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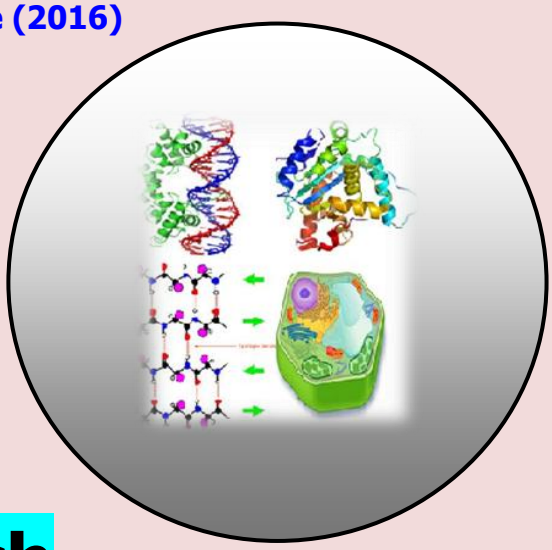
ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

UGC Approved Journal No. 62923
MCI Validated Journal
Index Copernicus International Value
IC Value of Journal 82.43 Poland, Europe (2016)
Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66

J. Biol. Chem. Research
Volume 35 (2) 2018 Pages No. 517-526



Journal of Biological and Chemical Research

An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 35, No. 2: 517-526, 2018
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 35/02/7002/2018

ISSN 2319-3077 (Online/Electronic)
ISSN 0970-4973 (Print)

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RESEARCH PAPER

Received: 10/07/2018 **Revised: 17/07/2018** **Accepted: 18/07/2018**

Exploration of the Unique Blend of Traditional Knowledge and Medicinal Plants from Bastar, Chhattisgarh, India

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ABSTRACT

Indian traditional knowledge of medicinal plants as therapeutics is gaining increased recognition globally. Chhattisgarh is identified as an 'Herbal State' due to its rich repository of medicinal plants in many tribal districts including Bastar. Despite of rich abundance of medicinal flora the region is relatively less explored with reference to the therapeutic efficacy of medicinal plants. Bastar, the land of tribes is known for its unique blend of distinctive traditional knowledge and agro-climatic zone with favourable summer temperature and high atmospheric humidity suitable for the cultivation of medicinal plants. Keeping in view the vast potentiality of medicinal plants as therapeutics, the present study deals with the exploration of fifty eight medicinal plants which covers thirty three families and their usage by the tribal communities of Bastar since long back. The study gives a clear picture of the biological and pharmacological activities from various plant parts viz., root, stem, leaf, rhizome, bulb, bark, fruit, seed, inflorescence, flower and gum used by the tribal healers of this area in the amelioration of several dreadful diseases such as diabetes, leucorrhoea, asthma, urinary tract infection, anaemia, malaria, anorexia, blood infections, diarrhoea and wound healing. Thus, in light of above prospects there is an urgent need of extensive research in the area of medicinal plants with the aim of exploring their therapeutic efficacy and subsequently the isolation and characterization of bioactive compounds by HPLC, UV-VIS, FT-IR, NMR and ESI-MS will contribute for the better, safer and cost effective novel drug development for future.

Keywords: Bastar, Traditional knowledge, Therapeutic, Medicinal plants and Tribal healers .

INTRODUCTION

In India plants and plant based products have been used traditionally by native inhabitants from ancient times (Bargali *et al*., 2003). Tribal people have traditional knowledge of plant species used for the treatment of several severe diseases. This knowledge was even passed through generation to generation and played an important role in the conservation and sustainable use of biodiversity (Parekh *et al*., 2006). Indigenous herbal treatment is a part of the culture and dominant mode of therapy in most of the developing countries. These traditional herbal remedies with a considerable extent of effectiveness are socially and economically accepted. Still, one-third of the modern pharmaceutical preparations have botanical origin. It was officially recognized

that 2500 plant species have medicinal value while over 6000 plants are estimated to be explored in traditional, folk and herbal medicine (Harsha *et al*., 2003).

Traditional home remedies and herbal medicine constitute prominent dimensions of local health tradition and unique heritage of district Bastar, Chhattisgarh. In Chhattisgarh, traditional home remedies and herbal medicines are administered both in remote rural areas as well as in urban areas where allopathic medicine is easily available (Gupta, 2001). Chhattisgarh, the premier herbal state of India upholds unique local health tradition interlinked with a large number of sacred grooves and rich traditional knowledge base of thousands of folk healers, Baidyas, Guniyas and local knowledgeable person in tribal area of Bastar. The traditional folk healers of Bastar Chhattisgarh have sustained a wide range of folk healing practices since generations together (Pandey and Gupta, 2014; Sharma *et al*., 2015). According to the World Health Organization (WHO) 80% of the world's population in developing countries uses traditional medicines. Nature has been a source of medicinal treatments for thousands of years, and plant-based system continues to play a vital role in primary health care of 80% of world's population (Tanaka *et al*., 2006).

The present study was carried out in the Bastar regions of Chhattisgarh. The state Chhattisgarh consist a rich and varied flora due to its diversified topography and variable climatic condition. About 20-25 tribes are living isolated or in combination in four different zones like Central, Eastern, Western, Northern and Southern zones respectively. The Gonds constitute the largest tribal community amongst the other tribes of the state. Gonds, Bhatara, Muriya and Mariya are the main tribes of Bastar and they have unique identification in the country (Bargali *et al*., 2003). District Bastar is located in the southern zone of Chhattisgarh. Bastar is a tribal district where about 70% of the total population are tribals which constitutes 26.76% of the total tribal population of Chhattisgarh state.

MATERIALS AND METHODS

The aim of the present investigation was mainly focused on the study of the therapeutic efficacy of medicinal plants from Bastar region of Chhattisgarh. The study involved the periodic field surveys for therapeutic exploration of medicinal plants of Bastar region. In the present study extensive field survey was undertaken in Bastar region of Chhattisgarh. During the survey personal interview was conducted with the tribals, the herbal medicine practioners, village dwellers and other traditional healers. The documentation of traditional knowledge based on medicinal plants as therapeutics by tribal healers was recorded. The information was collected in village as well as by making transit visit to the forest area of the study site (Fig. 1). The traditional knowledge for health security was collected disease wise. However, it was found that some of the information documented in the present investigation has not so far been available in literature.

Figure 1. Site visit for the documentation of medicinal plants.

STUDY SITE

India has the largest concentration of tribal population in the world. Chhattisgarh is a tribal populated state. Bastar is one among the tribal rich districts of Chhattisgarh. Bastar, was selected as a study site for the present work. It is located between longitudes 81.9535°E and 19.1071°N latitudes and has an area of 4029.98 km². The population of the district is 1,411,644 according to the 2011 census. It is surrounded by Bijapur, Dantewada, Kondagaon, Narayanpur and Sukma districts of the state. On its east the Koraput district of Odisha also adjoins the Bastar. Bastar district is divided into seven Tehsils *viz*., Jagdalpur, Bastar, Bakawand, Bastanar, Darbha, Lohandiguda and Tokapal. Bastar, the land of tribals and natural resources, is also surrounded with dense forests, hilly mountains, natural caves, waterfalls and streams. The tribals comprises 66% of the total district's population and include PTC like, Abhuj Maria, Bison Horn Maria, Bhatra, Gonds, Darda Maria, Dhruva, Munia Doria and Halba. Jagdalpur is both district and divisional headquarter of Bastar district. The city lies on the southern bank of river Indravati with an average elevation of 562 meters. It has a total forest area of 292130 ha which is more than 19% of the total land area of the district (Fig. 2).

Source: www.halbi.org, Dated: 15-01-2016

Figure 2. Map of Bastar district showing study area.

RESULTS AND DISCUSSION

The present study deals with the exploration of fifty eight medicinal plants which covers thirty three families and their usage by the tribal communities of Bastar since long back. Singh *et al*. (2017), studied medicinal plants from Belgahna region of Bilaspur district. However, in the present study medicinal plant of Bastar region of Chhattisgah were studied. The study gives a clear picture of the biological and pharmacological activities from various plant parts *viz*., root, stem, leaf, rhizome, bulb, bark, fruit, fruit coat, seed, inflorescence, flower and gum used by the tribal healers of this area in the amelioration of several dreadful diseases such as diabetes, leucorrhoea, asthma, urinary tract infection, anaemia, malaria, anorexia, blood infections, diarrhoea and wound healing. The medicinal plants extracts were also documented to be potent antibacterial (Pandey and Gupta 2013) and antifungal (Pandey and Gupta 2016) (Table 1). The above plants under investigation were categorized into different plant type and number of medicinal plant species *viz*., climber, shrub, tree and herb. The results showed that out of total fifty eight medicinal plants under investigation six are climbers, ten are shrubs, seventeen are trees and twenty five are herbs. The results are compiled and presented (Fig. 3). The findings clearly indicated that herbs predominated in curing several dreadful ailments followed by tree shrub and climber. Kumar *et al*., 2012 reported 19 plant species among which 6 species were found to be trees, 6 species were shrubs, 1 species was a climber, 4 species were herbs, 1 species was under tree. Singh *et al*., 2017 collected medicinal plants from Belgahna region of Bilaspur district and recorded 67 plant species belongs to 65 genera of 40 families of angiosperm from the forest of Ratanpur and in terms of number of species they found trees (32) are the primary source of medicinal plants, followed by herbs (21), climbers (7) and shrubs (6). Lal *et al*., 2017 studied diversity in Bhoramdeo wild life sanctuary three villages filed survey Thuhapani, Pahchrahi and Bairkh, Kabirdham region of India and recorded 115 edible plant species under 108 genera and 45 families and recorded 59 species were herbs, 09 shrubs, 29 trees and the rest 18 were climbers.

Table 1. Therapeutic properties of different families, types and parts of medicinal plants.

S. No.	Botanical Name	Common Name	Family	Type of Plant	Parts Used	Therapeutic Properties
1	*Andrographis panniculata*	Kalmegh	Acanthaceae	Herbs	All Parts	Fever, Blood Poisoning
2	*Adhatoda vasika*	Adhusa	Acanthaceae	Shrub	Root, Leaf	Cough, Acidity, Asthma
3	*Mangifera indica*	Aam	Anacardiaceae	Tree	Root, Leaf	Stomach-ache
4	*Holerania antidysantrica*	Kurja	Apocynaceae	Tree	Seed, Bark	Loose Motion
5	*Hemidesmus indicus*	Anantmool	Asclepiadaceae	Climber	Root	Urinary Tract Infection, Blood Infection, Skin Diseases
6	*Terminalia belarica*	Vibhitaki	Combretaceae	Tree	Outer Fruit Coat	Cough, Asthma, Constipation
7	*Terminalia chebula*	Haritika	Combretaceae	Tree	Outer Fruit Coat	Asthma, Cough, Diarrhoea, Constipation, Indigestion
8	*Acliptus alba*	Bhringraaj	Compositae	Herb	Whole Plant	Acidity, Loose Motion
9	*Anacycas pysthem*	Akarkara	Compositae	Herb	Root	Tooth-ache
10	*Rafanus sativus*	Muli	Cruciferae	Herb	Root	Urinary Tract Infection
11	*Brassica compestris*	Sarso	Cruciferae	Herb	Seed	Asthma, Tooth-ache
12	*Cyprus rotendus*	Nagarmotha	Cypraceae	Herb	Root	Loose Motion
13	*Emblica officinalis*	Amala	Euphorbiaceae	Tree	Fruit	Asthma, Constipation, Anemia, Wound Healing, Acidity
14	*Risinis quenis*	Arand	Euphorbiaceae	Tree	Seed, Root	Stomach-ache, Constipation
15	*Phylanthus niruri*	Bhoo-Amla	Euphorbiaceae	Herb	Whole Plant	Liver, Urinary Disorders
16	*Ocimum sanctum*	Tulsi	Labeateae	Herb	Flower, Leaf, Inflorescence	Cold, Cough, Fever
17	*Mentha spikera*	Pudina	Labeateae	Herb	Leaf	Stomach-ache, Anorexia, Loss of Appetite
18	*Glycerhiza glabra*	Mulaithi	Leguminaceae	Herb	Root	Cough, Breast Milk Enhancer
19	*Acacia arabia*	Babool	Leguminaceae	Tree	Fruit, Gum, Bark	Loose Motion
20	*Tamarindus indica*	Imli	Leguminaceae	Tree	Fruit, Leaf	Loss of Appetite
21	*Trigonella finmagracum*	Methi	Leguminaceae	Herb	Root, Leaf	Stomach-ache, Menstrual

						Pain
22	*Beautia monosperma*	Palas	Leguminaceae	Tree	Seed, Bark, Flower	Intestinal Worms
23	*Pongamia pinnata*	Karanj	Leguminaceae	Tree	Bark, Leaf, Seed	Heart Disease
24	*Aloe vera*	Dhritkumari	Liliaceae	Herb	Leaf	Wound Healing, Constipation
25	*Asparagus racemosus*	Satavari	Liliaceae	Climber	Root	Acidity, Menstrual Pain, Milk Enhancer
26	*Allium sativam*	Lahson	Liliaceae	Herb	Bulb	Menstrual Pain
27	*Woodfordia fruticosa*	Ghatki	Lytheraceae	Herb	Flower	Loose Motion
28	*Lawsonia inermis*	Mehandi	Lytheraceae	Shrub	Leaf	Liver Disorder
29	*Azardiracta indica*	Neem	Maliaceae	Tree	Bark, Leaf	Intestinal Worms, Wound Healing, Leucorrhoea, Liver Disorder
30	*Abutinal indicum*	Atibala	Malvaceace	Shrub	All part	Menstrual Pain
31	*Hibiscus rosa-sinensis*	Gudahal	Malvaceace	Shrub	Flower	Leucorrhoea
32	*Gossipium herbasium*	Kapas	Malvaceace	Shrub	Root, Flower	Breast Milk Enhancer
33	*Sida cordifolia*	Balaa	Malvaceae	Herb	Whole Plant	Energy Tonic, Leucorrhoea
34	*Ambila ribes*	Vidang	Maycernaceae	Shrub	Fruit	Intestinal Worms
35	*Tinospora cordifolia*	Guduchi	Menispermiacae	Climber	Climber	Malaria, Fever, Cold, Liver disorder
36	*Moringa olefera*	Munga	Moringaceae	Tree	Fruit, Seeds, Leaf, Root	Intestinal Worms, Haemoglobin and Breast Milk Enhancer
37	*Sizigium aromaticum*	Laong	Myrtaceae	Tree	Inflorescence	Stomach-ache
38	*Euginia jambulina*	Jamun	Myrtaceae	Tree	Bark, Fruit, Seed, Leaf	Diabetes
39	*Borevica diffusa*	Punarnava	Nictiginaceae	Herb	All Parts	Anaemia
40	*Jasminum officinale*	Chameli	Oliaceae	Shrub	Leaf	Wound Healing
41	*Coccus nucifera*	Nariyal	Palmae	Tree	Fruit	Thirst Quencher, Anti-Inflammatory
42	*Piper nigrum*	Kali Mirch	Piperaceae	Climber	Fruit	Cold, Severe Diarrhoea
43	*Piper longum*	Pippali	Piperaceae	Climber	Fruit, Root	Loose Motion, Loss of Appetite

						Tooth-ache
44	*Punica granatum*	Anaar	Punicaceae	Shrub	Fruit, Seed	Cough, Loose Motion
45	*Zizphus guguba*	Ber	Rehnmaceae	Tree	Leaf, Root	Leucorrhoea
46	*Citrus limone*	Nimboo	Rutaceae	Shrub	Leaf, Fruit, Bark	Stomach-ache, Loss of Appetite
47	*Aegle marmelos*	Bel	Rutaceae	Tree	Fruit Pulp	Loose Motion & Severe Diarrhoea
48	*Solanum suratens*	Kantakari	Solanaceae	Herb	Whole Plant	Cough
49	*Techispermum ammi*	Ajwain	Umbelliferae	Shrub	Fruit	Loss of Appetite, Intestinal Worms, Stomach-ache
50	*Ferula nothax*	Hing	Umbelliferae	Herb	Gum	Urinary Tract Infection, Stomach-ache
51	*Coriandrum sativum*	Dhania	Umbelliferae	Herb	Leaf, Fruit, Seed	Fever, Asthma, Urinary Tract Infection
52	*Cuminum siminum*	Jeera	Umbelliferae	Herb	Seed	Cough, Breast Milk Enhancer
53	*Vitex nigundo*	Nirgundi	Vervinaceae	Herb	Root, Leaf	Joint Pain, Head-ache
54	*Vitis venifera*	Angur	Vitaceae	Climber	Fruit	Indigestion
55	*Plebango zeylinica*	Chitta	Zelinaceae	Herb	Root	Indigestion
56	*Curcuma longa*	Haldi	Zingiberaceae	Herb	Rhizome	Heart Disorder, Skin Complexion, Cough, Allergy
57	*Zingiber officinale*	Adrak	Zingiberaceae	Herb	Rhizome	Fever, Cold, Cough, Loss of Appetite, Asthma, Urinary Tract Infection
58	*Tribulus teristris*	Gokhru	Zygophilaceae	Herb	Leaf	Urinary Tract Infection

The medicinal plants under investigation were categorized based on the number of plant species and their different parts used as therapeutics *viz*., leaf, root, fruit, seed, bark, all parts, flower, gum, fruit coat, bulb, rhizome and climber. The results revealed that out of total fifty eight plants under investigation nineteen plant species leaves were found to possess disease curative potentiality followed by sixteen root, fourteen fruit, ten seed, seven bark, seven all parts, five flower, two gum, two fruit coat, two bulb, two rhizome and one climber were found to be effective as therapeutics. The results were analyzed and compiled (Fig. 4). The findings clearly showed that out of total medicinal plants the therapeutic efficacy was found to be maximum in case of leaf followed by root, fruit, seed, bark, all parts, flower, gum, fruit coat, bulb, rhizome and climber. However, reports are available on the antimicrobial activity of root, stem and leaf of medicinal plants from Bastar (Pandey and Gupta, 2014).

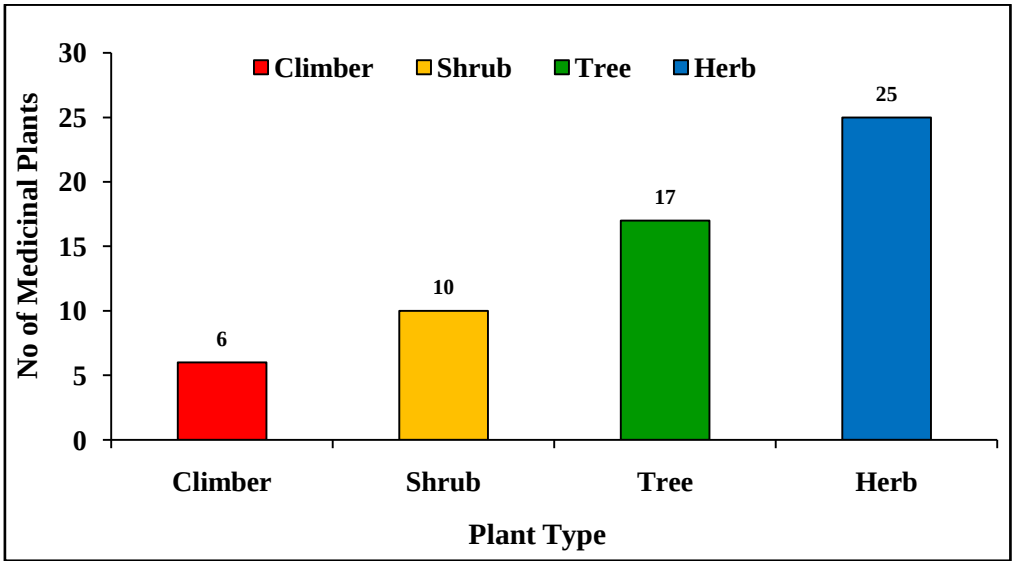

Figure 3. Plant type and number of medicinal plants.

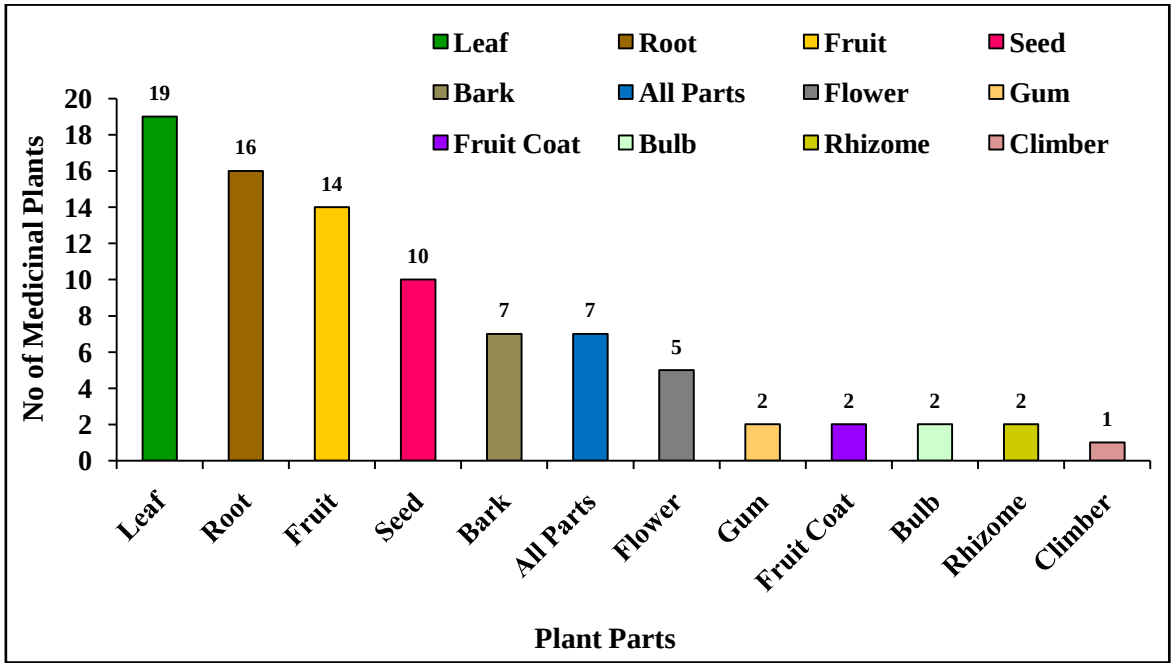

Figure 4. Plant parts and number of medicinal plants.

The medicinal plants under investigation were further categorized based on the number of plant species and family. The results revealed that total fifty eight medicinal plants under investigation belonged to thirty three different plant families which comprises of Acantahceae (2), Anacardiaceae (1), Apocynaceae (1), Asclepiadaceae (1), Combretaceae (2), Compositae (2), Cruciferae (2), Cypraceae (1), Euphorbiaceae (3), Labeateae (2), Leguminaceae (6), Liliaceae(3), Lytheraceae (2), Maliaceae (1), Malvaceae (4), Maycernaceae (1), Menispermiaceae (1), Moringaceae (1), Myrtaceae (1), Nictiginaceae (1), Oliaceae (1), Palmae (1), Piperaceae (2), Punicaceae (1), Rhenmaceae (1), Rutaceae (2), Solanaceae (1), Umbelliferae (4), Vervinaceae 1), Vitaceae (1), Zelinaceae (1), Zingiberaceae (2), Zygophilaceae (1). The results are compiled and presented (Fig. 5).

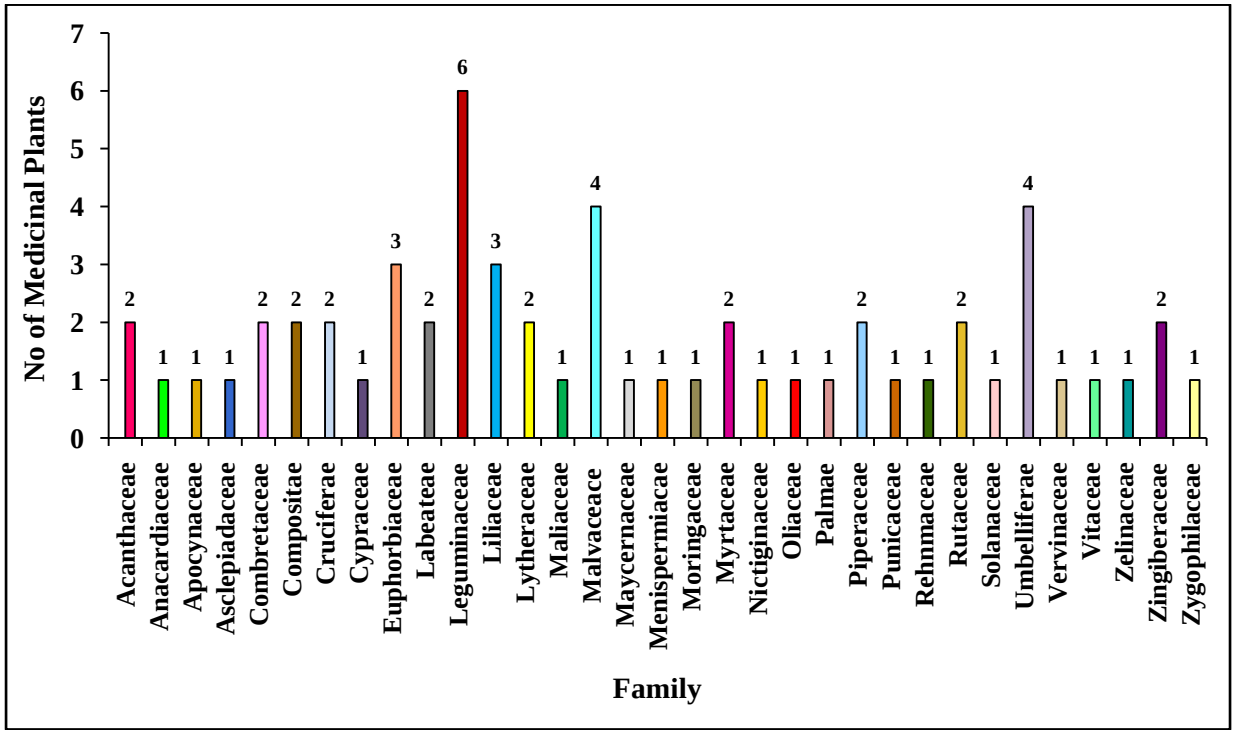

Figure 5. Plant family and number of medicinal plants.

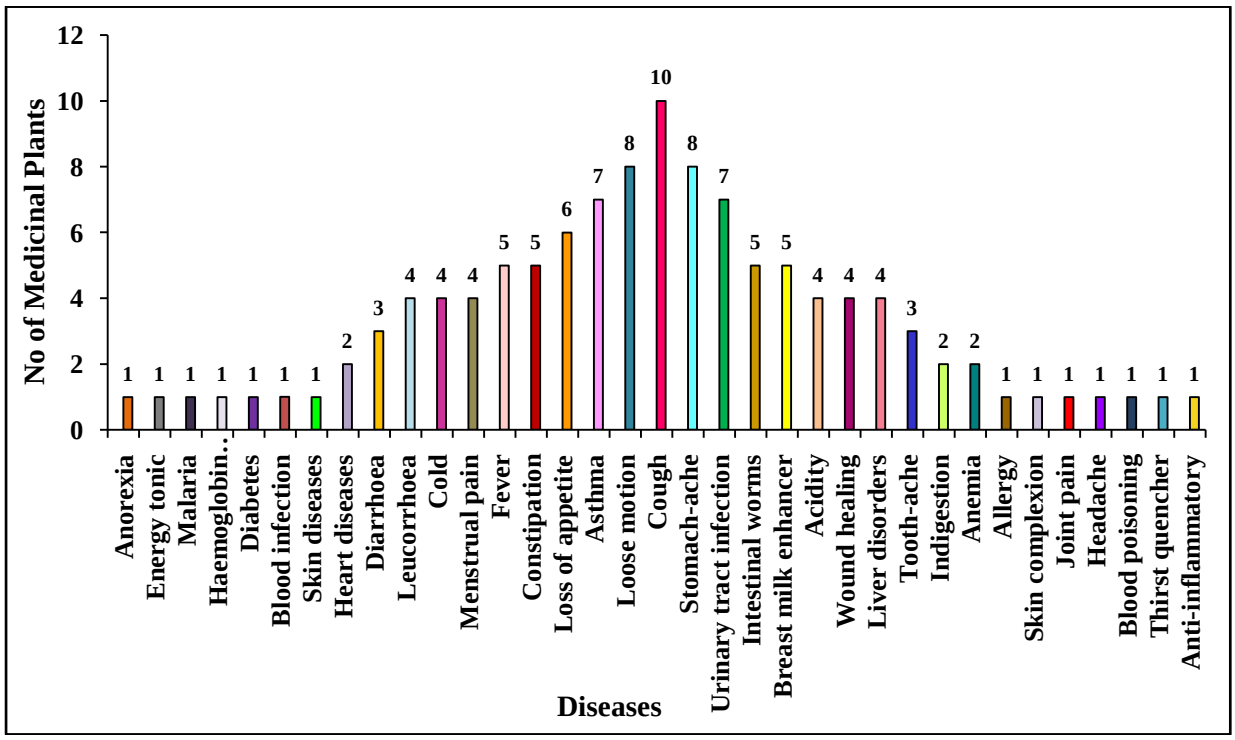

Figure 6. Diseases and number of medicinal plants.

The results clearly indicated that maximum six plant species were of family Leguminaceae followed by four plant species of Malvaceae and Umbelliferae and three plant species of Euphobiaceae and Lilliaceae. Rest other family consisted of either one or two plant species. The results indicated that family leguminaceae followed by Malvaceae, Umbelliferae, Euphobiaceae and Lilliaceae were found to be more potent in the healing several diseases as compared to other plant families Lal *et al*. (2017).

Studied family wise distribution of edible plants shows Fabaceae is most dominant families with 18 species each and Cucurbitaceae was co- dominant family with 10 species, Poaceae 7 species, Solanaceae, Zingiberaceae and Brassicaceae (5 species each), while, Liliaceae and Rutaceae, (4 species each), While Apiaceae, Convolvulaceae, Lamiaceae, and Malvaceae (3 species each), While Tiliaceae, Myrtaceae, Chenopodiaceae, Boraginaceae, Basellaceae, Araceae, Annonaceae, Anacardiaceae, Amaranthaceae (2 species each), While Apocynaceae, Arecaceae, Bombacaceae, Combretaceae, Comaceae, Cyperaceae, Dioscorcaceae, Ebenaceae, Euphorbiaceae, Hypoxidaceae, Linaceae, Marsileaceae, Moringaceae, Musaceae, Nympheaceae, Oxalidaceae, Palmaceae, Pedaliaceae, Piperaceae, Rhamnaceae, Sapotaceae, and Scrophulariaceae (1 species each).

The medicinal plants were further categorized based on the number of plant species and curative potentiality of different diseases. The results revealed that out of total maximum ten plant species were found to be effective for cough followed by eight for loose motion and stomach-ache, seven for asthma and urinary tract infection, six for loss of appetite and five for constipation, fever, intestinal worms and breast milk enhancer. Other diseases were found to be cured by four or less than four plant species (Fig. 6). The result clearly indicated that different plant parts and families possess enormous therapeutic efficacy for the amelioration of wide array of dreadful and infectious diseases. Therapeutic potentiality in different parts of medicinal plants has been studied in the present research paper whereas similarly other researchers also studied about different plants having different potential of curing diseases, Verma (2016) reported 22 plants belonging to different families that cure skin disease, Kumar *et al*. (2012) reported 19 plant species that cure skin disease, from king (Dongaria Kandha) of Niyamgiri (a primitive tribe of Odisha, India). Whereas, in the present studies we have reported *Hemidesmus indicus* (Asclepiadaceae) and *Curcuma longa* (Zingiberaceae) useful for curing skin diseases and skin complexion. However, the antibacterial activity assessment and structural elucidation of bioactive compound from *Curcuma caesia* (Roxb.) from Bastar region of Chhattisgarh, India were also investigated and documented (Pandey and Gupta, 2018).

CONFLICTS OF INTEREST

We declare that we have no conflicts of interest.

CONCLUSIONS

The present investigation was carried out to explore the curative potentiality of medicinal plants from Bastar region of Chhattisgarh, India. The results based on the traditional knowledge of tribal healers revealed that medicinal plants possess a wide array of healing potentiality against several dreadful diseases with natural, low cost and homemade therapies. Further, the above findings clearly revealed that the plant based therapy have enormous therapeutic potentials and can serve the purpose with lesser side effects that are often associated with synthetic drugs. This is the first report of its kind from Bastar depicting the detailed efficacy of fifty eight medicinal plants belonging to varied plant families. However, the present study would be a primary platform to explore local potential medicinal plants possessing disease healing ability and their further exploration will prove to be the bedrock for future herbal medicine.

ACKNOWLEDGEMENTS

The authors are thankful to the authorities of Bastar Vishwavidyalaya, Jagdalpur (C.G.) and Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for providing research facilities. Authors record humble gratitude and thanks to Shri. Kartik Nag, Asna Nursery, Jagdalpur (C.G.) and the tribal healers of Bastar for providing valuable information on the therapeutic efficacy of medicinal plants. One of the author (DP) is grateful to Department of Science and Technology, New Delhi, India for the financial assistance for research as DST-INSPIRE Fellow.

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