Ethnomedicinal plants used by the indigenous tribal communities of Arunachal Pradesh, India: a review

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Review

Abstract

Background: In the absence of modern healthcare facilities in remote rural localities, the indigenous tribal communities of Arunachal Pradesh in the Eastern Himalayan region of India continue to rely on plant-based ethnomedicine for the treatment of various ailments prevalent within their biocultural landscape. This review work has been carried out to document the ethnomedicinal knowledge of the indigenous tribal communities of Arunachal Pradesh by critically perusing the selected published literature. The exploration of ethnomedicinal knowledge of the tribal communities may provide clues for development of new drugs and can also help in the continuity and preservation of such important traditional healing practices.

Methods: We downloaded 20 published ethnomedicinal literature (between 2005 to 2019) from online databases such as iMedPub, Academia.edu, ResearchGate, Semantic Scholar, Scopus, Web of Science, Publons, PubMed, etc. using keywords 'ethnomedicine', 'tribes of Arunachal Pradesh', and 'North-East India'. The diversity of ethnomedicinal plants, types of ailments treated, herbal formulation, informant consensus and the species and family use values have been quantified using relevant statistical tools and techniques.

Results: The present review have reported 358 species of medicinal plants belonging to 100 families used by the fourteen indigenous tribal communities for treating 107 specific types of ailments which are classified under 10 broad categories of ailments, namely, cardiovascular, dermatological, gastrointestinal, general health, gynecological, musculoskeletal, odontological, orthopaedic, respiratory, and urological disorders. Asteraceae has shown the highest use reports per family (86) while Acanthacaeae demonstrated the highest family use value index (UV*f*) of 4.90. The highest species use report was observed under gastrointestinal disorders with an Informant consensus factor (F_{IC}) of 0.41 while the least species use report was observed under urological disorder (F_{IC} 0.11).

Conclusion: Plants showing higher UV*f* index and F_{IC} in the present analysis should be useful for conservation priority. It will also help in prioritization for in-depth investigation of bioactive phytochemicals of potential medicinal plants effective against reported target ailment categories.

Keywords: Ailments, Ethnomedicine, Family use value (UV*f*), Tribal communities, Informant consensus factor (F_{IC}).

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Background

Ethnomedicine refers to the totality of health, knowledge, skills, values, beliefs, and practices of members of the traditional society, including all the clinical and non-clinical activities that narrate their health needs (Foster & Anderson 1978). It is more than a privileged study of the stunning or the typical form of unusual healing rituals and culturally bound syndromes (Kleinman 1980). In other words, it is the practices of traditional healers who are dependent on indigenous medicine along with some ritual practices to treat the illness of the patient that is essentially the outcome of culture (Neumann & Lauro 1982). It entails the full range and distribution of health-related experience, discourse knowledge, and practice among different strata of the human population (Nichter 1991) and the vital vehicle for understanding indigenous societies and their relationship with nature (Anyinam 1995). It is the documentation of the consequences of particular behaviors and practices through cultural and biological expertise inherent to the fields of anthropology and biology (Pieroni *et al.* 2005). Ethnomedicine is the explanation of illness and diseases from the classic point of view (Bhasin 2007). The ethnomedicinal plants are the major source for novel drug discovery and development from traditional herbal technology methods used by the local herbal healers (Heinrich & Gibbons 2001). The exploration of ethnomedicinal knowledge of the tribal people can reveal the uses of plants for medicinal purposes and can help in the formulation of modern herbal drugs that are comparatively safer and cheaper (Manna & Mishra 2018). Ethnobotanical studies have significantly contributed in the development of new drugs for many centuries and may also prove worthy for modern medicinal practices (Pandey & Tripathi 2017).

Genetic resources including plant resources are an integral component of biological diversity. They provide the basis for the continuous evolution and maintenance of the life-supporting systems on earth and also contribute to the sustainable economic, scientific, technological, cultural, and spiritual development of humankind (Pushpangadan & George 2010). In the recent decades, the resurgence of interest in ethnomedicine is increasing exponentially, and, the herbal products trade in both national and international markets. As per the World Health Organization (2002), about 80% of the world's rural populations of the developing countries are primarily dependent on herbal medicines for their basic healthcare needs. India has an officially recorded list of 45,000 plant species (Paul *et al.* 2005) and various estimations have put a list of 7,500 species of medicinal importance (Namsa *et al.* 2009). The ethnomedicinal plants play a significant role in the lives of rural people of tribal areas of India (Raghuvanshi *et al.* 2021).

The tribal people who live in a mutual relationship with the forests have developed a highly balanced physical and mental state without endangering biodiversity even today. Different tribal societies of North-East India use about 1963 species of medicinal plants for ethnomedicinal purposes (Sajem & Gosai 2006). Arunachal Pradesh is the largest State of North-East India which is endowed with a rich heritage of biological and cultural diversity. The State harbors around 5,000 species of angiosperms, out of which over 500-600 plant species are reported to be used in traditional ethnomedicinal practices (Haridasan *et al.* 2003, Jambey et al. 2017, Tag 2007). The State is inhabited by 26 major tribes and more than 110 sub-tribes with rich heritage of ethnobotanical knowledge system (Nimachow *et al.* 2011). Each of these ethnic groups possesses unique sets of traditional knowledge related to their faith and belief systems, agricultural and ethnomedicinal practices that had been orally passed down from generation to generation. However, these valuable traditional knowledge systems could face extinction in immediate future due to lack of proper conservation, documentation, and promotional activities (Das & Tag 2006). Over the last two decades, several researchers have endeavored to document the ethnomedicinal practices of the tribes of Arunachal Pradesh. So far, we have partial records of the traditional healing practices of Adi, Aka, Apatani, Galo, Idu Mishmi, Tai Khamti, Memba, Monpa, Nocte, Nyishi, Singpho, Tagin, Tangsa, and Wancho. However, ethnomedicinal practices of certain tribes and sub-tribes like Bugun (Khowa), Digaru Mishmi, Khamba, Lisu (Yobin), Miju Mishmi, Nah, Puroik (Sulung), Sajolang (Miji), Sherdukpen, and Zakhrings are still largely unexplored. This review is intended to document various medicinal plants reportedly used by fourteen indigenous tribal communities of Arunachal Pradesh in their ethnomedicinal practices through critical screening of the selected published ethnomedicinal literature published in between the year 2005 to 2019. This paper also quantified the diversity of ethnomedicinal plants, types of ailments treated, herbal formulation, informant consensus, and species as well as family use values.

Materials and Methods

Study area

The present review on ethnomedicinal plants is based on the tribal communities of Arunachal Pradesh, India. The State is situated in between 26° 30′ N and 29° 31′ N latitudes and 91° 30′ E to 97° 30′ E longitudes. It shares an international boundary with Bhutan (160 Km) in the west, China (1080 Km) in the north, Myanmar (440 Km) in the southeast and state boundary with Assam and Nagaland (Fig. 1). Some of the major tribes of the State are Aka, Adi,

Apatani, Galo, Tai Khamti, Puroik, Mishmi (Idu, Taraon & Kaman), Monpa, Nyishi, Nocte, Sajolang, Singpho, Tagin, Tangsa, Wancho, etc. As per the Census of India (2011), the total population of the state was 13, 83,727 with 7, 13,912 males and 6, 69,815 females. The sex ratio was 938 females per 1,000 males and the percentage of decadal growth rate was 26. The density of population was only 17 persons per km^2 and the literacy rate was 65.38%. The total urban population was 3, 17,369 and a major chunk of the population i.e., 10, 66,358 was categorized as rural population. The total number of villages was 5,589 with 2, 70,577 households. Out of the total population 9, 51,821 belong to the Scheduled Tribe. The tribal communities of the state largely depend on the surrounding forests to derive their livelihood including medicinal requirements due to remoteness and predominance of rural population.

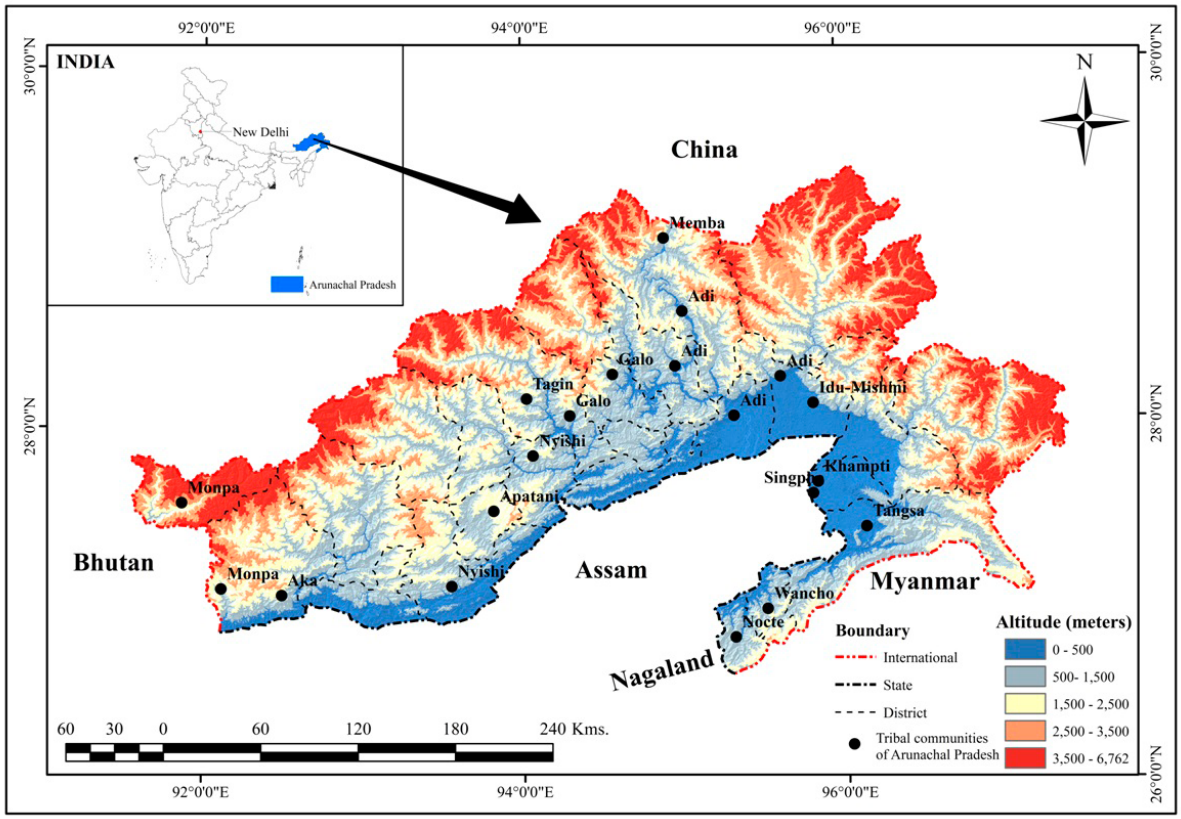

Figure 1. Location map of the study area.

Screening of published ethnomedicinal literature

There are several research papers available on the general ethnobotany of the indigenous tribal communities of Arunachal Pradesh, India. This review includes 20 research papers published between the years 2005 to 2019 that have reported ethnomedicinal uses of the plant resources by the various tribes of Arunachal Pradesh (Table 1). The relevant published ethnomedicinal literature was downloaded from online databases like iMedPub, Academia.edu, ResearchGate, Semantic Scholar, Scopus, Web of Science, Publons, PubMed, etc. using keywords like ethnomedicine, tribes of Arunachal Pradesh, and North-East India. The accepted botanical names and author citations of the plant species mentioned in the original papers were updated by consulting website http://www.theplantlist.org (The Plant List), http://www.worldfloraonline.org (World Flora Online), http://www.plantsoftheworldonline.org (Plants of the World Online). The consulted articles reflect the botanical name, family name, conservation status, habit, parts used, herbal formulation, ailments treated, and the ethnic groups. The ethnomedicinal plants were grouped into 10 broad disorders/disease categories that include 107 specific types of ailments.

Statistical analysis

The cultural importance of botanical species was initially proposed by Phillips and Gentry (1993) using the formula as shown below:

$$\mathrm{UV}is = \sum \mathrm{U}is/\mathrm{N}is$$

Where U*is* represents the number of uses mentioned by all informants for a given species *is* (use reports for species *s*), and N*is* is the total number of informants that reported species *s*. In this study, the concept of pseudo-informant was used instead of informants, as described previously (Phumthum *et al.* 2018, Tardío & Pardode-Santayana 2008). A pseudo-informant refers to the individual authors who have taken out ethnomedicinal study rather than the original informants who reported the number of plants during the field studies. The modified equation of Tardío and Pardo-de-Santayana (2008) was used to calculate the family Use Values (UV*f*) as given below:

$$\mathrm{UV}f = \sum \mathrm{U}f/\mathrm{N}f$$

Where, U*f* represents the number of uses mentioned by all pseudo-informants for a given family *f* (use reports for the family *f*), and N*f* is the total number of pseudo-informants that reported family *f*.
Further, the Informant Consensus Factor (F_{IC}) was calculated following Heinrich *et al.* (1998) as given below:

$$F_{IC} = \frac{n_{ur} - n_t}{n_{ur} - 1}$$

Where, n_{ur} is the number of use-reports in each category and n_t is the number of use-reports in each category minus 1. The value of F_{IC} ranges between 0 to 1, indicating a high value close to 1 as few species are used by a large number of people and vice versa.

Results and Discussion

Screening of the papers from 2015-2019

The original studies included in the present review have reported 1,050 ethnomedicinal plant species used against a wide range of ailments/disorders (Table 1). Out of the 20 studies found, 15 studies were based on particular ethnic tribes while the remaining 5 studies were carried out on 2 to 7 ethnic tribes together. Overall, we have recorded 6 studies on Adi (Ali & Ghosh 2006, Doley *et al.* 2014, Kagyung *et al.* 2010, Khongsai *et al.* 2015, Nimasow *et al.* 2012, Tangjang *et al.* 2011), 5 on Nyishi (Doley *et al.* 2014, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Tangjang *et al.* 2011, Tripathi *et al.* 2017), 4 on Apatani (Ayam 2017, Doley *et al.* 2014, Kala 2005, Khongsai *et al.* 2015), 3 each on Galo (Bharali *et al.* 2016, Murtem & Chaudhry 2016, Wangpan *et al.* 2019a), Monpa (Doley *et al.* 2014, Khongsai *et al.* 2015, Namsa *et al.* 2011), and Tagin (Goswami *et al.* 2009, Murtem & Chaudhry 2016, Wangpan *et al.* 2019a), 2 each on Idu Mishmi (Doley *et al.* 2014, Khongsai *et al.* 2015), Khampti (Das & Tag 2006, Sen *et al.* 2008), and Nocte (Tangjang *et al.* 2011, Wangpan *et al.* 2019b), and 1 each on Aka (Nimachow *et al.* 2011), Memba (Rethy *et al.* 2010), Singpho, Tangsa (Khongsai *et al.* 2015), and Wancho tribes (Wangjen *et al.* 2011). The field survey and analysis methods used in these studies were mostly questionnaires, personal interview, discussion, market survey, and participant observation. With the exception of 6 studies that applied F_{IC}, UV and Fidelity Level (FL), no statistical analyses have been used in rest of the studies (Table 1).

Table 1. Checklist of selected published research papers on ethnomedicinal plants used by the indigenous tribal communities of Arunachal Pradesh, India

Ethnic tribes/Area	Number of species	Informant characteristics	Field survey and analysis methods	Authors
Adi, Nocte & Nyishi Eastern Himalayas	74	Folk healers (male & female)	Semi-structured questionnaire. Informant consensus factor (ICF) & Fidelity level (FL).	(Tangjang *et al.* 2011)
Khampti Namsai District	45	Folk healers & herbal traders	Questionnaire, group interview & market survey. No statistical analysis.	(Das & Tag 2006)
Nyishi Papum Pare District	21	Folk healers	Questionnaire & personal interview. No statistical analysis.	(Tripathi *et al.* 2017)
Galo & Tagin Arunachal Pradesh	36	Folk healers & herbal traders	Questionnaire, group interview & market survey. Use value (UV) & Fidelity level (FL).	(Wangpan *et al.* 2019a)
Galo West Siang District	45	Folk healers & herbal traders	Survey & interview. Informants consensus factor (ICF).	(Bharali *et al.* 2016)

Memba Upper Siang District	88	Folk healers & herbal traders	Questionnaire & informal discussion. No statistical analysis.	(Rethy *et al.* 2010)
Apatani Lower Subansiri District	158	Folk healers & herbal traders (male & female)	Literature survey, semi-structured questionnaire, group discussion & participant observation. No statistical analysis.	(Kala 2005)
Wancho Tirap District	13	Folk healers	Open-ended questionnaire & participant interview. No statistical analysis.	(Wangjen *et al.* 2011)
Adi, Apatani, Idu Mishmi, Monpa, Nyishi, Singpho & Tangsa Arunachal Pradesh	84	Folk healers & herbal traders	Discussion & exploration. No statistical analysis.	(Khongsai *et al.* 2015)
Khampti Arunachal Pradesh	37	Folk healers & herbal traders	Standard questionnaire & discussion. No statistical analysis.	(Sen *et al.* 2008)
Adi Lower Dibang Valley District	26	Folk healers & herbal traders	Field survey, schedules & personal interview. Informants consensus factor (ICF).	(Nimasow *et al.* 2012)
Aka West Kameng District	18	Folk healers & herbal traders (men & women)	Ethnobotanical survey & interview. No statistical analysis.	(Nimachow *et al.* 2011)
Monpa Kalaktang, West Kameng District	50	Folk healers & herbal traders	Semi-structured questionnaire & interview. Informants consensus factor (ICF).	(Namsa *et al.* 2011)
Tagin Upper Subansiri District	10	Folk healers & herbal traders	Semi-structured questionnaire, personal interview & group discussion. No statistical analysis.	(Goswami *et al.* 2009)
Adi, Apatani, Idu Mishmi, Monpa & Nyishi Arunachal Pradesh	64	Folk healers	Pre-structured questionnaire & direct interview. No statistical analysis.	(Doley *et al.* 2014)
Apatani Lower Subansiri District	30	Folk healers	Questionnaire, interview & group discussion. No statistical analysis.	(Ayam 2017)
Nocte Tirap District	48	Folk healers & herbal traders	Standard questionnaire, group interview & market survey. Use value (UVc) Index.	(Wangpan *et al.* 2019b)
Galo, Nyishi & Tagin Arunachal Pradesh	140	Shaman, Folk healers & Herbal traders	Questionnaire & market survey. No statistical analysis.	(Murtem & Chaudhry 2016)
Adi Dehang-Debang Biosphere Reserve	44	Shaman, folk healers & herbal traders	Modified semi-structured questionnaire & interview. No statistical analysis.	(Kagyung *et al.* 2010)
Adi East, West and Upper Siang District	19	Shaman, folk healers & herbal traders	General observation & oral investigation. No statistical analysis.	(Ali & Ghosh 2006)

Ethnomedicinal plants, habit, parts used and mode of herbal preparation

We filtered the repetitive and non-medicinal plant species and enlisted only 358 ethnomedicinal plant species belonging to 100 families. The ethnomedicinal plants have been categorized under 10 broad categories of diseases/ailments which include 107 specific types of ailments prevalent and treated among the fourteen ethnic tribes of Arunachal Pradesh. The other minor diseases/ailments and unspecified medicinal terminologies have been excluded in this study. The enlisted ethnomedicinal plants contained the botanical name, family, habit/conservation status, parts used/mode of preparation, therapeutic indications, and name of the ethnic groups (Table 2). About 41% of the medicinal plants reported were herbs, 24% shrubs, 24% trees, 9% climbers, and 1% each of creepers and fronds (Fig. 2). Most of the herbal remedies were prepared from leaves (39.45%) followed by rhizome/root (15.40%), fruit (14.98%), stem (8.23%), bark (7.38%), seed (5.06%), whole plant (4.43%), flower (2.74%) and shoot/twig (2.32%) as shown in Fig. 3. The common uses of herbs as ethnomedicinal sources and the preference of leaves have been also indicated by studies conducted by previous workers (Ayyanar & Ignacimuthu 2005, Bhattarai *et al.* 2010, Giday *et al.* 2007, Ragupathy *et al.* 2007). The remedies were mostly taken in raw form (185 species) followed by paste form (91 species), water decoction (40 species), vegetable (18 species), infusion (12 species), roasted and powder form (8 species) each (Fig. 4). The local and IUCN-based conservation status of the ethnomedicinal plants showed 12 endangered, 6 near threatened, 2 vulnerable, 1 each critically endangered and extinct in wild and rest of the species were data deficient, least concern and not evaluated.

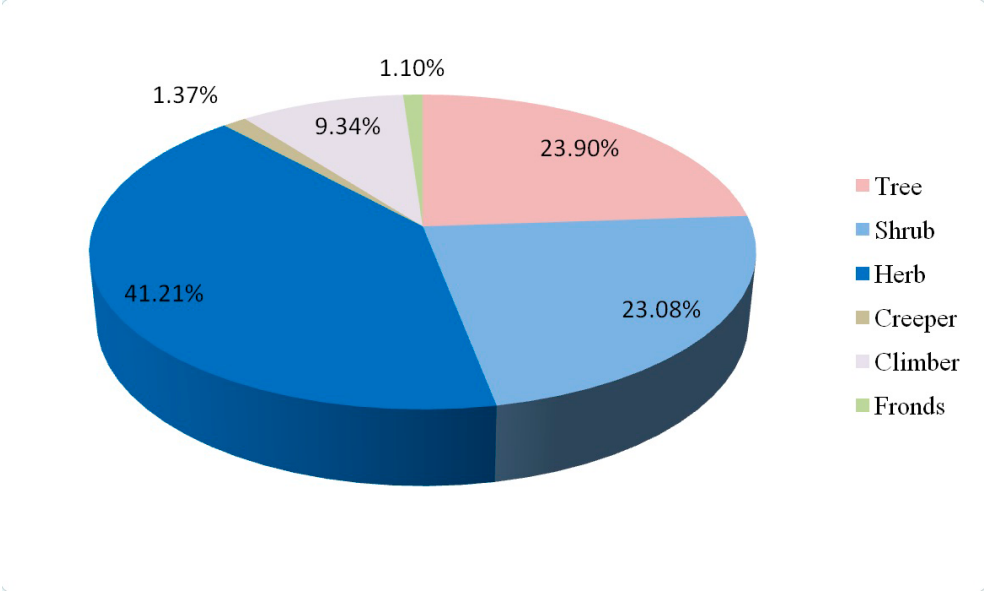

Figure 2. Habit of medicinal plants

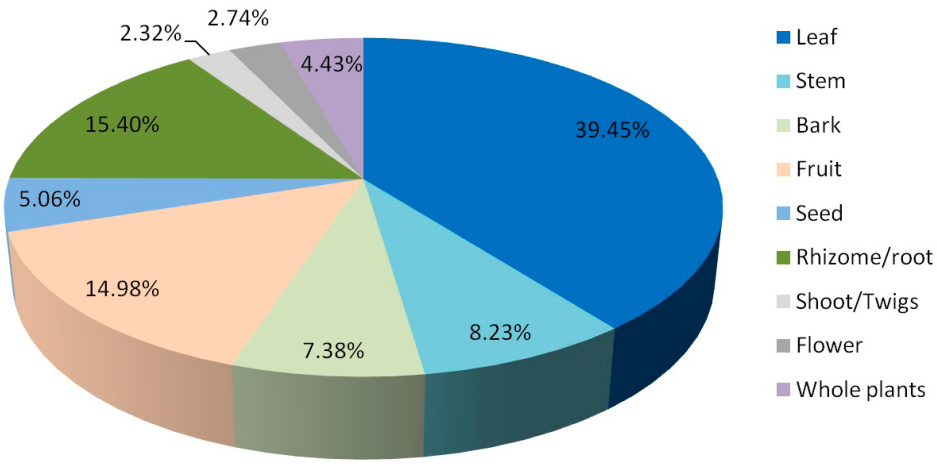

Figure 3. Morphological parts of plants used for ethnomedicine preparation

Table 2. List of ethnomedicinal plants used by the indigenous tribal communities of Arunachal Pradesh

Botanical name	Family	Habit/Ecological status[#]	Parts used/Mode of preparation	Therapeutic indications	Used by ethnic groups
Abroma augusta L.	Sterculiaceae	Tree/ NT	Bark & root/powder taken with water	Loss of appetite, dysentery, urinal ailments & vomiting	Adi, Khampti & Nyishi (Das & Tag 2006, Kagyung *et al.* 2010, Tripathi *et al.* 2017)
Abrus precatorius L.	Fabaceae	Herb/ NE	Seed/powder taken with water	Snake bite & vomiting	Khampti (Das & Tag 2006)
Acacia caesia (L.) Willd.	Fabaceae	Climber/ LC	Leaf/paste	Killing head lice	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Acmella oleracea (L.) R.K. Jansen	Asteraceae	Herb/ LC	Fruit & flower/raw	Toothache	Galo & Tagin (Wangpan *et al.* 2019b)
Acmella paniculata (Wall. ex DC.) R.K. Jansen	Asteraceae	Herb/ LC	Young shoot & flower/raw	Worm infection, leucorrhoea & mouth ulcer	Galo (Bharali *et al.* 2016)
Aconitum heterophyllum Wall. ex Royle	Ranunculaceae	Herb/ EN	Root & rhizome/raw	Snake bite & wounds	Memba (Rethy *et al.* 2010)
Acorus calamus L.	Acoraceae	Herb/ LC	Rhizome/raw	Asthma, bone fracture, bronchitis, cuts, diarrhea, dysentery, skin allergy, snake bite, stomachache & wounds	Adi, Apatani, Galo, Nyishi, Tagin & Wancho (Ayam 2017, Kala 2005, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Wangjen *et al.* 2011)
Adhatoda vasica Nees.	Acanthaceae	Herb/ LC	Leaf, bark & root/raw	Anemia, gastric & fever	Khampti (Das & Tag 2006)
Adhatoda zeylanica Medik.	Acanthaceae	Shrub/ NE	Leaf/decoction	Cough & cold, tumour & uterine problems	Adi, Galo, Nyishi & Tagin (Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Aegle marmelos (L.) Correa	Rutaceae	Tree/ NT	Fruit/raw	Indigestion	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Aerva sanguinolenta (L.) Blume	Amaranthaceae	Herb/ LC	Leaf/paste	Injuries	Khampti (Sen *et al.* 2008)
Aesculus assamica Griff.	Hippocastanacea e	Tree/ LC	Leaf/paste	Skin allergy & backache	Monpa (Khongsai *et al.* 2015)

Ageratum conyzoides L.	Asteraceae	Herb/ LC	Whole part/paste	Blood coagulant, cuts, diarrhea, dysentery & wounds	Adi, Aka, Apatani, Galo, Idu-Mishmi, Memba, Monpa, Nocte, Singpo, Tagin & Tangsa (Ayam 2017, Bharali *et al.* 2016, Goswami *et al.* 2009, Kagyung *et al.* 2010, Kala 2005, Khongsai *et al.* 2015, Namsa *et al.* 2011, Nimachow *et al.* 2011, Nimasow *et al.* 2012, Rethy *et al.* 2010, Tangjang *et al.* 2011, Wangpan *et al.* 2019b)
Ageratum houstonianum Mill.	Asteraceae	Herb/ LC	Leaf & young twigs/raw	Cuts & blood coagulant	Galo & Tagin (Wangpan *et al.* 2019a)
Allium hookeri Thwaites	Liliaceae	Herb/ NE	Leaf, rhizome & bulbs/raw	Bone fracture, cough & cold, skin allergy & wounds	Apatani, Galo, Monpa, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016, Namsa *et al.* 2011)
Allium sativum L.	Liliaceae	Herb/ NE	Leaf & rhizome/paste	Bone fracture, lung disorder & stomachache	Adi, Monpa, Nocte & Nyishi (Kagyung *et al.* 2010, Namsa *et al.* 2011, Tangjang *et al.* 2011)
Allium schoenoprasum L.	Liliaceae	Herb/ LC	Leaf and root/raw	Body ache, blood circulation, fresh cuts & wounds & indigestion	Apatani (Ayam 2017)
Alocasia fornicata (Roxb.) Schott	Araceae	Herb/ LC	Root/paste	Heel crack	Apatani (Kala 2005)
Aloe barbadensis Mill.	Liliaceae	Herb/ LC	Leaf & rhizome/paste	Cuts, burns, eczema, stomachache, menstrual disorder, constipation	Nyishi (Khongsai *et al.* 2015, Tripathi *et al.* 2017)
Alpinia galanga (L.) Wild.	Zingiberaceae	Herb/ LC	Rhizome/raw	Bone fracture, bacterial infection & constipation	Galo, Khampti & Tagin (Das & Tag 2006, Wangpan *et al.* 2019a)
Alstonia scholaris (L.) R. Br.	Apocynaceae	Tree/ LC	Whole part (mostly bark, leaf and root)/raw & decoction	Malaria, snake bite, skin allergy, wounds, headache, stomachache, menstrual disorder, delivery problems & jaundice	Adi, Apatani, Galo, Nocte, Nyishi, Tagin & Wancho (Doley *et al.* 2014, Kala 2005, Murtem & Chaudhry 2016, Nimasow *et al.* 2012, Tangjang *et al.* 2011, Tripathi *et al.* 2017, Wangjen *et al.* 2011)

Amaranthus spinosus L.	Amaranthaceae	Herb/ LC	Whole plant (mostly root and leaf)/vegetable & paste	Skin allergy, gout, snake bite & gonorrhea	Adi, Khampti, Monpa & Singpho (Ali & Ghosh 2006, Khongsai *et al.* 2015, Sen *et al.* 2008)
Amomum aromaticum Roxb.	Zingiberaceae	Herb/ LC	Leaf & seed/raw	Fever & abortion	Apatani (Kala 2005)
Amorphophallus paeoniifolius (Dennst.) Nicolson	Araceae	Herb/ LC	Corn/infusion	Piles	Apatani (Kala 2005)
Amphineuron opulentum (Kaulf.) Holttum	Thelyperidaceae	Herb/ EN	Leaf/paste	Snake bite & body ache	Nocte & Nyishi (Tangjang *et al.* 2011)
Ananas comosus (L.) Merr.	Bromeliaceae	Herb/ LC	Fruit & leaf/raw & decoction	Cough & cold, urinal ailments & worm infection	Khampti, Nocte & Nyishi (Sen *et al.* 2008, Tangjang *et al.* 2011)
Andrographis paniculata (Burm.f.) Nees	Acanthacaeae	Herb/ LC	Seed & leaf/paste	Malaria, jaundice, diabetes, liver disease, snake bite, fever, cough & cold, stomachache & dysentery	Apatani, Galo Khampti, Nyishi & Tagin (Das & Tag 2006, Kala 2005, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Sen *et al.* 2008, Tripathi *et al.* 2017)
Angiopteris evecta (G. Forst.) Hoffm.	Marattiaceae	Herb/ EN	Rhizome & stem/paste	Inflammation, dysentery & diarrhea	Adi, Apatani & Galo (Bharali *et al.* 2016, Kagyung *et al.* 2010, Kala 2005)
Anisomeles indica (L.) Kuntze	Lamiaceae	Herb/ NE	Shoot/raw	Body ache	Apatani (Kala 2005)
Anisomeles ovata R.Br.	Lamiaceae	Shrub/ LC	Whole plant/paste	Body ache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Antidesma acidum Retz.	Euphorbiaceae	Shrub/ LC	Leaf/raw	Wounds	Apatani (Kala 2005)
Arenaria orbiculata Royle ex Edgew. Hook. f.	Caryophyllaceae	Herb/ NE	Whole plant/raw	Anemia	Khampti (Das & Tag 2006)
Argemone mexicana L.	Papaveraceae	Herb/ NE	Shoot/paste	Skin allergy	Apatani (Kala 2005)
Argyreia nervosa (Burm. f.) Bojer	Convolvulaceae	Shrub/ LC	Leaf & stem/vegetable	Malaria & body ache	Adi & Khampti (Das & Tag 2006, Nimasow *et al.* 2012)
Artemisia dubia Wall. ex Besser	Asteraceae	Herb/ LC	Leaf/decoction & paste	Ringworm & skin allergy	Nocte (Wangpan *et al.* 2019b)
Artemisia indica Willd.	Asteraceae	Herb/ NE	Leaf/raw & paste	Cough & cold, menstrual disorder, body ache, headache, nosebleed, skin allergy, asthma & cuts	Apatani, Galo, Nyishi & Tagin (Ayam 2017, Bharali *et al.* 2016, Kala 2005, Murtem & Chaudhry 2016)
Artemisia nilagirica (C.B. Clarke) Pamp.	Asteraceace	Herb, shrub/ NE	Leaf/paste	Cough & cold, fever, wounds, inflammation, cuts, scabies, stomachache, sores & body ache	Aka, Apatani, Galo, Monpa, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016, Namsa *et al.* 2011, Nimachow *et al.* 2011)

Artocarpus heterophyllus Lam.	Moraceae	Tree/ NE	Roots & leaf/infusion	Fever, skin allergy & dysentery	Galo & Khampti (Bharali *et al.* 2016, Sen *et al.* 2008)
Asplenium nidus L.	Denustaidiaceae	Frond/ NE	Leaf/paste	Bone fracture, body ache, dumbness & ulcer	Apatani, Khampti & Galo (Bharali *et al.* 2016, Das & Tag 2006, Kala 2005)
Averrhoa carambola L.	Averrhoeaceae	Tree/ NE	Leaf, root, bark & fruit/raw	Jaundice	Khampti (Sen *et al.* 2008)
Azadirachta indica A. Juss.	Meliaceae	Tree/ LC	Leaf/raw	Skin allergy, stomachache & diarrhea	Galo, Monpa, Nyishi & Tagin (Murtem & Chaudhry 2016, Namsa *et al.* 2011)
Bambusa balcooa Roxb.	Poaceae	Shrub/ LC	Bark/paste	Wounds, cuts & blood coagulant	Galo & Tagin (Bharali *et al.* 2016, Wangpan *et al.* 2019a)
Bambusa arundinacea Willd.	Poaceae	Shrub or tree/ NE	Bark & leaf/raw	Wounds, injuries & urinal ailments	Khampti (Sen *et al.* 2008)
Barleria prionitis L.	Acanthaceae	Shrub/ LC	Leaf/raw	Cough & cold	Apatani (Kala 2005)
Bauhinia purpurea L.	Fabaceae	Tree/ LC	Leave & bark/raw	Diarrhea & dysentery	Apatani (Ayam 2017)
Begibua josephii A. DC.	Begoniaceae	Herb or shrub/ NE	Leaf/raw	Insect bite	Memba (Rethy *et al.* 2010)
Begonia palmate D. Don	Begoniaceae	Herb/ LC	Root/paste	Diarrhea & dysentery	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Begonia roxburghii A. DC.	Begoniaceae	Herb/ NE	Stem/paste	Stomachache, bee bite, constipation, indigestion, diabetes & blood purification	Adi, Apatani, Galo, Nocte & Nyishi (Bharali *et al.* 2016, Kala 2005, Tangjang *et al.* 2011)
Begonia sp.	Begoniaceae	Herb/ LC	Tender leaf/raw	Abscesses	Aka (Nimachow *et al.* 2011)
Begonia tessaricarpa C.B. Clarke	Begoniaceae	Herb/ EN	Leaf/paste	Body ache	Nocte & Nyishi (Tangjang *et al.* 2011)
Berberis aristata DC.	Berberidaceae	Shrub/ LC	Root & stem/raw	Fever, bacterial infection, fungal infection, diabetes & eye infection	Adi & Apatani (Ayam 2017, Khongsai *et al.* 2015)
Berberis wallichiana DC.	Berberidaceae	Shrub/ LC	Fruit & root/raw	Indigestion & body ache	Apatani (Kala 2005)
Bergenia ciliata (Haw.) Sternb.	Saxifragacea	Herb/ LC	Leaf & root/paste	Cuts & wounds	Apatani (Kala 2005)
Bidens pilosa L.	Asteraceae	Herb/ NE	Leaf & tuber/decoction	Ulcer, earache, eye infection, wounds & inflammation	Apatani & Monpa (Khongsai *et al.* 2015, Namsa *et al.* 2011)
Bischofia javanica Blume	Euphorbiaceae	Tree/ LC	Leaf & bark/decoction	Gastric & jaundice	Nyishi (Doley *et al.* 2014)
Blechnum orientale L.	Blechnaceae	Herb/ LC	Leaf/paste	Skin allergy	Khampti (Das & Tag 2006)
Blumea balsamifera (L.) DC.	Asteraceae	Shrub/ LC	Leaf/raw	Diabetes & body ache	Khampti (Das & Tag 2006)
Bonnaya brachiata Link & Otto	Schropulariaceae	Herb/ LC	Leaf & roots/raw	Urinal ailments & tuberculosis	Khampti (Das & Tag 2006)

Brassica campestris L.	Brassicaceae	Herb/ LC	Seed/oil	Cough & cold, body ache & fever	Nocte & Nyishi (Tangjang *et al.* 2011)
Brassica juncea (L.) Czern.	Brassicaceae	Herb/ NE	Seed & young shoot/vegetable	Indigestion, fever & headache	Galo & Tagin (Wangpan *et al.* 2019a)
Brassiopsis glomerulata (Blume) Regel	Araliaceae	Shrub/ EN	Fruit/infusion	Cough & cold & skin allergy	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Brugmansia suaveolens (Humb. & Bonpl. ex Wild.) Bercht. & J. Presl	Solanaceae	Shrub/ EW	Leaf & stem/paste & raw	Wounds & skin allergy	Nocte (Wangpan *et al.* 2019b)
Bryophyllum calycinum Salisb.	Crassulaceae	Herb/ EN	Fresh Leaf/raw	Jaundice, dysentery & gastric	Adi & Tagin (Goswami *et al.* 2009, Kagyung *et al.* 2010)
Buddleja asiaica Lour.	Scrophulariaceae	Herb/ LC	Leaf & young twigs/raw	Diarrhea, sinusitis & inflammation	Apatani, Galo, Monpa, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016, Namsa *et al.* 2011)
Caesalpinia cucullata Roxb.	Caesalpiniaceae	Tree/ LC	Leaf & seed/paste	Stomachache & body ache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Calamus erectus Roxb.	Arecaceae	Tree/ LC	Tender shoots/raw	Dyspepsia	Adi (Kagyung *et al.* 2010)
Calamus inermis T. Anderson	Arecaceae	Tree/ NE	Leaf bud & soft core (pith)/raw	Malaria	Adi (Nimasow *et al.* 2012)
Callicarpa arborea Roxb.	Verbenaceae	Tree/ LC	Bark & leaf/paste	Indigestion, gastric & toothache	Adi & Nyishi (Doley *et al.* 2014, Khongsai *et al.* 2015)
Callicarpa macrophylla Vahl	Lamiaceae	Tree/ LC	Leaf/raw	Headache	Apatani (Kala 2005)
Callicarpa vestita Wall. ex C.B. Clarke	Lamiaceae	Tree/ NE	Leaf/raw	Indigestion	Apatani (Kala 2005)
Calotropis gigantea (L.) W. T. Aiton	Apocynaceae	Shrub/ LC	Root & flower/paste	Dog bite	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Calotropis procera (Aiton) Dryand.	Apocynaceae	Shrub/ LC	Leaf/raw	Dysentery, body ache & burns	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Camellia sinensis (L.) Kuntze	Theaceae	Herb/ DD	Leaf/vegetable	Wounds & stomachache	Adi, Nocte & Nyishi (Tangjang *et al.* 2011)
Camphora glandulifera (Wall.) Nees	Lauraceae	Tree/ NE	Leaf/raw	Wounds	Nyishi (Doley *et al.* 2014)
Campylandra aurantiaca Baker	Liliaceae	Shrub/ NE	Whole part/raw	Indigestion	Adi (Nimasow *et al.* 2012)
Canarium bengalense Roxb.	Combretaceae	Tree/ LC	Bark/paste	Wounds	Idu-Mishmi (Doley *et al.* 2014)

Canarium resiniferum Bruce ex King	Burseraceae	Tree/ LC	Fruit/raw	Urinal ailments	Apatani (Kala 2005)
Canarium strictum Roxb.	Burseraceae	Tree/ CR	Bark/raw	Insect bite	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Cannabis Sativa L.	Cannabaceae	Herb/ LC	Leaf/decoction	Dysentery, body ache, diarrhea & stomachache	Adi, Galo & Tagin (Khongsai *et al.* 2015, Wangpan *et al.* 2019a)
Capsicum chinense Jacq.	Solanaceae	Herb/ LC	Fruits/raw	Worm infection	Galo (Bharali *et al.* 2016)
Capsicum frutescens L.	Solanaceae	Herb/ LC	Fruit/raw	Wounds & blood coagulant	Adi, Nocte & Nyishi (Tangjang *et al.* 2011)
Carica papaya L.	Caricaceae	Tree/ DD	Fruit , seed & latex/vegetable	Burns, cuts, wounds, heel crack, gastric, delivery problems, cough & cold, blood pressure & stomachache	Apatani, Galo, Khampti, Nocte, Nyishi & Tagin (Bharali *et al.* 2016, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Sen *et al.* 2008, Tangjang *et al.* 2011)
Cassia alata L.	Leguminosae	Shrub/ LC	Leaf/paste	Skin allergy & ringworm	Adi, Nocte, Nyishi & Wancho (Tangjang *et al.* 2011, Wangjen *et al.* 2011)
Cassia fistula L.	Caesalpinaceae	Tree/ LC	Leaf/raw	Indigestion, piles & constipation	Adi, Galo, Khampti, Nocte, Nyishi & Tagin (Murtem & Chaudhry 2016, Sen *et al.* 2008, Tangjang *et al.* 2011)
Cassia hirsuta L.	Ceasulpiniaceae	Shrub/ LC	Bark/paste	Gastric	Khampti (Das & Tag 2006)
Cassia tora L.	Caesalpinaceae	Herb/ LC	Roots & bark/raw	Headache, ringworm & skin allergy	Galo, Khampti, Nyishi & Tagin (Murtem & Chaudhry 2016, Sen *et al.* 2008)
Centella asiatica (L.) Urb.	Apiaceae	Herb/ LC	Whole part especially leaf & roots/raw, vegetable & decoction	Stomachache, toothache, loss of appetite, jaundice, indigestion, ulcer, blood purification, cuts, wounds, inflammation, gastric, constipation, ringworm, cerebral tonic, asthma, leprosy, tuberculosis & dysentery	Adi, Aka, Apatani, Galo, Khampti, Monpa, Nocte, Nyishi, Tagin & Wancho (Ayam 2017, Kagyung *et al.* 2010, Kala 2005, Khongsai *et al.* 2015, Namsa *et al.* 2011, Nimachow *et al.* 2011, Sen *et al.* 2008, Tangjang *et al.* 2011, Wangjen *et al.* 2011, Wangpan *et al.* 2019a)
Cheilocostus speciosus (J. Koenig) C.D. Specht	Costaceae	Herb/ LC	Root & stem/raw	Airway obstruction, jaundice gastric, eye infection, urinal ailments, snake bite, earache & burns	Adi, Aka, Nyishi & Singpho (Khongsai *et al.* 2015, Nimachow *et al.* 2011, Tangjang *et al.* 2011, Tripathi *et al.* 2017)

Christella parasitica (L.) Lev.	Thelypteridaceae	Herb/ NE	Frond/raw	Cuts & wounds	Apatani (Kala 2005)
Chromolaena odorata (L.) R.M. King & H. Rob.	Asteraceae	Shrub/ LC	Leaf/paste	Headache, fever, blood coagulant, wounds & cuts	Apatani, Galo, Nocte & Tagin (Kala 2005, Wangpan *et al.* 2019a, Wangpan *et al.* 2019b)
Chrysanthemum indicum L.	Compositae	Shrub/ NT	Leaf/raw	Backache	Wancho (Wangjen *et al.* 2011)
Chrysopogon aciculatus (Retz.)Trin.	Poaceae	Herb/ NE	Leaf/decoction	Tonsillitis	Adi (Tangjang *et al.* 2011)
Cinnamomum verum J. Presl	Lauraceae	Tree/ LC	Bark & root/vegetable	Cough & cold, oral infection, indigestion, tuberculosis & vomiting	Adi, Apatani, Galo, Nyishi & Tagin (Ayam 2017, Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Tangjang *et al.* 2011)
Cissampelos pareira L.	Menispermaceae	Climber/ LC	Tender leaf & stem/raw	Abortion	Khampti (Das & Tag 2006)
Citrus limon (L.) Burm. f.	Rutaceae	Small tree/ LC	Fruit & leaf	Paralysis, diarrhea & dysentery	Galo & Khampti (Bharali *et al.* 2016, Das & Tag 2006)
Citrus medica L.	Rutaceae	Shrub/ EN	Fruit, leaf & seed/ decoction	Indigestion, epilepsy, cough & cold, dandruff & diarrhea	Khampti, Nyishi & Singpho (Khongsai *et al.* 2015, Sen *et al.* 2008, Tangjang *et al.* 2011)
Citrus paradise Macfad.	Rutaceae	Small tree/ NE	Leave/raw	Vomiting	Nyishi (Doley *et al.* 2014)
Citrus reticulata Blanco	Rutaceae	Tree/ LC	Fruit/decoction	Worm infection	Nyishi (Tangjang *et al.* 2011)
Clerodendrum colebrookianum Walp.	Lamiaceae	Shrub/ LC	Stem & Leaf/raw	Blood pressure & stomachache	Galo, Nyishi, Singpho, & Tagin (Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Clerodendrum glandulosum Lindl.	Lamiaceae	Shrub/ LC	Leaf/raw	Blood pressure, headache, fever, stomachache & cough & cold	Apatani, Galo & Tagin (Bharali *et al.* 2016, Kala 2005, Wangpan *et al.* 2019a)
Clerodendrum infortunatum L.	Lamiaceae	Shrub/ LC	Leaf/vegetable	Blood pressure	Nocte & Nyishi (Tangjang *et al.* 2011)
Clerodendrum japonicum (Thunb.) Sweet	Lamiaceae	Shrub/ LC	Leaf/vegetable	Blood pressure, hypertension, diarrhea, stomachache, headache & bowel problems	Adi, Aka, Apatani, Galo, Idu-Mishmi, Memba, Monpa, Nocte, Nyishi, & Tagin (Ayam 2017, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Namsa *et al.* 2011, Nimachow *et al.* 2011, Nimasow *et al.* 2012, Rethy *et al.* 2010, Wangpan *et al.* 2019b)
Clerodendron venosum Wall.	Lamiaceae	Herb/ EN	Leaf/paste	Body ache	Nyishi (Tangjang *et al.* 2011)

Coffea bengalensis Roxb.	Rubiaceae	Shrub/ LC	Young shoots/raw	Indigestion & stomachache	Adi (Ali & Ghosh 2006, Kagyung *et al.* 2010)
Coleus forskohlii Briq.	Lamiaceae	Herb/ NE	Leaf & stem/raw	Knee pain	Khampti (Das & Tag 2006)
Colocasia esculenta (L.) Schott.	Araceae	Herb/ LC	Shoots, root & tender leaf/paste	Delivery problems & skin allergy	Galo & Nyishi (Bharali *et al.* 2016, Tangjang *et al.* 2011)
Conocephalus Suaveolens Blume	Moraceae	Climbing shrub/ NE	Stem/raw	Eye infection	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Coptis teeta Wall.	Rahunculaceae	Herb/ EN	Whole plant (mostly leaf and rhizome)/raw	Dandruff, stomachache, dysentery, diarrhea, cough & cold, gastric, malaria, fever, eye infection, loss of appetite, backache, headache, inflammation & skin allergy	Adi, Galo, Memba, Nyishi & Tagin (Ali & Ghosh 2006, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Rethy *et al.* 2010, Tangjang *et al.* 2011, Tripathi *et al.* 2017)
Coriandrum sativum L.	Apiaceae	Herb/ LC	Leaf/raw	Stomachache & cerebral tonic	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Crassocephalum crepidioides (Benth.) S.Moore	Asteraceae	Herb/ NE	Leaf/raw	Indigestion, headache, stomachache, cuts, injuries & wounds	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Croton roxburghii Balakr.	Euphorbiaceae	Herb, shrub, tree/ LC	Root/raw	Bone pain, cancer & indigestion	Apatani & Khampti (Das & Tag 2006, Kala 2005)
Croton tiglium L.	Euphorbiaceae	Tree/ LC	Leaf & flower/raw	Malaria	Khampti (Das & Tag 2006)
Cucumis sativus L.	Cucurbitaceae	Climber/ LC	Leaf/raw	Stomachache, worm infection & indigestion	Galo, Tagin & Nyishi (Murtem & Chaudhry 2016, Wangpan *et al.* 2019a)
Curculigo capitulata (Lour.) Kuntze	Hypoxidaceae	Herb/ NE	Rhizome/paste	Blood coagulant	Nyishi (Tangjang *et al.* 2011)
Curcuma aromatica Salisb.	Zingiberaceae	Herb/ NE	Rhizome/raw	Cough & cold	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Curcuma caesia Roxb.	Zingiberaceae	Herb/ NE	Collar crushed & rhizome/raw	Stomachache, wounds, injury, pimples, diarrhea, skin allergy & dysentery	Adi, Aka, Galo, Khampti & Monpa (Bharali *et al.* 2016, Kagyung *et al.* 2010, Namsa *et al.* 2011, Nimachow *et al.* 2011, Sen *et al.* 2008)
Curcuma longa L.	Zingiberaceae	Herb/ DD	Rhizome/raw	Asthma, bone fracture, indigestion, stomachache & muscle pain	Adi, Galo, Khampti, Nocte, Nyishi & Tagin (Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Sen *et al.* 2008, Tangjang *et al.* 2011)
Cyathea spinolusa Wall.	Cyatheaceae	Herb/ LC	Leaf & stem/powder	Rheumatism	Nyishi (Tangjang *et al.* 2011)

Cyclosorus parasiticus (L.) Farw.	Thelypteridaceae	Herb/ LC	Leaf/raw	Body ache	Galo (Bharali *et al*. 2016)
Cyperus flabeliformis Rottb.	Cyperaceae	Tuber/ LC	Root	Bone fracture	Khampti (Das & Tag 2006)
Dalbergia pinnata (Lour.) Prain	Fabaceae	Climber/ LC	Leaf/paste	Cuts & wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Datura innoxia Mill.	Solanaceae	Sub-shrub/ NE	Leaf/paste	Rabies	Khampti (Das & Tag 2006)
Datura metel L.	Solanaceae	Herb/ NE	Leaf/raw	Headache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Debregeasia longifolia (Burm. f.) Wedd.	Urticaceae	Shrub/ LC	Fruit & leaf/raw & decoction	Stomachache, dysentery & scabies	Nocte (Wangpan *et al*. 2019b)
Dendrocalamus hamiltonii Nees & Arn. ex Munro	Poaceae	Shrub/ NE	Culm & young shoot/raw	Cuts, bee bite & burns	Aka, Galo & Tagin (Nimachow *et al*. 2011, Wangpan *et al*. 2019a)
Dendrocalamus strictus (Roxb.) Nees	Poaceae	Shrub/ NE	Bark/paste	Cuts & wounds	Adi (Nimasow *et al*. 2012)
Desmodium gyroides (Link) DC.	Fabaceae	Shrub/ LC	Leaf/raw	Sinusitis, leprosy & skin allergy	Galo & Tagin (Wangpan *et al*. 2019a)
*Diaplazium esculentum (*Retz.) Sw.	Athyriaceae	Frond/ LC	Root & rhizome/ decoction	Fever	Galo (Bharali *et al*. 2016)
Dillenia indica L.	Dilleniaceae	Shrub/ LC	Fruit/raw	Throat infection, cough & cold, fever, indigestion & stomachache	Adi, Apatani & Nyishi (Kagyung *et al*. 2010, Kala 2005, Khongsai *et al*. 2015, Nimasow *et al*. 2012)
Dioscorea alata L.	Dioscoreaceae	Climber/ NE	Tuber/raw	Gastric & indigestion	Apatani & Monpa (Kala 2005, Namsa *et al*. 2011)
Dioscorea floribunda M.Martens & Galeotti	Dioscoreaceae	Climber/ LC	Tuber/paste	Dysentery	Adi & Aka (Khongsai *et al*. 2015, Nimachow *et al*. 2011)
Drymaria cordata (L.) Willd. ex Schult.	Caryoplyllaceae	Herb/ LC	Whole part/raw	Headache, skin allergy, scabies, abscesses, sinusitis, jaundice & gastric	Adi, Galo, Khampti & Nocte (Bharali *et al*. 2016, Kagyung *et al*. 2010, Sen *et al*. 2008, Tangjang *et al*. 2011)
Dysphania ambrosioides (L.) Mosyakin & Clemants	Chenopodiaceae	Herb/ LC	Leaf/raw	Toothache	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Echinocarpus assamicus Benth.	Elaeocarpaceae	Tree/ NE	Bark & leave/raw	Diarrhea	Nyishi (Doley *et al*. 2014)
Eclipta prostrata (L.) L.	Asteraceae	Herb/ LC	Shoot/raw	Cuts & wounds	Apatani (Kala 2005)
Elaeocarpus floribundus Blume	Elaeocarpaceae	Tree/ NE	Fruits/raw	Stomachache & blood pressure	Galo & Nyishi (Bharali *et al*. 2016, Tripathi *et al*. 2017)
Elatostema platyphyllum Wedd.	Urticaceae	Herb/ NE	Roots/raw	Vomiting	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Elsholzia blanda (Benth.) Benth.	Lamiaceae	Herb/ NE	Leaf/raw	Itching	Apatani (Kala 2005)

Embelia ribes Burm. f.	Myrsinaceae	Creeper shrub/ NE	Leaf & fruits/raw	Diarrhea, liver disease & worm infection	Nyishi &Tagin (Goswami *et al.* 2009, Tripathi *et al.* 2017)
Emblica officinalis Gaertn.	Euphorbiaceae	Tree/ LC	Fruit/dried	Diabetes, jaundice, stomachache, heart & liver disease	Adi, Apatani & Nocte (Khongsai *et al.* 2015, Tangjang *et al.* 2011)
Emilia sonchifolia (L.) DC. ex DC.	Asteraceae	Climbing herb/ NE	Leaf/decoction	Eye infection	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Entada pursaetha DC.	Fabaceae	Climber/ NE	Stem & leaf/paste	Bone fracture	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Entada rheedii Spreng.	Fabaceae	Climber/ NE	Seed/powder	Scabies, abscesses, skin allergy & pneumonia	Galo (Bharali *et al.* 2016)
Equisetum arvense L.	Equisetaceae	Herb/ LC	Whole plant/raw	Cough & cold & rheumatism	Apatani (Ayam 2017)
Equisetum diffusum D. Don.	Equisetaceae	Herb/ LC	Whole plant/paste	Bone fracture	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Eranthemum palatiferum (Wall.) Nees	Acanthaceae	Shrub/ NE	Leaf/raw	Stomachache	Khampti (Das & Tag 2006)
Erigeron bonariensis L.	Asteraceae	Herb/ NE	Leaf/raw	Nasal congestion	Apatani (Kala 2005)
Eryngium foetidum L.	Apiaceae	Herb/ NE	Leaf/raw	Loss of appetite & headache	Adi, Apatani, Galo, Nyishi & Tagin (Kagyung *et al.* 2010, Kala 2005, Murtem & Chaudhry 2016)
Erythrina indica Lam.	Fabaceae	Tree/ LC	Flowers/paste	Wounds	Adi (Tangjang *et al.* 2011)
Erythrina stricta Roxb.	Fabaccae	Tree/ LC	Flower & bark/paste	Scorpion bite & headache	Nyishi & Wancho (Doley *et al.* 2014, Wangjen *et al.* 2011)
Eupatorium odoratum L.	Asteraceae	Shrub/ NE	Leaf/paste	Blood coagulant, cuts & wounds	Apatani & Nocte (Kala 2005, Tangjang *et al.* 2011)
Euphorbia hirta L.	Euphorbiaceae	Herb/ NE	Whole plant (leaf)/raw	Bronchitis, asthma, anemia & worm infection	Kampti & Nyishi (Das & Tag 2006, Khongsai *et al.* 2015)
Euphorbia ligularia Roxb. ex Buch.-Ham.	Euphorbiaceae	Shrub/ NE	Leaf & stem/raw	Delivery problems, bone fracture & stomachache	Galo, Khampti, Nyishi, Tagin & Wancho (Das & Tag 2006, Murtem & Chaudhry 2016, Wangjen *et al.* 2011)
Fagopyrum dibotrys (D. Don) H. Hara	Polygonaceae	Herb/ NE	Seed/raw	Cough & cold, cholera & diarrhea	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Ficus benjamina L.	Moraceae	Tree/ LC	Stem/raw	Stomachache	Apatani (Kala 2005)
Ficus glomerata Roxb.	Moraceae	Tree/ NE	Fruits & seeds/raw	Diabetes	Monpa (Namsa *et al.* 2011)
Ficus hirta Vahl	Moraceae	Tree / NE	Fruit/raw	Cuts & wounds	Apatani (Kala 2005)

Ficus hispida L. f.	Moraceae	Tree/ LC	Roots, bark & stem/decoction	Dysentery, tuberculosis & burns	Adi, Khampti & Tagin (Das & Tag 2006, Goswami *et al.* 2009, Nimasow *et al.* 2012)
Ficus semicordata Buch.-Ham. ex Sm.	Moraceae	Tree/ LC	Bark/raw	Toothache & diarrhea	Adi, Nyishi & Monpa (Doley *et al.* 2014)
Ficus squamosa Roxb.	Moraceae	Tree/ NE	Latex/raw	Pimples	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Garcinia cowa Roxb. ex DC.	Clusiaceae	Tree/ LC	Fruits/raw	Gastric, dysentery & diarrhea	Nyishi (Doley *et al.* 2014)
Garcinia lanceifolia Roxb.	Clusiaceae	Tree/ NE	Fruits/raw	Stomachache & fever	Galo (Bharali *et al.* 2016)
Garcinia pedunculata Roxb.	Clusiaceae	Tree/ NE	Fruits (pulp)/raw	Cough & cold, diarrhea, dyspepsia, flatulence & dysentery	Adi, Galo, Khampti, Nyishi & Tagin (Bharali *et al.* 2016, Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Sen *et al.* 2008)
Gerbera piloselloides (L.) Cass.	Asteraceae	Herb/ NE	Leaf/raw	Rheumatism	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Girardinia diversifolia (Link) Friis	Urticaceae	Shrub/ NE	Leaf/roast	Muscle pain	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Gloriosa superba L.	Liliaceae	Climbing shrub/ LC	Tuber & leaf/paste	Killing head lice	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Gmelina arborea Roxb. ex Sm.	Verbenaceae	Tree/ LC	Root, bark & leaf/raw	Blood purification & stomachache	Adi, Apatani, Galo Niyishi & Tagin (Kala 2005, Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Grewia tiliaefolia Vahl	Tiliaceae	Tree/ NE	Fruits/raw	Diarrhea	Adi (Doley *et al.* 2014)
Gynocardia odorata R. Br.	Achariaceae	Tree/ NE	Seed & leaf/paste	Skin allergy	Adi, Galo, Nocte & Tagin (Bharali *et al.* 2016, Doley *et al.* 2014, Goswami *et al.* 2009, Wangpan *et al.* 2019b)
Gynura bicolor (Roxb. ex Willd.) DC.	Asteraceae	Herb/ NE	Leaf/raw	Worm infection	Apatani (Kala 2005)
Gynura crepedioides Benth.	Asteraceae	Herb/ NE	Leaf & young twigs/raw	Stomachache	Monpa (Namsa *et al.* 2011)
Hedychium coronarium J. Koenig	Zingiberaceae	Shrub/ DD	Rhizome/raw	Body ache	Apatani (Kala 2005)
Hedychium dekianum A.S. Rao & D.M. Verma	Zingiberaceae	Shrub/ NE	Rhizome/raw	Cuts & wounds	Apatani (Kala 2005)

Hedyotis scandens Roxb.	Rubiaceae	Climber/ NE	Leaf & young twigs/raw	Diabetes, gastric, stomachache & bladder stone	Adi, Galo, Khampti, Monpa, Nyishi & Tagin (Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Namsa *et al.* 2011, Sen *et al.* 2008)
Hemidesmus indicus R. Br.	Apocynaceae	Vine/ EN	Leaf/paste	Bone fracture	Adi (Tangjang *et al.* 2011)
Hibiscus fragans Roxb.	Malvaceae	Shrub/ NE	Leaf & flower/paste	Dandruff	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Hibiscus rosa-sinensis L.	Malvaceae	Shrub/ NE	Leaf/paste	Blood coagulant & abscesses	Adi & Nocte (Tangjang *et al.* 2011)
Homalomena aromatica Linn.	Araceae	Herb/ LC	Rhizomes/raw	Diabetes	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Houttuynia cordata Thunb.	Saururaceae	Herb/ LC	Leaf & stem/vegetable	Dysentery, measles, indigestion diarrhea, headache, gonorrhea, tonsillitis, skin allergy, cough & cold, toothache, jaundice, stomachache & blood coagulant	Adi, Apatani, Galo, Khampti, Monpa, Nocte & Singpo (Ayam 2017, Bharali *et al.* 2016, Das & Tag 2006, Kagyung *et al.* 2010, Khongsai *et al.* 2015, Namsa *et al.* 2011, Nimasow *et al.* 2012, Tangjang *et al.* 2011, Wangpan *et al.* 2019b)
Hydrocotyle javanica Thunb.	Araliaceae	Creeper/ LC	Leaf/decoction, raw & paste	Fever, snake bite, wounds, abscesses & menstrual disorder	Galo, Nocte, Nyishi & Tagin (Murtem & Chaudhry 2016, Wangpan *et al.* 2019b)
Hypericum japonicum Thunb.	Hypericaceae	Herb/ NE	Stem/raw	Cuts & wounds	Apatani (Kala 2005)
Hyptis suaveolens (L.) Poit.	Lamiaceae	Herb/ NE	Leaf/paste & decoction	Itching & cough & cold	Apatani (Kala 2005)
Imperata cylindrica (L.) Raeusch.	Poaceae	Herb/ LC	Fruits/raw	Blood coagulant	Galo & Tagin (Wangpan *et al.* 2019a)
Ipomea aquatica Forsk.	Convulvulaceae	Herb/ NE	Leaf/raw	Asthma & loss of appetite	Khampti (Das & Tag 2006)
Ixora acuminata	Rubiaceae	Shrub/ NE	Tender leaf/infusion	Fever	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Ixora sp.	Rubiaceae	Tree/ NE	Leaf/raw	Stomachache	Adi (Nimasow *et al.* 2012)
Jatropa curcas L.	Euphorbiaceae	Tree/ NE	Stem & leaf/paste	Toothache & scabies	Adi, Galo, Nyishi & Tagin (Murtem & Chaudhry 2016, Tangjang *et al.* 2011)
Justicia gendarussa Burm. f.	Acanthaceae	Shrub/ NE	Leaf/raw	Bone fracture & muscle pain	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Kaempferia galanga L.	Zingiberaceae	Herb/ DD	Rhizome & leaf/raw	Flatulence	Khampti (Das & Tag 2006)
Kalanchoe pinnata (Lam.) Pers.	Crassulaceae	Shrub/ NE	Leaf/paste	Bladder stone, bone fracture, fever & constipation	Adi, Khampti & Nocte (Sen *et al.* 2008, Tangjang *et al.* 2011)

Lagenaria siceraria (Molina) Standl.	Cucurbitaceae	Herb/ NE	Fruit/paste	Burns	Apatani (Kala 2005)
Laggera pterodonta (DC.) Sch. Bip. ex Oliv.	Asteraceae	Herb/ NE	Leaf/paste	Inflammation	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Laportea crenulata Gaud.	Urticaceae	Shrub/ NE	Young shoots/raw	Gastric	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Lasia spinosa (L.) Thwaites	Araceae	Herb/ LC	Stem/raw	Worm infection	Galo (Bharali *et al.* 2016)
Leonotis nepetifolia R. Br.	Lamiaceae	Herb/ NE	Seed/paste	Burns	Apatani (Kala 2005)
Leucas aspera (Wild.) Link	Lamiaceae	Herb/ NE	Leaf & roots/decoction	Sinusitis, migraine, cuts, wounds, inflammation, piles, nosebleed, indigestion, snake bite, earache & menstrual disorder	Adi, Khampti, Monpa, Nocte & Nyishi (Das & Tag 2006, Namsa *et al.* 2011, Tangjang *et al.* 2011, Tripathi *et al.* 2017, Wangpan *et al.* 2019b)
Lindera neesiana (Wall. ex Nees) Kurz	Lauraceae	Tree/ LC	Fruits & seeds/raw	Diarrhea & scabies	Monpa (Namsa *et al.* 2011)
Lindernia cordifolia (Colsm.) Merr.	Scrophulariaceae	Herb/ LC	Leaf/raw	Headache & body ache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Litsea cubeba (Lour.) Pers.	Lauraceae	Tree/ NE	Fruits/raw	Eczema, heart disease, cough & cold & stomachache	Galo & Monpa (Bharali *et al.* 2016, Namsa *et al.* 2011)
Litsea monopetala (Roxb.) Pers.	Lauraceae	Shrub/ LC	Bark/infusion	Diabetes & gastric	Idu-Mishmi (Doley *et al.* 2014)
Litsea polyantha Juss.	Lauraceae	Tree/ LC	Stem/paste	Blood coagulant	Wancho (Wangjen *et al.* 2011)
Litsea salicifolia (Roxb. ex Nees) Hook. f.	Lauraceae	Tree/ LC	Bark/raw	Bone fracture	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Lobelia chinesis Lour.	Campanulaceae	Herb/ NE	Leaf/raw	Diabetes	Khampti (Sen *et al.* 2008)
Lobelia montana Reinw. ex Blume	Campanulaceae	Creeping herb/ NE	Leaf/raw	Stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Luffa acutangula (L.) Roxb.	Cucurbitaceae	Creeper or climber/ NE	Leaf/decoction	Hyperlactation	Khampti (Sen *et al.* 2008)
Lycopersicon lycopersicum L.	Solanaceae	Herb/ NE	Fruits/raw	Cancer	Apatani (Ayam 2017)
Lycopodium sp.	Lycopodiaceae	Herb/ LC	Whole plant/raw	Cancer	Apatani (Ayam 2017)
Macaranga denticulata (Blume) Müll.-Arg.	Euphorbiaceae	Small tree/ LC	Latex/raw	Burns	Aka (Nimachow *et al.* 2011)
Maesa indica (Roxb.) A. DC.	Myrsinaceae	Shrub/ LC	Fruit/raw	Hyperthermia	Nyishi (Khongsai *et al.* 2015)
Magnolia hodgsonii (Hook.f. & Thomson) H. Keng	Magnoliaceae	Tree/ LC	Fruit/raw	Toothache	Nocte (Wangpan *et al.* 2019b)

Mahonia nepaulensis DC.	Berberidaceae	Shrub/ NE	Stem & bark/raw	Stomachache, oral infection & toothache	Apatani (Ayam 2017)
Mastersia assamica Benth.	Fabaceae	Climber/ NE	Stem/paste	Cuts & wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Mazus pumillus (Burm. f.) Steenis	Mazaceae	Herb/ NE	Leaf/paste	Blood coagulant	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Melastoma malabathricum L.	Melastomaceae	Shrub/ NE	Leaf, flowers & fruits/infusion	Stomachache, jaundice, diarrhea, dysentery & toothache	Adi, Apatani, Galo (Ayam 2017, Bharali *et al.* 2016, Kagyung *et al.* 2010)
Melia azedarach L.	Meliaceae	Tree/ LC	Leaf & bark/decoction	Inflammation, malaria & killing head lice	Apatani, Galo, Nyishi & Tagin (Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Mentha arvensis L.	Lamiaceae	Herb/ LC	Leaf/raw	Stomachache & influenza	Apatani[70]
Mentha piperita L.	Lamiaceae	Herb/ LC	Leaf/raw	Knee pain, cough & cold & gastric	Khampti, Galo, Nyishi & Tagin (Das & Tag 2006, Murtem & Chaudhry 2016)
Mentha spicata L.	Lamiaceae	Herb/ LC	Leaf/raw	Gastric & acidity	Galo (Bharali *et al.* 2016)
Mesua ferrea L.	Calophyllaceae	Tree/ NE	Sap soaked/decoction	Eye infection	Khampti (Sen *et al.* 2008)
Meyna laxiflora Robyns	Rubiaceae	Shrub/ NE	Fruit/raw	Abortion	Galo (Bharali *et al.* 2016)
Michelia champaca L.	Magnoliaceae	Tree/ LC	Fruit/raw	Stomachache, constipation & indigestion	Apatani (Ayam 2017)
Microsorum punctatum (L.) Copel.	Polygonaceae	Frond/ NE	Leaf/paste	Inflammation	Galo & Tagin (Wangpan *et al.* 2019a)
Mikania micrantha Kunth	Asteraceae	climber/ LC	Leaf/paste	Wounds, cuts, skin allergy, itching, fever, dysentery & diarrhea	Adi, Apatani, Galo (Ayam 2017, Bharali *et al.* 2016, Kagyung *et al.* 2010)
Mikania scandens (L.) Wild.	Asteraceae	Climber/ NE	Leaf/paste	Blood coagulant, diarrhea, cuts & wounds	Adi, Galo, Nocte, Nyishi, Tagin & Tangsa (Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Tangjang *et al.* 2011)
Millingtonia hortensis L. f.	Bignoniaceae	Tree/ NE	Leaf & flowers/raw	Chest pain & jaundice	Khampti (Das & Tag 2006)
Mimosa pudica L.	Fabaceae	Creeper/ LC	Root/decoction	Piles, skin allergy, toothache & worm infection	Apatani, Nocte & Singpo (Ayam 2017, Khongsai *et al.* 2015, Tangjang *et al.* 2011)

Mollugo disticha Ser.	Molluginaceae	Herb/ NE	Root/roast	Muscle pain	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Mollugo pentaphylla L.	Molluginaceae	Herb/ NE	Leaf & stem/vegetable	Dehydration	Khampti (Das & Tag 2006)
Momordica charantia L.	Cucurbitaceae	Climber/ NE	Fruits/seed	Diabetes, stomachache & blood pressure	Galo, Monpa, Nyishi & Tagin (Murtem & Chaudhry 2016, Namsa *et al.* 2011)
Moringa oleifera Lam.	Moringaceae	Shrub/tree/ LC	Leaf & fruit/decoction	Anemia	Adi (Tangjang *et al.* 2011)
Morus laevigata Wall.	Moraceae	Tree/ NE	Stem & bark/raw	Abscesses, itching & wounds	Adi, Galo, Memba, Nyishi & Tagin (Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Rethy *et al.* 2010)
Mosla dianthera (Buch.-Ham. ex Roxb.) Maxim.	Lamiaceae	Herb/ NE	Leaf/paste	Skin allergy	Khampti (Das & Tag 2006)
Mucuna macrocarpa Wall.	Fabaceae	Climber/ NE	Stem/decoction	Eye infection	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Musa balbisiana Colla	Musaceae	Herb/ LC	Hearth (inner core)/cooked	Dysentery, diarrhea & stomachache	Adi & Galo (Bharali *et al.* 2016, Nimasow *et al.* 2012)
Musa paradisiaca L.	Musaceae	Herb/ NE	Fruits, roots & root/powder	Backache, fever, worm infection, dysentery, indigestion, diarrhea, vomiting & urinal ailments	Adi, Apatani, Galo, Idu-Mishmi & Khampti (Bharali *et al.* 2016, Kagyung *et al.* 2010, Kala 2005, Khongsai *et al.* 2015, Nimasow *et al.* 2012, Sen *et al.* 2008, Tangjang *et al.* 2011)
Musa velutina H. Wendl. & Drude	Musaceae	Shrub/ NE	Inflorescence/raw	Stomachache	Galo (Bharali *et al.* 2016)
Mussaenda roxburghii Hook.f.	Rubiaceae	Shrub/ LC	Leaf/paste	Blood coagulant	Galo & Tagin (Wangpan *et al.* 2019a)
Ocimum americanum L.	Lamiaceae	Herb/ NE	whole plant/raw	Cough & cold	Khampti (Sen *et al.* 2008)
Ocimum basilicum L.	Lamiaceae	Shrub/ NE	Leaf & seed/powder	Cough & cold	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Ocimum sanctum L.	Lamiaceae	Shrub/ NE	Leaf & seed/decoction	Cough & cold, bronchitis, skin allergy, fever, stomachache, diarrhea, inflammation, wounds & cuts	Apatani, Monpa, Nocte, Nyishi (Khongsai *et al.* 2015, Namsa *et al.* 2011, Tangjang *et al.* 2011)
Ormosia robusta Baker	Fabaceae	Tree/ NE	Leaf/paste	Abscesses	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)

Oroxylum indicum (L.) Kurz	Bignoniaceae	Tree/ EN	Leaf, bark & root/decoction	Liver disease, stomachache, cancer, itching, inflamation, tuberculosis, diarrhea, rheumatism, jaundice & heart disease	Adi, Galo, Monpa, Nyishi, Tagin & Wancho (Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Tangjang *et al.* 2011, Tripathi *et al.* 2017)
Oxalis acetosella L.	Oxalidaceae	Herb/ NE	Whole plant/raw	Cuts & wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Oxalis corniculata L.	Oxalidaceae	Herb/ NE	Whole plant (leaf)/raw	Burns, diarrhea, blood coagulant, indigestion, dysentery, scurvy, headache & loss of appetite	Adi, Apatani, Galo, Kampti, Nyishi & Tagin (Ali & Ghosh 2006, Ayam 2017, Das & Tag 2006, Kagyung *et al.* 2010, Murtem & Chaudhry 2016)
Oxalis debilis var. *corymbosa* (DC.) Lourteig	Oxalidaceae	Herb/ NE	Whole plant/decoction	Cuts, injuries & burns	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Oxalis triangularis A. St. Hill.	Oxalidaceae	Herb/ LC	Leaf/vegetable	Stomachache & diarrhea	Adi & Nocte (Tangjang *et al.* 2011)
Paederia foetida L.	Rubiaceae	Climber/ NE	Leaf & tuber/decoction	Body ache, gastric, stomachache, diarrhea, burns, toothache, urinal ailments, dysentery & indigestion	Adi, Aka, Apatani, Galo, Khampti, Nyishi & Tagin (Bharali *et al.* 2016, Goswami *et al.* 2009, Kagyung *et al.* 2010, Khongsai *et al.* 2015, Nimachow *et al.* 2011, Nimasow *et al.* 2012, Sen *et al.* 2008, Tangjang *et al.* 2011)
Papaver somniferum L.	Papaveraceae	Herb/ LC	Capsule/alkaloid	Body ache	Adi & Nocte (Tangjang *et al.* 2011)
Paris polyphylla Sm.	Melanthiaceae	Herb/ VU	Rhizome/ decoction	Flatulence	Nocte (Wangpan *et al.* 2019b)
Parkia timoriana (DC.) Merr.	Fabaceae	Tree/ LC	Fruit/raw	Indigestion	Nyishi (Doley *et al.* 2014)
Pedalium murex L.	Pedaliaceae	Herb/ NE	Whole plant/crushed	Wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Pennisetum macrostachyum (Brongn.) Trin.	Poaceae	Herb/ NE	Leaf & root/raw	Urinal ailments & worm infection	Khampti (Das & Tag 2006)
Perilla frutescens (L.) Britton	Lamiaceae	Herb/ LC	Seed/infusion	Headache & fever	Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016)
Persicaria chinensis (L.) H. Gross	Polygonaceae	Herb/ LC	Leaf & flower/raw	Urinal ailments	Galo (Bharali *et al.* 2016)
Phlogacanthus thyrsiformis (Roxb. ex Hardw.) Mabb.	Acanthaceae	Shrub/ NE	Leaf/decoction	Cheek crack, pimples, scabies, stomachache, dysentery & malaria	Adi, Memba, Nocte & Wancho (Rethy *et al.* 2010, Tangjang *et al.* 2011, Wangjen *et al.* 2011)
Phoebe cooperiana P.C. Kanj. & Das	Lauraceae	Tree/ NE	Bark/raw	Itching	Adi, Apatani & Nyishi (Doley *et al.* 2014)

Phyllantus emblica L.	Phyllanthaceae	Tree/ LC	Fruit/raw	Loss of appetite	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Physalis peruviana L.	Solanaceae	Herb/ LC	Fruit/raw	Gastric	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Physalis angulata L.	Solanaceae	Herb/ LC	Fruit/raw	Gastric	Apatani (Kala 2005)
Picrorhiza kurrooa Royle	Scrophulariaceae	Herb/ EN	Whole plant/infusion	Stomachache & malaria	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Pilea trineria Wight	Urticaceae	Shrub/ NE	Leaf & bark/paste	Muscle pain	Khampti (Das & Tag 2006)
Pinus roxburghii Sarg.	*Pinaceae*	Tree/ LC	Seed/raw	Indigestion	Apatani (Kala 2005)
Piper longum L.	Piperaceae	Climber/ NE	Fruit & root/raw	Cough & cold, asthma & dysentery	Apatani (Ayam 2017)
Piper mullesua Buch.-Ham. ex D. Don	Piperaceae	Climber/ NE	Whole plant/paste	Rheumatism, cough & cold, body ache, mouth ulcer & bronchitis	Adi, Galo, Khampti, Nyishi, Singpo, Tagin & Tangsa (Bharali *et al.* 2016, Das & Tag 2006, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Tangjang *et al.* 2011)
Piper nigrum L.	Piperaceae	Climber/ NE	Seed, fruit & leaf/raw	Cough & cold, bronchitis, killing head lice & tonsillitis	Adi, Galo, Idu-Mishmi, Nyishi, Singpo, Tagin & Tangsa (Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Piper pedicellatum C. DC.	Piperaceae	Climber/ VU	Leaf/raw	Scabies, abscesses & skin allergy	Galo (Bharali *et al.* 2016)
Piper peepuloides Roxb.	Piperaceae	Climber/ NE	Fruit/raw	Cough & cold	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Plantago erosa Wall.	Plantaginaceae	Herb/ NE	Leaf/paste	Cuts & wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Plantago major L.	Plantaginaceae	Herb/ LC	Whole plant/paste	Wounds & inflammation	Monpa (Namsa *et al.* 2011)
Plumbago indica L.	Plumbaginaceae	Herb/ shrub/ NE	Whole plant/raw	Bone pain & mouth ulcer	Khampti (Das & Tag 2006, Sen *et al.* 2008)
Pogostemon benghalensis (Burm. f.) Kuntze	Lamiaceae	Herb/ NE	Whole plant/paste	Vomiting, muscle pain, body ache & stomachache	Khampti, Galo, Nyishi & Tagin (Murtem & Chaudhry 2016, Sen *et al.* 2008)
Polygonum chinense L.	Polygonaceae	Climber/ NE	Leaf/boiled	Urinal ailments	Galo & Tagin (Wangpan *et al.* 2019a)
Pothos cathcartii Schott	Acoraceae	Shrub/ NE	Whole plant/raw	Bone fracture	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Potssia laxiflora (Blume) Kuntze	Apocynaceae	Climber/ NE	Leaf/paste	Bee bite	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)

Pouzolzia bennetiana Wight var. *gardneri* (Wight) Hook. f.	Urticaceae	Climber/ NE	Leaf/raw	Constipation & stomachache	Galo, Monpa, Nyishi & Tagin (Murtem & Chaudhry 2016, Namsa *et al.* 2011)
Pouzolzia viminea Wedd.	Urticaceae	Shrub/ NE	Leaf & stem/paste	Blood coagulant & sores	Adi (Nimasow *et al.* 2012)
Prunus persica (L.) Stokes	Rosaceae	Tree/ NE	Leaf/paste	Worm infection	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Psidium guajava L.	Myrtaceae	Shrub or small tree/ LC	Root & leaf/decoction	Diarrhea, cough & cold & dysentery	Adi, Galo, Khampti, Monpa, Nocte, Nyishi & Tagin (Bharali *et al.* 2016, Kagyung *et al.* 2010, Murtem & Chaudhry 2016, Namsa *et al.* 2011, Sen *et al.* 2008, Tangjang *et al.* 2011)
Punica granatum L.	Lythraceae	Shrub/ LC	Tender leaf/raw	Dysentery, stomachache & diarrhea	Khampti & Monpa (Namsa *et al.* 2011, Sen *et al.* 2008)
Pyllanthus acidus (L.) Skeels	Phyllanthaceae	Shrub or tree/ NE	Fruit/raw	Vomiting	Khampti (Sen *et al.* 2008)
Quercus serrata Thunb.	Fagaceae	Tree/ LC	Bark and fruit/raw	Tonsillitis	Idu-Mishmi (Doley *et al.* 2014)
Ranunculus diffusus DC.	Ranunculaceae	Shrub/ NE	Stem & root/raw	Toothache & oral infection	Apatani (Ayam 2017)
Rauwolfia serpentina (L.) Benth. ex Kurz	Apocynaceae	Shrub/ EN	Bud, shoot & fruit/raw	Stomachache, snake bite, vomiting, malaria, fever & blood pressure	Khampti & Nyishi (Sen *et al.* 2008, Tripathi *et al.* 2017)
Rhaphidophora decursiva (Roxb.) Schott.	Araceae	Climber/ NE	Stem/paste	Wounds & burns	Galo & Tagin (Wangpan *et al.* 2019a)
Rhododendron arboreum Sm.	Ericaceae	Tree/ LC	Flower/decoction	Dysentery, diarrhea & throat infection	Monpa (Namsa *et al.* 2011)
Rhus javanica Linn.	Anacardiaceae	Herb/ NE	Fruits/raw	Dysentery	Aka (Nimachow *et al.* 2011)
Ricinus communis L.	Euphorbiaceae	Shrub/ NE	Leaf/paste	Bone fracture, abortion & stomachache	Aka, Galo, Nyishi & Tagin (Murtem & Chaudhry 2016, Nimachow *et al.* 2011)
Rotheca serrata (L.) Steane & Mabb.	Lamiaceae	Shrub/ LC	Fresh tender leaf/raw	Blood pressure	Tagin (Goswami *et al.* 2009)
Rubia cordifolia L.	Rubiaceae	Climber herb/ NE	Root/paste	Headache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Rubus calycinus Wall. ex D. Don	Rosaceae	Herb/ NE	Fruit/raw	Stomachache	Apatani (Kala 2005)
Rubus ellipticus Sm.	Rosaceae	Herb/ LC	Fruit/raw	Indigestion, cough, fever & sores	Apatani (Ayam 2017, Kala 2005)
Rubus paniculatus Sm.	Rosaceae	Climber/ NE	Fruit/raw	Stomachache	Apatani (Kala 2005)
Rumex nepalensis Spreng.	Polygonaceae	Herb/ NE	Leaf/powder	Snake bite	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)

Saccharum officinarum L.	Poaceae	Shrub/ NE	Stem/water decoction	Jaundice	Galo, Monpa, Nocte, Nyishi & Tagin (Murtem & Chaudhry 2016, Namsa *et al.* 2011, Tangjang *et al.* 2011)
Sarcochlamys pulcherrima Gaudich.	Urticaceae	Tree/ NE	Leaf/decoction	Indigestion, constipation, cuts & wounds	Adi , Galo & Tagin (Doley *et al.* 2014, Wangpan *et al.* 2019a)
Saurauia armata Kurz	Actinidiaceae	Tree/ LC	Leaf/paste	Cuts & wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Schima wallichii (DC.) Korth.	Theaceae	Tree/ LC	Seed/decoction	Stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Scoparia dulcis L.	Plantaginaceae	Herb/ NE	Whole plant (leaf)/paste	Piles, malaria, abscesses, blood coagulant & jaundice	Adi, Galo, Nocte, Nyishi, Tagin & Wancho (Murtem & Chaudhry 2016, Tangjang *et al.* 2011, Wangjen *et al.* 2011, Wangpan *et al.* 2019b)
Scrophularia lindernia (Linn.) Dubia	Scrophulariaceae	Herb/ NE	Leaf/decotion	Chest pain	Khampti (Sen *et al.* 2008)
Sida acuta Burm. f.	Malvaceae	Herb/ NE	Leaf & roots/vegetables	Pneumonia	Khampti (Das & Tag 2006)
Solanum aculeatissimum Jacq.	Solanaceae	Shrub/ NE	Fruit/raw & vegetable	Toothache	Galo (Bharali *et al.* 2016)
Solanum indicum L.	Solanaceae	Shrub/ NE	Dried fruit/vegetable	Toothache, constipation, diabetes & stomachache	Adi, Apatani, Monpa, Nocte & Tangsa (Ayam 2017, Khongsai *et al.* 2015, Namsa *et al.* 2011, Tangjang *et al.* 2011)
Solanum khasianum C.B. Clarke	Solanaceae	Herb/ NE	Fruit & seed/roast	Toothache & gum problem	Apatani, Galo, Nyishi &Tagin (Ayam 2017, Khongsai *et al.* 2015, Murtem & Chaudhry 2016)
Solanum kurzii Brace ex Prain	Solanaceae	Shrub/ NE	Fruit/raw & boil	Stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Solanum nigrum L.	Solanaceae	Shrub/ NE	Whole part/raw & vegetable	Indigestion, liver disease, malaria, gastric, stomachache, constipation, dysentery, toothache, loss of appetite & blood pressure	Adi, Apatani, Galo, Nyishi & Tagin (Kala 2005, Murtem & Chaudhry 2016, Nimasow *et al.* 2012, Wangpan *et al.* 2019a)
Solanum spirale Roxb.	Solanaceae	Shrub/ NE	Fruits & leaf/decoction	Stomachache, fresh cuts & wounds, toothache & jaundice	Adi & Nyishi (Ali & Ghosh 2006, Kagyung *et al.* 2010, Nimasow *et al.* 2012, Tangjang *et al.* 2011)

Solanum surattense Burm. f.	Solanaceae	Herb or shrub/ NE	Fruits & seed/roast	Rabies & stomachache	Khampti (Das & Tag 2006)
Solanum torvum Sw.	Solanaceae	Shrub/ NE	Roots, leaf & fruit seed/roast & boiled	Indigestion, itching, blood pressure, malaria, stomachache, oral infection & toothache	Adi, Galo, Khampti, Memba, Monpa, Nyishi & Tagin (Das & Tag 2006, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Namsa *et al.* 2011, Rethy *et al.* 2010)
Solanum viarum Dunal	Solanaceae	Shrub/ LC	Fruit/roast	Toothache	Galo & Tagin (Wangpan *et al.* 2019a)
Solanum xanthocarpum Schrad. & H. Wendl.	Solanaceae	Herb/ NE	Fruit/roast	Oral infection & cough & cold	Adi & Monpa (Ali & Ghosh 2006, Namsa *et al.* 2011)
Sonchus sp.	Asteraceae	Herb/ NE	Leaf/raw	Flatulence & body ache	Adi (Kagyung *et al.* 2010, Nimasow *et al.* 2012)
Spermacoce hispida L.	Rubiaceae	Herb/ NE	Leaf/raw	Vomiting, food poisoning & delivery problem	Khampti (Sen *et al.* 2008)
Spilanthes acmella L. Murray	Asteraceae	Herb/ NE	Flower & root/raw	Toothache	Apatani & Monpa (Khongsai *et al.* 2015)
Spilanthes oleracea L.	Asteraceae	Herb/ NE	Leaf and young twig/raw & paste	Blood coagulant, skin allergy & gastric	Monpa (Namsa *et al.* 2011)
Spilanthes paniculata Wall. ex DC.	Asteraceae	Herb/ NE	Flower, fruit, stem & tender leaf/raw	Toothache, fever, cough & cold, body ache, mouth ulcer, constipation & worm infection	Adi, Apatani, Idu-Mishmi, Khampti, Memba, Nocte & Nyishi (Ali & Ghosh 2006, Ayam 2017, Khongsai *et al.* 2015, Nimasow *et al.* 2012, Rethy *et al.* 2010, Sen *et al.* 2008, Tangjang *et al.* 2011, Tripathi *et al.* 2017)
Stachytarpheta dichotoma Vahl	Verbenaceae	Herb/ NE	Leaf & bark/raw	Cancer	Khampti (Das & Tag 2006)
Stellaria media (Linn.) Vill	Caryophyllaceae	Herb/ NE	Whole plant/paste	Blood coagulant	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Stemona tuberosa Lour.	Stemonaceae	Climber/ NE	Rhizome/infusion	Burns	Galo (Bharali *et al.* 2016)
Stephania japonica (Thunb.) Miers	Menispermaceae	Climber/ NE	Tubers/infusion	Malaria & body ache	Khampti (Das & Tag 2006)
Stereospermum chelonoides (L. fil.) DC.	Bignoniaceae	Tree/ NE	Bark/infusion	Gastric	Monpa (Doley *et al.* 2014)
Stereospermum colais (Buch.-Ham. ex Dillwyn) Mabb.	Bignoniaceae	Tree/ NE	Young twigs/paste	Backache	Galo & Tagin (Wangpan *et al.* 2019a)
Syzygium cumini (L.) Skeels	Myrtaceae	Tree/ LC	Fruit/raw	Stomachache, diarrhea & dysentery	Adi (Khongsai *et al.* 2015)

Tacca integrifolia Ker Gawl.	Taccaceae	Herb/ NE	Rhizome & berry/raw	Wounds, diarrhea, stomachache & dysentery	Adi, Galo, Nyishi & Tagin (Kagyung *et al.* 2010, Murtem & Chaudhry 2016)
Tamarindus indica L.	Fabaceae	Tree/ LC	Leaf/decoction	Menstrual disorder	Galo (Bharali *et al.* 2016)
Terminalia arjuna (Roxb.) Wight & Arn.	Combretaceae	Tree/ NE	Bark/raw	Jaundice & diabetes	Adi, Idu-Mishmis & Monpa (Doley *et al.* 2014)
Terminalia bellerica (Gaertn.) Roxb.	Combretaceae	Tree/ NE	Leaf & fruit/raw	Cough & cold, constipation, dyspepsia, piles, abscesses, diarrhea, headache & fever	Adi & Nyishi (Nimasow *et al.* 2012, Tripathi *et al.* 2017)
Terminalia chebula Retz.	Combretaceae	Tree/ LC	Fruit/powder	Dehydration, stomachache, constipation, chest pain, gastric, cough & cold, heart disease, ulcer & malaria	Adi, Apatani, Galo, Khampti, Nyishi & Tagin (Das & Tag 2006, Khongsai *et al.* 2015, Murtem & Chaudhry 2016, Tangjang *et al.* 2011, Tripathi *et al.* 2017)
Terminalia citrina (Gaertn.) Roxb. ex Flem.	Combretaceae	Tree/ LC	Fruit/raw	Gastric and Constipation	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Tetrastigma serrutatum (Roxb.) Planch.	Vitaceae	Herb/ NE	Leaf/paste	Burns	Wancho (Wangjen *et al.* 2011)
Thunbergia coccinea Wall.	Acanthaceae	Climber/ NE	Root/raw	Scabies, abscesses & skin allergy	Galo (Bharali *et al.* 2016)
Tinospora cordifolia (Willd.) Miers	Menispermaceae	Climber/ NE	Leaf & stem/raw	Scabies, skin allergy & gastric	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Torenia asiatica L.	Scrophulariaceae	Herb/ NE	Leaf/raw	Stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Torenia diffusa D. Don	Scrophulariaceae	Herb/ NE	Leaf/raw	Stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Torenia parviflora Buch.-Ham. & Benth.	Scrophulariaceae	Herb/ NE	Leaf/raw	Gastric	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Trichosanthes tricuspidata Lour.	Cucurbitaceae	Climber/ NE	Fruit & stem/raw & paste	Burns, asthma & pneumonia	Aka & Galo (Bharali *et al.* 2016, Nimachow *et al.* 2011)
Tupistra aurantiaca (Baker) Wall. ex Hook. f.	Asparagaceae	Shrub/ NE	Stem/dried & boiled	Malaria & stomachache	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Urena lobata L.	Malvaceae	Shrub/ LC	Root/paste	Malaria & pneumonia	Galo & Tagin (Wangpan *et al.* 2019a)
Urginea indica (Roxb.) Kunth	Asparagaceae	Herb/ NE	Latex/raw	Asthma & bronchitis	Khampti (Sen *et al.* 2008)
Urtica dioica L.	Urticaceae	Herb/ LC	Leaf/paste	Bone fracture	Apatani (Kala 2005)
Urtica magellanica (Juss.) ex Poir.	Urticaceae	Herb/ NE	Inner bark/paste	Rheumatism	Adi (Tangjang *et al.* 2011)

Urtica palmate Forssk.	Urticaceae	Herb/ NE	Leaf/decoction	Itching	Galo & Tagin (Wangpan *et al.* 2019a)
Urtica parviflora Roxb.	Urticaceae	Herb/ NE	Leaf/roasted	Muscle pain	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Urtica pulcherrima Gaud.	Urticaceae	Shrub/ NE	Leaf/decoction	Constipation	Galo & Tagin (Wangpan *et al.* 2019a)
Vernonia cinerea (L.) Less.	Asteraceae	Shrub/ NE	Leaf/raw	Indigestion	Apatani (Kala 2005)
Vernonia volkameriifolia DC.	Asteraceae	Tree/ LC	Leaf/dreid paste	Burns	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Viburnum colebrookianum	Caprifoliaceae	Shrub/ NE	Leaf/pounded	Sores	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Villebrunea frutescens (Thunb.) Blume	Urticaceae	Tree/ NE	Leaf/vegetable	Wounds	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Vinca rosea L.	Apocynaceae	Shrub/ NE	Roots/paste	Diabetes	Khampti (Sen *et al.* 2008)
Wedantia scarab Kurz.	Vitaceae	Shrub/ NE	Roots/paste	Dysentery & cholera	Galo, Nyishi & Tagin (Murtem & Chaudhry 2016)
Zanthoxyllum armatum DC.	Rutaceae	Tree/ LC	Dried fruits, leaf & stem/raw	Cough & cold, bronchitis, throat infection, killing head lice, fever, loss of appetite, toothache & stomachache	Adi, Apatani, Galo, Nocte, Nyshi & Tangsa (Ayam 2017, Bharali *et al.* 2016, Kagyung *et al.* 2010, Khongsai *et al.* 2015, Wangpan *et al.* 2019b)
Zanthoxyllum rhetsa (Roxb.) DC.	Rutaceae	Tree/ LC	Leaf & fruit/vegetable	Jaundice, diarrhea, gastric, skin allergy, diabetes & dandruff	Adi, Aka & Nocte (Ali & Ghosh 2006, Nimachow *et al.* 2011, Nimasow *et al.* 2012, Tangjang *et al.* 2011, Wangpan *et al.* 2019b)
Zanthoxylum acanthopodium DC.	Rutaceae	Shrub or tree/ LC	Leaf, bark & fruit/dried infusion	Stomachache & dysentery	Apatani & Khampti (Das & Tag 2006, Kala 2005)
Zanthoxylum hamiltonianum Wall.	Rutaceae	Tree/ NE	Tubers & leaf/raw	Malaria	Adi (Ali & Ghosh 2006, Nimasow *et al.* 2012)
Zanthoxylum oxyphyllum Edgew.	Rutaceae	Tree/ NE	Fruit/paste	Stomachache	Apatani (Kala 2005)
Zanthoxylum piperatum Benn.	Rutaceae	Tree/ NE	Fruits/paste	Delivery problems	Aka (Nimachow *et al.* 2011)
Zea mays L.	Poaceae	Grass or herb/ LC	Corn/decoction	Urinal ailments	Adi (Tangjang *et al.* 2011)

Zingiber officinale Roscoe	Zingiberaceae	Herb/ DD	Rhizome/paste	Cough & cold, bronchitis, fever, influenza, throat infection, inflammation, stomachache, itching, blood purification & delivery pain	Adi, Apatani, Galo, Khampti, Monpa, Nocte & Tagin (Ayam 2017, Kagyung *et al.* 2010, Kala 2005, Khongsai *et al.* 2015, Namsa *et al.* 2011, Sen *et al.* 2008, Tangjang *et al.* 2011, Wangpan *et al.* 2019a)
Zingiber zerumbet (L.) Roscoe ex Sm.	Zingiberaceae	Shrub/ DD	Leaf/raw	Cough & cold, stomachache, vomiting & diarrhea	Adi (Nimasow *et al.* 2012)

[#] NE: not evaluated, DD: data deficient, LC: least concern, NT: near threatened, VU: vulnerable, EN: endangered, CR: critically endangered, EW: Extinct in the wild.

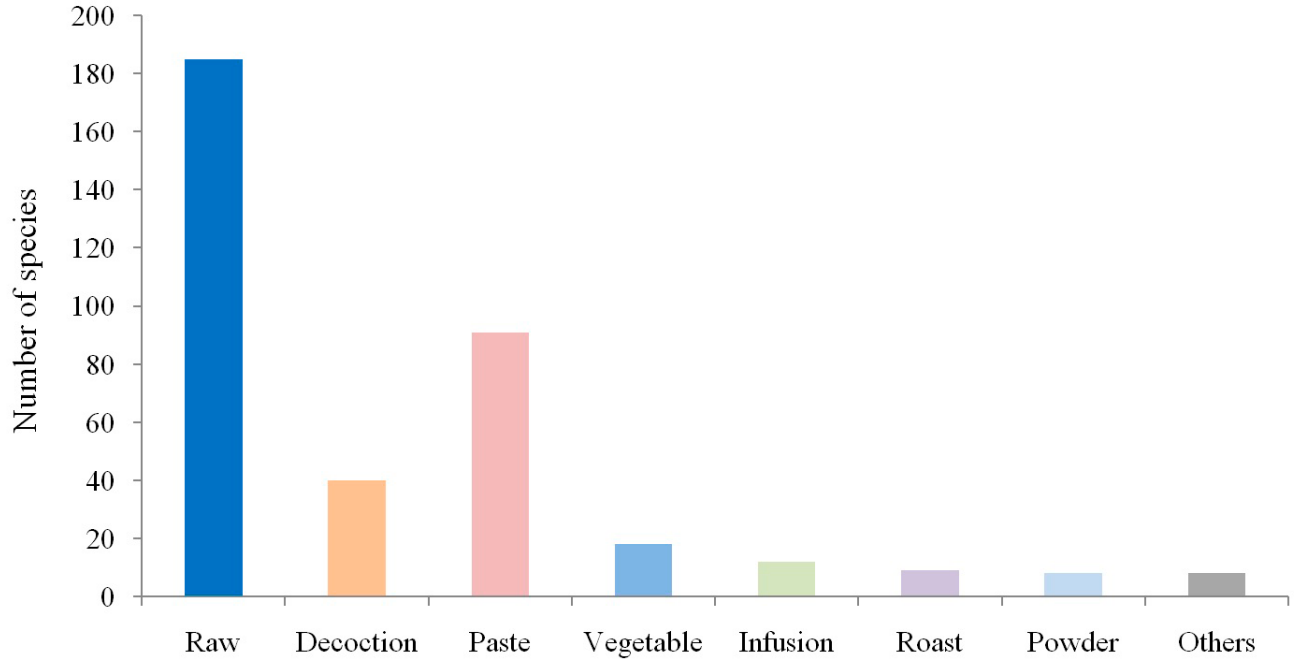

Figure 4. Mode of ethnomedicine preparation

The use reports of the ethnomedicinal plants have been explained and compared with the studies conducted by previous workers to ascertain the indicated curative properties of the plants against specific ailments.

Cardiovascular disorders

The common cardiovascular ailments are related to the heart muscle, strokes, heart failure, and high blood pressure (Olorunnisola *et al*. 2011). Anaemia, blood circulation, blood pressure, blood purification, diabetes, heart disease, and hypertension are included in this category. Under cardiovascular ailment category, 50 use reports and 38 species were found, and out of which 14 species are used for the treatment of diabetes and 12 species are used for blood pressure. *Begonia roxburghii*, *Emblica officinalis* and *Momordica charantia* were found to use in more than two cardiovascular ailments. The use of *B. roxburghii* against diabetes and blood purification among the Adi, Nocte and Nyishi (Tangjang *et al*. 2011), *E. officinalis* against diabetes and heart disease by the Apatani (Khongsai *et al*. 2015) and *M. charantia* against diabetes and blood pressure among the Galo, Monpa, Nyishi and Tagin tribes (Murtem & Chaudhry 2016, Namsa *et al*. 2011) were found. The use report of *Centella asiatica*, *M. charantia,* and *Clerodendrum glandulosum* in the treatment of cardiovascular ailments have also been found in other parts of the world (Maruthupandian *et al*. 2011, Menetrier *et al*. 2020, Sharma *et al*. 2001, Uddin *et al*. 2019).

Dermatological disorders

Dermatological disorders are one of the most common ailments among the rural people (Policepatel & Manikrao 2013). The medicinal plants reported under dermatological ailment category includes those medicinal species commonly used for the treatment of abscesses, bacterial infection, burns, cheek crack, cuts, dandruff, eczema, fungal infection, gout, heel crack, inflammation, injuries, itching, leprosy, pimples, ringworm, scabies, skin allergy and wounds. A total of 117 plant species and 171 use reports were found under the dermatological disorder category, while 46 species are found to be used for the treatment of wounds, 33 species for cut wounds, and 32 for skin allergy. *Artemisia nilagirica*, *Centella asiatica*, *Curcuma caesia*, *Drymaria cordata* and *Mikania micrantha* showed higher use reports. *A. nilagirica* is used against cuts, wounds and inflammation by Monpa (Namsa *et al*. 2011), *C. asiatica* against cuts, wounds, inflammation, ringworm and leprosy by Adi, Apatani, Galo, Monpa and Tagin (Khongsai *et al*. 2015, Namsa *et al*. 2011, Tangjang *et al*. 2011, Wangpan *et al*. 2019a), *C. caesia* against wounds, injuries, pimples and skin allergy by Galo, Khampti and Monpa (Bharali *et al*. 2016, Namsa *et al*. 2011, Sen *et al*. 2008), *D. cordata* against abscesses, scabies and skin allergy by Galo and Nocte (Bharali *et al*. 2016, Tangjang *et al*. 2011) and *M. micrantha* against cuts, wounds, itching and skin allergy by Apatani and Galo (Ayam 2017, Bharali *et al*. 2016). Similar use reports of these plants under dermatological ailments category were also found in other studies (Jyothilakshmi *et al*. 2015, Kalita *et al*. 2019, Nono *et al*. 2014, Suresh *et al*. 2011).

Gastrointestinal disorders

Gastrointestinal related ailments (disorders) substantially contributed towards larger number of human morbidity and mortality rates worldwide (Maman *et al*. 2017). So ethnomedicinal plants have been reported as good alternatives for treatment of such ailments. The highest number of plant species (163) and use reports (277) were found under gastrointestinal ailment category. Acidity, loss of appetite, bowel problems, cholera, constipation, worm infection, diarrhea, dysentery, dyspepsia, flatulence, gastric, indigestion, piles, stomachache, and ulcer falls within gastrointestinal ailment category. Out of the total 163 plant species reported, 73 species are found to be used for the treatment of stomachache, 49 species in diarrhea, and 37 species in dysentery. *Centella asiatica*, *Coptis teeta,* and *Terminalia chebula* have more than five use reports under gastrointestinal ailments (disorders) category. *C. asiatica* is used against stomachache, dysentery, indigestion ulcer, cerebral disorder, constipation and gastric by Adi, Aka, Apatani, Khampti, Monpa and Wancho (Ayam 2017, Kagyung *et al*. 2010, Kala 2005, Khongsai *et al*. 2015, Namsa *et al*. 2011, Nimachow *et al*. 2011, Sen *et al*. 2008, Wangjen *et al*. 2011), *C. teeta* against stomachache, dysentery, diarrhea, gastric and loss of appetite by Adi, Galo, Memba, Nyishi and Tagin (Ali & Ghosh 2006, Khongsai *et al*. 2015, Murtem & Chaudhry 2016, Rethy *et al*. 2010, Tangjang *et al*. 2011, Tripathi *et al*. 2017) and *T. chebula* against stomachache, constipation, gastric and ulcer by Apatani, Galo, Khampti, Nyishi and Tagin (Das & Tag 2006, Khongsai *et al*. 2015, Murtem & Chaudhry 2016, Tripathi *et al*. 2017). Similar uses of these plants in gastrointestinal disorders have been reported previously by various workers (Arora *et al*. 2002, Mukherjee & Chakraborty 2019, Rathinamoorthy & Thilagavathi 2014).

Gynaecological disorders

Gynaecological disorders are the leading cause of morbidity and health care expenditures in women (Mishra *et al*. 2013). Due to the social stigma associated with sexual diseases, most of the womenfolk in the rural localities primarily rely on traditional medicinal herbal healers for their ultimate treatments. The gynaecological disorders included in the present report are abortion, delivery problems, leucorrhoea, menstrual disorder, and uterine

problems. Various ethnic tribes of Arunachal Pradesh use 18 plant species in 5 types of gynaecological disorders (Table 3), and out of which 5 species are reported to be used in delivery problems and 4 species are used in the traditional abortion and birth control practices. *Alstonia scholaris* has two use reports and the rest of the species has single-use reports. In the present review, *A. scholaris* was found to be used in menstrual disorder and delivery problems by Apatani and Nyishi tribes (Kala 2005, Tripathi *et al.* 2017) while it was previously reported to be used in abortion (Ayyanar & Ignacimuthu 2005) and pain during child delivery (Sharma & Kumar 2011).

Table 3. Major and specific types of ailments/disorders under each broad category

Major categories	Specific types of ailments/disorders	No. of ailments
Category 1: Cardiovascular disorders	Anemia, blood circulation, blood pressure, blood purification, diabetes, heart disease and hypertension.	07
Category 2: Dermatological disorders	Abscesses, bacterial infection, burns, cheek crack, cuts, dandruff, eczema, fungal infection, gout, heel crack, inflammation, injuries, itching, leprosy, pimples, ringworm, skin allergy, scabies, and wounds.	19
Category 3: Gastrointestinal disorders	Acidity, bowel problems, cholera, constipation, worm infection, diarrhea, dysentery, dyspepsia, flatulence, gastric, indigestion, loss of appetite, piles, stomachache, and ulcer.	15
Category 4: General health	Bee bite, blood coagulant, cancer, cerebral tonic, chest pain, cough & cold, dehydration, dog bite, dumbness, earache, epilepsy, eye infection, fever, food poisoning, fresh cuts & wounds, gonorrhea, headache, hyperlactation, hyperthermia, influenza, insect bite, jaundice, killing head lice, liver disease, malaria, measles, migraine, nosebleed, paralysis, rabies, scorpion bite, scurvy, snake bite, tuberculosis, tumor and vomiting.	36
Category 5: Gynecological disorders	Abortion, delivery problems, leucorrhea, menstrual disorder, and uterine problems.	05
Category 6: Musculoskeletal disorders	Backache, body ache and muscle pain.	03
Category 7: Odontological disorders	Cavity, gum problem, mouth ulcer, oral infection, and toothache.	05
Category 8: Orthopedic disorders	Bone fracture, bone pain, joint pain, knee pain and rheumatism.	05
Category 9: Respiratory disorders	Airway obstruction, asthma, bronchitis, lung disorder, nasal congestion, pneumonia, sinusitis, sores, tonsillitis, and throat infection.	10
Category 10: Urological disorders	Bladder stone and urinal ailments.	02
Total		**107**

Musculoskeletal disorders

Musculoskeletal disorders like arthritis and back pain affect more than 1.7 billion communities worldwide and are reported as the 4th greatest influence on the complete fitness of the world populations, causing both disability and death (Hignett & Fray 2010). Musculoskeletal disorders include backache, body ache, and muscle pain and 35 plant species were reported under this category for the treatment (Table 3). Out of these, 26 plant species were used for body ache and 7 species for muscle pain. *Pogostemon benghalensis* have two use reports (muscle and body pains) by Galo, Nyishi and Tagintribes (Murtem & Chaudhry 2016) while the rest of the species has single-use reports. The leaves of *P. benghalensis* have also been reported by Das *et al.* (2003) in alleviating body pains.

Odontological disorders

Medicinal plants confer considerable antibacterial activity against various microorganisms including bacteria responsible for dental caries (Anushri *et al.* 2015). Cavity, gum problem, mouth ulcer, oral infection, and toothache are included in this category. The study reported 29 plant species used for the treatment of 5 types of odontological problems (Table 3). Out of which, 21 species are reported to be used for the treatment of toothache and 3 species for mouth ulcers. *Solanum torvum*, *Solanium khasianum,* and *Spilanthes paniculata* have two use reports each. *S.*

torvum is used against oral infection and toothache by Galo, Memba, Nyishi and Tagin (Murtem & Chaudhry 2016, Rethy *et al*. 2010), *S. khasianum* against gum problem and toothache by Apatani, Galo, Nyishi and Tagin (Ayam 2017, Khongsai *et al*. 2015, Murtem & Chaudhry 2016) and *S. paniculata* against mouth ulcer and toothache by Adi, Apatani, Idu-Mishmi, Khampti, Memba, Nocte & Nyishi (Ali & Ghosh 2006, Ayam 2017, Khongsai *et al*. 2015, Nimasow *et al*. 2012, Rethy *et al*. 2010, Sen *et al*. 2008, Tangjang *et al*. 2011, Tripathi *et al*. 2017). The traditional uses of these plants in odontological ailments have been corroborated with similar literatures published from Indian sub-continent (Achuta *et al*. 2010, Jaiswal 2012, Prusti & Behera 2007).

Orthopaedic disorders

Bone lesions are an important health problem, causing social and financial burdens (Loi *et al*. 2016). It is estimated that, with the increase in the elderly population in the world, the incidence of fractures increases even more in the next years (Rosberg & Dahlin 2018). Hence, the natural products, biomaterials, and their derivatives are promising alternatives to minimize side effects, reduce costs, and promote a fast and efficient treatment of orthopaedic disorders (Patel *et al*. 2015). This category of diseases includes bone fracture, bone pain, joint pain, knee pain, and rheumatism. Orthopaedic disorders recorded 28 plant species with 30 use reports, and out of which 17 species were used in bone fracture and 6 species in rheumatism. All the plant species have single-use reports. Some of the important plants used for the treatment of bone fracture are *Acorus calamus* by Apatani, (Kala 2005) and *Ricinus communis* by Aka (Nimachow *et al*. 2011) while *Oroxylum indicum* by Adi tribe (Khongsai *et al*. 2015) and *Piper mullesua* by Singpho tribe (Khongsai *et al*. 2015) are reportedly used to treat rheumatism. Similar use reports of *A. calamus*, *R. communis,* and *O. indicum* for orthopaedic disorders have been previously reported by Burkill (1966), Imam *et al*. (2013) and Scarpa & Guerci (1982).

Respiratory disorders

A large number of people suffer from respiratory diseases worldwide (WHO 2008). Respiratory disorders are on the rise due to many reasons including poor air quality, especially in urban areas (D'Amato *et al*. 2014). In 2013, air pollution caused about 1.4 million deaths in India (Biswas & Hartley 2016). Despite advancements in medical sciences, rural people in developing countries still use traditional medicines as the first safety measure in healthcare (Bhasin 2008). Airway obstruction, asthma, bronchitis, lung disorder, nasal congestion, pneumonia, sinusitis, sores, tonsillitis, and throat infection falls under respiratory ailments category. The present review has found 44 plant species used for the treatment of 10 types of respiratory ailments (Table 3), and out of these, 8 species each were used for the treatment of asthma and bronchitis. *Acorus calamus* has two use reports by Adi, Galo, Nyishi, Tagin (Khongsai *et al*. 2015, Murtem & Chaudhry 2016) while the rest of the species has single-use reports. The uses of *A. calamus* in respiratory disorders have been also reported by Balakumbahan *et al*. (2010), Kala (2020) and Kayani *et al*. (2014).

Urological disorders

Nephrolithiasis is one of the most common urological conditions (Ziemba & Matlaga 2017). Globally, 12 % of the population suffers from the problem of nephrolithiasis with its recurrence rate higher in males than the female (Tiwari *et al*. 2012). Bladder stones and urinal ailments were included in this category. This review has reported 17 plant species used in the treatment of 2 types of urological disorders (Table 3), and out of which 13 species were used for urinal ailments and 4 species for the treatment of gall bladder stones. All the plant species have single-use reports. *Cheilocostus speciosus*, *Paederia foetida,* and *Zea mays* are mostly used in urinal ailments by Adi, Galo, and Singpho (Bharali *et al*. 2016, Khongsai *et al*. 2015, Tangjang *et al*. 2011). The use of *C. speciosus* and *Z. mays* in urological disorders has also been previously reported (Hasanudin *et al*. 2012, Srivastava *et al*. 2011).

General health disorders

The common diseases general in nature like swelling due to bee/wasp sting, blood coagulant, cancer, cerebral tonic, chest pain, colic disorder, cough & cold, dehydration, dog bite, dumbness, earache, epilepsy, eye infection, fever, food poising, fresh cuts & wounds, gonorrhoea, headache, hyperlactation, hyperthermia, influenza, insect bite, jaundice, killing head lice, liver disease, malaria, measles, nosebleed, paralysis, rabies, scorpion bite, snake bite, tuberculosis, tumour and vomiting were included in this category. We have recorded 133 plant species under the general health disorder category which are used for the treatment of 36 types of ailments (Table 3), and out of which 34 plant species were used against cough & cold, 27 species against fever, 18 species each against jaundice and malaria, and 11 species against vomiting & emetic tendency. *Andrographis paniculata*, *Coptis teeta* and *Centella asiatica* showed higher use reports in general health disorder category. *A. paniculata* is used against cough & cold, malaria, jaundice, liver disease, snake bite and fever by Galo Khampti, Nyishi and Tagin (Das & Tag 2006, Khongsai *et al*. 2015, Murtem & Chaudhry 2016, Sen *et al*. 2008, Tripathi *et al*. 2017), *C. teeta* against cough & cold,

malaria, fever, headache and eye infection by Adi, Galo, Memba, Nyishi and Tagin (Ali & Ghosh 2006, Khongsai *et al*. 2015, Murtem & Chaudhry 2016, Rethy *et al*. 2010, Tangjang *et al*. 2011, Tripathi *et al*. 2017) and *C. asiatica* against jaundice, cerebral disorder and tuberculosis by Aka and Apatani tribes (Ayam 2017, Khongsai *et al*. 2015, Nimachow *et al*. 2011).

Family use value (UVf)

The plant families with the highest use reports were Asteraceae (27 species with 86 use reports), Solanaceae (18 species with 48 use reports), and Lamiaceae (18 species with 45 use reports). The statistical analysis shows the predominance of Acanthaceae, Asteraceae, Berberidaceae, and Lamiaceae with UV*f* of 4.90, 4.78, 4.50, and 4.00 respectively. Apocynaceae, Euphorbiaceae, Scrophulariaceae, and Solanaceae recorded the next higher UV*f* of more than 3 while Myrtaceae, Chenopodiaceae, and Achariaceae recorded the lowest UV*f* of 0.86, 0.50, and 0.25 respectively (Table 4).

Table 4. Family use values of the ethnomedicinal plants reported to be used by the tribal communities of Arunachal Pradesh

Family name	Number of species	Use reports / family	Number of informants / family	UV*f*
Acanthacaeae	8	49	10	4.90
Achariaceae	1	1	4	0.25
Acoraceae	2	11	5	2.20
Actinidiaceae	1	1	1	1.00
Amaranthaceae	2	5	3	1.67
Anacardiaceae	1	1	1	1.00
Apiaceae	3	20	11	1.82
Apocynaceae	7	24	7	3.43
Araceae	6	8	5	1.60
Araliaceae	2	7	3	2.33
Arecaceae	2	2	2	1.00
Asparagaceae	2	4	2	2.00
Asteraceae	27	86	18	4.78
Athyriaceae	1	1	1	1.00
Averrhoeaceae	1	1	1	1.00
Begoniaceae	5	11	6	1.83
Berberidaceae	3	12	3	4.00
Bignoniaceae	4	14	8	1.75
Blechnaceae	1	1	1	1.00
Brassicaceae	2	6	2	3.00
Bromeliaceae	1	3	2	1.50
Burseraceae	2	2	2	1.00
Caesalpinaceae	4	9	3	3.00
Calophyllaceae	1	1	1	1.00
Campanulaceae	2	2	2	1.00
Cannabaceae	1	4	2	2.00
Caprifoliaceae	1	1	1	1.00
Caricaceae	1	9	5	1.80
Caryophyllaceae	3	11	6	1.83
Chenopodiaceae	1	1	2	0.50
Clusiaceae	3	6	5	1.20
Combretaceae	5	22	7	3.14
Compositae	1	1	1	1.00
Convolvulaceae	2	4	2	2.00
Costaceae	1	8	4	2.00
Crassulaceae	2	7	4	1.75
Cucurbitaceae	5	12	8	1.50
Cyatheaceae	1	1	1	1.00
Cyperaceae	1	1	1	1.00
Denustaidiaceae	1	4	3	1.33
Dilleniaceae	1	5	4	1.25
Dioscoreaceae	2	4	4	1.00
Elaeocarpaceae	2	3	3	1.00
Equisetaceae	2	4	2	2.00
Ericaceae	1	3	1	3.00
Euphorbiaceae	10	28	8	3.50

Fabaccae	13	23	10	2.30
Fagaceae	1	1	1	1.00
Hippocastanaceae	1	2	1	2.00
Hypericaceae	1	2	1	2.00
Hypoxidaceae	1	1	1	1.00
Lamiaceae	18	45	10	4.50
Lauraceae	8	18	8	2.25
Leguminosae	1	2	2	1.00
Liliaceae	6	21	9	2.33
Lycopodiaceae	1	1	1	1.00
Lythraceae	1	3	2	1.50
Magnoliaceae	2	5	2	2.50
Malvaceae	4	7	4	1.75
Marattiaceae	1	4	3	1.33
Mazaceae	1	1	1	1.00
Melanthiaceae	1	1	1	1.00
Melastomaceae	1	5	3	1.67
Meliaceae	2	6	3	2.00
Menispermaceae	3	5	3	1.67
Mimosaceae	2	2	1	2.00
Molluginaceae	2	2	2	1.00
Moraceae	9	18	11	1.64
Moringaceae	1	1	1	1.00
Musaceae	3	12	7	1.71
Myrsinaceae	2	4	3	1.33
Myrtaceae	2	6	7	0.86
Oxalidaceae	4	15	6	2.50
Papaveraceae	2	2	2	1.00
Pedaliaceae	1	1	1	1.00
Phyllanthaceae	2	3	2	1.50
Pinaceae	1	1	1	1.00
Piperaceae	5	17	6	2.83
Plantaginaceae	3	9	5	1.80
Plumbaginaceae	1	2	2	1.00
Poaceae	9	18	9	2.00
Polygonaceae	5	7	3	2.33
Ranunculaceae	3	18	7	2.57
Rosaceae	4	7	3	2.33
Rubiaceae	9	25	12	2.08
Rutaceae	11	29	14	2.07
Saururaceae	1	13	9	1.44
Saxifragacea	1	2	1	2.00
Schropulariaceae	7	16	5	3.20
Solanaceae	18	48	14	3.43
Stemonaceae	1	1	1	1.00
Sterculiaceae	1	4	3	1.33
Taccaceae	1	4	2	2.00
Theaceae	2	3	2	1.50
Thelyperidaceae	3	5	3	1.67
Tiliaceae	1	1	1	1.00
Urticaceae	14	21	9	2.33
Verbenaceae	9	22	15	1.47
Vitaceae	2	3	2	1.50
Zingiberaceae	10	36	13	2.77

Informant consensus factor (F_{IC})

Gastrointestinal disorders emerged as the most frequently treated ailments among the tribal communities with a total of 163 plant species, 277 use reports and F_{IC} 0.41 followed by General health (133 species, 194 use reports, and F_{IC} 0.32) and Dermatological disorders (117 species, 171 use reports and F_{IC} 0.32). The Odontological disorders with a higher number of use reports also recorded 0.32 F_{IC}. The lowest F_{IC} was found in Gynaecological and Orthopaedic disorders with 0.06 each. The F_{IC} of Cardiovascular, Musculoskeletal, Respiratory, and Urological disorders ranged between 0.08 to 0.25 (Table 5).

Table 5. Informant consensus factor (F_{IC}) with number of species used and number of use reports of the ethnomedicinal plants reported against different ailment categories

Category of ailments/disorders	Number of species	Number of use reports	F_{IC}
Category 1: Cardiovascular disorders	38	50	0.25
Category 2: Dermatological disorders	117	171	0.32
Category 3: Gastrointestinal disorders	163	277	0.41
Category 4: General health	133	194	0.32
Category 5: Gynaecological disorders	18	19	0.06
Category 6: Musculoskeletal disorders	35	38	0.08
Category 7: Odontological disorders	29	42	0.32
Category 8: Orthopedic disorders	28	30	0.06
Category 9: Respiratory disorders	44	49	0.10
Category 10: Urological disorders	17	19	0.11

Conclusion

The present qualitative and quantitative review revealed 358 species of ethnomedicinal plants (100 families) widely used by the fourteen indigenous tribal communities of Arunachal Pradesh for treatment of 10 broad categories of ailments and 107 specific types of ailments. Some plant species reported have ethnobotanical novelties which are reported for the first time against treatment of various diseases. This indicates that the tribal communities of Arunachal Pradesh are still largely dependent on ethnomedicinal plants for their healthcare system. However, the ethnomedicinal practices are based on oral communications with no written convention. Hence, with the increasing influence of modernization and lack of interest among the younger generations, the ethnomedicinal practices are declining rapidly in the semi-urban areas. Therefore, sincere efforts to create public awareness on promotion of such important and rare traditional healing practices are need of the time. The highest number of species (163) and use report (277) were recorded under gastrointestinal disorders with F_{IC} 0.41. The ethnomedicinal plants with higher Informant Consensus Factor (F_{IC}) would help in prioritization for a further study focusing on potent bioactive secondary metabolites as novel phytomedicines useful against the effective treatment of the target ailments.

Declarations

List of abbreviations:F_{IC} – Informant consensus factor**;** UV*f*– Family use value; WHO – World Health Organization
Ethics approval and consent to participate: Not applicable
Consent for publication: Not applicable
Availability of data and materials: No datasets have been deposited in public repositories.
Competing interests: Authors declare no conflict of interest.
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Authors' contributions:DB, KB & RM considerably contributed to the literature survey, data collection, map-making, and drafting of the manuscript. ODN, GN, and HT supervised in conceptualization, research design, statistical analysis, critical evaluation, editing, and moderation of the manuscript.

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Literature cited

Achuta NS, Sharad S, Rawat AKS. 2010. An ethnobotanical study of medicinal plants of Rewa district, Madhya Pradesh. Indian Journal of Traditional Knowledge 9(1):191-202.

Ali N, Ghosh B. 2006. Ethnomedicinal plants in Arunachal Pradesh: Some tacit prospects. ENVIS Bulletin Himalayan Ecology 14(2):1-6.

Anushri M, Yashoda R, Puranik MP. 2015. Herbs: A good alternatives to current treatments for oral health problems. International Journal of Advanced Health Sciences 1(12):26-32.

Anyinam C. 1995. Ecology and ethnomedicine: Exploring links between current environmental crisis and indigenous medical practices. Social Science & Medicine 40(3):321-329.

Arora D, Kumar M, Dubey SD. 2002. *Centella asiatica* - A review of its medicinal uses and pharmacological effects. Journal of Natural Remedies 2(2):143-149.

Ayam VS. 2017. Ethnomedicine of wild plants of Ziro, Arunachal Pradesh. International Journal of Research Studies in Biosciences 5(7):1-12.

Ayyanar M, Ignacimuthu S. 2005. Traditional knowledge of Kani tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. Journal of Ethnopharmacology 102:245-255.

Balakumbahan R, Rajamani K, Kumanan K. 2010. *Acorus calamus*: An overview. Journal of Medicinal Plants Research 4(25):2740-2745.

Bharali P, Binay S, Chaman LS. 2016. Ethnomedicinal knowledge of Galo tribe from Arunachal Pradesh, India. International Journal of Current Research in Biosciences and Plant Biology 3(6):139-148.

Bhasin V. 2007. Medical anthropology: A review. Studies on Ethno-Medicine 1(1):1-20.

Bhasin V. 2008. Gaddi's folk medicine: A source of healing. Studies on Ethno-Medicine 2(1):1-27.

Bhattarai S, Chaudhary RP, Cassandra LQ, Robin SLT. 2010. The use of medicinal plants in the trans-himalayan arid zone of Mustang district, Nepal. Journal of Ethnobiology & Ethnomedicine 6:14.

Biswas AK, Hartley K. 2016. Foul odour of failure: Why some Asian countries manage air pollution very well while others fall cripplingly short. https://timesofindia.indiatimes.com/blogs/toi-edit-page/foul-odour-of-failure-why-some-asian-countries-manage-air-pollution-very-well-while-others-fall-cripplingly-short. (Accessed 26/06/2021).

Burkill IH. 1966. A dictionary of economic products of Malay Peninsula. Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia.

D'Amato G, Cecchi L, D'Amato M, Annesi-Maesano I. 2014. Climate change and respiratory diseases. European Respiratory Review 23(132):161-169.

Das AK, Tag H. 2006. Ethnomedicinal studies of the *Khamti* tribe of Arunachal Pradesh. Indian Journal of Traditional Knowledge 5(3):317-322.

Das S, Dash SK, Padhy SN. 2003. Ethno-medicinal informations from Orissa state, India, a review. Journal of Human Ecology 14:165-227.

Doley B, Gajurel PR, Rethy P, Buragohain R. 2014. Uses of trees as medicine by the ethnic communities of Arunachal Pradesh, India. Journal of Medicinal Plants Research 8(24):857-863.

Foster GM, Anderson BG. 1978. Medical anthropology. John Wiley & Sons, Inc., New York, U.S.A.

Giday M, Teklehaymanot T, Animut A, Mekonnen Y. 2007. Medicinal plants of the Shinasha, Agew-Awiand Amhara peoples in northwest Ethiopia. Journal of Ethnopharmacology 110:516-525.

Goswami P, Soki D, Jaishi A, Das M, Sarma HN. 2009. Traditional healthcare practices among the Tagin tribe of Arunachal Pradesh. Indian Journal of Traditional Knowledge 8(1):127-130.

Haridasan K, Anupam S, Bhuyan LR, Bisht NS. 2003. Medicinal plants sector in Arunachal Pradesh: An overview. Indian Forester 129:37-47.

Hasanudin K, Hashim P, Mustafa S. 2012. Corn silk (*Stigma maydis*) in healthcare: A phytochemical and pharmacological review. Molecules 17(8):9697-9715.

Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. 1998. Medicinal plants in Mexico: healers' consensus and cultural importance. Social Science & Medicine 47:1859-1871.

Heinrich M, Gibbons S. 2001. Ethnopharmacology in drug discovery: An analysis of its role and potential contribution. Journal of Pharmacy and Pharmacology 53(4):425-432.

Hignett S, Fray M. 2010. Manual handling in healthcare. Proceedings of the 1st Conference of the Federation of the European Ergonomics Societies (FEES), 10-12th October, 2010, Bruges, Belgium.

Imam H, Riaz Z, Azhar M, Sofi G, Hussain A. 2013. Sweet flag (*Acorus calamus* Linn.):An incredible medicinal herb. International Journal of Green Pharmacy 7:288-96.

Jaiswal BS. 2012. *Solanum torvum*: A review of its traditional uses, phytochemistry and pharmacology. International Journal of Pharma and Bio Sciences 3(4):104-111.

Jambey T, Gogoi BJ, Pallabi KH, Tam N, Tag H. 2017. Ethnobotanical appraisal on the wild edible plants used by the Monpa community of Arunachal Pradesh. Indian Journal of Traditional Knowledge 16(4):626-637.

Jyothilakshmi M, Jyothis M, Latha MS. 2015. Antidermatophytic activity of *Mikania micrantha* Kunth: An invasive weed. Pharmacognosy Research 7(Suppl 1):S20-S25.

Kagyung R, Gajurel PR, Rethy P, Singh B. 2010. Ethnomedicinal plants used for gastrointestinal diseases by Adi tribes of Dehang-Debang Biosphere Reserve of Arunachal Pradesh. Indian Journal of Traditional Knowledge 9(3):496-501.

Kala CP. 2005. Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. Journal of Ethnobiology and Ethnomedicine 1:11. https://doi.org/10.1186/1746-4269-1-11

Kala CP. 2020. Medicinal plants used for the treatment of respiratory diseases in Uttarakhand state of India. Studies on Ethno-Medicine 14(1-2):1-8.

Kalita V, Pegu P, Chetia P. 2019. Phytochemical screening and evaluation of antioxidant, anti-microbial and anti-inflammatory activity of *Curcuma caesia*. International Journal of Pharmaceutical Science and Research 10 (2):846-855.

Kayani S, Ahmad M, Zafar M, Sultana S, Khan MPZ, Ashraf MA, Hussain J, Yaseen G. 2014. Ethnobotanical uses of medicinal plants for respiratory disorders among the inhabitants of Gallies – Abbottabad, Northern Pakistan. Journal of Ethnopharmacology 156:47-60.

Kleinman A. 1980. Patients and healers in the context of culture: An exploration of the borderland between anthropology, medicine and psychiatry. University of California Press, Berkeley, U.S.A.

Kongsai M, Saikia SP, Kayang H. 2011. Ethnomedicinal plants used by different tribes of Arunachal Pradesh. Indian Journal of Traditional Knowledge 10(3):541-546.

Loi F, Córdova LA, Pajarinen J, Lin TH, Yao Z, Goodman SB. 2016. Inflammation, fracture and bone repair. Bone 86:119-130.

Maman ML, Moussa I, Ikhri K. 2017. Ethnobotanical survey: A comprehensive review of medicinal plants used against Gastrointestinal disorders in Niger, West Africa. Jundishapur Journal of Natural Pharmaceutical Products 12(4):e65730. https://doi.org/10.5812/jjnpp.65730

Manna SS, Mishra SP. 2018. Ethnomedicinal survey of plants used by tribal in Lalgarh forest range, W.B., India. The Journal of Phytopharmacology 7(2):199-202.

Maruthupandian A, Mohan VR, Kottaimuthu R. 2011. Ethnomedicinal plants used for the treatment of diabetes and jaundice by Palliyar tribals in Sirumalai hills, Western Ghats, Tamil Nadu, India. Indian Journal of Natural Products and Resources 2(4):493-497.

Menetrier JV, Bonkoski VR, Medeiros KA, Estevan DA, Palozi RAC, dos Reis Lívero FA, Velasquez LG, Lourenço ELB, Gasparotto AJ. 2020. Ethnomedicinal plants used for the treatment of cardiovascular diseases by healers in the southwestern state of Paraná, Brazil, and their validation based on scientific pharmacological data. Journal of Religion and Health 59:3004-3036.

Mishra D, Singh RK, Srivastava RK, Dubey SR. 2013. Ethnomedicinal plants used to cure the gynaecological disorders by ethnic populace of Sitapur district, Uttar Pradesh, India. Medicinal Plants - International Journal of Phytomedicines and Related Industries 5(4):238-2245.

Mukherjee D, Chakraborty S. 2019. *Coptis teeta*: conservation and cultivation practice - A rare medicinal plant on earth. Current Investigations in Agriculture and Current Research 6(4):845-851.

Murtem G, Pradeep C. 2016. An ethnobotanical note on wild edible plants of Upper Eastern Himalaya, India. Brazilian Journal of Biological Sciences 3(5):63-81.

Namsa DN, Manadendra M, Tangjang S, Mandal SC. 2011. Ethnobotany of the Monpa ethnic group at Arunachal Pradesh, India. Journal of Ethnobiology and Ethnomedicine 7:31. http://www.ethnobiomed.com/content/7/1/31

Namsa DN, Tag H, Mandal M, Kalita P, Das AK. 2009. An ethnobotanical study of traditional anti-inflammatory plants used by the Lohit community of Arunachal Pradesh, India. Journal of Ethnopharmacology 125(2):234-245. https://doi.org/10.1016/j.jep.2009.07.004

Neumann AK, Lauro P. 1982. Ethnomedicine and biomedicine linking. Social Science & Medicine 16(21):1817-1824.

Nichter M. 1991. Ethnomedicine: diverse trends, common linkages. Medical Anthropology 13(1-2):137-171.

Nimachow G, Rawat JS, Arunachalam A, Nimasow OD. 2011. Ethnomedicines of Aka tribe, West Kameng district, Arunachal Pradesh (India). Science and Culture 77(3-4):149-155.

Nimasow G, Ringu N, Nimasow OD. 2012. Ethnomedicinal knowledge among the Adi tribes of Lower Dibang Valley district of Arunachal Pradesh, India. International Research Journal of Pharmacy 3(6):223-229.

Nono NR, Nzowa KL, Barboni L, Tapondjou AL. 2014. *Drymaria cordata* (Linn.) Willd (Caryophyllaceae): Ethnobotany, Pharmacology and Phytochemistry. Advances in Biological Chemistry 4:160-167.

Olorunnisola OS, Bradley G, Afolayan AJ. 2011. Ethnobotanical information on plants used for the management of cardiovascular diseases in Nkonkobe Municipality, South Africa. Journal of Medicinal Plants Research 5(17):4256-4260.

Pandey AK, Tripathi YC. 2017. Ethnobotany and its relevance in contemporary research. Journal of Medicinal Plants Studies 5(3):123-129.

Patel C, Ayaz RM, Parikh P. 2015. Studies on the osteoprotective and antidiabetic activities of *Moringa oleifera* plant extract. IOSR Journal of Pharmacy and Biological Sciences 5:19-22.

Paul A, Khan ML, Arunachalam A, Arunachalam K. 2005. Biodiversity and conservation of Rhododendrons in Arunachal Pradesh in the Indo-Burma biodiversity hotspot. Current Science 89(4):623-634.

Phillips O, Gentry A. 1993. The useful plants of Tambopata, Peru:I . Statistical hypotheses tests with a new quantitative technique. Economic Botany 47(1):15-32.

Phumthum M, Srithi K, Inta A, Junsongduang A, Tangjitman K, Pongamornkul W, Trisonthi C, Balslev H. 2018. Ethnomedicinal plant diversity in Thailand. Journal of Ethnopharmacology 214:90-98.

Pieroni A, Price LL, Vandebroek I. 2005. Welcome to Journal of Ethnobiology and Ethnomedicine. Journal of Ethnobiology and Ethnomedicine 1:1. https://doi.org/10.1186/1746-4269-1-1

Policepatel SS, Manikrao VG. 2013. Ethnomedicinal plants used in the treatment of skin diseases in Hyderabad Karnataka region, Karnataka, India. Asian Pacific Journal of Tropical Biomedicine 3(11):882-886.

POWO (Plants of the World Online). Hosted by Royal Botanic Garden, Kew, U.K. http://www.plantsoftheworldonline.org (Accessed 20/06/2021).

Prusti AB, Behera KK. 2007. Ethnobotanical exploration of Malkangiri district of Orissa, India. Ethnobotanical Leaflets 11:122-140.

Pushpangadan P, George V. 2010. Ethnomedical practices of rural and tribal populations of India with special reference to the mother and childcare. Indian Journal of Traditional Knowledge 9(1):9-17.

Raghuvanshi D, Dhalaria R, Sharma A, Kumar D, Kumar H, Valis M, Kuča K, Verma R, Puri S. 2021. Ethnomedicinal plants traditionally used for the treatment of Jaundice (*Icterus*) in Himachal Pradesh in Western Himalaya-A Review. Plants 10(2):232. https://doi.org/10.3390/plants10020232

Ragupathy S, Newmaster GS, Murugesan M, Balasubramaniam V, Muneer MU. 2008. Consensus of the 'Malasars' traditional aboriginal knowledge of medicinal plants in the Velliangiri holy hills, India. Journal of Ethnobiology & Ethnomedicine 4:8.

Rathinamoorthy R, Thilagavathi G. 2014. *Terminalia chebula* - Review on pharmacological and biochemical studies. International Journal of PharmTech Research 6(1):97-116.

Rethy P, Singh B, Kagyung R, Gajurel PR. 2010. Ethnobotanical studies of Dehang-Debang Biosphere Reserve of Arunachal Pradesh with special reference to Memba tribe. Indian Journal of Traditional Knowledge 9(1):61-67.

Rosberg HE, Dahlin LB. 2018. An increasing number of hand injuries in an elderly population - A retrospective study over a 30-year period. BMC Geriatrics 18(1):68. https://doi.org/10.1186/s12877-018-0758-7

Sajem AL, Gosai K. 2006. Traditional use of medicinal plants by the Jaintia tribes in North Cachar Hills district of Assam, Northeast India. Journal of Ethnobiology and Ethnomedicine 2:33. https://doi.org/10.1186/1746-4269-2-33

Scarpa A, Guerci A. 1982. Various uses of the castor oil plant *(Ricinus communis* L.) a review. Journal of Ethnopharmacology 5(2):117-137.

Sen P, Dollo M, Choudhury MD, Choudhury D. 2008. Documentation of traditional herbal knowledge of Khampti tribes of Arunachal Pradesh. Indian Journal of Traditional Knowledge 7(3):438-442.

Sharma H, Kumar A. 2011. Ethnobotanical studies on medicinal plants of Rajasthan (India): A review. Journal of Medicinal Plants Research 5(7):1107-1112.

Sharma HK, Chhangte L, Dolui AK. 2001. Traditional medicinal plants in Mizoram, India. Fitoterapia 72(2):146-161.

Srivastava S, Singh P, Mishra G, Jha KK, Khosa RL. 2011. *Costus speciosus* (Keukand): A review. Der Pharmacia Sinica 2:118-128.

Suresh J, Mahesh NM, Ahuja J, Santilna KS. 2011. Review on *Artemisia nilagirica* (Clarke) Pamp. Journal of Biologically Active Products from Nature 1(2):97-104.

Tag H. 2007. *A systematic study of plants of ethnomedicinal importance used by the Khamti tribe of Arunachal Pradesh. PhD thesis* submitted to Department of Botany, Rajiv Gandhi University, Rono Hills, Doimukh (unpublished).

Tangjang S, Namsa DN, Chocha A, Anggu L. 2011. An ethnobotanical survey of medicinal plants in the Eastern Himalayan zone of Arunachal Pradesh, India. Journal of Ethnopharmacology 134(1):18-25.

Tardío J, Pardo-de-Santayana M. 2008. Cultural importance indices: a comparative analysis based on the useful wild plants of southern Cantabria (Northern Spain). Economic Botany 62:24-39.

The Plants List, Version 1.1. Working list of all plant species. Created and hosted by Royal Botanic Gardens, Kew, U.K. and Missouri Botanical Garden, U.S.A. http://www.theplantlist.org (Accessed 20/06/2021).

Tiwari A, Soni V, Londhe V, Bhandarkar A, Bandawane D, Nipate S. 2012. An overview on potent indigenous herbs for urinary tract infirmity: Urolithiasis. Asian Journal of Pharmaceutical and Clinical Research 5(1):7-12.

Tripathi AK, Limasenla, Rama S. 2017. Ethno-Medicinal plants used by *Nyishi* tribe of Arunachal Pradesh, India. World Journal of Pharmacy and Pharmaceutical Sciences 6(5):246-1253.

Tripathi R, Mishra, RP, Singh AR, Dwivedi SN. 2011. Folklore use of some medicinal plants in the treatment of UTI infections. International Journal of Drug Discovery & Herbal Research 1:58-60.

Uddin MZ, Rifat AB, Mitu FY, Haque T. 2019. Ethnomedicinal plants for prevention of cardiovascular diseases in Bangladesh. Bangladesh Journal of Plant Taxonomy 26(1):83-95.

Wangjen K, Shivaji C, Satish CA, Samal PK. 2011. A preliminary investigation on ethnomedicinal plants used by Wancho tribes of Arunachal Pradesh, India. Journal of Non-Timber Forest Products 18(2):129-132.

Wangpan T, Jumpee T, Tapi T, Gentu G, Pongam T, Tangjang S. 2019a. Traditional use of plants as medicine and poison by Tagin and Galo Tribe of Arunachal Pradesh. Journal of Applied Pharmaceutical Science 9(9):98-104.

Wangpan T, Nonya C, Chatam L, Tapi T, Jentu G, Phongam T, Tangjang S. 2019b. Ethnobotanically important plants used by the Nocte tribe of Eastern Himalaya. Journal of Bioresources 6(1):36-45.

WFO (World Flora Online). Published on internet. http://www.worldfloraonline.org (Accessed 20/06/2021).

WHO, 2002. Traditional medicine strategy 2002-2005. World Health Organization, Geneva, Switzerland. (document reference WHO/EDM/TRM/2002.1). http://apps.who.int/iris/bitstream/handle/10665/67163/WHO_EDM_TRM_2002.1.pdf?sequence=1 (Accessed 22/07/2021).

WHO, 2008. Global alliance against chronic respiratory diseases. Action Plan 2008-2013. World Health Organization, Geneva, Switzerland. https://www.who.int/gard/publications/GARD_actionplan_FINAL.pdf?ua=1 (Accessed 25/06/2021).

Ziemba JB, Matlaga BR. 2017. Epidemiology and economics of nephrolithiasis. Investigative and Clinical Urology 58(5):299-306.