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Cross-cultural comparison of plant use knowledge between different ethnic tribes in India and Bangladesh

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Abstract
India with diverse human races and cultures coupled with enormous biodiversity presents a fertile ground for ethnobotanical research. Since there is no modern medical care in most tribal settlements, indigenous traditional medicine plays a vital role in treating various human ailments. The objective of the present communication is to record the traditional ethnomedicinal knowledge (ethnomedicine information/data) of indigenous medicinal plants used for treating various ailments faced by the *Mandi* ethnic tribe in the Dhaka Division of Bangladesh with the *Kandha* in Phulbani and Ghumsar Udayagiri forest divisions of Kandhamal District of Orissa, the *Paliyan* in the Sirumalai Hills in Dindigul District of Tamil Nadu, the *Pawra* in the Satpura Hills in Nandurbar District of Maharashtra, and the *Tolchha* and *Marcha* sub-communities of the *Bhotiya* in the Niti valley of Alaknanda catchment in Central Himalaya, Uttarakhand of India particularly to know about the plant usage, uniformity/similarities and variability/differences in ailments treated, and part (s) used for remedy preparation. The cross-cultural comparison reflects the pattern of plant use in different ethnic tribes and the exchange of traditional knowledge.

Keywords: ethnic tribes, indigenous medicinal plants, tribal medicine, traditional medicine, ethnomedicine

Introduction
One of the generally used indigenous knowledge systems is the knowledge and application of traditional medicine. Such knowledge, known as ethnomedicinal knowledge includes customary diagnosis, collection of raw materials, preparation of remedies, and its prescription to the patients (Farnsworth, 1994). Indigenous knowledge on remedies in numerous nations passes from one generation to the other orally with extraordinary secrecy (Jansen, 1981) [2]. Such secrete and crude transfers make indigenous knowledge or ethnomedicinal knowledge defenseless to contortion and often some of the lore is lost at each point of transfer (Getahun, 1976), consequently there is a necessity for systematic documentation of such helpful knowledge through ethnobotanical research.
Tribal medicine or traditional medicine plays an indispensable role in the primary healthcare of tribal as well as rural people (Rajiv, 1998; Patil, 2008) [4, 5]. Traditional medicine studies cover ethnomedicine, which involves the practices usually used by people who live in rural areas and by the indigenous tribes. The word ethnomedicine is sometimes used as a synonym for traditional medicine (Acharya *et al*., 2008) [6]. Ethnomedicine is one of the systems of medicine that is generally practiced among the tribal and aboriginal tribes for the treatment of different ailments (Singh *et al*., 2013). Ethnomedicine may be defined as the usage of plants by humans as medicines and these uses could be called more precisely ethnobotanic medicine (Fransworth, 1994) [1]. Ethnomedicine is one of the systems of medicine that is broadly practiced among the tribal and aboriginal populaces of our country for the treatment of ailments (Singh *et al*., 2013) [7]. Ethnomedicine information/data plays a significant role in developing new scientifically validated and standardized drugs, i.e. both herbal and modern (Savnur, 1993) [8].

Cross-cultural Studies
The information and practice related to the collection and usage of plants vary within any culture due to the origin, abundance, and quality of plant species, geography of the area, the residence of the people, cultural status, and connections within the community (Cameron, 1996; Toledo *et al*. 2007; Cetinkaya, 2009; Thomas *et al*. 2009) [9, 10]. Cross-cultural studies were sparingly concentrated before 1998 (Chandra Prakash, 2005) [13], however, these days, they are amply being studied (Pieroni *et al*. 2011; Saslis *et al*. 2011: Lardos and Heinrich, 2013; Gairola *et al*. 2014; Aziz *et al*. 2018). Intercultural comparison has practical importance since we can address both the agreement and disparities of plant use knowledge (Heinrich *et al*. 1998). Various subsets of socio-cultural factors such as settlement, populace, family size, sex, age, ethnicity, education, economy, employment, and belongings also influence plant use knowledge (Paniagua-Zambrana*et al*. 2014; Phillips and Gentry, 1993; Byg and Balslev2001; Fadiman, 2005; Reyes-García*et al*.2006; Voeks 2007). Rao (2015) emphatically focuses on the necessity for shortlisting and focusing the leads for a specific ailment by

crisscrossing the data through cross-cultural studies among different ethnic tribes within a country and afterward comparing with other developing countries for exceptional bioprospecting and subsequent product development. It is accepted that the usage of a certain plant species for the same ailment by various unrelated ethnic tribes positively suggests the efficacy of these plant species for drug development.

Materials and Methods

The following earlier publications are chosen for this comparative ethno-medico-botany communication.

1. Partha, P. and Hossain, A.E., 2007. Ethnobotanical investigation into the *Mandi* ethnic community in Bangladesh. Bangladesh Journal of Plant Taxonomy, 14(2): 129-145.
2. Behera, S.K., Panda, A., Behera, S.K. and Misra, M.K., 2006. Medicinal plants used by the *Kandhas* of Kandhamal district of Orissa. Indian Journal of Traditional Knowledge.5 (4): 519-528.
3. Karuppusamy, S., 2007. Medicinal plants used by *Paliyan* tribes of Sirumalai hills of southern India. Natural Product Radiance, 6(5): 436-442.
4. Jagtap, S.D., Deokule, S.S., Pawar, P.K. and Harsulkar, A.M., 2009. Traditional ethnomedicinal knowledge is confined to the *Pawra* tribe of Satpura Hills, Maharashtra, India. Ethnobotanical Leaflets, 13: 98-115.
5. Phondani, P.C., Maikhuri, R.K., Rawat, L.S., Farooquee, N.A., Kala, C.P., Vishvakarma, S.C.R., Rao, K.S. and Saxena, K.G., 2010. Ethnobotanical uses of plants among the Bhotiya tribal communities of Niti Valley in Central Himalaya, India. Ethnobotany Research and Applications, 8:233-244.

In this comparative ethno-medico-botany communication, the indigenous medicinal plants used for treating various ailments faced by the *Mandi* ethnic tribe in the Dhaka Division of Bangladesh are compared with the indigenous medicinal plants used by the *Kandha* in Phulbani and Ghumsar Udayagiri forest divisions of Kandhamal District of Orissa, the *Paliyan* in the Sirumalai Hills in Dindigul District of Tamil Nadu, the *Pawra* in the Satpura Hills in Nandurbar District of Maharashtra, and the *Tolchha* and *Marcha* sub-communities of the *Bhotiya* in the Niti valley of Alaknanda catchment in Central Himalaya, Uttarakhand of India to know about the plant usage, uniformity/similarities and variability/differences in ailments treated, and part(s) used for remedy preparation.

The Cultures/Ethnic Tribes

Mandi

The Mandis or Garos are an Indigenous Tibeto-Burman ethnic group from the Indian subcontinent, notably found in Indian states of Maghalaya, Assam, Tripura, Nagland and neighboring areas of Bangladesh. (https://www. ethnologue. com/ language/grt).

Kandha

The *Kandha* or *Dongria Kondh* people are members of the Kondhs. They are located in the Niyamgiri Hills in the state of Odisha (formerly Orissa) in India. (https:// en. wikipedia. org/ wiki/ Dangaria Kandha).

Paliyan

The *Paliyan*, when compared to various tribal communities in Tamil Nadu constitute relatively a small group (Ignacimuthu *et al*., 2006). It is believed that the *Paliyan* are indigenous people of the Palani Hills. In the Palani Hills, they are found at an altitude of up to 2200 m. Generally, the *Paliyan* are illiterate and they speak Tamil (Shenbaham, 2016).

Pawra

The *Pawra* is one of the major tribes in Maharashtra. Their original habitat is the former Udaipur state in Rajasthan (Prasad, 1996).

Bhotiya

Bhotiya or *Bhot* are groups of ethno-linguistically related Tibetan people living in the Trans-Himalayan region that divides India from Tibet. The Bhotiya speak numerous languages including Ladakhi. *Bhotiya* has six recognizable sub-groups: the *Bhot*, *Bhotiya*, the *Bhutia* of Sikkim, the *Tibbati* (of Sikkim and Arunachal Pradesh), the *Bhut*, the *Gyakar Khampa* of Khimling, *Bhidang* of Uttarakhand. *Bhotiya* tribe are also natives of other countries outside India and they are in Pakistan, Afghanistan, Kazakhstan, Nepal, Bhutan, and Tibet (https://en.wikipedia.org/wiki/Bhotiya).

Results and Discussion

In the present communication, a comparative account of indigenous medicinal plants used for the treatment of various human ailments/disease conditions by the *Mandi, Kandha, Paliyan, Pawra,* and the *Tolchha* and *Marcha* sub-communities of the *Bhotiya* is discussed. Different ailments faced by the *Mandi, Kandha, Paliyan, Pawra,* and the *Tolchha* and *Marcha* sub-communities of the *Bhotiya* in their settlements are grouped under 11 ailment categories with their biomedical terms (Table 1).

Table 1: Different ailments reported in the earlier publications grouped under different ailment categories/Organ system categories with their biomedical terms

Biomedical Terms for Human Ailments	Ailment Categories / Organ System Categories
Bilious Fever, Body Ache, Hyperpyrexia, Intermittent Fever, Malaria, Nociceptive Pain, Pyrexia, and Typhoid	Aches and Fever
Diarrhoea, Dysentry, Indigestion, Intestinal Worm Infestation, and Piles	Digestive System
Canker Sore, Gingivitis, and Oral Problems	Dental and Oral System
Diabetes	Endocrine System
Angioedema, Animal Bites, Candidiasis, Common Skin Diseases, Dermatitis, Itches, Leprosy, Poisonous Bites, Wounds, and Vitiligo	Integumentary System
Jaundice and Hepatosplenomegaly / Liver Pain	Liver System
Asthma and Cold	Respiratory System
Azoospermia and Sexual Dysfunction	Reproductive System
Bone Fracture and Rheumatism	Skeletal System
Cystitis and Urolithiasis	Urogenital System

Comparative Ethno-medico-botany of the *Mandi* in Dhaka Division of Bangladesh with the *Kandha* in Kandhamal District of Orissa

Comparison between the *Mandi* and the *Kandha* (Table 2) reveals that both of them use 13 plant species, namely *Abutilon indicum*, *Achyranthes aspera*, *Andrographis paniculata*, *Asparagus racemosa*, *Cissus quadrangularis*, *Euphorbia hirta*, *Ficus racemosa*, *Mangifera indica*, *Mimosa pudica*, *Punica granatum*, *Rauvolfia serpentina*, *Shorearobusta*, and *Withania somnifera* belong to Malvaceae, Amaranthaceae, Acanthaceae, Liliaceae, Vitaceae, Euphorbiaceae, Moraceae, Anacardiaceae, Mimosaceae, Punicaceae, Apocynaceae, Dipterocarpaceae, and Solanaceae to treat different ailments in 9 (Aches and Fever, Breast Diseases, Dental and Oral System, Digestive System, Endocrine System, Integumentary System, Reproductive System, Skeletal System, and Urogenital System) and 6 (Aches and Fever, Digestive System, Integumentary System, Liver System, Respiratory System, and Skeletal System) ailment categories/organ system categories respectively out of 109 and 98 plant species reported to be used by both of them. It is observed that out of 13 plant species, 4 plant species, namely *Achyranthes aspera* (Digestive System), *Cissus quandrangularis* (Skeletal System), *Mangifera indica* (Digestive system), and *Rauvolfia serpentina* (Aches and Fever) are used by both of them to treat ailments in the same ailment category. It is observed that out of 13 plant species, 1 plant species *Ficus racemosa* (Urogenital and Endocrine System) is used by the *Mandi* to treat ailments in more than one ailment category/organ system category. It is observed that out of 13 plant species, 6 plant species, namely *Achyranthes aspera* (Aches and Fever, Digestive System, and Integumentary System), *Andrographis paniculata* (Integumentary System and Digestive System), *Ficus racemosa* (Digestive System and Liver System), *Mangifera indica* (Digestive System and Integumentary System), *Punica granatum* (Digestive System and Liver System), *Rauvolfia serpentina* (Aches and Fever, Integumentary System and Skeletal System), and *Shorea robusta* (Digestive System and Integumentary System) are used by the *Kandha* to treat ailments in more than one ailment category/organ system category.

It is observed that out of 13 plant species, the *Mandi* use 3 plants species, namely *Andrographis paniculata*, *Euphorbia hirta*, and *Rauvolfia serpentina* to treat communicable diseases such as cold, Malaria and Pyrexia; and 10 plant species, namely *Abutilon indicum*, *Achyranthes aspera*, *Asparagus racemosus*, *Cissus quadrangularis*, *Ficusr acemosa*, *Mangifera indica*, *Mimosa pudica*, *Punica granatum*, *Shorea robusta*, *and Withania somnifera* to treat non-communicable diseases such as Azoospermia, Bone Fracture, Canker sore, Common Skin Diseases, Cystitis, Diabetics, Diarrhoea, Dysentery, Intestinal Worm Infestation, Mastitis in Women, Nociceptive Pain, Piles, and Pyrexia. It is observed that out of 13 plant species, the *Kandha* use 2 plant species, namely *Achyranthes aspera* and *Euphorbia hirta* to treat communicable diseases such as Common Skin Diseases, Malaria and Pyrexia; and 11 plant species, namely *Abutilon indicum*, *Andrographis paniculata*, *Asparagus racemosus*, *Cissus quadrangularis*, *Ficus racemosa*, *Mangifera indica*, *Mimosa pudica*, *Punica granatum*, *Rauvolfia serpentina*, *Shorea robusta*, and *Withania somnifera* to treat non-communicable diseases such as Angioedema, Animal Bites, Asthma, Bilious Fever, Body Ache, Bone Fracture, Candidiasis, Cold, Dermatitis, Diarrhoea, Dysentery, Hyperpyrexia, Indigestion, Intermittent Fever, Intestinal Worm Infestation, Itches, Jaundice, Rheumatism, Rheumatic Fever, Typhoid, Vitiligo, and Wounds.

Table 2: Comparative Ethno-medico-botany of the *Mandi* in Dhaka Division of Bangladesh with the *Kandha* in Kandhamal District of Orissa

S/N	Botanical name	Part (s) Used		Biomedical Terms for Ailments		Organ System Categories	
		Mandi	***Kandha***	***Mandi***	***Kandha***	***Mandi***	***Kandha***
1	*Abutilon indicum*	Leaf and Root	Leaf	Mastitis in Women	Jaundice	Breast Diseases	Liver System
2	*Achyranthes*	Root	Leaf	Interstitial	Bilious Fever,	Digestive	Aches and Fever,

	aspera			Cystitis and Intestinal Worm Infestation	Fever, Rheumatic Pain, Typhoid, and Wounds	System	Digestive System, and Integumentary System
3	*Andrographis paniculata*	Leaf	Leaf	Fever and Nociceptive Pain	Dermatitis, Intestinal Worm Infestation, and Itches	Aches and Fever	Digestive System and Integumentary System
4	*Asparagus racemosus*	Root	Root	Azoospermia	Dysentery	Reproductive System	Digestive System
5	*Cissus quadrangularis*	Whole Plant	Stem	Bone Fracture	Bone Fracture	Skeletal System	Skeletal System
6	*Euphorbia hirta*	Leaf	Root and Stem	Skin Diseases	Candidiasis, Cold, Intermittent Pyrexia, and Vitiligo	Integumentary System	Aches and Fever and Others
7	*Ficus racemosa*	Seed and Young Twig	Root	Diabetics and Piles	Diarrhoea, Hyperpyrexia, Jaundice, Indigestion, and Wounds	Endocrine System and Urogenital System	Digestive System and Liver System
8	*Mangifera indica*	StemBark	Leaf and Stem Bark	Dysentry	Diarrhoea, Dysentery, and Wounds	Digestive System	Digestive System and Integumentary System
9	*Mimosa pudica*	Root	Root	Mastitis in Women	Wounds	Breast Diseases	Integumentary System
10	*Punica granatum*	Young Twig and Root bark	Root and Young Fruit	Intestinal Worm Infestation	Diarrhoea, Dysentery, and Jaundice	Digestive System	Digestive System and Liver System
11	*Rauvolfia serpentine*	Root and Leaf	Root	Malaria	Anasarca, Body Ache, and Rheumatism	Aches and Fever	Aches and Fever, Integumentary System, and Skeletal System
12	*Shorea robusta*	Stem Bark	Stem Bark	Canker Sore	Animal Bites, Diarrhoea, and Dysentery	Dental and Oral System	Digestive System and Integumentary System
13	*Withania somnifera*	Root	Root	Diarrhoea	Asthma	Digestive System	Respiratory System

Comparative Ethno-medico-botany of the *Mandi* in Dhaka Division of Bangladesh with the *Paliyan* in the Sirumalai Hills in Dindigul District of Tamil Nadu

Comparison between the *Mandi* and the *Paliyan* (Table 3) reveals that both of them use 6 plant species, namely belong to *Achyranthes aspera*, *Aristolochia indica*, *Artemisia nilagirica*, *Asparagus racemosus*, *Centella asiatica*, and *Punica granatum* belong to Amaranthaceae, Aristolochiaceae, Asteraceae, Liliaceae, Apiaceae, and Punicaceae to treat different ailments in 4 ailment categories/organ system categories (Digestive System, Integumentary System, Liver System, and Reproductive System) and 4 ailment categories/organ system categories (Dental and Oral System, Integumentary System, Respiratory System, and Urogenital System) respectively out of 109 and 90 plant species reported to be used by both of them. It is observed that out of 6 plant species, 2 plant species, namely *Aristolochia indica* (Integumentary System), and *Centella asiatica* (Integumentary System) is used by both of them to treat ailments in the same ailment category. It is observed that out of 6 Plant species, *Artemisia nilagirica* (Integumentary system and Digestive System) is used by the *Mandi* to treat ailments in more than one ailment category/organ system category. It is observed that no plants are used by the *Paliyan* to treat ailments in more than one ailment category/organ system category.

It is observed that out of 6 plant species, the *Mandi* use *Artimisia nilagrica* to treat a communicable disease, Leprosy; and 5 plant species *Achyranthes aspera*, *Aristolochia indica*, *Asparagus racemosus*, *Centella asiatica*, and *Punica granatum* to treat non-communicable diseases such as Animal Bites, Azoospermia, Cystitis, Dysentery, Intestinal Worm Infestation, Jaundice, Hepatospleenomegaly/Liver Pain, Rheumatism, and Wounds. It is observed that out of 6 plant species, the *Paliyan* use *Aristolochia indica* to treat communicable Common Skin Diseases; and 5 plant species, namely *Achyranthes aspera*, *Artimisia nilagrica*, *Asparagus racemosus*, *Centella asiatica*, and *Punica granatum* to treat non-communicable diseases such as Animal Bites, Asthma, Urolithiasis, Oral Problems, and Wounds.

Table 3: Comparative Ethno-medico-botany of the *Mandi*in Dhaka Division of Bangladesh with the *Paliyan* in the Sirumalai Hills in Dindigul District of Tamil Nadu

S/N	Botanical name	Part (s) Used		Biomedical Terms for Ailments		Organ System Categories	
		Mandi	***Paliyan***	***Mandi***	***Paliyan***	***Mandi***	***Paliyan***
1	*Achyranthes aspera*	Root	Root	Cystitis and Intestinal worm Infestation	Animal Bites	Digestive System	Integumentary System
2	*Aristolochia indica*	Leaf and Stem	Leaf	Wounds	Skin Diseases	Integumentary System	Integumentary System
3	*Artemisia nilagirica*	Leaf	Leaf	Dysentery, Leprosy, and Liver Pain	Asthma	Digestive System, Integumentry System, and Liver System	Respirational System
4	*Asparagus racemosus*	Root	Tubers	Azoospermia	Nephrolithiasis	Reproductive System	Urogenital System
5	*Centella asiatica*	Leaf and Seed	Leaf	Animal Bites, Jaundice, and Rheumatism	Wounds	Integumentary System and Liver System	Integumentary System
6	*Punica granatum*	Young Twig and Root Bark	Fruit	Intestinal Worm Infestation	Oral Problems	Digestive System	Dental and Oral System

Comparative Ethno-medico-botany of the *Mandi* in Dhaka Division of Bangladesh with the *Pawra* in the Satpura Hills in Nandurbar District of Maharashtra

Comparison between the *Mandi* and the *Pawra* (Table 4) reveals that both of them use 1 plant species *Asparagus racemosa* belongs to Liliaceae treat 1 ailment in different ailment categories/organ system categories (Dental and Oral System and Reproductive System) out of 109 and 79 plant species reported to be used by both of them. It is observed that *Asparagus racemosa* is not used by the *Mandi* to treat any communicable diseases but used to treat a non-communicable reproductive system disorder, Sexual Dysfunction. It is observed that *Asparagus racemosa* is not used by the *Pawra* to treat any communicable diseases but is used to treat a non-communicable Oral Problem, Gingivitis.

Table 4: Comparative Ethno-medico-botany of the *Mandi*in Dhaka Division of Bangladesh with the *Pawra*in the Satpura Hills in Nandurbar District of Maharashtra

S/N	Botanical Name	Part (s) Used		Biomedical Terms for Ailments		Organ System Categories	
		Mandi	***Pawra***	***Mandi***	***Pawra***	***Mandi***	***Pawra***
1.	*Asparagus racemosus*	Root	Root	Sexual Dysfunction	Gingivitis	Reproductive System	Oral and Dental System

Comparative Ethno-medico-botany of *the Mandi* in Dhaka Division of Bangladesh with the *Bhotiya* in the Niti Valley in Central Himalaya of Uttarakhand

Comparison between the *Mandi* and the *Tolchha* and *Marcha* sub-communities of the *Bhotiya* (Table 5) reveals that both of them use 2 plant species, namely *Achyranthes aspera* and *Centella asiatica* belong to Amaranthaceae and Apiaceae to treat different ailments in 4 (Digestive System, Integumentary Problems, Liver Problems, and Skeletal Problems) and 1 (Digestive System) ailment categories/organ system categories respectively out of 109 and 86 plant species reported to be used by both of them. It is observed that both of them use 1 plant species *Achyranthes aspera* to treat ailments in the same category (Digestive System). It is observed that out of 2 plant species (*Achyranthes aspera* and *Centella asiatica*), 1 plant species *Centella asiatica* is used by the *Mandi* to treat ailments in more than one ailment categories /organ system categories (Skeletal System, Liver System, and Integumentary System). It is observed that no plants are used by the sub-communities of *Bhotiya* to treat ailments in more than one ailment category/organ system category.

It is observed that out of 2 plant species, the *Mandi* use no plant species to treat communicable diseases and use 2 plant species, namely *Achyranthes aspera* and *Centella asiatica*to treat non-communicable diseases such as Intestinal Worm Infestation, Cystitis, Rheumatism, Jaundice, and Animal Bites. It is observed that out of 2 plant species, the sub-communities of *Bhotiya* use no plant species to treat communicable diseases and use 2 plant species, namely *Achyranthes aspera* and *Centella asiatica* to treat a non-communicable disease Intestinal Worm Infestation.

Table 5: Comparative Ethno-medico-botany of *the Mandi* in Dhaka Division of Bangladesh with the *Bhotiya* in the Niti Valley in Central Himalaya of Uttarakhand

S/N	Botanical Name	Part (s) Used		Biomedical Terms for Ailments		Organ System Categories	
		Mandi	***Bhotiya***	***Mandi***	***Bhotiya***	***Mandi***	***Bhotiya***
1.	*Achyranthes aspera*	Root	Root	Interstitial Cystitisand Intestinal Worm Infestation	Intestinal Worm Infestation	Digestive System	Digestive System
2.	*Centella asiatica*	Leaf	Whole Plant	Animal Bites, Jaundice Nociceptive Pain, and Rheumatism	Intestinal Worm Infestation	Integumentary System, Liver System, and Skeletal System	Digestive System

Table 6: List of Plants Used by the *Mandi* to Treat Communicable and Non-communicable Diseases

S/N	Botanical Name	Communicable Diseases	Botanical Name	Non-CommunicableDiseases
1.	*Andrographis paniculata*	Fever	*Abutilon indicum*	Mastitis in Women
2.	*Rauvolfia serpentine*	Malaria	*Achyranthes aspera*	Intestinal Worm Infestation and Interstitial Cystitis
3.	*Artimisia nilagirica*	Leprosy	*Aristolochia indica*	Wounds
4.	*Euphorbia hirta*	Cold	*Asparagus racemosus*	Azoospermia
5.			*Centella asiatica*	Rheumatism, Animal Bites, and Jaundice
6.			*Cissus quadrangularis*	Bone Fracture
7.			*Ficus racemosa*	Piles and Diabetics
8.			*Mangifera indica*	Dysentery
9.			*Mimosa pudica*	Wounds
10.			*Punica granatum*	Jaundice, Diarrhoea, and Dysentery
11.			*Shorea robusta*	Canker sore
12.			*Withania somnifera*	Diarrhorea

Table 7: List of Plants Used by the *Kandha* to Treat Communicable and Non-communicable Diseases

S/N	Botanical Name	Communicable Diseases	Botanical Name	Non-Communicable Diseases
1.	*Achyranthes aspera*	Typhoid	*Abutilon indicum*	Jaundice
2.	*Euphorbia hirta*	Cold	*Andrographis paniculata*	Dermatitis and Intestinal Worm, Infestation and Itches
3.			*Asparagus racemosus*	Dysentery
4.			*Cissus quadrangularis*	Bone Fracture
5.			*Ficus racemosa*	Hyperpyrexia, Jaundice, Wounds, Diarrhoea, and Indigestion
6.			*Mangifera indica*	Diarrhoea, Dysentery, and Wounds
7.			*Mimosa pudica*	Wounds
8.			*Punica granatum*	Jaundice, Diarrhoea, and Dysentery
9.			*Rauvolfia serpentina*	Body Ache, Anasarca and Rheumatism
10.			*Shorea robusta*	Diarrhoea, Dysentery and Animal Bite
11.			*Withania somnifera*	Asthma

Table 8: List of Plants Used by the *Paliyan* to Treat Communicable and Non-communicable Diseases

S/N	Botanical Name	Communicable Diseases	Botanical Name	Non-Communicable Diseases
1.	*Aristalochia indica*	Leprosy	*Achyranthes aspera*	Animal Bites
2.			*Artemisia nilagirica*	Asthma
3.			*Asparagus racemosus*	Nephrolithiasis
4.			*Centella asiatica*	Wounds

Table 9: List of Plants Used by the *Pawra* to Treat Communicable and Non communicable Diseases

S/N	Botanical Name	Communicable Diseases	Botanical Name	Non-Communicable Diseases
1.	---	---	*Asparagus racemosus*	Sexual Dysfunction and Gingivitis

Table 10: List of Plants Used by the *Bhotiya* to Treat Communicable and Non-communicable Diseases

S/N	Botanical Name	Communicable Diseases	Botanical Name	Non-Communicable Diseases
1.	---	---	*Achyranthes aspera*	Intestinal Worm Infestation
2.	---	---	*Centella asiatica*	Intestinal Worm Infestation

Communicable and Non-communicable Diseases

Tables (6, 7, 8, 9, and 10) show the number of plants used for treating communicable and non-communicable diseases by the *Mandi*, *Kandha*, *Pawra*, *Paliyan*, and *Bhotiya* ethnic tribes. It is noted that 7 plants (*Andrographis paniculata*: Fever, *Artimisia nilagirica*: Leprosy, *Euphorbia hirta*: Cold, *Rauvolfia serpentina*: Malaria, *Achyranthes aspera*: Typhoid, *Euphorbia hirta*: Cold, *Aristolochia indica*: Leprosy) are used by these 5 ethnic tribes to treat communicable diseases and 13 plants (*Abutilon indicum*: Jaundice *Andrographis paniculata*: Dermatitis and Intestinal Worm Infestation and Itches *Asparagus racemosus*: Dysentry, Animal Bites, Sexual Dysfunction, Gingivitis and Nephrolithiasis, *Cissus quadrangularis*: Bone Fracture, *Ficus racemosa*: Hyperpyrexia, Jaundice, Wounds, Diarrhoea and Indigestion, *Mangifera indica*: Diarrhoea, Dysentery, and Wounds, *Mimosa pudica*: Wounds, *Punica granatum*: Jaundice, Diarrhoea, Oral Problems and Dysentery, *Rauvolfia serpentina*: Body Ache, Anasarca and Rheumatism, *Shorea robusta*: Diarrhoea, Dysentery, An Animal Bite, *Withania somnifera*: Asthma, *Artemisia nilagirica*: Asthma and *Centella asiatica*: Wounds) are used to treat non-communicable diseases. It is noted that out of these 20 plants, 2 plants, namely *Asparagus racemosus* (5 uses) and *Punica granatum* (4 uses) have multiple uses and are mostly preferred by these 5 ethnic tribes.

The comparability i.e. similarity in plant usage to treat ailments between these unrelated culturally distinct ethnic tribes of India and Bangladesh may be through the sharing of information rather than independent diagnosis and the dissimilarity in plant usage may indicate certain sociocultural gaps, which in turn have prevented the sharing of traditional knowledge among the respective ethnic tribes.

Conclusion

Non-reported comparative ethnomedicine information/data about indigenous medicinal plants of various unrelated ethnic tribes are significant substitute routes in the quest for and selection of candidate plant species for screening, and identification of the pharmaceutically active substances present in indigenous medicinal plants. It is important to gather the traditional ethnomedicinal knowledge (ethnomedicine information/data) of indigenous medicinal plants and foster the database of indigenous medicinal plants for future research and development of new drugs. Expert-curated databases are required to organize the data derived from the research findings and published literature. Knowing the chemical nature of phytochemical constituents present in the plants will give some information on the distinctive functional groups accountable for their therapeutic properties. Phytochemicals from medicinal plants fill in as lead compounds in drug discovery and design. Clinical pharmaceutical scientists acknowledge that screening plants based on the data derived from traditional knowledge saves billions of dollars in time and resources. Cross-cultural comparison of plant use knowledge is vital not only for proposing ways of using plant natural resources but also for focusing on small-scale trade of medicinal plants.

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