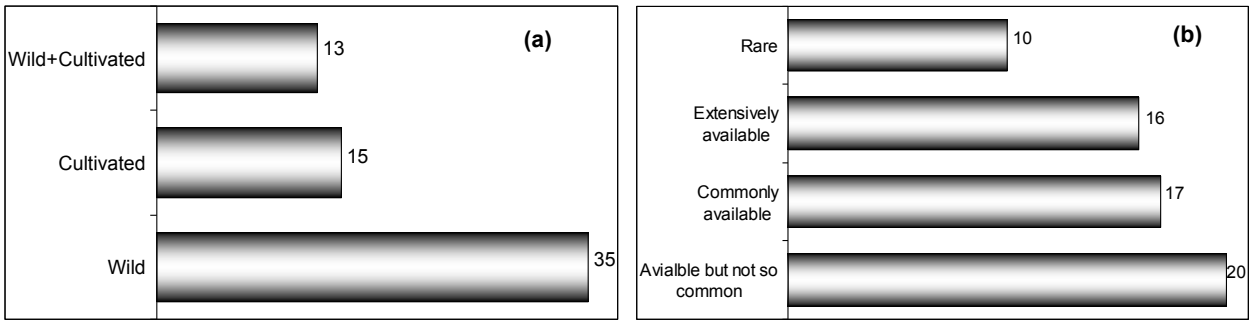

Figure 4: No. of ethnomedicinal plants species representation **(a)** Collection Source **(b)** Availability status

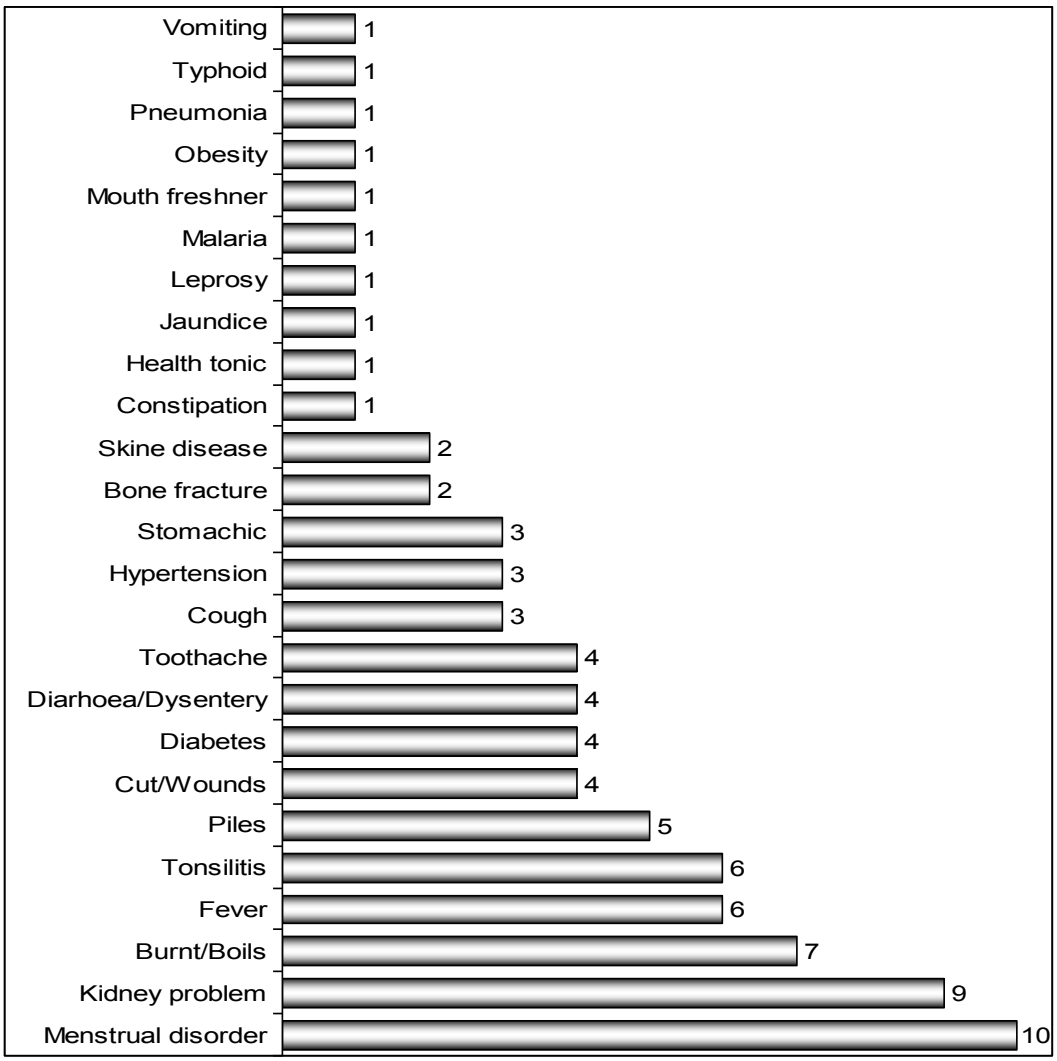

Figure 5: No. of species represented in disease types

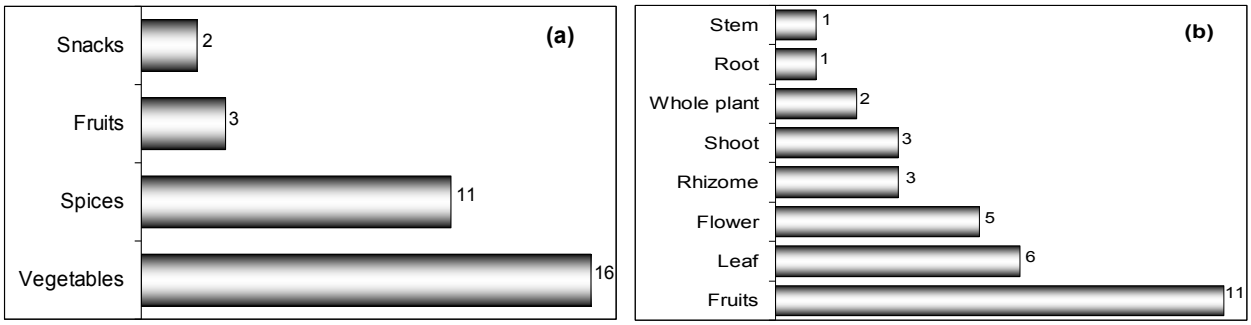

Figure 6: No. of edible plant species representation in **(a)** Edibility types **(b)** Edible parts

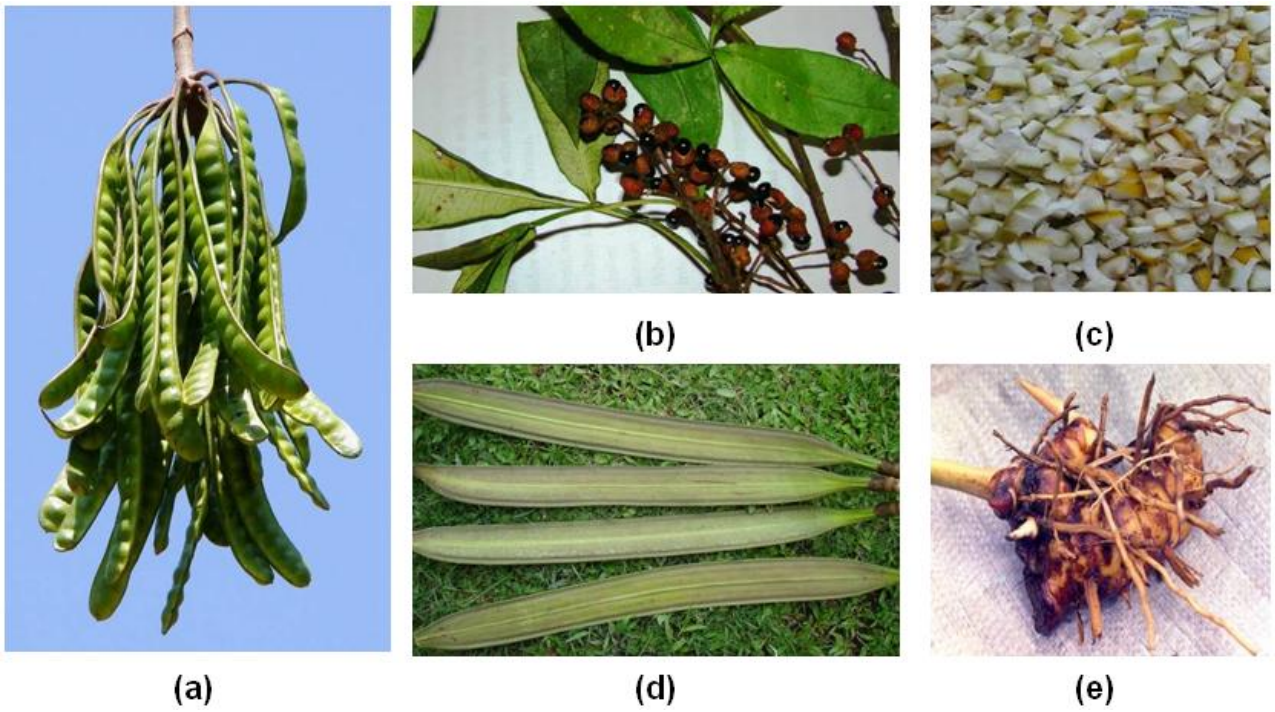

Plate 1: Edible plants having ethnomedicinal uses (a) Pods of *Parkia timoriana* (b) Fruiting twig of *Zanthoxylum acanthopodium* (c) Slices of fruit cover of *Citrus macroptera* (d) Pods of *Oroxylum indicum* (e) Rhizome of *Alpinia galanga*