

Original Research Article

Medicinal Plants Used by the Tribes for Snakebite Treatment at Jhargram Area, West Bengal

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Received: July 6, 2023; revised: October 10, 2023; accepted: October 20, 2023

<https://doi.org/10.5281/zenodo.10798231>

Available Online: 15 November, 2023

Abstract: Though the medical sciences have made enormous advances, plants are still considered as a potential source of drugs for treating various diseases worldwide. Plants are used extensively for the treatment of different health conditions with a high rate of recovery. The present study on ethnobotany was carried out to identify the plants and their parts that are used for the treatment of snakebite by the tribal population of Jhargram district. The study was conducted by taking interviews of the knowledgeable informants like tribal medical practitioners, elderly members of the tribal community and house-wives with structured questionnaire in the remote places of the district. The study investigated and listed 43 plants that are commonly used for snakebite treatment. Among them, herbs are dominated followed by trees, climbers, shrubs and grass. There are total 29 families, out of which 23 families were dicotyledons and 6 families belong to monocotyledons. This ethnobotanical study mainly emphasized on the documentation of those plants which are used for snakebite treatment and found it important for future use. The study may also influence other pharmacologists, ethno botanists and phytochemists for further extensive studies on medicinal plants used by tribal people of different parts of West Bengal.

Keywords: Ethnobotany, Knowledgeable informants, Medicinal plants, Snakebite, Traditional knowledge

Introduction

Prevalence of snakebites all over the world has affected humans since the beginning of civilization, especially in the locations with presence of highly venomous snakes. Snake bite has been reported by WHO as one of the most mistreated diseases which led to casualties worldwide (World Health Organization, 2007). WHO has also reported that approximately around 2,500,000 snakebites crop up annually worldwide which in turn leads to 1,25,000 casualties, out of the total number, 1,00,000 takes place in Asia itself and India contributes to almost 50000 of this data (Chaudhuri *et al.*,

2019). Out of the recorded 216 species of snakes residing in India about around 60 species are considered to be venomous (Mana *et al.*, 2019, Chaudhuri *et al.*, 2019). As because of the climate and a rich snake fauna in west Bengal, the most cases of envenoming are reported in the farmers, plantation workers and herdsmen's mainly from the rural or remote areas. Extensiveness of myths and superstitions has led to promotions of unscientific and unreasonable methods of snakebite handling in rural areas with low availability of proper treatment.

Since the beginning of time immemorial being the major sources of bioactive compounds, medicinal plants-based

remedies have attracted the eyes of researchers and medicine practitioners worldwide because of their naturally healing properties. It has been found that around 25% of the total drugs prescribed come from different medicinal plants (Pullani and Prabha 2020, Upasani *et al.* 2018). Ethnobotany considers as the systematic and scientific study of the traditional knowledge of rural and tribal people related to plants and their uses in medical purpose and religion (Upasani *et al.* 2018). There is a wide use of ethnobotanical science for understanding how indigenous knowledge can be used on the utilization of natural resources (Shukla *et al.* 2022). Rural and tribal people of all over the country rely on different indigenous methods of treatment like Ayurveda, Unani and Siddha. The acceptance of plant-based remedies is increasing day by day. The traditional methods along with Ayurveda, Unani and Siddha largely serve the rural and tribal people due to unavailability of modern treatment facilities in different parts of India (Pullani and Prabha 2020, Bose *et al.* 2015). Developing countries have a growing attempt of incorporating traditional medicines and herbal preparations for local health care and treatments. India is famous for having a great knowledge on medicinal plants. Various tribal groups in India, still depend on the medicinal plants for their primary health care (Bose *et al.* 2015, Mandal *et al.* 2020). Now-a-days many researchers involve themselves in acquiring potential ethnobotanical knowledge for the treatment of different diseases (Bose *et al.* 2015).

In India, different districts of West Bengal have a large number of tribal habitats mainly due to the availability of appropriate environment (Ghosh *et al.* 2015). The districts include Purulia, Bankura, Jhargram, Alipurduar, Paschim Medinipur, Jalpaiguri, Jharkhand, Darjeeling and so on. Tribes living in these districts majorly depend on the rich flora for their day to day purposes (Dolai *et al.* 2021). The main physiological issues treated by using the local medicinal plants are stomach problems, anaemia, common cough and cold, snake bite, insect sting, fractured bone, diarrhea, dysentery and so on (Mandal *et al.* 2020). The venom secreted from the glands of snakes is modified saliva, and a combination of various enzymes and proteins.

The major enzymes present in the snake venom are ATP-ase, Protease, Amino acid oxidase, Hyaluronidase, Cholinesterase, Phosphodiesterases (Mitra and Mukherjee 2014, Upasani *et al.* 2017). The major physiological issues caused by snake venom are tissue injury at the site of snake bite (cytotoxicity), renal damage, renal failure, cardiotoxicity, flaccid paralysis (neurotoxicity), coagulopathy and hemorrhage (hemotoxicity). Sometimes, it may also cause death (Upasani *et al.* 2017, Casewell *et al.* 2020).

Keeping the background in mind, the objective of this ethnobotanical study is to document and provide information regarding the medicinal plants used for treating snakebites by the tribal communities in the Jhargram district of West Bengal.

Materials and method

Source of data

The data has been collected by preparing structured questionnaires and interviewing the knowledgeable informants like tribal medical practitioners, elderly members of the tribal community and house-wives. The questions were based on the medicinal plants used for snakebite treatment and the part of plants used for treatment. The information has been gathered extensively from different parts of Jhargram district of West Bengal. Reported plants were identified on account of literature and taxonomic workout (Shukla *et al.* 2022, Bose *et al.* 2015, Mandal *et al.* 2020, Konar *et al.* 2022, Datta *et al.* 2014).

Study area

The selected area for conducting the present study is Jhargram district of West Bengal Fig. 1 (a and b). The district is renowned for its majestic wooded beauty along with Belpahari range. This place becomes attractive for the royal palaces, ancient temples and folk tunes. This district is located at 22.45° N and 86.98° E. The district has its head-quarters at Jhargram. Currently the forests of this district are located under the sub-division of Paschim Medinipur district. It has eight community development blocks which include Binpur-I, Binpur-II, Gopiballavpur-I, Gopiballavpur-II, Nayagram, Sankrail.

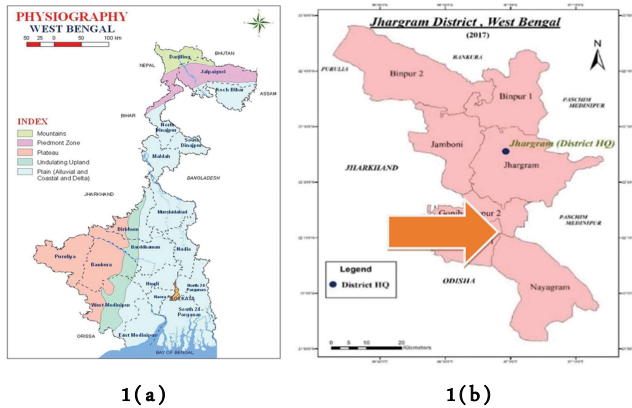


Fig. 1. 1(a): Map of West Bengal 1(b): Location of the study area (Jhargram District).

Jhargram district has an average elevation of 81 metre (above mean sea level). The highest place is Kakrajhore, having an altitude of 300 metre and Gopiballavpur with height of 65 metre being the lowest altitude. Temperatures of Jhargram varies from maximum 46° C in summer and minimum 4° C in winter. The climate is very humid and tropic with an average annual rainfall of 1400mm. The nature of soil is laterite, red, high in potassium and phosphorus, low in organic matter (Das and Das 2016, Sen and Bhakat 2020).

Result

The study also noted that these traditional medicines mainly work against the toxins of snakes like Red Sand Boa, Indian Rat Snake, Saw Scaled Viper, Common Krait, Russell's Viper, Common Vine Snake and Spectacled Cobra (Table 1).

The data collected from the knowledgeable informants have been tabulated (Table 1 and 2) and it has been found that 43 medicinal plants (Table 2) are used by the

Table 1. Common species of snakes found in Jhargram.

Sl.No.	Common Name	Scientific Name
1	Russell's viper	<i>Daboia russelii</i>
2	Common krait	<i>Bungarus caeruleus</i>
3	Spectacled cobra	<i>Naja naja</i>
4	Saw Scaled viper	<i>Echis carinatus</i>
5	Indian Rat snake	<i>Ptyas mucosa</i>
6	Common vine snake	<i>Ahaetulla nasuta</i>
7	Red sand boa	<i>Eryx johnii</i>







tribal population of Jhargram region for the snakebite and snake envenomation treatment. Among the recorded plants, herbs (37.20%) are mainly used for the treatment along with trees, climbers, shrubs and grass. Based on the bioactive component present, different parts of plants like roots (46.51%), seeds (13.95%), leaves (23.25%), latex (4.65%), bulb (2.32%), bark (4.65%) stem (2.32%) and rhizome (2.32%) are used.

Discussion









The main focus of the present study is to create a comprehensive picture of the ethnobotanical plants containing anti snake venom activity frequently used by the tribal population of Jhargram district, West Bengal. Jhargram is a storehouse of faunal and floral resources. The district is inhabited by a number of tribal communities like Lodhas, Santals, Sabars, Bhumijis, Koras, Mahalis and so on (Sahoo et al., 2023). Snakebite is one of the major problems of the tribal population residing all over West Bengal. Snake venom has neurotoxic, cytotoxic, hypotensive and anticoagulant effects which results in blister formation, oedema, tissue necrosis and intense pain. Various research has found that ethnobotanical plants actively take part in antivenom activities by reducing haemorrhagic and necrotic activity (Kadir et al., 2015).

In the present study, a total of 43 medicinal plants are found in the Jhargram region which are used for snakebite remedies by the tribal people. Among the different plants recorded, herbs are dominated followed by trees, climbers, shrubs and grass. There are total 29 families, out of which 23 families were dicotyledons and 6 families belong to monocotyledons. The study has been showed that different parts of plants are used for the treatment of snakebites by the tribal people. In very few cases the whole plant is used but in most of the cases roots, seeds, leaves, latex, bulb, stem and rhizome used for treatment. A study conducted by Sarkhel in 2014 also showed that tribal population of different districts of West Bengal also depend on parts of ethnobotanical plants for preparing anti venom against snakebites. The commonly

Table 2. Enumeration of different plant species.

Sl. No.	Local Name	Family	Parts used	Method to use	Image
1.	Apang, Chirchiti (<i>Achyranthesaspera</i> L)	Amaranthaceae (Herb)	RootsSeeds	Root extractwith crushed blackpepper is given orallyfor snake bite.	
2.	Bach (<i>Acorus calamus</i>)	Acoraceae (Herb)	Rhizome	Rhizomeextract withwarm watergiven orallyfor snakebites.	
3.	Rosun (<i>Allium sativum</i> L.)	Amaryliaceae (Herb)	Bulb	Paste of bulbgiven orally.	
4.	Nim (<i>Azadirachtaindica</i> A.Juss.)	Meliaceae (Tree)	Leaf	Leaf paste/extract is usedas snakebiteantidote.	
5.	Ishermul, Iswarmul, Bhedijanetet (Santali) (<i>Aristolochiaindica</i> Linn)	Aristolochiaceae (TwiningHerb/climber)	Root	Juice extractedfrom roots isused orallyfor snakebites.	
6.	Patharkuchi (<i>Bryophyllumpinnatum</i> (Lam.) Kurz)	Crassulaceae (Herb)	Leaves	Juice extractedfrom leaf isused forsnakebites.	
7.	Akanada (<i>Calotropis procera</i> R.Br)	Asclepiadaceae (Shrub)	LatexRootsLeaves	Root bark paste is usedorally andlatex isapplied ontothe affectedarea.	

8.	Kansira (<i>Commelinabenghalensis</i> L.)	Commelinaceae (Herb)	Leaf	Leaves paste is used for insect and snake bites.	
9.	Dhutra (<i>Datura metel</i> L.)	Solanaceae (Shrub)	Root	Garlic paste taken with Dhutra root are used in snakebite.	
10.	Amla (<i>Emblica officinalis</i> Linn)	Euphorbiaceae (Tree)	Root	Root extract with black pepper is used in snake bites.	
11.	Manasa (<i>Euphorbianeriifolia</i> L)	Euphorbiaceae (Shrub)	Latex	Latex is applied locally on affected area due to snakebite.	
12.	Gamar (<i>Gmelina arborea</i> Roxb.)	Verbenaceae (Tree)	Root/Bark	Decoction of the root and bark is used as an oral liquid in snakebite.	
13.	Gudmar (<i>Gymnemasylvestre</i> (Retz) R.Br.ex Schult)	Asclepiadaceae (Climber)	Root	The root is famous for its action against streptococcus and is reputed as a remedy for snakebite.	
14.	Anantmula (<i>Hemidesmus indicus</i> L. R.Br.)	Apocynaceae (Herb)	Roots	Roots of Anantmula along with <i>Allium sativum</i> (1:1) boiled and given as decoction and paste is applied on the site of the snakebite.	
15.	Kurchi tree (<i>Holarrhena antidysenterica</i> (L.) Wall)	Apocynaceae (Tree)	Seed	Seed paste is applied externally on the site of the bite.	

16.	Swetadrona (<i>Leucas Aspera</i> (willd) Link.)	Lamiaceae (Herb)	Leaves	The crushed leaves are applied locally on the snake bites.	
17.	Sajna (<i>Moringa oleifera</i> Lam)	Moringaceae (Tree)	Root	Root paste is used orally for snakebite.	
18.	Alkushi shrub (<i>Mucuna pruriens</i> (L.) Dc.)	Fabaceae (Climber)	Seed	Seeds paste used orally for snake venoms.	
19.	Ghikalla (<i>Momordica dioica</i> Roxb)	Cucurbitaceae (Climber)	Root	The root paste from male plant is applied externally on snake bites.	
20.	Shiuli (<i>Nyctanthes arbor-tristis</i> L)	Oleaceae (Tree)	Leaves	Juice of leaves is used as antidote to snake venoms.	
21.	Sarpagandha (<i>Rauvolfia serpentina</i> Benth.ex Kurz)	Apocynaceae (Shrub)	Root	Root decoction is used orally for snakebite.	
22.	Tentul (<i>Tamarindus indica</i> L.)	Caesalpineaceae (Tree)	Seed	Seed extract is used orally for snakebite.	
23.	Gulan-cha (<i>Tinospora cordifolia</i> (Willd))	Minispermaceae (Climber)	Root	Paste of root is applied on the snake bite.	

24.	Nishinda (<i>Vitex negundo</i> Linn.)	Verbenaceae (Tree)	Root	Root extract is given orally along with warm water.	
25.	Ashwagandha (<i>Withania somnifera</i>)	Solanaceae (Herb)	Root	Root powder with warm water is used for snakebites.	
26.	Kalmegh (<i>Andrographis paniculata</i>)	Acanthaceae (Herb)	Leaf/Root	Dried leaf decoctions orally and root paste applied externally for snakebites.	
27.	Bishalaya Karani (<i>Justicia gendarussa</i> Burm. f.)	Acanthaceae (Shrub)	Leaf	Leaves extract is given as an antidote to snake venom.	
28.	Githa (<i>Thunbergia grandiflora</i> Roxb)	Acanthaceae (Climber)	Whole plant	Whole plant especially root and rhizome paste is used for snakebite.	
29.	Chanchi (<i>Alternanthera sessilis</i> (L.) R. Br. ex DC. LC)	Amaranthaceae (Herb)	Whole plant	Paste of whole plant is given as an antidote to snake bite.	
30.	Baunati (<i>Amaranthus viridis</i> L.)	Amaranthaceae (Herb)	Whole plant	Paste of whole plant along with residue got after washing unboiled rice is used against snake venom.	
31.	Nati (<i>Ichnocarpus frutescens</i> (L.) W.T. Aiton)	Apocynaceae (Herb)	Root	Aqueous extract of squeezed and crushed root is used.	

32.	Sinduri (<i>Bixa orellana</i> L. LC)	Bixaceae (Tree)	Root	Paste of root is used applied on snake bite as antidote.	
33.	Luban <i>Boswellia serrata</i> Roxb. ex Colebr.	Burseraceae (Tree)	Seed	Powdered seed is used on affected area to stop bleeding caused by snakebite.	
34.	Hurhure (<i>Capparis zeylanica</i> L.)	Capparaceae (Shrub)	FruitSeed	Dried and powdered fruit and seed with warm water is used against snake venom.	
35.	Gothubi (<i>Kyllingabrevifolia</i> Rottb. LC)	Cyperaceae (Herb)	Whole plant	Aqueous extract of whole plant is used for snakebite.	
36.	Mukta jhuri (<i>Acalypha indica</i> L.)	Euphorbiaceae (Herb)	Whole plant	Paste of whole plant is given for an antidote of snake bite.	
37.	Gueebabla (<i>Acacia farnesiana</i> (L.) Willd.)	Fabaceae (Tree)	Root	Root extract is given against antidote to snake venom.	
38.	Bishoop (<i>Acacia pennata</i> (L.) Willd. LC)	Fabaceae (Tree)	Stem	Stem decoction is used orally for snake bite	
39.	Sirish (<i>Albizia procera</i> (Roxb.) Benth. LC)	Fabaceae (Tree)	Root	Fresh root paste used for snake bite externally.	

40.	Brahmi (<i>Bacopa monnieri</i> (L.) Wettst. LC)	Plantaginaceae (Herb)	Whole plant	Whole plant is dried and given with warm milk.	
41.	Kumeria (<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.)	Poaceae (Grass)	Root	Root paste is used orally in snakebite.	
42.	Kamini (<i>Murraya paniculata</i> (L.) Jack)	Rutaceae (Tree)	Bark	Paste of bark applied externally on the snake bite.	
43.	Lataphatkari (<i>Cardiospermum halicacabum</i> L. LC)	Sapindaceae (Herb)	Leaf	Leaf extract used both as decoction as well as applied on snake bite.	

found snakes against which these plants are used as antitoxins are Indian rat snake, Common vine snake, Red sand boa, common Krait, Russell's viper, Spectacled cobra and so on. The present investigation has also found that all the plants recorded are available and grow abundantly in the Jhargram area and generously used as therapeutics.

It has been found that the knowledge of ethnomedicinal treatment transmitted from one generation to another orally. However, the study observed that most of the traditional plants are eroding fast and the present generation are not willing to carry on the tradition. Conservation efforts should be employed for protecting these plants and maintaining a balance in the nature. This ethnobotanical study mainly emphasized on the documentation of those plants which are used for snakebite treatment. The study also found it important to document the use of these plants so that it can be further investigated through scientific experiments. The study may also influence

other pharmacologists, ethno botanists and phytochemists for further extensive studies on medicinal plants present in Jhargram district of West Bengal.

Acknowledgement

The authors are thankful to the Sub Divisional Officer, Jhargram for the administrative support. The forest officials and the local people those helped during the field work are remembered here with thanks.

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