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Research Article

Botany for Medicinal science

Indigenous Medicinal Plants of Tripura used by the Folklore Practitioners for the Treatment of Bone Fractures

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Abstract: Traditional medicine is the oldest form of medicine and modern medicine has its roots in it. The experienced folklore practitioners are very scientific in their approach and understand well the mind and body relationship. This has enabled them to treat their patients in an integrated and holistic manner. Indian system of medicine has identified around medicinal plants, of which 500 species are used in preparation of drug formulations. KiratDesh an ancient name of Tripura was well known as a land of hills and dates in the past and was very rich in flora and fauna diversity. Almost all the plants contain some chemical compounds that are beneficial to mankind and many of them are used for medicinal values. In Tripura, about 266 species have been found to have medicinal properties. Folklore practitioners of Tripura were studied for the use of indigenous medicinal plants in the treatment of bone fractures. They use a combination of herbal, physical and natural process for treatment. They know that natural resources that have nurtured the human race the secret of healing. Knowledge of Traditional medicine is like a family heirloom and is transferred by means of inheritance. This precious knowledge should be conserved and all of indigenous medicinal plants should be protected from unauthorized use for monetary gain. We recorded 23 numbers of wild indigenous medicinal plant species and formulations of 12 types of traditional medicine treatments for the cure of bone fractures. This is a preliminary study and there is more scope for further extensive research and documentation.

Keywords: Indigenous medicinal plants, Folklore practitioners, Traditional medicine, Bone fracture, Tripura

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1. INTRODUCTION

Medicinal and aromatic plants have long been used in different parts of the world in traditional medicines, since time immemorial. WHO in its surveys in the late 1970s listed 21,000 medicinal species used by people worldwide and reported that about 1 billion people rely on herbal medicine which is about 75-80% of the world's population.[1-2] Apart from conventional traditional use, the importance of medicinal plants has increased tremendously in last few years throughout the world. Scientists realize its value in the health sector and have developed feasible protocols for identification of their bioactive components and technology for large scale synthesis suitable for the modern pharmaceutical industry. The return of the philosophy 'back to nature' accelerates its magnitude manifold. India's treasure in medicinal plants extends to about 2500 species out of which 2000 to 2300 species are being used in traditional medicines while at least 150 species are in commercial use. Tripura, one of the eight states of the North eastern region of India, is bestowed with unique biodiversity and occupies a unique number of places where indigenous medicinal plants are available in the wild and the state is endowed with rich flora and fauna diversity (Fig 1). The number of indigenous medicinal plants of Tripura vary from 25 to 50% of the recorded medicinal plants of India. Out of 350 plants used in the Unani and Ayurvedic system of medicine, about 132 plants are found in Tripura in the wild. There are enough reports on indigenous medicinal plants utilized for different health problems.[3-4] The ethnic people of Tripura basically exploit indigenous medicinal plants from the natural forest rather than initiate their own cultivation. The Forest Department has given thrust to the medicinal plant sector by constituting the Medicinal Plants Board of Tripura (MPBT). Special endeavour is needed from the state government and MPBT to divert the trend of collecting medicinal plants from the natural forest by the local people through engaging them in commercial cultivation of such plants in agricultural lands. The approach will not only enrich the state economy but also be helpful for restoration of plant diversity and habitats. Folklore practitioner deals with the acquired knowledge system about the use of different indigenous medicinal plants resources among various ethnic communities living close to nature. The ethnic people are totally dependent on plants. Plants have been utilized as medicines for thousands of year.[5] Tripura is rich in folklore medicine culture based on herbs and ritual practices for health care adopted right from ancient times. The indigenous plants are the main source of the traditional medicine system practiced by folklore practitioners. Medicinal plants used for bone fracture are of age old practices in India including Tripura. Folklore practitioners of Tripura were studied for the use of indigenous medicinal plants in the treatment of bone fractures. The folklore practitioner detects the type and nature of the fracture by placing their hand on the injured portion, their expertise developed over long years of practice. After detection they use their herbal formulations in different modes. Herbal formulations are very effective in reducing pain and it relieves swelling of the fracture and also speedy recovery of the inju

2. MATERIALS AND METHODS

The study was conducted among the ethnic people of Tripura mainly inhabitant of Barmura-Devatamura hills and nearby area like Teliamura, Tetoibari, Ampinagar, Taidu, Gamakupara village, Baishamani. Karvu, Jantranapara (Fig 2). The length of Jampui hill is 74 k.m and the length of hill is 47 km. The main inhabitant of this area are Molsom, Chakma, Lushai tribes, Debberma, Kaipeng, Uchoi and Reang tribes. Field studies were carried out to identify the plant species in the presence of experienced folklore practitioners. In addition to field investigation the association of indigenous medicinal plants with ethnic inhabitants of Tripura was also considered. Traditional uses of indigenous plants information was obtained by oral interviews from folklore practitioners of the study area. A total of 17 selected folklore practitioners were interviewed, 12 were male and 5 female. The age of the healers was between 45 - 82 years. The collected information was cross checked, analyzed critically and recorded. The identification of plant specimens which were used in the treatment of bone fracture was confirmed by consulting literature survey according to different references concerning the medicinal plants of Tripura [6-9] and is presented in the form of herbarium and further confirmed by the taxonomist from Botany Department of Assam down Town University.

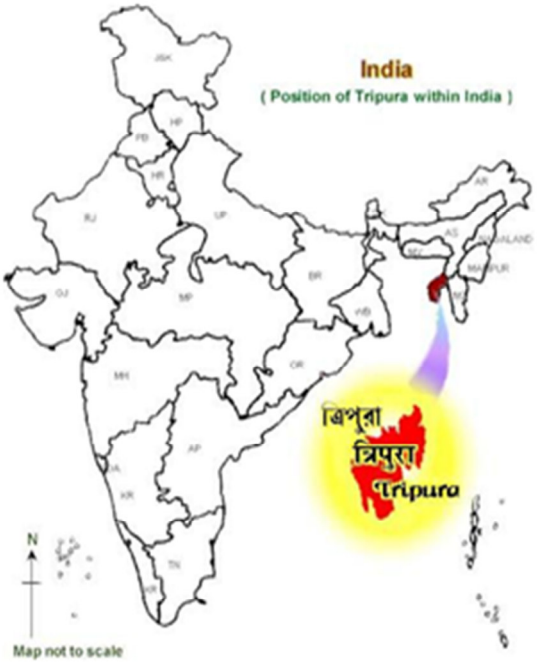

Fig 1: MAP of India showing Tripura state

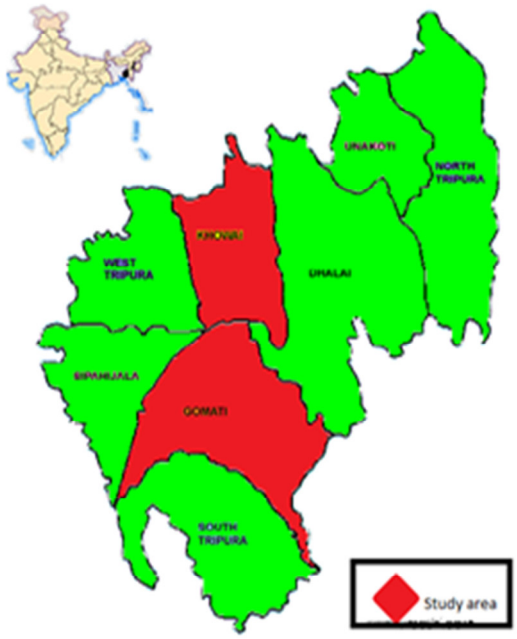

Fig 2: MAP of Tripura highlighting the study area in red colour

3. RESULT

The world's indigenous medicinal plants often lead to the belief of some supernatural cures and miraculous. In earlier days, most of medicine suggested and guided by a hermit (folklore practitioner) earned more favour and reputation than the one based on some test and experience.[10] As times changed and man started weighing everything on the scales of reasoning, several of earlier beliefs seemed unsound and despite their golden past, the use of medicinal herbs declined in most of the places. But few of the practices still have their faith among the ethnic communities and it is possible such beliefs suited the conditions and mental attitudes of the ethnic people living in the remote areas. The folklore practitioners belonged to various ethnic communities of Tripura viz., Molsom, Reang, Debberma, Lushai tribes, Kaipeng, Chakma, Tripuri and Uchoi tribes as reported in some previous work.[11] Through the present study 24 plants (Fig 3) identified and recorded which were used by the folklore practitioners and 12 types of traditional treatment for the cure of bone fractures. Along with the traditional medicine which were used both externally and taken orally, the patient was also given a supplementary diet which was rich in protein and calcium like egg, milk and vitamin C which includes various fruits like banana, guava, amla etc.[12] All these formulations were found to be very effective and accepted among the rural tribal populations. Extensive interactions were conducted among the folklore practitioners and patients; it was noticed that the patients were highly satisfied with their treatment. As reported by the other authors similarly the enumeration of this study proved that the use of herbal formulations stimulates calcification and bone repair which accelerates the formation of new bone on the fracture region.[13-14] It also worked as anti-inflammatory and pain relieving medicine. Most of the indigenous medicinal plants were collected from wild and most of the herbal formulations were obtained from trees, herbs, small shrubs and climber plants. The stems or stem barks and roots were the most commonly used plant part to prepare medicine. [15] The preventive measures and the herbal formulations of traditional medicines are given in Table I.

Table I: List of indigenous medicinal plants and method of treatment practiced by the folklore practitioners of Tripura

Serial No.	*Botanical Name*	*Parts used*	*Method of treatment*
Treatment I	*Cissus quadrangularis*	Whole plant	Whole plant is made into paste and plastered over the fractured part. Plastering of the paste is applied every after 7 days for 30 days.
Treatment II	*Calotropis procera*	Leaves latex	Latex is applied on the affected area and leaves are tied in fractured parts of bones.
Treatment III	*Kaempferia rotunda* *Viscum articulatum* *Bergenia ciliata*	Rhizome Whole plant Whole plant	The rhizome of *Kaempferia rotunda,* the entire plant of *Viscum articulatum* and *Bergenia ciliata* are ground into paste. Bandage the affected area with it. Leave it for 20-25 days
Treatment IV	*Abroma augusta* *Kaempferia rotunda* *Euphorbia hirta*	Root Rhizome Root	The root of *Abroma augusta*rhizome of *Kaempferia rotunda* and root of *Euphorbia hirta* are ground into paste, mixed with red mud and bandage the affected area with it. Leave it till the bandage loosens.
Treatment V	*Bergenia ciliata* *Viscum articulatum* *Kaempferia rotunda*	Whole plant Whole plant Fruit	All above species are ground individually and juice extracted. A type of stone is put into the mixture which is boiled for 10 minutes, cooled and bandaged on the fractured area. A powder of *Bergenia*

	Euphorbia hirta *Astilbe rivularis* *Terminalia chebula* *Terminalia belerica*	Whole plant Root Bark Bark	*ciliata, Viscum articulatum, Euphorbia hirta* and *Astilberi vularis* is boiled with water and one glass is taken once a day for two months.
Treatment VI	*Euphorbia hirta*	Bark	Bark of the *Euphorbia hirta* and spider is ground properly and made into paste. Bandage with it on the affected area, covered with bamboo sticks, wrapped properly and leave for 15-20 days or till it loosens.
Treatment VII	*Terminalia chebula* *Phyllanthus emblica* *Terminalia belerica* *Rubia cordifolia* *Abroma augusta* *Prunus cerasoides*	Bark Bark Bark Root Root Bark	Bark of *Terminalia chebula, Phyllanthus emblica* and *Terminalia belerica* are ground into powder and mixed with one glass of milk and taken twice a day for 15 days. The root of *Rubia cordifolia,* roots of *Abroma augusta* and bark of *Prunus cerasoides* are ground into powder and boiled with water till a paste is formed. The affected area is bandaged with it and left for 15 days.
Treatment VIII	*Kaempferia rotunda* *Abroma augusta* *Urtica dioica*	Root Root Root	All species are ground into paste and bandaged onto the fracture area. Bandage is retained till it loosens.
Treatment IX	*Engelhardtia spicata* *Kaempferia rotunda* *Euphorbia hirta*	Whole plant Rhizome Bark	Bark of *Engelhardtia spicata,* whole plant of *Euphorbia hirta*and rhizome *of Kaempferia rotunda* is ground properly and juice extracted. Mix and boil the mixture with water and make paste. Make a bandage with this paste and wrap in the fractured portion. Leave for 22-25 days.
Treatment X	*Plumbago zeylanica* *Pergularia daemia* *Vanda tessellata*	Root Leaves Leaves	Roots of *Plumbago zeylanica* are ground with leaves of *Pergularia daemia* and *Vanda tessellata* and the paste is plastered and bandaged for 21 days.
Treatment XI	*Oxalis corniculata* *Ficus benghalensis*	Whole plant Root	Whole plant of *Oxalis corniculata*is made into paste with tender prop roots of *Ficus benghalensis*and is applied on the fractured part and bandaged with light bandaged for 15 days. After removing the bandage the paste is applied for 7 more days.
Treatment XII	*Polyalthia longifolia* *Sesamum indicum* *Piper nigrum*	Stem Bark Seeds	Bark of *Polyalthia longifolia and* seeds of *Sesamum indicum* and *Piper nigrum* are taken in equal quantities, soaked in water for one hour, heated and ground. 2 spoonfuls of paste mixed with egg albumin is administered daily twice for 30 days and paste mixed with lime is applied on the fractured area and bandaged.

4. DISCUSSION

Tripura comprises of a well-established traditional bone healing system. In many places of Tripura, the folklore practitioners are renowned for their success in the treatment of bone fractures and injuries. The ethnic people have good knowledge about the use of indigenous medicinal plants. Herbal medicines for the cure of bone fracture prescribed by the folklore practitioners are either preparation based on a single plant part or a combination of several plant parts. The traditional medicines, their formulations and the use of indigenous medicinal plants indicated the rich knowledge of folklore practitioners who have made the ancestral knowledge alive in today's era. The folklore practitioners uses various indigenous medicinal formulations and the knowledge of bone setting is practiced from one generation to another, without any formal training.[16] They believe that all afflictions are caused by supernatural forces. The folklore practitioner uses their eyes, ears, nose and hands to diagnose as they live in interior areas and there is a lack of modern equipment for treatments. During the study we have noticed that while treatment of bone fractures the folklore practitioners first identifies the fractured area using some symptoms like pain , swelling, abnormal mobility, loss of function etc. [17, 18]Uses of indigenous medicinal plants and their extracts in different traditional formulations are wide practiced in traditional medicine and these plants are widely practiced because of its therapeutic value in the treatment of bone fractures. [19] The folklore practitioners use anti-inflammation herbal formulations in the treatment of bone fracture along with the herbal bandage. It relieves the pain as well as control swellings in the fracture site and reduced inflammation.[20]

Fig 3: Indigenous medicinal plants used in the treatment of bone fractures

5. CONCLUSION

We reported-species namely *Cissus quadrangularis, Calotropis procera, Kaempferia rotunda, Viscum articulatum, Bergenia ciliata, Abroma augusta, Euphorbia hirta, Astilbe rivularis, Terminalia chebula, Terminalia belerica, Prunus cerasoides, Phyllanthus emblica, Rubia cordifolia, Urtica dioica, Engelhardtia spicata, Plumbago zeylanica, Pergularia daemia, Vanda tessellata, Oxalis corniculata, Ficus benghalensis, Polyalthia longifolia, Sesamum indicum* and *Piper nigrum* which are used in the treatment of bone fracture. The present paper deals with the information of 23 indigenous medicinal plants, useful parts of plants and mode of administration for curing of bone fractures by the folklore practitioners. Root, Stem, Leaf, Bark, Latex, Fruits and Seed have been used in bone fracture and joint part. Many people still practice as healers for cure of bone fractures and hardly consult a physician or a recognised Practitioner. Their faith on herbal formulation based on traditional medicine system is unbelievable and the acceptability of these herbal formulations is quite high among the ethnic people of Tripura. Further survey and clinical researchare highly recommended to ascertain the efficacy of these herbal formulations.

6. AUTHORS CONTRIBUTION STATEMENT

Dr. Gunamoni Das conceptualized and gathered the data with regard to this work and carried out the field investigation under the guidance of Dr. R. K. Sharma. Dr.Anjan Kumar Sarma, NitulJyoti Das and Dr.PrasenjitBhagawatianalyzed these data and necessary inputs were given towards the designing of the manuscript. All authors discussed the methodology and results and contributed to the final manuscript.

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8. CONFLICT OF INTEREST

Conflict of interest declared none.

9. REFERENCES

1. WHO, World Health Organization. Geneva, Switzerland. WHO/EDM/TRM/2002.1. p. 2002-5; 2002. Traditional Medicine Strategy. Available from: https://apps.who.int/iris/bitstream/handle/10665/67163/WHO_EDM_TRM_2002.1_eng.pdf?sequence=1&isAllowed=y.
2. WHO. Guidelines for the production, control and regulation of snake AntivenomImmunoglobulins. Geneva, Switzerland: WHO Press; 2010. Available from: https://www.who.int/biologicals/expert_committee/Antivenom_WHO_Guidelines_DJW_DEB_mn_cp.pdf.

3. Das HB, Majumdar K, Datta BK, Ray D. Ethnobotanical uses of some plants by Tripuri and Reang tribes of Tripura. Nat Prod Radiance. 2009;8:172-80 Available form: http://nopr.niscair.res.in/bitstream/123456789/4040/1/NPR%208(2)%20172-180.pdf
4. Pandey A, Mavinkurve RG. Ethno-Botanical usage of plants by the Chakma community of Tripura, Northeast India. Bull Environ Pharmacol Life Sci. 2014 May 6;3(6):11-4. https://www.academia.edu/download/36275732/Chakma_Tribe_Paper__Tripura.pdf
5. Samuelsson G. Drugs of Natural Origin: a Textbook of Pharmacognosy, 5th. Stockholm: Swedish Pharmaceutical Press; 2004.
6. Deb DB, The Flora of Tripura state, Today and Tomorrows' Printers and Publishers, New Delhi., 1983, Vol.2 324-325. Available form: https://www.scirp.org/(S(lz5mqp453edsnp55rrgjct55))/reference/ReferencesPapers.aspx?ReferenceID=1961322
7. Majumdar K, Saha R, Dutta BK. Medicinal Plants Prescribe by Different Tribal and non- tribal Medicine Men of Tripura State. Indian J TraditKnowle. 2006;5(4):559-62
8. Jain SK. A manual of ethno-botany. Jodhpur: Scientific Publishing; 1987.
9. Jain SK. Dictionary of Indian folk medicine and ethnobotany. New Delhi: Deep Publications; 1991.
16. Agarwal A, Agarwal R. The practice and tradition of bonesetting. Educ Health (Abingdon). 2010 Apr;23(1):225. Epub 2010 Apr 21. PMID: 20589600
17. Omololu AB, Ogunlade SO, Gopaldasani VK (2008) The practice of traditional bonesetting. ClinOrthopRelat Res 466:2392–2398 CrossRefGoogle Scholar
18. Omololu B, Ogunlade SO, Alonge TO (2002) The complications seen from the treatment by traditional
10. Jain SK. Medicinal plants, (published by the director, national book trust, India, A-5, Green Park, new Delhi-110016).
11. Monlai S, Lalramnghinglova H, Arunachalam A. Traditional Tai-Khampti medicinal plants to cure fractured bones. Pleione. 2013;7:469-72
12. JabaDebbarma, Dipankar Deb. Sourabh Deb and B.K. Datta, Traditional bone setting (TBS): an ethno-orthopedic healing practice of Tripura, NE India, NeBIO an international journal of environment and biodiversity. Available from: https://www.researchgate.net/publication/306346555_Traditional_bone_setting_TBS_An_ethno-orthopedic_healing_practice_of_Tripura_NE_India. Vol. 7(2, June); 2016. p. 45-8.
13. Miranda LL, Guimarães-Lopes VP, Altoé LS, Sarandy MM, Melo FCSA, Novaes RD, Gonçalves RV. Plant Extracts in the Bone Repair Process: A Systematic Review. Mediators Inflam. 2019;2019:Article ID 1296153. doi: 10.1155/2019/1296153, PMID 31885494.
14. Dixit Jr Iii V, Kumar I, Palandurkar K, Giri R, Giri K. Lepidiumsativum: bone healer in traditional medicine, an experimental validation study in rats. J Fam Med Prim Care. 2020;9(2):812-8. doi: 10.4103/jfmpc.jfmpc_761_19, PMID 32318426.
15. Singh V. Medicinal plants and bone healing. Natl J Maxillofac Surg. 2017;8(1):4-11. doi: 10.4103/0975-5950.208972, PMID 28761270
bonesetters. West Afr J Med 21(4):335–337 Google Scholar
19. Singh, Vibha. "Medicinal plants and bone healing." *National journal of maxillofacial surgery* vol. 8,1 (2017): 4-11. doi:10.4103/0975-5950.208972
20. Siu WS, Ko CH, Lam KW, Wat E, Shum WT, Lau CB, et al. Evaluation of a topical herbal agent for the promotion of bone healing. Evid Based Complement Alternat Med. 2015;2015:10. [PMC free article] [PubMed] [Google Scholar]