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Plants used against snakebite by tribal people of Kendrapara district of Odisha, India

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ABSTRACT

The aim of the present study is to provide knowledge about the medicinal plants with anti-snake venom activity, used by the people of Kendrapara district, Odisha. Information on the medicinal plants were collected from different villages under nine blocks (Aul, Derabish, Garadpur, Mahakalpada, Marshaghai, Kendrapara, Rajnagar, Rajkanika and Patamundai) of Kendrapara district. During the survey a total of 38 plant species belonging to 36 genera and 29 families were identified as used for treatment of snakebite. The plants were arranged alphabetically according to their scientific name, habit, local name, family, parts used and mode of preparation of medicine. Maximum number of medicinal plants used for snakebite was recorded under the family Apocyanaceae and 68% plants were used orally and internally, whereas 32% of plants were externally applied to the affected area.

INTRODUCTION

Medicinal plants are used as remedies for venomous bites, due to the presence of therapeutic components. Traditional medicines play an important role in maintaining health care of majority of people in India. Traditional medicine

includes all kinds of folk medicine and any kind of therapeutic method that had been done by the tradition of a community or ethnic group (Akerele 1992; Rameshkumar & Ramakritinan, 2013). Snakebite is an important and serious problem and Global economic health hazard many parts of the world, especially in South Asian

countries. Now a days the importance of community-based ethno botanical knowledge is increasing for sustainable use and conservation of plant as well as standardization of appropriate drugs (Poonam & Singh 2009). These indigenous groups possess their own distinct culture, religious rites, food habit and rich knowledge of traditional medicine (Anuradha et al. 1986; Harsha 2002). Even today, indigenous and certain local communities practice herbal medicine to cure variety of diseases, with plants particularly used as folk medicine to treat snakebite (Houghton and Osibogun 1993). Envenomation due to snakebites is commonly treated by parenteral administration of horse or sheep-derived polyclonal anti-venoms aimed at neutralization of toxins. However, despite the widespread success of this therapy, it is still important to search for different venom inhibitors, either synthetic or natural, that could complement or substitute for the action of anti-venoms. Plants are reputed to neutralize the action of snake venom, with a plethora of plants claimed to be antidotes for snakebites in folk medicine (Kirtikar and Basu 1975). A large number of plants have been found to be effective as antidotes against snake venoms in India (Chopra et al. 1956). The study of herbal antidotes against snake venom is of great importance in the management of snakebite. There are few survey reports that reveal the practice of herbal medicine by either folk or indigenous communities (Bhandary et al. 1996). Odisha state in India, is known as a genetic paradise for its diversity in plant genetic resources, notably the Kendrapara district is blessed with rich and diverse cultural heritage and the people possess rich knowledge regarding plants including their usage for treating

common diseases (Mishra and Chaudhury 2012; Sahoo & Mahalik, 2020). During the recent years, more attention have been paid to the ethnobotanical survey of medicinal plants traditionally used for the treatment of snakebite patients. There are few reports on the ethno-botanical flora of the district in relation to various diseases and plants used against snakebite by the tribal community (Misra et al. 2012). Most of these reports are incomplete and inadequate. Hence, the focus of the present study is on the preliminary survey of medicinal plants for therapeutic application of snakebite and its extensive traditional use by the peoples in Kendrapara.

METHODOLOGY

Observation, documentation and plant identification

Informations on ethno-medicinal plants were collected from different villages less than nine blocks (Aul, Derabish, Garadpur, Mahakalpada, Marshaghai, Kendrapara, Rajnagar, Rajkanika and Patamundai) of Kendrapara district based on proximity to forests or rivers. The study was carried out from March to July 2020 during lockdown. The information on herbal medicinal plants against snakebite was collected through questionnaire and personal interviews with traditional healers and knowledge holders. The medicinal plants were collected from the field. While collecting the plants one of the healers was accompanied to make sure that the correct plant is collected. The plants were identified with the help of flora books-the flora of Odisha (Saxena and Brahmam 1994-96). Plants were enumerated alphabetically according to their scientific name with latest available nomenclature.

RESULTS AND DISCUSSION

The result of the present study on ethno medicinal plants used for snakebite showed that the tribal people of Koraput district have very good knowledge and wisdom on plants and their medicinal importance. The present paper provides information about ethno-botanical and scientific evidences of 38 plants species belonging to 36 genera and 29 families, which were identified as being used for treatment of snakebite. The plants are enumerated alphabetically according to their scientific name, habit, local name, family, parts used, mode of preparation and medicinal uses (Table 1). In the present study, most of the plants (n=11 species) were reported for the first time used against snakebite. However, no plant was reported as a new medicinal plant as the plants were reported with other use earlier. The reported plants were used by more than one ethnic group. Similar to this study, some of these plants like *Emblca officinalis*, *Hemidesmus indicus*, *Tamarindus indicus*, *Rauwolfia serpentina* have been earlier reported to have anti-snake venom activity in various ethno medicinal studies (Sakal 2013; Chatterjee et al. 2006; Ushanandini et al. 2006). From this study it has been observed that out of 29 families, maximum number of medicinal plants used for snakebite was recorded in the family Apocynaceae followed by Leguminaceae, Asparagaceae and Lamiaceae. But, some others reported that most of the plants used for snakebite belong to the families Rubiaceae and Euphorbiaceae, Acanthaceae, Amaranthaceae and Mimosaceae and Fabaceae (John 1984). Most of the traditional medicines were prepared by the healers, from fresh material collected from the wild. However, in some cases, sun dried stored plant materials were used for the treatment of snakebite. In the

present study people of Rajkanika block was found to use more number of plants resources for snakebite in comparison to other blocks. Maximum use of roots for treatment of snakebite was revealed during the present study as similar to other published reports. Preparation of paste for the treatment of diseases is a common practice among some tribal communities in India (Sarkhel 2013). In the present study, most of the medicines for treatment of snakebite were given internally (68%), which were mostly in the form of paste. The paste was prepared by grinding the fresh or dried plant parts with oil or water or milk. The decoction was obtained by boiling the plant parts in water or ghee until the volume reduced to minimum or required amount. The medicinal preparations were made from a single plant part or with some other additives like *Mimosa pudica* with raw rice water. They were using specific plant parts and specific dosages for the treatment of snakebite and the dose given to the patient depends on age, physical status and health conditions and times. Before treatment, the traditional healer observed condition of the patients carefully and then medicine was given. The most commonly used species was *Rauwolfia serpentina* having highest use value of 0.333 with six use-reports by 18 informants. Several earlier studies also revealed that *Rauwolfia serpentina* is the most important plant for antidote of snakebite. For treatment of snakebite reported in the study area are *Rauwolfia tetraphylla*, *Bryophyllum pinnatum*, *Andrographis paniculata*, *Asparagus racemosus*, *Musa paradisiaca*, *Nyctanthes arbor-tristis* and *Piper longum* for treatment of snakebite was reported in the study area. This is because of less availability of the plants in the study area leads them to

low use value among the peoples (Rokaya et al. 2010) Consumption of medicinal plants among different communities

depends on their availability and knowledge of their practices.

Table 1: list of plants used by the people of Kendrapara for treatment of snakebite

Scientific name	family	Life form	Parts used	Mode of application
<i>Achyranthes aspera</i> L.	Amaranthaceae	Herb	Root	Root paste is used orally
<i>Acorus calamus</i> L.	Aroraceae	Herb	Rhizome and root	Root paste is applied on effected area
<i>Andrographis paniculata</i> (Burm. f.) Wall. ex Nees	Acanthaceae	Herb	Root	Root paste is applied on wound area
<i>Asparagus racemosus</i> Willd.	Asparagaceae	Herb	Whole plant	Paste is used orally
<i>Azadirachta indica</i> A. Juss.	meliaceae	Herb	Leaf and stem	Paste is used orally
<i>Bambusa arundinacea</i> (Retz.) Willd.	Poaceae	Herb	Root	Paste is used orally and applied on the wound
<i>Bryophyllum pinnatum</i> (Lam.) Kurz.	Crassulaceae	Herb	Whole plant	Paste is taken orally
<i>Caladium bicolor</i> (Aiton) Vent.	Araceae	Shrub	Rhizome and root	Rhizome paste is taken orally
<i>Calotropis gigantea</i> (L.) W. T. Aiton.	Asclepiadaceae	Shrub	Latex	Latex is applied externally on the wound
<i>Cassia fistula</i> L.	Caesalpiaceae	Tree	Bark, fruit and root	Bark and root paste is applied on wound and fruit paste is given orally
<i>Chionanthus mala-elengi</i> (Dennst.)	Oleaceae	Tree	Whole plant	Whole plant paste is applied on the wound.
<i>Curcuma longa</i> L.	Zingiberaceae	Shrub	Root	Root is mixed with hot water and applied on the wound
<i>Cyperus rotundus</i> L.	Cyperaceae	Herb	Whole plant	Paste is taken orally and applied on wound.
<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	Tree	Leaf	Decoction is given orally
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Tree	Leaf	Juice is used orally

				and applied on wound.
<i>Hemidesmus indicus</i> (L.) R. Br.	Apocynaceae	Climber	Whole plant	Plant juice is given orally.
<i>Leucas aspera</i> (willd.) Link	Lamiaceae	Herb	Leaf and Whole plant	Leaf paste is applied on the wound and given orally
<i>Litsea glutinosa</i> (Lour.) C. B. Rob.	Lauraceae	Tree	Leaf and root	Paste is given to eat
<i>Martynia annua</i> L.	Martyniaceae	Shrub	Fruit and root	Paste is used orally
<i>Mimosa pudica</i> L.	Leguminosae	Creepers	Root	Paste is mixed with raw rice and given orally
<i>Momordica charantia</i> L.	Cucurbitaceae	Climber	Leaf and stem	Paste is applied on wound
<i>Moringa oleifera</i> Lam.	Moringaceae	Tree	Bark and root	Paste is used orally
<i>Musa paradisiaca</i> L.	Musaceae	Tree	Root	Paste is used orally
<i>Nyctanthes arbor-tristis</i> Linn.	Oleaceae	Tree	Root	Paste is used orally
<i>Ocimum sanctum</i> L.	Lamiaceae	Shrub	Leaf and root	Paste is used orally
<i>Opuntia elatior</i> Mill.	Cactaceae	Shrub	Whole plant	Paste is applied on wound
<i>Phoenix sylvestris</i> (L.) Roxb.	Areaceae	Tree	Fruit and seed	Paste is used orally
<i>Phyllanthus amarus</i> Schumach. & Thonn.	Euphorbiaceae	Herb	Root	Paste is used orally
<i>Piper longum</i> L.	Piperaceae	Creepers	Leaf	Paste is used orally
<i>Pongamia pinnata</i> (L) Pierre	Leguminaceae	Tree	Seed	Oil is extracted from the seed and used orally
<i>Rauvolfia serpentina</i> (L.) Benth. Ex Kurz	Apocyanaceae	Shrub	Root	Paste is used orally
<i>Rauvolfia tetraphylla</i> L.	Apocyanaceae	Shrub	Root	Paste is used orally
<i>Sansevieria roxburghiana</i> Schult. & Schult.f.	Asparagaceae	Shrub	Root	Paste is used orally
<i>Schleichera oleosa</i> (Lour.) Oken.	Sapindaceae	Tree	Bark	Paste is used orally
<i>Sphaeranthus indicus</i> Linn.	Compositae/ Asteraceae	Herb	Leaf and flower	Root juice is given orally
<i>Tinospora cordifolia</i> (Thunb.) Miers	Menispermaceae	Climber	Root	Paste is used orally
<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	Shrub	Flower	Paste is applied on the wound.

CONCLUSION

The present study on the ethnomedicinal resources of Kendrapara district of Odisha documented 38 plants species having therapeutic potential against snakebite. The most commonly used species for treatment of snakebite was *Rauvolfia serpentina* with highest use value among peoples followed by *Curcuma longa*, *Achyranthes aspera* and *Mimosa pudica*. The findings of this study suggest that some medicinal plants are sources of several chemical constituents and possess snake venom neutralizing potential and further work need to be carried out to elucidate the possible mechanism of action of these plant extracts against snake venom.

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