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Herbal cure for poisons and poisonous bites from Western Uttar Pradesh, India

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PEER REVIEW

Peer reviewer

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Comments

Studies of this nature will be important and should be encouraged. Documentation of herbal remedies employed by herbalist is no doubt an important first step towards the rationalization and standardization of herbal drugs for the treatment of poisonous bites.

Details on Page S119

ABSTRACT

Objective: To conduct ethnopharmacobotanical field explorations in rural areas of five districts of Uttar Pradesh, India with regard to the folk herbal formulations associated with the management of poisons and poisonous bites.

Methods: Local traditional healers known as “Vaidya” and “Hakeems” in the study area were interviewed to gather ethnopharmacobotanical information using a questionnaire attending various medical practices.

Results: Information on 49 herbal formulations prepared from 39 plant species belonging to 28 plant families in the treatment of poisons and poisonous bites is presented in this scientific communication.

Conclusion: Present communication revealed that study area is rich in its ethnopharmacobotanical knowledge. The plant species discussed here also encompasses new reports on *Chenopodium album*, *Solanum xanthocarpum*, *Solanum melongena*, *Sesamum indicum*, *Calotropis procera*, *Coriandrum sativum*, *Cynodon dactylon*, *Brassica campestris*, *Triticum aestivum*, *Vitis vinifera*, *Sorgum vulgare* and *Nerium indicum*. This study further concludes that there lies a lot of potential in the Indian herbal repository which should be explored systematically and later subjected to thorough study under the light of latest available scientific research methodologies for the drug standardization and pharmaco-toxicological studies with a view to making cheaper and safer drugs for the benefit of humanity periodically encountered with poisons and poisonous bites.

KEYWORDS

Herbal formulations, Poisons, Poisonous bites

1. Introduction

The ethnic and rural societies of the world have preserved vast traditional knowledge of medicinal plants since prehistoric time. It is a well known fact that most of the valuable drugs used in allopathic medicines are derived from plant resources. The ethnopharmacobotanical field studies in the rural and tribal areas play pivotal role in unearthing key information which is unknown or less known about many of the plant species of our rich flora[1–3].

In a developing country like India, nearly 70% of the

population still rely on herbs, which are explored by the ethnic societies, exploiting them for the treatment of various diseases. Nation accounts for 2500 plant species of 1000 genera utilized by traditional phytotherapist[4–9]. Different ailments witness availability and usefulness of various plant species in the treatment of poisoning associated with different plants or poisonous bites from lethal attacks of snake, scorpion–other reptiles and insects. About 35000 to 50000 people die from snakebite every year in India[10]. The present study is an attempt to investigate and document the variety of herbal remedies in use by the local inhabitants

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and herbal practitioners for these health hazards. Although many such herbal drugs have not been recognized as poisons in modern medicine yet, these folk drugs have, in our present study, proven to be very promising in their effectiveness. Moreover, these herbal remedies are relatively cheaper and easily available to local population at their doorsteps. In many instances, the therapeutic benefits of these crude plant preparations have been shown to be either equal or superior to the modern therapeutic approaches.

2. Materials and methods

Review of literature revealed that only a very little information on ethnobotanical work conducted in Aligarh and Bulandshahar districts is available while, Farrukhabad, Hathras and Budaun districts of the State of Uttar Pradesh, India remain almost unexplored ethnobotanically. Prescribed study was conducted for five years (Jan 2007–2009 and Jan 2010–2012) in the rural areas of the following districts of western Uttar Pradesh namely: Aligarh, Bulandshahar, Budaun, Farrukhabad and Hathras districts. The location of the study areas is as follows: Aligarh (27°34′–28°11′ N Latitude 77°29′–78°38′ E Longitude) Bulandshahar (28°4′–28°0′ N Latitude 77°0′ 18–78°0′ 28 E Longitude) Budaun (47°40′–28°29′ N Latitude 78°16′–79°37′ E Longitude) Farrukhabad (26°45′ 45″–27°42′ 45″ N Latitude 79°10′ 45″ 8°6′ E Longitude) and Hathras (27°35′ N Latitude 78°3′ E Longitude)

Initially a pilot survey was conducted in the study area to locate the genuine herbal practitioners and the plant species growing in the region. Local traditional healers known as “Vaidya” and “Hakeems” in the study area were interviewed to gather ethnomedicinal information. All the informants were in the age group between 50 to 85 years. From each village more than 6 informants were interviewed who were known for their ethnobotanical acumen. Informants considered unreliable were eventually eliminated from the study. Each village was visited at least

once in each month to ensure that the informants were able to locate maximum plant species. A questionnaire was developed to elicit botanical name; family; vernacular name of the plant; plant part used; mode of drug preparation; administration; ailment treated and combination with other herbs. The data collected were further verified and cross-checked at different villages with renowned practitioners and the patients^[11].

Voucher specimens were collected from different locations and later they were identified by senior taxonomist (Associate Professor Dr. Athar Ali Khan). Plant specimens of non-domesticated plant species were kept in the herbarium of the Department of Botany, Aligarh Muslim University, Aligarh, U.P., India.

3. Results

The field work yielding the information herein presented was carried out in rural areas of five districts of Uttar Pradesh, India related to the folk herbal formulations associated with the management of poisons and poisonous bites. Present ethnomedicopharmacological investigation reports a total of 49 folk claims from the study area (Table 1) in which different plant parts were used, root/bulb; seed; leaf were used in 9 claims; fruit in 6 claims; whole plant in 7 claims; inflorescence and young bud in 1 claim and stem in 2 claims, respectively.

A total of 28 plant families were recorded in this investigation. Maximum number of folk claims were made in respect of two families; Solanaceae and Poaceae *i.e.*, 3 in number while 2 claims were recorded for seven plant families *i.e.* Leguminosae, Rutaceae, Meliaceae, Liliaceae, Umbeliferaceae, Brassicaceae and Apocynaceae. For the following families one folk claim each was recorded from the study area *i.e.* Ranunculaceae, Caricaceae, Lamiaceae, Scrophulariaceae, Asteraceae, Pedaliaceae, Asclepiadaceae, Euphorbiaceae, Fabaceae, Apiaceae, Amaranthaceae,

Table 1
Herbal cure for poisons and poisonous bites from Western Uttar Pradesh, India.

| Botanical name/Family | Local Name | Part Used | Uses/ ailments treated | Preparations | Mode of uses |
|--|--------------|------------------|---|----------------------------|---|
| <i>Chenopodium album</i> Linn. (Chenopodiaceae) | Chaulayee | Root Whole Plant | Snake; Spider poison | Paste; Decoction | 5 g; 7–8 thrice a day/7 d 25 mL; 3 times a day/3 d |
| <i>Solanum xanthocarpum</i> Sharad & Wendl (Solanaceae) | Choti kateli | Root | Snake poison; Dog bite | Paste; Decoction | 10 g; 4–5 times, once/4 d 10 mL; 3 times a day/ 4 d |
| <i>Gossypium herbaceum</i> (Malvaceae) | Kapaas | Seed Kernal | Snake poison; <i>Calotropis procera</i> poisoning | Seeds boiled in milk Paste | 30 mL; 3 times a day/4 d 20 g; once a day/3 d |
| <i>Ricinus communis</i> Linn. (Euphorbiaceae) | Arand. Andi | Root | <i>Papaver somniferum</i> poisoning | Decoction | 20 mL; 4–6 times a day/ 7 d |
| <i>Cajanus cajan</i> (Linn.) Millsp. (Leguminosae) | Arhar | Leaf | <i>Papaver somniferum</i> poisoning | Extract | 20 mL; 4–5 times a day/7 d |
| <i>Solanum melongena</i> Linn. (Solanaceae) | Baigan | Fruit | <i>Calotropis procera</i> poison | Eaten raw | 1–3 fruits eaten raw once a day/2 d |
| <i>Citrus aurantifolia</i> (Chr.) Sw. Swingle (Rutaceae) | Kagzi nebu | Fruit | Mercury; Scorpion poison | Extract Extract | 10 mL; 5–10 times a day/7 d applied externally thrice a day/2 d |
| <i>Tamarindus Indica</i> Linn. (Leguminosae) | Imli | Fruit | (Bhilawa) <i>Semecarpus anacardium</i> Poison | Eaten raw | 20 g; twice daily/3 d |
| <i>Sesamum indicum</i> Linn. (Pedaliaceae) | Til | Seed | Scorpion poison | Eaten raw | 10 g; along with 25mL milk twice a day/3 d |

Table 1, Continued:

Herbal cure for poisons and poisonous bites from Western Uttar Pradesh, India

| <i>Calotropis procera</i> (Ait) R. Br. (Asclepiadaceae) | Ak. Madar | Young Buds | Snake bite | Paste Powder | 10 g + 10 g each once a d/3d |
|--|-----------|---------------------|-------------------------------|--------------------|--|
| <i>Azadirachta indica</i> A. Juss. (Meliaceae) | Neem | Leaf | Snake bite | Extract | 20–30 mL; 4–6 times a day/2 d |
| <i>Citrullus colocynthis</i> Linn. Shrad (Cucurbitaceae) | Indrayan | Fruit | Snake bite; Scorpion sting | Powder; Powder | 5 g; twice in a day/5 d 5 g; once in a day/ 3d |
| <i>Allium cepa</i> Linn. (Liliaceae) | Pyaz | Bulb | Scorpion sting; Monkey's bite | Extract; Extract | 10 mL; twice a day/2 d 10 mL; twice a day and applies |
| <i>Coriandrum sativum</i> Linn. (Umbeliferae) | Dhaniya | Whole plant | Bee's sting | Extract | Applied externally twice a day/10 d |
| <i>Solanum nigrum</i> Linn. (Solanaceae) | Makoi | Whole plant | Bee's sting | Decoction/extract | 10 mL; twice a day/1 d |
| <i>Allium Sativum</i> Linn. (Liliaceae) | Lahsun | Bulb | Scorpion sting | Extract | Applied externally twice a day/2 d |
| <i>Tachyspermum ammi</i> Linn. Sprague (Umbeliferae) | Ajwan | Seed | Scorpion sting | Decoction | 15 mL + 10g Butter twice a day/3 d |
| <i>Raphanus sativus</i> Linn. (Brassicaceae) | Muli | Root | Scorpion sting | Decoction | Applied externally along with salt (NaCl) twice a day/2 d |
| <i>Cannabis sativa</i> Linn. (Cannabinaceae) | Bhang | Seed, Leaf | Scorpion sting; Dog bite | Raw; Raw | 2 g; twice a day /2 d Applied after warming till would heals |
| <i>Cynodon dactylon</i> Linn. (Poaceae) | Doob | Leaf | Scorpion sting | Extract | 20 mL; twice a day/2 d |
| <i>Brassica campestris</i> Linn. (Brassicaceae) | Sarson | Seed | Lizard poison | Paste | Applied externally twice a day/3 d |
| <i>Vitis vinifera</i> Linn. (Vitaceae) | Angur | Root | Dog bite | Powder | Applied externally twice a day/10 d |
| <i>Nigella sativa</i> Linn. (Ranunculaceae) | Kalaungi | Seed | Dog bite | Paste | 5 g; twice a day/10 d |
| <i>Sorgum vulgare</i> Pers. (Poaceae) | Jwar | Seed | Dog bite | Paste | 5 g; twice a day/15 d |
| <i>Nerium indicum</i> Mill. (Apocynaceae) | Kaner | Root | Snake bite | Paste | Applied externally thrice/5 d |
| <i>Carica papaya</i> Linn. (Caricaceae) | Papita | Fruit | Snake bite | Paste | 5 g; twice a day/10 d |
| <i>Ocimum sanctum</i> Linn. (Lamiaceae) | Tulsi | Whole plant | Snake bite; Bee's sting | Decoction; extract | Applied externally thrice/3 d Applied externally once/2 d |
| <i>Aegle marmelos</i> Linn. Corr. Ser. (Rutaceae) | Bel | Root bark | Snake bite | Decoction/extract | 20 mL; twice a day/5 d |
| <i>Bacopa monnieri</i> Linn. Pannell (Scrophulariaceae) | Brahmi | Leaf | Snake bite | Decoction/extract | 20 mL; twice a day/5 d |
| <i>Eclipta alba</i> Linn. (Asteraceae) | Bhangra | Whole plant | Scorpion sting | Decoction | 20 mL; twice a day/5 d |
| <i>Euphorbia thymifolia</i> Linn. (Euphorbiaceae) | Nayoti | Whole plant | Scorpion sting | Extract | 20 mL; twice a day/5 d |
| <i>Butea monosperma</i> (Lam.) Taub. (Fabaceae) | Dhak | Stem bark, seed | Snake bite | Paste | Applied externally twice a day/3 d |
| <i>Catharanthus roseus</i> Linn. G.Don. (Apocynaceae) | Sadabahar | Leaf | Bee's sting | Extract | Applied externally twice a day/2 d |
| <i>Coriandrum sativum</i> Linn. (Apiaceae) | Dhaniya | Seed | Bee's sting | Paste | Applied externally twice a day/10 d |
| <i>Melia azedarach</i> Linn. (Meliaceae) | Bakayan | Leaf, stem bark | Snake bite | Extract/paste | Applied externally thrice/3 d Applied externally twice / 2 d |
| <i>Achyranthes aspera</i> Linn. (Amaranthaceae) | Apamarg | Leaf, Inflorescence | Snake poison; Dog bite | Extract; paste | Applied externally thrice/3 d Applied externally twice/2 d |
| <i>Boerhavia diffusa</i> Linn. (Nyctaginaceae) | Punarnava | Whole plant | Snake bite | Paste | Applied externally thrice/5 d |
| <i>Triticum aestivum</i> Linn. (Poaceae) | Gahun | Fruit | Scorpion; Bee's stings | Paste; Paste | Applied externally thrice/3 d Applied externally once/2 d |
| <i>Lantana camara</i> Linn. (Verbenaceae) | Gajukampa | Leaf | Snake poison | Extract | Applied externally twice a day/5d |

Plant part used: Root/bulb: 9, Seed: 9, Leaf: 9, Fruit: 6, Whole plant: 7, Inflorescence:1, Stem:2, Young buds:1; Claims reported (49): Snake poisoning=16, Scorpion sting=12, Dog bite=6, Bee's sting=6, Spider poison=1, Lizard poison=1, Monkey's bite=1, *Calotropis procera* poisoning=2, *Papaver somniferum* poisoning=2, *Semecarpus anacardium* poison=1, Mercury poison=1; Families encountered (28)

Nyctaginaceae, Verbenaceae, Malvaceae, Euphorbiaceae, Chenopodiaceae and Cannabinaceae.

Ethnomedicobotanical results highlighted that the majority (16 in number) of reported claims were for snake bites. The claims reported for scorpion sting were 12 in number, while 6 cases were reported for dog bite and bee's sting. For *Calotropis procera* and *P. somniferum* poisoning, 2 claims were reported and for Spider and Lizard poisoning, Monkey's bite, *Semecarpus anacardium* poison, mercury poisoning one claim was reported for each.

4. Discussion

Poisoning is caused by the entry of toxins into the body through air, food, or drinks. Poisoning can also occur due to intentional or unintentional activities. Victims of poisoning should immediately be helped to avoid more fatal conditions such as injury, disability, paralysis, or even death. Antiserum is the only therapeutic agent available throughout the world which is invariably unavailable in most of the rural areas. Secondly, health care centers are some distance away.

Traditional healers play vital role at the crucial moment providing them medical aid through herbal formulations.

The traditional healers of Snake and other aforementioned poisonous bites represent only a small percentage (9%–14%) of the total herbalists in the study area. These traditional practitioners treat all kinds of poisonous bites like cobra, scorpion, lizards, monkey, dog, and including those from *Opium* (*Papaver Somniferum*), *Calotropis procera*, *Bhilawa* (*Semecarpus Anacardium*) and mercury. The services rendered by these herbalists are immense and considered to be a matter of dare necessity since in their absence, the victims do not generally survive for more than few hours.

Diagnosis and prognostic techniques employed by these herbalists include pulse rate, colour of the skin, movement of the eyes, patient's expressions, and gesture, patient with venomous bites has general weakness, nausea, fever and shock. Majority of the antidotes are prepared from freshly collected plant material. The treatment includes purgatives antidote plants either used solitary or with other secondary ingredients. It becomes necessary to quickly provide medical aid when such poisoning takes place. Some of them prove to be fatal when the victim is poisoned either with the reptiles, animals or with the poisoning of plants origin. At this critical stage of once life, when no medical aid is available due to approach, herbal folk people play vital role in saving the life of such patients by providing instant herbal aid to them^[12].

Pharmacological investigations show that extracts of plants such as *Achyranthes aspera*, *Gossypium herbaceum*, *Lantana camara*, *Ocimum sanctum*, *Solanum nigrum*, *Tamaridus indica*, *Ricinus communis* (leaf); *Aegle marmelos*, *Brassica campestris*, *Nigella sativa*, (seed); *Allium cepa*, *Allium sativum*, *Azadirachta indica*, *Bacopa monnieri*, *Boerhavia diffusa*, *Cannabis sativa*, *Cynodon dactylon*, *Eclipta alba*, *Euphorbia thymifolia* (whole plant); *Butea monosperma* (bark); *Cajanus cajan* (root); *Catharanthus roseus* (leaf and root); *Citrullus colocynthis*, *Coriandrum sativum* (fruit); and *Melia azedarach* (leaf and seed) are antiseptic^[13–23].

Early workers reported that *Gossypium herbaceum*'s leaf is used in snake bite but new report favors seed kernel for the same purpose. *Citrus aurantifolia*'s root and fruit are used as antidote in the present study; fruit extract of this plant is also used in mercury poisoning. *Cajanus cajan* is previously reported for snake poisoning while the present investigation favors its utility in opium poisoning. Previously, *Brassica campestris*'s seed paste is used in scorpion poisoning but our investigation has pointed to its utility in lizard poisoning.

Other reports also favour the utility of *Solanum xanthocarpum* (root), *Cannabis sativa* (leaf), *Vitis vinifera* (root), *Nigella sativa* and *Sorgum vulgare* (seed) in case of dog's bite. *Coriandrum sativum* and *Solanum nigrum* in case of bees sting and use of *Tamaridus indica* in *Semecarpus anacardium* poisoning in the study area^[24].

Globally many of the plant species are utilised in snake bite like *Mikania laevigata*, *Mikania glomerata*, *Enicostemma axillare*, *Aristolochia bracteata*, *Delonix elata*, *Mollugo cerviana*, *Merremia tridentata*, *Mimosa pudica*, *Curcuma longa*, *Anacardium occidentale*, *Vitis vinifera*, *Vitex*

negund, *Emblica officinalis*, *Hemidesmus indicus*, *Eclipta prostrate*, *Ehretia buxifolia*, *Cordia verbenacea*, *Tamaridus indica*, and *Eclipta prostrata*. Plant extracts of *Aristolochia indica* (terpenoids), *Hemidesmus indica* (phenols), *Gloriosa superba* (esters), *Strychnos nux-vomica*, *Rauwolfia serpentina* (alkaloids), *Eclipta prostrata* (wedelolactone), *Achyranthes aspera* (glycosides) and *Andrographis paniculata* (terpenoids) have shown potent venom neutralizing effect^[25].

It should be emphasised that, not only anti venom study of ethnomedicinally important plants is necessary, but also the anti poisoning potential of presently discussed plants is essential since the poisoning associated with bees, animals (scorpion, lizards, monkey, dog) and *Opium*, *Calotropis procera*, *Bhilawa* (*Semecarpus anacardium*) and mercury is also a very hazardous condition and needs a prompt medical attention.

The present study clearly demonstrates that there lies a lot of potential in the Indian herbal repository which should be explored and documented systematically and later subjected to thorough study with the latest available scientific investigations for the drug standardization and pharmacotoxicological studies with the ultimate aim of producing cheaper and safer drugs for the benefit of humanity.

Conflict of interest statement

We declare that we have no conflict of interest.

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Comments

Background

To conduct ethnopharmacobotanical field explorations in rural areas of five districts of Uttar Pradesh, India with regard to the folk herbal formulations associated with the management of poisons and poisonous bites. A lot of potential Indian herbal plants should be explored and documented systematically with the ultimate aim of producing cheaper and safer drugs for the benefit of humanity.

Research frontiers

The study is a bold attempt by the researchers to document traditional practices using herbal preparations for treating various poisoning from plants, reptiles and mammals. This is very encouraging since documentation of herbal therapies

from traditional healers is invariably a difficult thing to do and vital information on herbal remedies are usually lost between generations.

Related reports

There appear to be no published report of this nature which aims to document the ethnotraditional practices of the herbalist in rural areas of Uttar Pradesh, India, the study area. This makes the research particularly interesting because of the high degree of reliance on ethnotraditional healers.

Innovations & breakthroughs

The most important innovation in this paper is the documentation of the different herbal remedies used for the treatment of poisoning and poisonous bites. This will in the future be a very good guide for modern scientific researchers.

Applications

This research can be usefully applied researchers for basic pharmacological investigations into the scientific basis for the use of these herbal remedies. It could also be a library for local and international drug companies that may be interested in exploring and producing herbal remedies for poisonous bites.

Peer review

Studies of this nature will be important and should be encouraged. Documentation of herbal remedies employed by herbalist is no doubt an important first step towards the rationalization and standardization of herbal drugs for the treatment of poisonous bites.

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