



Ethno-medicinal practices among the Mizo ethnic group in Lunglei district, Mizoram

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ABSTRACT

The present study is an attempt to document the traditional practice and knowledge of medicines/naturopathy among the Mizo ethnic group of Lunglei district, Mizoram. A total of 82 medicinal plant species belonging to 42 families and 76 genera, as well as 17 animal species was documented along with their parts used, methods of preparation and types of ailments treated. The present study revealed that there is a positive relationship between age and traditional knowledge and practice; while a negative relationship between educational level and traditional knowledge and practice was observed. Ethno-medicinal knowledge and practices of the Mizo and the medicinal plant species are under serious threat due to various factors. Therefore, urgent attention towards their conservation and sustainable utilization is needed.

Key words: Ethno-medicine; herbal threat; Mizo; traditional knowledge; traditional practice.

INTRODUCTION

Every human society, irrespective of its simplicity and complexity, has its own concept of practices concerning health and diseases as well as methods of their management.¹ Ethno-medicine has found its way in the laboratory research, involving biomedicine and pharmacology. In every human culture, medicine plays a very important role, thus the cures also hold a respectable position in the society. With the increased knowledge of life and culture of the

tribal communities, ethno-medicinal studies become an interesting subject, and a large number of works from the rural and tribal communities of India have been reported.²⁻⁹ However, studies on ethno-medicine and practices among the tribal communities in Northeast India are relatively less. Therefore, the present study was proposed to document the indigenous ethno-medicines, knowledge on traditional medicines and its practices among the Mizo ethnic group of Lunglei District, Mizoram.

MATERIALS AND METHODS

Mizoram is one of the eight states of North-

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east India, situated in the extreme end of the Himalayan ranges covering 21,081 sq km and lies between 92°15' and 93°26'E longitude and 21°58' 24°35'N latitude.¹⁰ The state has two international borders, Myanmar in the east and Bangladesh in the west. Lunglei district is the largest district in the state (4536 sq km) and lies in the southern part of Mizoram and has the highest rural population (79267); and Lunglei is its district headquarters.^{11,12} The present study was carried out among the Mizo community of Pangzawl and Lungmawi villages in Lunglei district, Mizoram (Figure 1).

The field work was done during 2009 to 2010. A total of 341 respondents, 266 from Pangzawl and 75 from Lungmawi village (198 males and 143 females) under different age groups were selected for the study (Figure 2). The respondents and traditional healers identified were consented to share their knowledge only for the purpose of this study. The information was collected through semi structured interviews, case study, field observation and discussion among the practitioner conducted in Mizo dialect. Data on age, sex, occupation and educational level of respondents, local name of medicinal plants and animals used, parts used, methods of remedy preparations, routes of remedy administration as well as existing threats to herbal medicines were also gathered during the interviews. Identification of medicinal plants was based on standard literatures.¹³⁻¹⁶

Statistical Analysis

Results were expressed as mean \pm S.D. Correlation analysis was done using statistical software OriginPro 8 SRO v8.0724 (B724), Northampton, MA, USA. *P* values less than 0.05 was considered significant.

RESULTS

Use of plants and animals

From the study area, the medicinal value of a

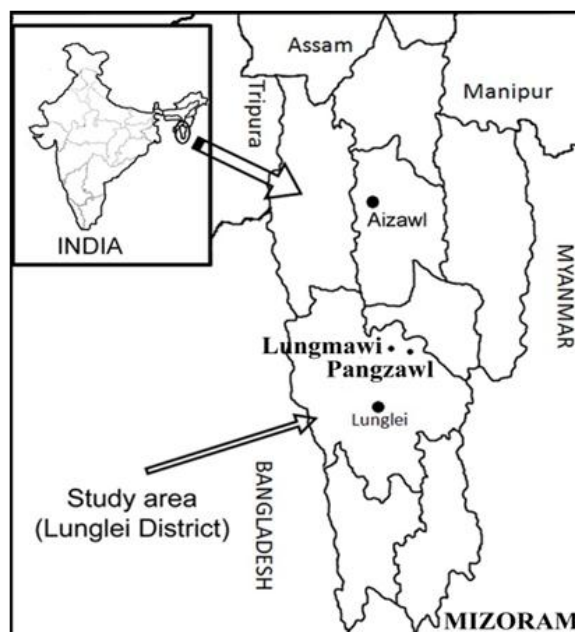


Figure 1. Map of the study sites showing location of two villages, Pangzawl and Lungmawi, Lunglei district, Mizoram.

total of 82 plant species belonging to 42 families and 76 genera were documented. Name of medicinal plants used by the people in the study area, parts used and application for the treatment of different human ailments were presented in Table 1. Among different plant families documented, the most commonly used family is Euphorbiaceae (8) followed by Asteraceae (5), Apocynaceae (3), Bignoniaceae (3) and Verbenaceae (3). A total of 34 different diseases or ailments were being treated using 82 medicinal plant species of which malaria is the most common ailment/disease followed by stomachache, diarrhoea, dysentery, jaundice and kidney problems (Figure 3). The highest number of medicinal plant species is used against diarrhea (18 species) followed by dysentery (15 species), stomachache (11 species), jaundice (8 species), malaria (4 species) and kidney problems (4 species). Medicinal plants used in the study area can be categorized into four habits such as tree, shrub, herb and liana/climber of which trees constitute the highest number of species used

Table 1. Ethno-medicinal uses of plants by the Mizo ethnic group in Lunglei district, Mizoram.

Sl. No.	Species (Family)	Vernacular name	Plant parts and mode of application
1	<i>Securinega virosa</i> Roxb. (Euphorbiaceae)	Saisiak	Leaves were boiled and taken bath with it for measles and chicken pox
2	<i>Chonemorpha fragrans</i> (Moon.) (Apocynaceae)	Phungtheikelki	Fruit, root and leaf were taken raw or boiled with water and taken for jaundice
3	<i>Anogoeisis acuminata</i> Roxb. (Combretaceae)	Zairum	Stem bark and leaves were ground and applied on cuts and wounds to stop bleeding. Leaves were also boiled with water and the water extract was consumed for indigestion
4	<i>Adhatoda vasica</i> Nees. (Acanthaceae)	Kawldai	Leaves were boiled and taken bath with it for measles and chicken pox
5	<i>Rhus semialata</i> (Anacardiaceae)	Khawmhma	Boiled leaves and raw fruit were taken for chicken pox
6	<i>Eryngium foetidum</i> Linn. (Apiaceae)	Bahkhawr	Root was chewed and keeps it in the mouth for toothache
7	<i>Aporusa octandra</i> (Buch-Ham. Ex D. Don) (Euphorbiaceae)	Chhawntual	Stem bark was boiled and drink for stomachache. Leaves were also boiled with water and the extract was drink for indigestion
8	<i>Solanum khasianum</i> Cl. (Solanaceae)	At hlo	Seeds were ground, burnt and the smoke was applied inside the mouth for toothache
9	<i>Ficus semicordata</i> Roxb. (Moraceae)	Theipui	Juice of stem bark was collected and used for treating boil
10	<i>Catharanthus roseus</i> L. (Apocynaceae)	Kumtluang	Leaves were ground and boiled with water, and the water extract was drink for dysentery and diarrhoea
11	<i>Clerodendrum bracteatum</i> Wall.ex Walp. (Verbenaceae)	Phuihnamchhia	leaves were ground, squeezed and the water was consumed for dysentery and diarrhoea
12	<i>Sapindus mukorossi</i> Gaertn. (Sapindaceae)	Hlingsi	A single seed was taken raw once a day for pile problems
13	<i>Baccaurea ramniflora</i> Lour. (Euphorbiaceae)	Pangkai	Raw fruit was eaten for stomachache
14	<i>Alstonia scholaris</i> L. (Apocynaceae)	Thuamriat	Stem bark was boiled with water and the water was taken for malaria
15	<i>Curcumorpha var. minor</i> King (Zingiberaceae)	Ailaidum	Raw or water extract of rhizome was used for stomachache and indigestion
16	<i>Paederia scandes</i> Lour. (Rubiaceae)	Vawihuih hru	Leaves and stem were chewed and keeps it inside the mouth for toothache
17	<i>Costus speculosus</i> (Kelnlg) (Costaceae)	Sumbul	Hot water extract of rhizome was taken for kidney problems
18	<i>Blumea lanceolaria</i> Roxb. (Asteraceae)	Buarze	Hot water extract of leaves was taken for kidney problems and gastric cancer
19	<i>Dillenia indica</i> Linn. (Dilleniaceae)	Kawrthindeng	fruit was dried, ground and mixed with water and drink for dysentery and diarrhoea
20	<i>Benincasa hispida</i> (Thumb.) Cogn. (Cucurbitaceae)	Maipawl	fruit was ground and the extract was drink for typhoid, diarrhoea and dysentery

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21	<i>Vitex peduncularis</i> Wall. (Verbenaceae)	Thingkhawilu	Stem bark was boiled with water and drink for stomachache and jaundice
22	<i>Mussa</i> sp. (Musaceae)	Changel	Flower and fruit were mixed with crab and taken raw or boiled with water and eaten for jaundice. Stem juice was also used against snake and insect bite
23	<i>Ageratum conyzoides</i> L. (Asteraceae)	Vailenhlo	Hot water extract of the root was used for dysentery
24	<i>Mangifera indica</i> (Anacardiaceae)	Theihai	Stem bark was chewed and keeps it inside the mouth for toothache
25	<i>Parkia roxburghii</i> (Mimosaceae)	Zawngtah	Hot water extract of the stem bark was used for diarrhoea and dysentery
26	<i>Stereospermum colais</i> (Dillw.) (Bignoniaceae)	Zihngal	Leaf juice was applied on the itching skin. Also used as febrifuge
27	<i>Oroxylum indicum</i> L. (Bignoniaceae)	Archangkawm	Hot water decoction of leaves was taken for placental problems
28	<i>Elaeagnus confertia</i> Roxb. (Elaeagnaceae)	Sarzuk	Hot water decoction of leaves was taken for placental problems
29	<i>Chikrassia tabularis</i> A. Juss. (Meliaceae)	Zawngtei	fruit and stem bark were dried, ground and mixed with water and drink for dysentery and diarrhoea
30	<i>Begonia inflata</i> Cl. (Bignoniaceae)	Sekhupthur	Leaves and stem were taken raw or the boiled juice was drink for pile problems
31	<i>Dysoxylum gobara</i> (Buch.- Ham) Merr. (Meliaceae)	Thingthupui	Raw or hot water decoction of young leaves were taken for treating diarrhoea and dysentery
32	<i>Garcinia lancaefolia</i> Roxb. (Clusiaceae)	Pelh	Leaves and fruits were taken raw for stomachache
33	<i>Lindernia ruelloides</i> (Colsm.) Penn. (Scrophulariaceae)	Thasuih	Hot water extract was applied on muscle sprain and sciatica
34	<i>Millettia pachycarpa</i> Sm. (Fabaceae)	Rulei	Hot water extract of the root was used for stomachache
35	<i>Trevesia palmata</i> (Araliaceae)	Kawhtebel	Juice of leaf-stalk or root was taken for stomachache
36	<i>Lonicera macrantha</i> D. Don (Caprifoliaceae)	Leihruisen	Hot water extract was used for Diarrhoea, dysentery and stomachache
37	<i>Callicarpa arborea</i> Roxb. (Verbenaceae)	Hnahkiah	Stem bark was chewed and keeps it in the mouth for toothache. Stem bark and leaves were ground and taken for internal bleeding and also applied on cuts and wounds to stop bleeding
38	<i>Psidium guajava</i> (Myrtaceae)	Kawiam/Kawlthe i	Cold water extract of the leaf was used for diarrhoea and dysentery
39	<i>Nicotiana tabacum</i> Linn. (Solanaceae)	Vaihlo	Leaf juice was applied on boils and the affected area of insect bites
40	<i>Dendrocnide sinuate</i> Bl. (Urticaceae)	Thakpui	Hot water extract of the root was taken for jaundice

41	<i>Osbeckia rostrata</i> D.Don. (Melastomaceae)	Builukhampa	Cold water extract of the root was used for diarrhoea and dysentery
42	<i>Eupatorium odoratum</i> L. (Asteraceae)	Tlamsam	Leaves were ground and applied on cuts and wounds to stop bleeding
43	<i>Picrasma javanica</i> Bl. (Simaroubaceae)	Thingdamdawi	Stem bark and leaves were boiled with water and the water was taken for dysentery, diarrhoea and malaria
44	<i>Colocasia esculenta</i> L. (Araceae)	Dawl	Stem juice or sap was used against snake and insect bite
45	<i>Mikania micrantha</i> Kunth. (Asteraceae)	Japan hlo	Leaves were ground and the water was consumed for dysentery and diarrhoea. Leaves were ground and applied on cuts and wounds to stop bleeding
46	<i>Jatropha curcas</i> (Euphorbiaceae)	Kangdamdawi	Leaves juice was applied on the skin for scabies and ring worm
47	<i>Hedychium spicatum</i> Buch-Ham. Ex Sm (Zingiberaceae)	Kelhnamtur	Leaf juice was used for cuts and wounds. Hot water decoction was taken for malaria and kidney problem
48	<i>Acacia sp.</i> (Mimosaceae)	Khanghu	Boiled leaves were taken for allergic to chicken meat
49	<i>Schima wallichii</i> Korth. (Theaceae)	Khiang	Stem juice was used for cuts and wounds
50	<i>Ananas comosus</i> (L.) Merr. (Bromeliaceae)	Lakhuih	Hot water decoction of leaf taken for treating convulsions
51	<i>Centella asiatica</i> (L.) Urb. (Apiaceae)	Lambak	Hot water decoction of leaf taken for treating hypertension and asthma
52	<i>Benincasa hispida</i> (Thunb.) Cogn. (Cucurbitaceae)	Maipawl	Fruit was boiled and taken for treating cholera and fever
53	<i>Melocanna baccifera</i> Roxb. (Poaceae)	Mautak	Outer surface of the stem was rubbed off and applied on cuts and wounds
54	<i>Phyllanthus fraternus</i> (Euphorbiaceae)	Mitthisunhlu	Raw or hot water decoction of stem bark and leaves were taken for treating diabetes and jaundice
55	<i>Saraca asoca</i> (Caesalpiniaceae)	Mualhawih	Hot water decoction of leaves was taken for gastric ulcer and stomachache
56	<i>Passiflora nepalensis</i> (Passifloraceae)	Nauawimu	Hot or cold water decoction of root was used for treating malaria and fever
57	<i>Azadirachta indica</i> (Meliaceae)	Neem	Hot water decoction of leaves were taken for measles and hypertension
58	<i>Baccaurea ramiflora</i> (Euphorbiaceae)	Pangkai	Hot or cold water decoction of the stem bark was used for treating jaundice
59	<i>Terminalia chebula</i> (Combretaceae)	Reraw	Fruit was eaten raw for stomach problems
60	<i>Zingiber officinale</i> Rosc. (Zingiberaceae)	Sawhthing	Rhizome was taken raw for cough & cold, sore throat
61	<i>Emblica officinalis</i> Gaertn. (Euphorbiaceae)	Sinhlu	Cold or hot water extract of the stem bark was taken for diarrhoea and dysentery
62	<i>Solanum torvum</i> Linn. (Solanaceae)	Tawkpui	Dried seeds were smoked as cigarette for treating toothache

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63	<i>Dalbergia pinnata</i> Lour. (Fabaceae)	Tengtere	Fruit was taken raw for diarrhoea and fever
64	<i>Averrhoa carambola</i> (Oxalidaceae)	Theiherawt	Raw fruit was eaten for jaundice
65	<i>Anodendron paniculatum</i> (Melastomaceae)	Theikelki	Raw leaves and fruits were eaten for jaundice
66	<i>Ficus semicordata</i> (Moraceae)	Theipui	Stem sap was used for boils
67	<i>Artocarpus lakoocha</i> (Moraceae)	Theitat	Grounded stem bark was used for skin sores.
68	<i>Carica papaya</i> (Caricaceae)	Thingfanghma	Fruit was taken for treating antihelminthic and diarrhoea
69	<i>Spondias pinnata</i> Linn. (Anacardiaceae)	Tawitaw	Raw juice or hot water decoction of stem bark was used for diarrhea and dysentery
70	<i>Lepidagathis incurve</i> Buch-Ham. Ex D. Don (Acanthaceae)	Vangvattur	Leaves were applied on cuts and wounds
71	<i>Thunbergia grandiflora</i> Roxb. (Acanthaceae)	Zawngafian	Leaves were applied on cuts and wounds. Hot water decoction was also used for diabetes
72	<i>Curcuma longa</i> (Zingiberaceae)	Aieng	Rhizome was taken raw for diarrhoea and gastric problems
73	<i>Pseudodrynaria coronans</i> Ching. (Polypodiaceae)	Awmvel	Rhizome was boiled and the water was taken for gastric ulcer. Raw rhizome was chewed for toothache
74	<i>Momordica charantia</i> Linn. (Cucurbitaceae)	Changkhate	Leaves and fruits were cooked and taken for treating hypertension
75	<i>Lagerstroemia speciosa</i> (Linn.) Pers. (Lythraceae)	Chawnpui	Root was boiled and taken for Jaundice and diarrhoea
76	<i>Inula cappa</i> DC (Asteraceae)	Buathau	Leaves juice was used for treating jaundice
77	<i>Eucalyptus sp.</i> (Myrtaceae)	Nawhalhthing	Hot water decoction of leaf was used for gastric ulcer and diabetes
78	<i>Mimosa pudica</i> Linn. (Mimosaceae)	Hlonuar	Hot water decoction of root was used for piles and pistula, and kidney stone,
79	<i>Mallotus roxburghianus</i> Muel-Arg. (Euphorbiaceae)	Zawngtenawhlu ng	Twigs was taken for treating jaundice
80	<i>Zanonia indica</i> (Cucurbitaceae)	Lalruanga dawibur	Fruit cover (even dry ones) was filled with water, kept for few hours and taken the water for stomach problems
81	<i>Dillenia pentagyna</i> Roxb. (Dilleniaceae)	Kaihzawl	Hot water extract of stem bark was used against stomach problems and stomach cancer
82	<i>Dysoxylum gobara</i> (Buch.-Ham) (Meliaceae)	Thingthupui	Hot water extract of young leaves was used for dysentery and diarrhoea

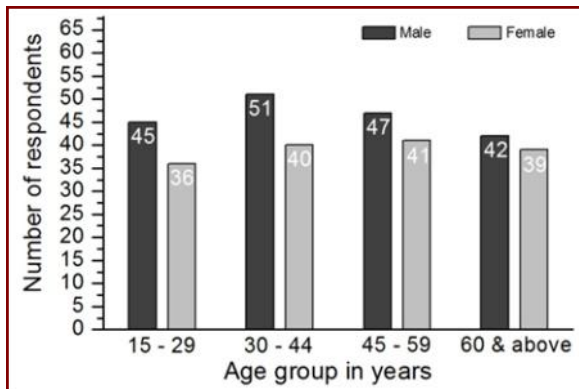


Figure 2. Number of male and female respondents in the study area categorizes according to the age.

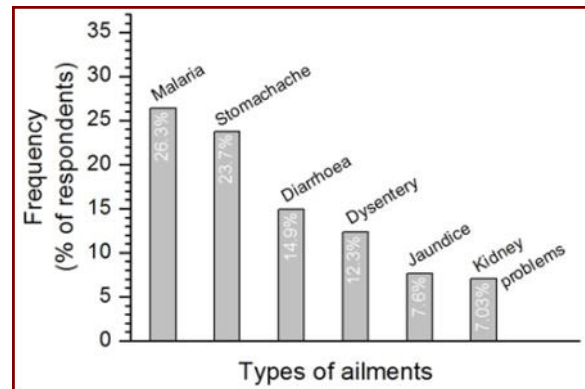


Figure 3. Graph showing common human ailments in the study area and the frequency of citation expressed in percentage of respondents.

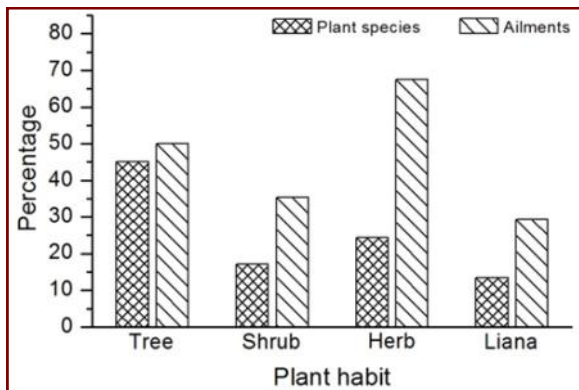


Figure 4. Graph showing percentage of medicinal plant species and percentage of ailment types treated with different plant habits.

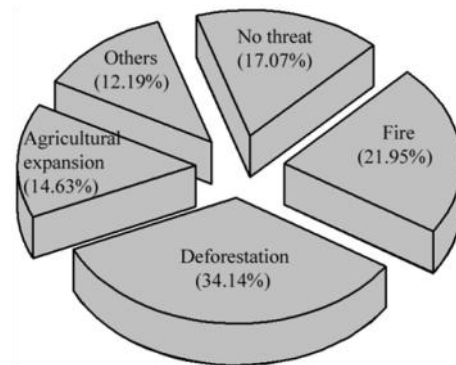


Figure 5. Pie chart showing percentage of medicinal plant species to different threats, calculated based on the information received from the respondents.

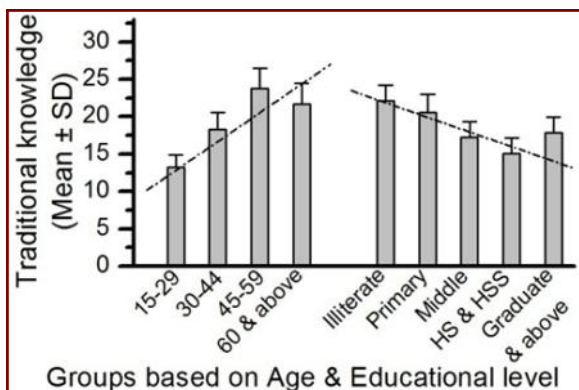


Figure 6. Graph showing the relationship of traditional knowledge on ethno-medicine with age and educational levels of the respondents. Dotted lines indicates the direction (+ve/-ve) of relationship. Results were mean ± S.D.

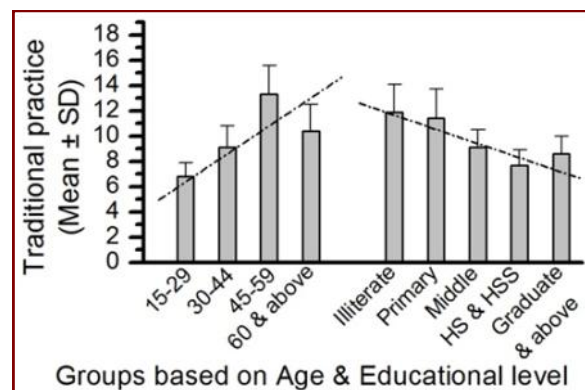


Figure 7. Graph showing the relationship of traditional practice on ethno-medicine with age and educational levels of the respondents. Dotted lines indicates the direction (+ve/-ve) of relationship. Results were mean ± S.D.

(45.12%) and the number of ailments treated with herb species (23 ailments) is highest compared to other habits (Figure 4). Different parts of the plant such as seed, fruit, leaves, stem bark, root, etc. were used as medicine. Among different parts of the plants, leaves are the most commonly used (41.46% species) followed by stem bark (28.04% species), fruit (18.07% species), root (12.19% species), rhizome (6.09% species) and seed (3.61% species). The people in the study area used different routes of medicine administration such as oral, topical and others including bathing and use of smoke. The people in the study area employed several methods of medicine preparation such as hot water decoction, cold water decoction, squeeze, poultice and smoke.

The people in the study area also make use of animals to treat ailments and sicknesses. A total of 17 different animals (primates 3, mammals 9, avians 2, reptiles 3) having medicinal value was documented and 21 different ailments were being treated using these animal products. Details of the animals, parts/organs used, method of preparation and application for the treatment of human ailments are presented in Table 2. Some of the animal products were used in combination with other products. There are six different animal species used for treating malaria, three species for jaundice, three species for cough and cold, and two species for toothache.

Ethno-medicinal knowledge and practice

Total number of ethno-medicines known and used by the respondents was also documented. Correlation analysis revealed that there was a positive relationship between age of the respondents and their ethno-medicinal knowledge ($p < 0.05$, $r = 0.3504$) while a negative correlation between ethno-medicinal knowledge and educational levels ($p < 0.05$, $r = -0.7236$) was observed (Figure 6). A positive correlation between age of the respondents and their ethno-medicinal practice ($p < 0.05$, $r = 0.2708$) as well as a negative correlation between educational levels and ethno-medicinal practice ($p < 0.05$, $r = -0.7954$)

were observed (Figure 7). This indicates that the younger as well as educated respondents were weaker in their knowledge and use of ethno-medicines, also indicating a decline in the interest on ethno-medicinal knowledge and practice among the Mizo.

Threat to medicinal plants

Different threats to medicinal plant species were gathered during interview with the respondents. The most cited threats in the present study area were deforestation (34.14% species), fire (21.95% species), agricultural expansion (14.63% species) and others including animal grazing and human activities (12.19% species). 17.07% species were reported to have no apparent threat (Figure 5). The effort to conserve medicinal plants in the area was observed to be very poor. The absence of practice by traditional healers and the local people to conserve or recover medicinal plants of the area was also observed. Giving conservation priority for medicinal plants by providing funds, land for cultivation and assisting their activities with professional guidance will help to conserve the fast eroding medicinal plants of the study area.

DISCUSSION

The Mizo traditional health care practices and disease treatment systems are based on their nature of intense observation and belief. The medicinal use of plant parts in the management and treatment of diseases has been an age long practice among different tribes.¹⁷ The use of medicinal plant species for treating various types of diseases is also commonly practiced in the study area. Traditional herbal remedies provide health services because they are important pillars of culture and human socialization.¹⁸ Some medicinal plants are not only important as drugs but also as food supplements rich in vitamins and minerals.¹⁹ The people in the present study area rely more on the indigenous system of treating diseases and on herbal medicines that can be obtained easily from the nearby forest. Plant

Table 2. Ethno-medicinal uses of animals by the Mizo ethnic group in Lunglei district, Mizoram.

Sl. No.	Common name	Vernacular name	Parts used and mode of application
1	Barkingdeer	Sakhi	Urine was dropped inside the ear for treating deaf.
2	Cappet langu	Ngau	Bile juice was mixed with one of the mineral product (stone blood) and eaten raw for malaria
3	Chicken	Ar	Warm fat (oil) is applied topically for treating cough and cold, especially for children. Bile juice was dropped inside the ear for deaf. Feather was burned and the ash was applied on the anus for treating hookworm. Worm blood was applied on the cheek for mumps
4	Chinese pangolin	Saphu	Scale (skin) was worn around the neck to prevent from pneumonia especially for children
5	Common Calotes	Laiking	Smoked meat was eaten before sleep for treating cough and cold
6	Dog	Ui	Fresh warm blood or cooked meat were used for treating malaria, tuberculosis and jaundice
7	Hog badger	Phivawk	Fat (oil) was used for cuts and wounds by applying on the affected area
8	Hoolock gibbon	Hauhuk	A small piece of bones was used for rheumatism by tying it around the anklet or wrist of the patient. Powdered teeth (canine) or smoked brain was applied for toothache and tooth decay
9	Himalayan black bear	Savawm	Bile juice eaten for stomachache, ovary gland problems and as a contraceptive in female
10	Himalayan crestless porcupine	Sakuh	Cooked meat was eaten to help delivery of baby. Stomach was chewed raw for toothache and tooth decay
11	Indian/Burmese python	Saphai	Bile juice was used for malaria and jaundice, and fat (oil) was used for burn and burned scar. Fat was kept inside the mouth for sore throat
12	Indian monitor lizard	Tangkawng	Tongue was cooked and eaten for treating those who has got a bad stammer. Bile juice was also eaten raw for treating malaria
13	Jackal	Sihal	Cooked meat was used for paralysis
14	Leopard	Keite	Raw or cooked brain and taken for treating epilepsy
15	Parrot	Vaki	Cooked meat of parrot was used for treating malaria and jaundice
16	Rhesus macaque	Zawng	Bile juice was eaten raw for malaria and cooked meat and brain was given to weak and unhealthy children
17	Mongoose	Sarivaithun	Burned meat was eaten for treating any kind of food poisoning/allergy. Cooked meat was also eaten for fever, cough and cold

derived medicines are widely used because they are comparatively safer than the synthetic drugs, easily available and cheaper.²⁰ This could also be the reason why the people of the present study area are still practicing the use of traditional ethno-medicine for treating human ailments. The ethno-medicinal knowledge was transferred from generation to generation through oral tradition. However, as compared to the older generation, the ethno-medicinal knowledge and interest on traditional practice decline among the younger generation. The change in lifestyles has had a negative impact on maintaining traditional knowledge and practice on ethno-medicines. Death of many aged traditional healers and herbalists is one of the major factors causing a rapid decline in authentic knowledge in traditional treatment.²¹ In the present study area also death of the traditional herbal practitioners and elders, development in education, awareness towards importance of health and health care, and the advent of modern health care facilities could be the factors leading to the decline in traditional ethno-medicinal knowledge and practice among the younger generations. This diminishing traditional ethno-medicinal knowledge and interest on the use of traditional remedies may lead to the disappearance of traditional knowledge and practice on ethno-medicines among the Mizo. Overgrazing, over exploitation of plant resources, deforestation, drought and agricultural expansion were reported to be the principal threats to medicinal plant species.²²⁻²⁴ The result of present study also showed that deforestation, agricultural expansion and fire were the major threats to traditional ethno-medicines.

Use of herbal remedy is still common among the Mizo. The knowledge and interest in traditional medicinal practices are diminishing among the younger generation. Ethno-medicinal knowledge and practice of the Mizo and ethno-medicinal plant species used are under serious threat. Thus, urgent action towards their conservation and sustainable utilization should be taken.

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