



Traditional Phytotherapy Treatment for Snake Bite and Scorpion Sting by Ethnic Groups of Kadapa District, Andhra Pradesh, India

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ABSTRACT

Traditionally plants have been used as a source of medicine in India by indigenous people of different ethnic groups inhabiting various terrains for the control of different ailments afflicting human. An ethnobotanical survey was undertaken to collect the information from tribal people using medicinal plants for the treatment of snake bite and scorpion sting by Kadapa District of Andhra Pradesh, India during the year of 2012. Ethnobotanical data was obtained through structural questionnaire and personal interviews during several field trips. The study revealed that the tribal leaders have been using 18 medicinal plant species belongs to 15 families to treat snake bite and Scorpion sting. Significantly higher number of medicinal plants was claimed by men when compared to women. The knowledge of herbal treatment to cure various diseases has been passed from generation to generation through verbal transmission from their ancestors. The tribals using different plant parts and different forms of the drug. Among them roots and paste form occupied significantly higher percentage. The plant based drugs were prepared by using them for the admixture of cow urine, garlic, gingelly oil, pepper, tati bellamu and tippasattu (a form of plant processed drugs) and other parts of the plant.

Keywords: Ethnobotany, snake bite, scorpion sting, Kadapa District.

INTRODUCTION

Ethnobotany is a multidisciplinary science which is defined as the interaction between plants and people¹. Plants have been used in traditional medicine for several thousand years². In India, drugs of herbal origin have been used in traditional systems of medicine such as Unani, Ayurveda and Siddha³. From an ancient times poisonous bite is an serious issue in the world. Millions of people die every year because of poisonous snake bites followed by scorpion stings. Snake bite is a serious medico legal problem in many parts of the world especially in the rural communities. It has been estimated that 5 million snake bite cases occur worldwide every year, causing about 1,00,000 deaths⁴. On an average 2,00,000 persons prey to snake bite per year in India and 35,000-50,000 of them die every year⁵. In case of scorpion sting estimated that in India, the annual number of scorpion sting cases exceeds 1.23 million, of which over 32,250 may be fatal⁶. Based on the epidemiological survey conducted by Hati *et al* in 1992 in 26 villages of Burdwan District, West Bengal, nearly 0.16 per cent/ year of an annual incidence and mortality rate of 0.016 per cent/year were observed⁷. In Maharashtra the highest incidences of snake bite have been reported (70 bite per 1,00,000 population and mortality of 2.4 per 1,00,000/year)⁸. The other states which show high incidences include Tamil Nadu, Uttar Pradesh and Kerala⁹. In Andhra Pradesh a total of 1379 cases of snake bites were recorded during the period of 1999 to 2003. The highest incidence of snake bite cases were recorded from the District of Mahabubnagar, while Srikakulam District had lowest incidence¹⁰. 3000 species of snakes were

distributed in the world among them 500 species are venomous and there are about 216 species of snakes identified in India; of which 52 are poisonous¹¹. The snakes most commonly associated with human mortality in India are Cobra (*Naja naja*), Krait (*Bungarus caeruleus*), Russells viper (*Vipera russelli*) and Saw scaled viper (*Echis carinatus*)¹² and Globally 1988 species of scorpions are known to occur of which 113 valid species of 25 genera under 6 families exist in India¹³. Among the 86 species of scorpions in India. *Mesobuthus tumulus* and *Palamneus swammer-dami* are medicinal importance¹⁴.

Due to lack of interest among the younger generation to learn the medicinal uses of plants and practicing the treatment, because it fetches very meager financial assistance to the practitioner. Moreover the general youth tendency at present days to migrate to cities for lucrative jobs. Most of the traditional knowledge had faded away due to lack of proper documentation and more number of practitioners. Hence an attempt has been made to document the available traditional knowledge with the Chenchu, Yanadi, Yerukula ethnic tribes of Kadapa District, Andhra Pradesh, India.

Description of the study area

YSR Kadapa District (Cuddapah) is a District in the state of Andhra Pradesh, India (Figure 1). The District covered by many undulations between 259' and 3787' from the Mean Sea Level. The District lies between 79° 29" and 79° 55" Eastern and 30° 43" and 15° 14" Northern latitudes. The District is surrounded on three sides by the Nallamala and Palakonda hills of Eastern Ghats. Based on geological and tectonic considerations the Eastern Ghats formed of

four sections. Among the third section lies between the Krishna river and the Chennai city along the arcuate Eastern margin of the Cuddaph basin. This section includes the Nallamala hills of Kurnool, Prakasam, Mahabubnagar. Veligonda, Palakonda hills of Cuddapah and Nellore Districts, Seshachalam hills of Cuddapah and Chittoor Districts of Andhra Pradesh¹⁵. The District covers an area of 15,938 square kilometers with nearly 33% of it under forests¹⁶. Red Sanders- *Pterocarpus santalinus* (Fabaceae), an endemic and endangered tree species of medicinal value is available in plenty in this area. This is the only area in India where Red Sanders, often referred to as 'Rakta-chandanam' or 'Yerra-chandanam' (red sandalwood) is available and it is the chief source of revenue for the state and nation. A national park is set up

in Seshachalam hills and Srilanka Malleswara Sanctuary was established for prospecting wild animals. The District experience its minimum temperature varies in between 28-30°C in November to January and its hottest temperature varies in between 40-45°C during April to May. According to the 2011 census YSR Kadapa District has a population of 2,884,524. The District has a population density of 188 inhabitants per square kilometer (490 /sq mi). Its population growth rate over the decade 2001–2011 was 10.87%. YSR Kadapa District has a sex ratio of 984 females for every 1000 males, and a literacy rate of 67.88%. Among this population the District has 61,317 scheduled tribes. The tribal inhabitants of this area are Chenchu, Yanadi and Yerukula groups.

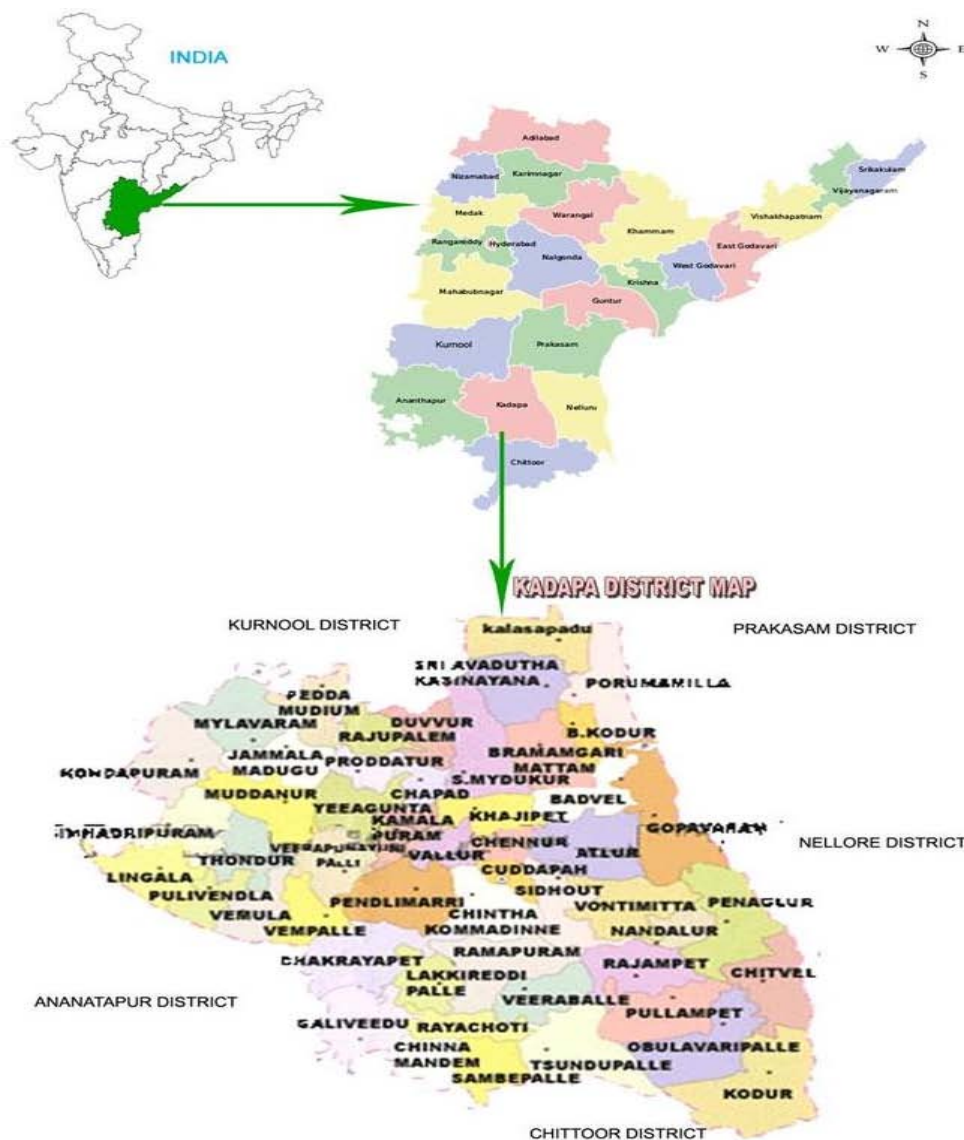


Figure 1: Location of the study area in Andhra Pradesh, India.

MATERIALS AND METHODS

In order to document the utilization of indigenous medicinal plants and use of traditional medicine a survey was carried out by several field trips during the year of 2012. The information on medicinal uses of indigenous plants has been described after gathering information

from experienced rural folk traditional herbal medicine practitioners who are having knowledge of traditional healing. The informants belongs to Chenchu, Yanadi and Yerukula tribal people are interviewed and brief discussion was made in local language. The ethnobotanical data collection to get their consent and to

explain to them that their cooperation is valuable contribution to documentation of the traditional plants used by them. In addition not only locating the medicinal plants in the field but also employed to collect the data on the knowledge and management of medicinal plants with the help of local healers. A structural questionnaire was used to elicit information from them and methodology used based on the methods available in literature¹⁷. During the study local name of the plants, parts used, mode of preparation and administration with modification of medicine was recorded.

Identification of plants

The plant species were collected from the forest with the help of practitioners and identified using the Gamble volumes¹⁸ and local floras as well as through comparison with identified specimens deposited in the herbarium of Sri Venkateswara University. The gathered information was documented on data sheets and herbarium sheets with voucher number are preserved in department of Botany, S.V.U. College of sciences, Tirupati.

RESULTS AND DISCUSSION

The information on scientific name, common name, family name, voucher specimen number, habit, parts used and mode of administration of plants have been shown in table 1. The study revealed that the healers of this tribal peoples used 18 medicinal species. According to the habit of plants- trees (07), climbers (04), herbs (04), shrubs (02) and creepers (01) (Figure 2). Different parts of the medicinal plants are using by the traditional practitioners, among them roots (43%) were used for the preparation of medicines predominantly followed by leaves (29%), seeds (09%), stembark (09%), fruits (05%) and leaf latex (05%) (Figure 3). The common use of roots in the preparation of remedies are higher percentage were reported. The use of roots in the preparation of remedies is also common elsewhere¹⁹. The most prevalent methods of drug preparation are paste (27%), juice (23%), powder (18%), decoction (14%), crushed form (9%), natural form (05%) and latex (4%) (Figure 4).

The practitioners prescribed the medicine either based on single plant part or a combination of several plant parts also reported that the plants used as single or in combination^{20, 21}. The use of water as diluent is the most frequently found for the preparation of drug, other useful diluents are reported as cow urine, gingelly oil. Ingredients for the preparation of drugs are garlic, pepper, tati bellamu and tippasattu a form of plant processed drugs from *Borassus flabellifer* and *Tinospora cardifolia* respectively. 55% of the remedies were applied through oral tract while 32% were applied on topical parts of the skin, 9% are taken through licking orally and 4% of vapors are inhaled through nose (Figure 5).

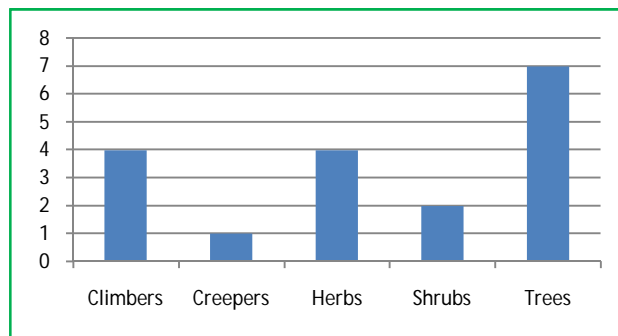


Figure 2: Distribution of medicinal plant species according to their life form

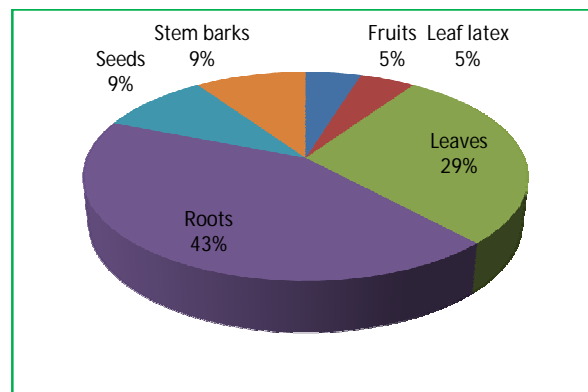


Figure 3: Percentage of different plant parts used in the preparation of traditional medicine

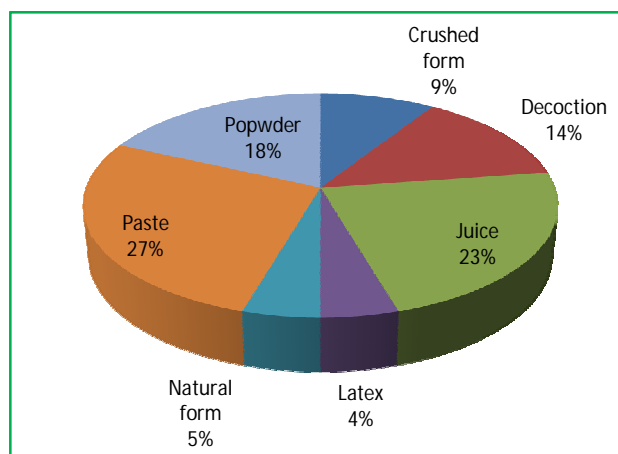


Figure 4: Percentage of different drug formulations used in traditional medicine

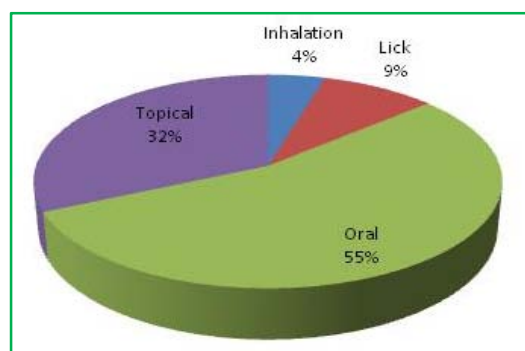


Figure 5: Percentage of mode of administration of drugs in traditional medicine

Table 1: Medicinal plants used to treat snake bites and scorpion stings by tribal people of kadapa district.

S. No	Botanical & Vernacular names & Voucher number	Family name & Habit	Part used & Administration	Medicinal uses
1.	<i>Acalypha indica</i> L. (Kuppentaku) YS 16	Euphorbiaceae (H)	Leaf (Topical)	The paste was prepared by using fresh leaves with admixture of one piece of garlic and 4-5 g of pepper powder is poultice on the stinging point for the treatment of Scorpion sting.
2.	<i>Alangium salvifolium</i> Wang.(Oodaga) YS 35	Alangiaceae (T)	Stem bark (Oral)	The powder of stem bark with cow urine is used for the treatment of snake bites.
3.	<i>Andrographis paniculata</i> Nees. (Nelavemu) YS 57	Acanthaceae (H)	Root (Oral)	The root decoction is used for the treatment of scorpion sting.
			Leaf (Oral)	The leaf juice with garlic is used for the treatment of snake bites.
4.	<i>Aristolochia indica</i> Linn. (Nalla eswari) YS 10	Aristolochiaceae (CL)	Root (Oral)	Root decoction is used for the treatment of snake bites.
5.	<i>Borassus flabellifer</i> L. (Tati) YS 34	Arecaceae (T)	Root (Oral)	The juice was prepared by using fresh roots with admixture of <i>Tinospora cardifolia</i> and <i>Phyllanthus reticulatus</i> leaves in equal proportion for the treatment of Snake bites. Precaution: Avoid head bath and sleep for 24h while on treatment.
6.	<i>Calotropis gigantea</i> (L.) R.Br.(Tella jilledu) YS 64	Asclepiadaceae (SH)	Root (Oral)	The root decoction is used for the treatment of snake bites.
			Leaf latex (Topical)	The leaf latex is applied externally at the stinging point for the treatment of scorpion sting.
7.	<i>Citrullus colocynthis</i> Hrad. (Veri puccha) YS 56	Cucurbitaceae (CR)	Fruit (Oral)	The natural form of fresh fruit pulp is used for the treatment of snake bite and scorpion sting.
8.	<i>Cleome viscosa</i> L. (Kukka vominta) YS 22	Capparidaceae (H)	Leaf (Topical)	The crushed form of leaves is poultice to used for the treatment of scorpion sting.
9.	<i>Cryptostegia grandiflora</i> R.Br. (Vishabuddi) YS 48	Periplocaceae (CL)	Root (Oral)	The juice was prepared by using root of <i>C. grandiflora</i> and <i>Aristolochia indica</i> for the treatment of Snake bites. Precautions: Avoid head bath and sleep for 24h while on treatment.
10.	<i>Holarrhena pubescens</i> (Buch-Ham.) (Kolamukhi) YS 17	Apocynaceae (T)	Stem bark (Oral)	The powder form of stem bark is used for the treatment of snake bite and scorpion sting.
11.	<i>Kigelia Africana</i> Lam. (Naga malli) YS 21	Bignoniaceae (T)	Root (Topical)	The root juice is poured into the eyes for the treatment of snake bite and scorpion sting.
12.	<i>Oroxylum indicum</i> Vent. (Nemali chettu) YS 91	Bignoniaceae (T)	Leaf (Topical)	The crushed form of drug was prepared by using leaves and garlic is poultice to used for the treatment of scorpion sting.
13.	<i>Pedaliium murex</i> L. (Enugu palleru) YS 58	Peddaliaceae (H)	Leaf (Oral)	The powder was prepared by using plant leaves, tati bellamu from <i>Borassus flabellifer</i> , tippa sattu from <i>Tinospora cardifolia</i> is used for the treatment of Snake bites.
14.	<i>Pergularia daemia</i> (Forsk.) Chiov. (Jettipaku) YS 52	Asclepiadaceae (CL)	Leaf (Inhalation)	The leaf juice is poured into the hot gingelly oil. The vapors are inhaled and the leaves are poultice at the point of sting for the treatment of scorpion sting.
15.	<i>Strychnos nuxvomica</i> L. (Visha mushti) YS 111	Strychnaceae (T)	Seed (Topical)	The paste of seeds is applied on the eye let for the treatment of snake bites.
			Seed (Topical)	Seed paste is poultice to stinging point for the treatment of scorpion sting.
			Root (Oral)	The paste is prepared by using roots of <i>S. nuxvomica</i> , <i>Decalepis hamiltonii</i> , <i>Solanum pubescens</i> , <i>Alangium salvifolium</i> , <i>Pongamia pinnata</i> , <i>Randia dumetorum</i> and <i>Azadirachta indica</i> is used for the treatment of snake bites.
16.	<i>Strychnos potatorum</i> L. (Chinna mushti) YS 116	Strychnaceae (T)	Seed (Oral)	The powder of stem barks of <i>S. potatorum</i> and <i>S.colubrina</i> is mixed in cow urine for the treatment of snake bites.
17.	<i>Tinospora cardifolia</i> (Tippa teega) YS 47	Menispermaceae (CL)	Root (orally licking)	The paste is prepared by using roots of <i>T. cardifolia</i> and seeds of <i>Sesamum alatum</i> are licking or applied externally to the eyes for the treatment of snake bites.
18.	<i>Withania somnifera</i> L. (Pennuru gadda) YS 25	Solanaceae (SH)	Root (Orally licking)	The paste is prepared by using plant roots and is licking for the treatment of snake bites.

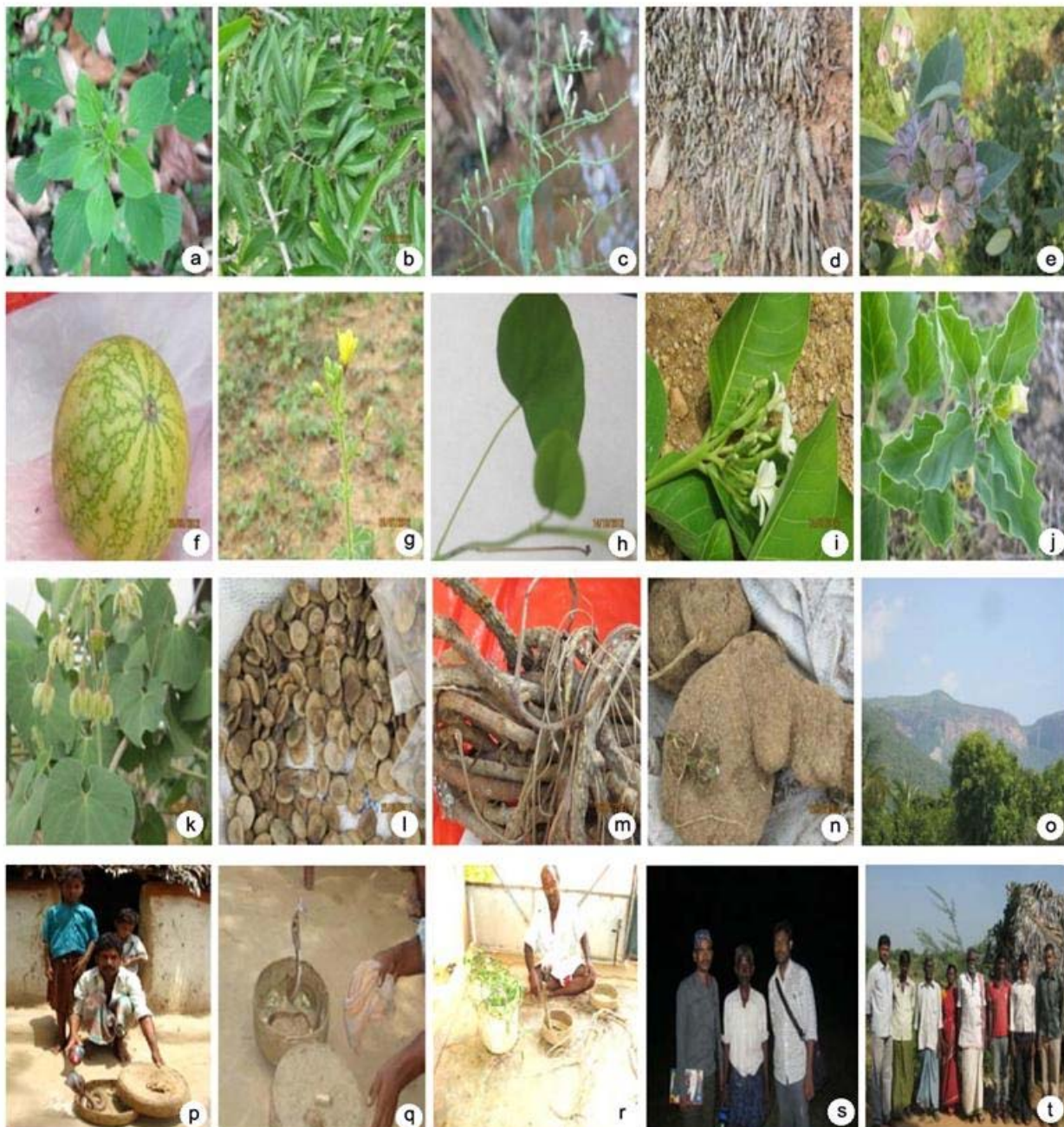


Figure 6: Plants used by ethnic groups for Snake bite and Scorpion sting: a) YS 16 b) YS 35 c) YS 57 d) YS 34 e) YS 64 f) YS 56 g) YS 22 h) YS 48 i) YS 17 j) YS 58 k) YS 52 l) YS 111 m) YS 47 n) YS 25 o) Deep forest of Kadapa district p-r) Snake charmers of Yanadi tribes, s) Yerukula tribe with authors, t) Chenchu tribal family with authors.

The leaf paste of *Acalypha indica*, Crushed form of *Cleome viscosa*, *Oroxylum indicum*, leaves of *Pergularia daemia* and seed paste of *Strychnos nux-vomica* are poultice to externally, *Kigelia africana* root juice are poured into the eyes externally, *Pergularia daemia* leaf juice is poured in to the hot gingelly oil, the evaporated vapors are inhaled. The seed paste of *Strychnos nux-vomica* and root paste of *Tinospora cardifolia* are applied externally on eyelet and *Withania somnifera* is licking for the treatment of snake bite and scorpion sting. 77% remedies were applied through oral route, 8% were applied topically and 15% were licking in the case of treatment of snake bite. 33% remedies were applied

through oral route, 56% were applied topically and 11% were applied externally on the eyelet for the treatment of scorpion sting.

During the survey it was found that the practitioners of Kadapa District collect medicinal plants from variety of habitats mainly wild plants collected from nearby forests and Nallamala reserve forest areas which is dominated by *Alangium salvifolium*, *Boswellia serrata*, *Butea monosperma*, *Chloroxylon swietenia*, *Ficus hispida*, *Gyeanocarpus asiaticus*, *Lannea coromandelica*, *Pongamia pinnata*, *Strychnos nux-vomica*, *Tamarindus indicus*, *Terminalia arjuna* trees. The photographs of important medicinal plants and tribals shown in Figure 6.

For the preparation of drugs, the practitioners mainly using two methods. In the first method, drug preparation was done by shade drying and then pounding of the plant parts to form powder. The infusion or decoction of this powder is prepared after boiling with water. In the second method, pellets were prepared after mixing with cow's ghee, honey or with other lubricant like oil of plants.

Nearly 80% of the global population still depends upon the herbal drugs for their health care. Plants are used either single or in combination as antidotes for snake bite and scorpion sting by rural populations in India and in many parts of the world since time immemorial. The medicine prepared in combination of plant parts from *Tinospora cardifolia*, *Phyllanthus reticulatus*, *Aristolochia indica*, *Borassus flabellifer*, *Decalepis hamiltonii*, *Solanum pubescens*, *Alangium salvifolium*, *Pongamia pinnata*, *Randia dumetorum*, *Azadirachta indica*, *Strychnos colubrina* and *Sesamum alatum* for the treatment of snake bite and scorpion sting.

Most treatments were reported to be completed within two or three days. Somehow are weeks to months. But, in case of snake bite treatment healers keep the patients for two or three days under continuous observation till the patients are antivenin. The patients were considered antivenin by the healers only often conformation for that the patient has given the cooking salt or capsicum to tasteless and dosage is repeated until the taste return to normal. Liquid remedies administrated to patients were usually measured by spoon or cup or number of drops. When patients did not show any sign of recovery to their illness then the healers sent the patients to nearby modern health centers.

The medicinal flora of Kadapa District was earlier studied²²⁻²⁵ and Ethnic information on treatments for snake bites in Kadapa District of Andhra Pradesh was studied²⁶. Surprisingly our study revealed 18 plants used by the ethnic groups Kadapa District is new and most preferable because combination of plant parts is working more efficiently. The plants mentioned in the previous study not repeated, through we interview the ethnic groups of Kadapa District. The present study is providing new and additional information compare to previous documentations.

CONCLUSION

It can be concluded that the tribal people of Kadapa District possess rich ethno pharmacological knowledge and therefore use several medicinal plant species in their traditional healthcare delivery system for snake bite and scorpion sting. These tribal people prefer keep this knowledge with them for their own profit. Data is always lost without any records after their passing away and lack of interest among the younger generation. So it is urgent need to identification and documentation. Snake bite and Scorpion sting constitute a significant medical emergency especially in rural areas. Data mentioned above clearly envisage that the herbal medications have excellent

potential to treat snake bite and scorpion sting. Traditional medicinal knowledge is important not only for its potential contribution to drug development and market values but also for the healthcare professionals. The above information is useful for scientists, drug designers, medicinal plant boards and other scientific bodies. Further studies require to their chemical contents and toxicity, if any, may help to increase the efficacy of their claims.

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REFERENCES

1. Yogamaya, D., Rajani, K.S., Bandita D. Ethnomedicinal survey of Koraput District, Odisha: An Update. *Journal of Pharmacy Research*. 4, 2011, 4142-4145.
2. Abu-Rabia A. Urinary diseases and ethnobotany among pastoral nomads in the Middle East. *Journal of Ethnobiology and Ethnomedicine*. 1(4), 2011, 1-3.
3. Satyavathi, G.V., Gupta, A.K., Tandom, N. Medicinal Plants of India. Indian council of Medical Research, New Delhi, India, 1987.
4. Mathew, J.L., Gera, T. Ophitoxaemia (venomous snake bite)-www.priory.com/med/Ophitoxaemia.html (accessed on feb 18, 2012).
5. David, A.W.-Guidelines for the clinical management of snake bites in south-east Asia region. World Health Organization, Regional office for South East Asia, New Delhi. 2005, 1-67.
6. Chippaux, J.P., Goyffon, M. Epidemiology of scorpionism: a global appraisal. *Acta Trop*. 107, 2008, 71-79.
7. Hati, A.K., Mandal, M., De M.K., Mukherjee, H., Hati, R.N. Epidemiology of snake bite in the district of Burdwan, West Bengal. *Journal of Med Assoc*. 1992, 145-147.
8. Gaitonde, B.B., Bhattacharya, S. An epidemiological survey of snake bite cases in India. *Snake*. 12, 1980, 129-133.
9. Bhatia, B.D. Scorpion sting and snake bite. In Sachdev H.P.S., Puri, R.K., Bagga, A., Choudhury, P., editors. Principles of pediatric and neonatal emergencies. New Delhi: Jaypee Brother Medical Publisher (P) Ltd. 1994, 257-264.
10. Brunda, G., Sashidhar, R.B. Epidemiological profile of snake-bite cases from Andhra Pradesh using immune analytical approach. *Indian Journal of Med Res*. 2007, 661-668.
11. Bannerjee, R.N. poisonous snakes of India, their venoms, symptomatology and treatment of envenomation progress in clinical medicine in India. 2nd series. Ed ahuja MMs. Arnold-Heinmann, Delhi. 1978, 136-178.
12. Whittaker, R. Common Indian Snakes: A field guide. New Delhi: McMillan India Limited, 2001.
13. Bastawade, D.B., Jadhav, S.S., Sharma, R.M. Scorpionida. Zoological survey of India, Western Regional Centre, Pune, 2012.



14. Erfati, P. Epidemiology, symptomology and treatment of buthinae stings. In: Arthropod Venoms. Handbook of Experimental Pharmacology. Ed. Bettini S. New York, Springer-Verlag, 1978, 312-315.
15. Meher-Homji, V.M. biotechnology and Plant geography of Peninsular India. Scientific Publishers. Jodhpur, India, 2001
16. Srivastava., Dayawanti. States and Union Territories: Andhra Pradesh: Government. India 2010. A Reference Annual (54th ed.). New Delhi, India. Additional Director General, Publications Division, Ministry of Information and Broadcasting (India). 2010, 1111-1112.
17. Jain, S.K. Methods and approaches in Ethnobotany. Society of Ethnobotanists, Lucknow, 1989 (ed.).
18. Gamble, J.S. Flora of the Presidency of Madras, Vol.1-3. Authority of the Secretary of State for India in council, Dehra Dun, India. 1915-1936, 5-1597.
19. Singh, E.A., Kamble, S.Y., Bapinraj, N.K., Jagtap, S.D. Medicinal plants used by the thakar tribes of raigad district, Maharashtra for the treatment of snake bite and scorpion bite. International Journal of Phytotherapy Research. 2, 2012, 26-35.
20. Savithamma, N., Sulochana, Ch., Rao, K, N., Ethnobotanical survey of plants used to treat asthma in Andhra Pradesh, India. Journal of ethnopharmacology. 113, 2007, 54-61.
21. Mainen, J.M., Donald, F.O., Anke W. Ethnomedicine of the Kagera Region, north western Tanzania. Part 3: plants used in traditional medicine in Kikuku village, Muleba District. Journal of Ethnobiology and Ethnomedicine. 2012. 8, 14, 3-11.
22. Reddy, R.V., Lakshmi, N.V.N., Venkata Raju, R.R. Traditional phytotherapy for Epilepsy, Fits and Hysteria by yanadis of Cuddaph district, A.P. Ancient Science of Life. 19(3&4), 2000, 1-5.
23. Rajagopal Reddy, S., Madhusudhana Reddy, A., Phiomina, Yasodamma N. Ethnobotanical survey of seshachalam hill range of kadapa district, Andhra Pradsh, India. Indian Journal of Fundamental and Applied Life Sciences. 1(4), 2011, 324-329.
24. Basha, S.K.M., Umamaheswari, P., Rambabu, M., Savithramma, N. Ethnobotanical study of Mamandur forest (Kadapa-Nalaamali range) in eastern ghats, Andhra Pradesh, India. Journal of Phytology. 3(10), 2011, 44-47.
25. Umamaheswari, P., Madhusudhana Reddy, A., Rambabu, M., Basha, S.K.M. Traditional medicinal flora habituated in various regions of YSR (Kadapa) district, Andhra Pradesh, India. Indian Journal of Fundamental and Applied Life Sciences. 2(3), 2011, 162-175.
26. Sekhar, J., Penchala Pratap, G., Sudarasnam, G., Prasad, G.P. Ethnic information on treatments for snake bites in kadapa district of Andhra Pradesh. Life sciences Leaflets. 12, 2011, 368-375.

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