

Folk Knowledge on Medicinal Plants Used for the Treatment of Skin Diseases in Bhadrak District of Odisha, India

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Abstract

Only recently there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Ethnic people and tribals of India are endowed with a deep knowledge concerning the utilization of medicinal plants to cure various diseases. However research on the local knowledge related to plant species utilization for skin ailments still lacks adequate attention. The current investigation aims to identify, collect and document the existing folk knowledge related to the utilization of medicinal flora for healing of skin ailments among the local inhabitants of Bhadrak district, Odisha, India. Data are collected through a combination of tools and techniques of questionnaire, group interview and discussion. A total of 57 medicinal plants representing 34 families are reported for their therapeutic use against skin ailments. The predominant families are Euphorbiaceae and Fabaceae. Most preferred species for the management of skin ailments are *Andrographis paniculata* (Burm. f.) Wall. ex. Nees., *Annona squamosa* L., *Azadirachta indica* A. Juss., *Calophyllum inophyllum* L., *Cissampelos pareira* L., *Croton sparsiflorus* Morong., *Glinus oppositifolius* (L.) A. DC., *Lantana camara* L., *Ocimum sanctum* L., *Pongamia pinnata* (L.) Pierre. and *Tridax procumbens* L. In most of the skin treatments with medicinal plants, the herbal preparations are administered topically. Further scientific research is required to evaluate biochemical constituent as well as the pharmacologically useful alkaloids, tannins, resins and any other beneficial plant product available from the local flora for the enhanced posterity of mankind.

Keywords: Ethnomedicine; Traditional knowledge; Skin disease; Medicinal plants

Introduction

Herbal and natural products of folk medicine are practiced for centuries in almost all cultures worldwide. However, in most of the world countries, especially those in the African continent, Asia and South and Central America, the majority of the population (roughly 80%) still relies to a great extent on herbal medicine for their primary healthcare [1,2]. Moreover, in developing countries and rural societies, the use of medicinal plants is both a valuable resource and a necessity, and furthermore a real alternative for prevention of diseases. Despite the great progress in commercial drugs, the increasing confidence in alternative therapies (especially herbal therapies), even in western countries, stems from the fact that some of these remedies have so far proven to be very effective in countries like France and Germany [3]. It is suggested that many conventional drugs prescribed worldwide are exclusively of plant based [4,5]. Examples include salicylic acid, which upon acetylation produces aspirin, which is isolated from the bark of *Salix caroliniana*, anticancer drug Taxol isolated from *Taxus brevifolia*, the pain killer morphine and the anti-cough codeine from *Papaver somniferum* etc. [6]. However, scientists and medical professionals have found that the herbs themselves, which possess unique combinations of chemical components, are more effective than the chemical derivatives [7]. Herbalists and indigenous healers have used botanical medicines traditionally for the prevention and treatment of different ailments. Traditional knowledge that is developed through the combined experience of many generations and still practiced in many tribal and rural societies develops their own medical practices by trial and error method [8]. In every period, every successive century from the development of humankind and advanced civilizations, the healing properties of certain medicinal plants are identified, noted, and conveyed to the successive generations. The benefits of one society were passed on to another, which upgraded the old properties, discovered new ones, till present days. Consequently, historical texts from medical

traditions in various countries of the world such as India, China, Egypt, Greek, Roman and Syria bring new insight into plant usage and become established as a rewarding tool for ethnopharmacological research. In India a number of studies have been in use, under indigenous systems of medicine like Ayurveda, Sidha and Unani. Ayurvedic texts viz., Charak Samhita, 'Sushrut Samhita', Sarangadhara Samhita, Bhavaprakasha Samhita, Satmya Darpan Samhita, Vaisajya Ratnabali, *Rasatarangini* etc. explain numerous remedies to treat different ailments. Indeed, many plant based medicines are still in demand for a variety of diseases like congestive cardiac failure, bronchitis, inflammatory conditions and other ailments [6,9-12]. Skin diseases are one such common disorder, effecting people worldwide, particularly in rural areas of developing countries due to poor sanitation and inattentiveness to dietary food supplements [13]. It is found in all ages with an incidence of 34% of all occupational diseases [14]. Common skins ailments include eczema, leucoderma, ringworm, itching, wound, scabies, swelling and many others without distinct symptoms and are caused by a variety of micro-organisms and uncomfortable environment [15]. Micro-organisms responsible for skin infections can be bacterial, fungal, parasitic or viral in nature. Many allopathic drugs prescribed for skin diseases have adverse effects. Consequently, there is an increased interest and confidence in alternative therapies, like phytomedicine, in the treatment of skin ailments [16]. Currently, many natural products

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from plants have been used by various cultures all over the world to treat skin diseases or their symptoms caused by micro-organisms [17]. Although efforts are on to document ethnobotanical information for the treatment of skin ailments in different parts of India [17-23], reports from Bhadrak district of Odisha, India is nil. Therefore, the current investigation aims to, identify, collect and document the medicinal plants traditionally used for the treatment of skin disorders in Bhadrak district of Odisha, India. Documentation of traditional ethnomedicinal knowledge, indigenous herbal preparation for skin ailments could help in preserving knowledge and creating awareness regarding the need for conservation of biological resources.

Materials and Methods

Study area

The study was endeavoured in Bhadrak district, Odisha, India falls within a geographical tract of 20° 43'–21° 13' N latitude and 86° 6'–87° E longitude. The total area of the district is 2505 km² with a population of 1.507 million (2011 Census). It is bounded on the north by Balasore district, on the east by Bay of Bengal and Kendrapara district, on the south by Jajpur district and west by Koenjher district (Figure 1). The climate condition of the district is generally hot with high humidity during April and May and cold during December and January. The district is inhabited by a large section of rural population and different tribes. People of the area practise agriculture and grow paddy, mustard and vegetables.

Data collection

The information on plants used for treating skin disorders of folklore origin were obtained from December 2013 to November 2014. For this purpose, frequent field trips were made to different localities of the district. Local medicine men and elderly people whose empirical knowledge was respected by everyone in the area were interviewed. After obtaining their consent, information regarding their knowledge of medicinal plants is recorded with the help of questionnaire-based interviews, open-ended field discussions and also by observation of their actual treatment practices, wherever possible [24-26]. Altogether 57 (52 men and 5 women) persons were interviewed. Data on local name of folk medicinal plants, parts used method of preparation and dosages recommended were recorded for each medicinal claim. Medicine men were requested to accompany with the authors in the field so as to facilitate the identification of different plants specially employed by them to treat skin disease. The information was also discussed with different medicine men in other localities to validate the claims as far as possible [27]. Botanical specimens of all folk medicinal plants were collected, identified and deposited at the herbarium of the Department of Botany, Chandbali College, Chandbali. The plants were identified with the help of local floras [28,29].

Results

Data on medicinal uses of plants are arranged alphabetically in the following sequence: scientific name, family, habit, vernacular name if any, parts used and modes of use.

Abutilon indicum (L.) Sweet. (Malvaceae) Habit: Herb, Local Name: Pedipedika

Fresh leaves are applied externally on the skin thrice daily to treat the ringworm infection.

Acalypha indica L. (Euphorbiaceae), Habit: Herb

To treat skin diseases leaf paste is used twice daily for a period of one week.

Achyranthes aspera L. (Amaranthaceae), Habit: Herb, Local Name: Apamaranga

To reduce the pain of the skin infected with worms as well as to expel the dead worms out, burned root ashes are applied topically.

Aegle marmelos (L.) Corr. (Rutaceae), Habit: Tree, Local Name: Bela

Paste prepared from leaf is applied topically over the skin twice daily to get relief from itches.

Allium cepa Linn. (Liliaceae), Habit: Herb, Local Name: Pajja

Bulb paste mixed with turmeric powder is applied on itching affected area twice daily.

Amaranthus spinosus L. (Amaranthaceae), Habit: Herb, Local Name: Kanta saga

Warmed leaves are applied locally thrice daily for 5 days to cure boils and burns.

Anacardium occidentale L. (Anacardiaceae), Habit: Tree, Local Name: Saitamba

Oil extracted from the seed is effective for the treatment of skin diseases.

Andrographis paniculata (Burm. f.) Wall. ex. Nees. (Acanthaceae), Habit: Herb, Local Name: Chireita

To treat leprosy, scabies, eczema and ringworm infection, paste made from leaf is applied topically twice daily till cure. Plants are grinded into powder; pills are prepared with honey and taken internally for warts.

Annona reticulata L. (Annonaceae), Habit: Tree, Local Name: Atta

Crushed leaves or a paste is poulticed on boils, abscesses and ulcers.

Annona squamosa L. (Annonaceae), Habit: Tree, Local Name: Neua

Paste made from leaf is gently warmed and applied locally for early maturation of boils.

Argemone mexicana L. (Papaveraceae), Habit: Herb, Local Name: Kantakusum

Fresh leaves are ground to paste; the paste is applied topically to treat eczema.

Artocarpus lacucha Roxb. Ex Buch.-Ham. (Moraceae), Habit: Tree, Local Name: Jeutha

Bark when applied externally draws out purulent matter, heals boils, cracked skin and pimples.

Azadirachta indica A. Juss. (Meliaceae), Habit: Tree, Local Name: Neem

Leaves along with turmeric powder are made into a paste. This is applied topically for skin infection, small pox and chicken pox. Seed oil is applied locally for eczema.

Basella Alba L. (Basillaceae), Habit: Climber, Local Name: Poi

Leaf is rubbed over the affected part to cure irritation and swellings due to caterpillar.

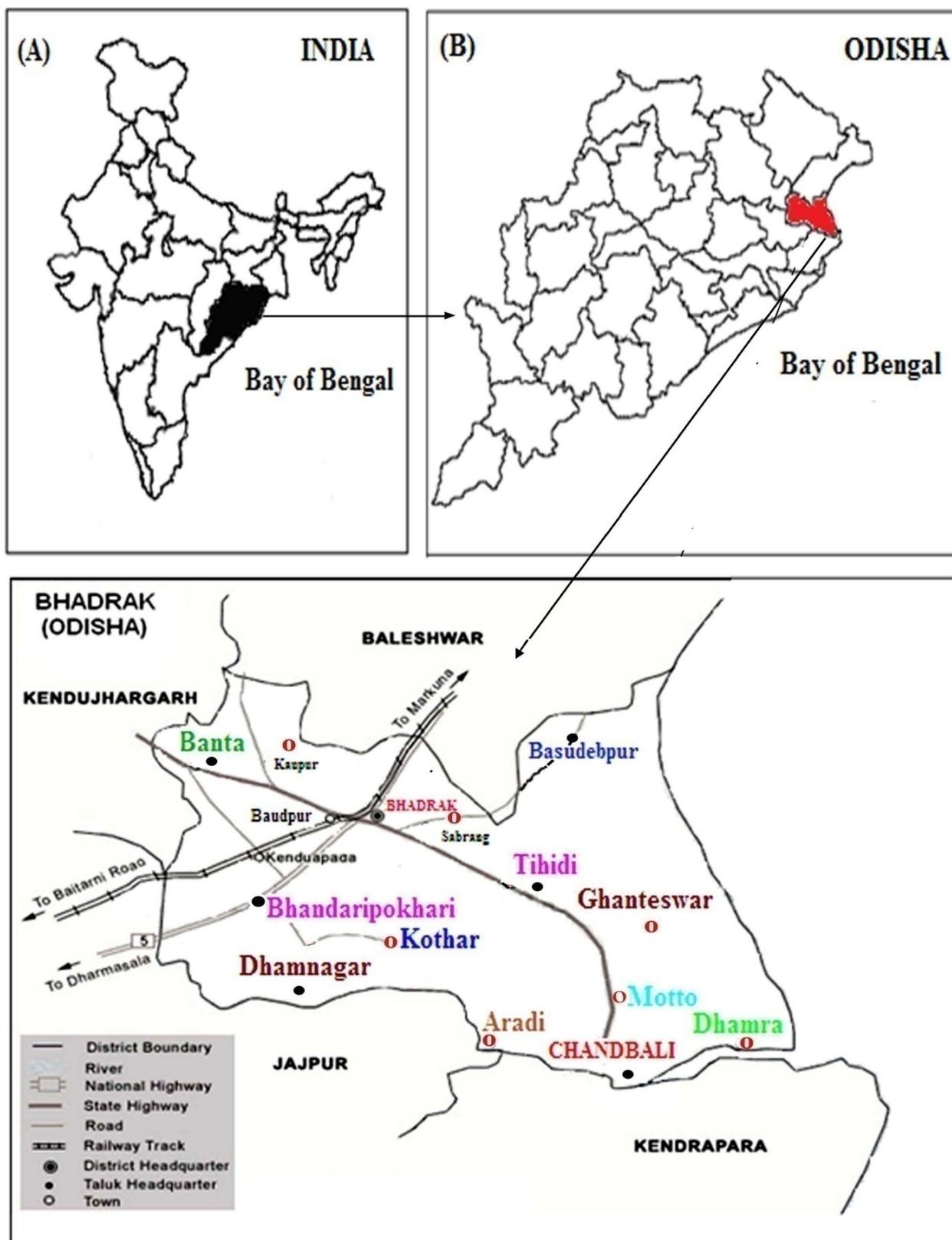


Figure 1: (A) Location of Odisha state in the eastern region of India (B) Map of the Odisha state and (C) study area showing different blocks of the Bhadrak district.

Boerhavia diffusa L. (Nyctaginaceae), Habit: Herb, Local Name: Goudapuruni

Decoction of leaf boiled in coconut oil is applied locally twice daily to treat scabies and ringworm infection.

Brassica campestris Hook. f. and Thomas. (Brassicaceae), Habit: Herb, Local Name: Sorisha

The seeds are crushed and the paste is applied locally to cure skin diseases.

Buchnanania lanzan Spreng. (Anacardiaceae), Habit: Tree, Local Name: Chara

The root and bark made into paste, the paste is applied topically on chronic wounds.

Butea monosperma (Lam.) Taub. (Fabaceae), Habit: Tree, Local Name: Palas

Paste of seed is applied topically for the treatment of skin diseases.

Calophyllum inophyllum L. (Clusiaceae), Habit: Tree, Local Name: Polanga

Oil prepared from seed is applied topically for scabies and eczema.

Calotropis gigantea R. Br. (Asclepiadaceae), Habit: Herb, Local Name: Dhala Arakha

Latex mixed with turmeric powder is warmed in coconut oil and the extract is applied locally to treat eczema. Fresh milky latex is applied topically twice daily for 7 days to cure scabies.

Cassia alata L. (Fabaceae), Habit: Herb

Decoction of leaf is applied topically to treat ringworm infection.

Cassia fistula L. (Caesalpiniaceae), Habit: Tree, Local Name: Sunari

Leaf paste is applied externally thrice daily for three days to treat injuries/ wounds on the skin.

Cassia occidentalis L. (Caesalpiniaceae), Habit: Herb, Local Name: Chakunda

About 1 gm powder made from dried fruits and seeds with 5-10 ml seed oil of this plant are applied locally to cure scabies.

Cassia tora L. (Caesalpiniaceae), Habit: Herb, Local Name: Bana chakunda

Paste of leaves is applied for skin disease.

Cissampelos pareira L. (Menispermaceae), Habit: Climber, Local Name: Akanbindhi

Gently warmed leaf is kept on wounds to draws out purulent matter.

Clerodendrum inerme (L.) Gaertn (Verbenaceae), Habit: Herb, Local Name: Phuljholi

Paste made from leaf is very effective for skin inflammation, scabies and ringworm infection.

Couroupita guianensis Aubl. (Lecythidaceae), Habit: Tree, Local Name: Nagalinga Leaf paste is applied topically to cure skin disease.

Croton sparsiflorus Morong. (Euphorbiaceae) Habit: Herb, Local Name: Nandababulii

7-8 leaves are crushed in palm and its juice is applied over the cut for blood clotting.

Datura metel L. (Solanaceae), Habit: Herb, Local Name: Kaladudura

To treat pimples and other infections, leaves gently heated on flame are applied topically over the face once daily for a week.

Eclipta alba (L.) Hassk. (Asteraceae), Habit: Herb, Local Name: Bhrungaraj

Paste made from leaf is applied topically for ringworm infection. The Leaves are boiled with coconut oil and the extract is applied on head for seven days to treat dandruff.

Euphorbia hirta L. (Euphorbiaceae), Habit: Herb, Local Name: Hariharika

Latex is effective for healing of wounds.

Ficus religiosa L. (Moraceae), Habit: Tree, Local Name: Aswastha

Stem latex is applied locally on the foot twice daily for healing cracks and fissures.

Flacourtia indica (Burm. f.) Merr. (Flacourtiaceae), Habit: Shrub, Local Name: Bainchaikoli

Stem bark paste is rubbed over the skin for the treatment of eczema.

Glinus oppositifolius (L.) A. DC. (Molluginaceae), Habit: Herb, Local Name: Pitasaga

Whole plant is used either in raw or cooked form to cure various types of skin disease like scabies, itches etc.

Gmelina arborea Roxb. (Verbenaceae), Habit: Tree, Local Name: Gambhari

Decoction of root bark is used for washing and healing of septic wounds.

Holarrhena pubescens (Buch-Ham) Wall. ex G. Don. (Apocynaceae), Habit: Tree, Local Name: Kerua

Paste prepared from root is applied on cut, wound, abscess and boils.

Jatropha curcas L. (Euphorbiaceae), Habit: Shrub, Local Name: Lankajada

Paste prepared from leaf is applied topically to treat eczema, scabies and ringworm infection.

Justicia adhatoda Burn. f. (Acanthaceae), Habit: Shrub, Local Name: Dhalabasanga

Paste prepared from leaf is applied topically for scabies and ringworm infection.

Lantana camara L. (Verbenaceae), Habit: Shrub, Local Name: Nagaairi

Fresh leaves are applied on the affected part to cure insect stings, skin eruptions, and itch of measles.

Lawsonia inermis L. (Lythraceae), Habit: Shrub, Local Name: Manjuati

Paste prepared from leaf is applied on cuts and wounds for a week.

Leucas aspera (Willd.) Link. (Lamiaceae), Habit: Herb, Local Name: Gayasa

Paste prepared from leaf is applied topically for ringworm infection.

Mangifera indica L. (Anacardiaceae), Habit: Tree, Local Name: Amba

Gum is gently heated and applied locally to treat cracks of soles. The tender stem is warmed in

slow flame and the oozing foam like juice is put to cuts, wounds, and cracks of the heels.

Michelia champaca L. (Magnoliaceae), Habit: Tree, Local Name: Champa

Cleaning of hair with leaf decoction helps in removing lice and dandruffs. Powder prepared from sun dried stem bark mixed with coconut oil is effective for treatment of skin diseases.

Mimosa pudica L. (Mimosaceae), Habit: Herb, Local Name: Lajakuli

The paste prepared from leaves is effective for eczema. A handful of entire plant paste is applied on cuts and wounds to promote healing.

Ocimum sanctum L. (Lamiaceae), Habit: Herb, Local Name: Tulasi

Leaf paste is applied daily once daily on ringworm affected area till it cures. Leaf paste is very effective for treating wounds of leprosy.

Peperomia pellucida (L.) Kunth. (Piperaceae), Habit: Herb

The paste prepared from leaves is applied over wounds.

Phyllanthus emblica L. (Euphorbiaceae) Habit: Tree, Local Name: Aonla

Barks are sundried and boiled with coconut oil; the extract is applied topically for scabies.

Piper nigrum L. (Piperaceae), Habit: Climber, Local Name: Golmaricha

Leaf paste is externally applied twice daily to treat the ringworm infection.

Plumbago zeylanica L. (Plumbaginaceae), Habit: Shrub, Local Name: Chintamani

Fresh leaves paste is applied externally to treat eczema, scabies and ringworm infection.

Pongamia pinnata (L.) Pierre. (Fabaceae), Habit: Tree, Local Name: Karanj

Powder made from the sun dried barks is gently boiled with coconut oil and the extract is applied topically to treat eczema, scabies and ringworm infection.

Portulaca quadrifida L. (Portulacaceae), Habit: Herb, Local Name: Balbalua

Whole plant decoction is effective to skin diseases. *Rauwolfia tetraphylla* L. (Apocynaceae), Habit: Shrub

The juice prepared from whole plant along with castor oil is applied externally to treat skin diseases.

Schleichera oleosa (Lour.) Oken (Sapindaceae), Habit: Tree, Local Name: Kusum

Stem bark is grinded into a paste and applied over skin as curative against itching. Oil is extracted from the seed and applied locally for

gout and scabies. Seed paste is slightly warmed and applied over the cuts to prevent pain and to cure white patches on the skin.

Solanum nigrum L. (Solanaceae), Habit: Herb, Local Name: Nunununia

Leaf paste or juice is applied on ringworm affected area for 3-4 days.

Tephrosia purpurea (L.) Pers. (Fabaceae), Habit: Shrub, Local Name: Banakulathi

Paste of the whole plant is applied topically to treat injuries.

Tridax procumbens L. (Asteraceae), Habit: Herb, Local Name: Bisalyakarani

Decoction of leaf is applied topically on the boils, cuts, sores, wounds and eczema to promote healing.

Vernonia cinerea (L.) Less. (Asteraceae), Habit: Herb, Local Name: Poksunga

Leaf paste is used for the treatment of skin disease, threadworm infection and wounds.

The plant species used as phytocure for skin diseases in Bhadrak district of Odisha, India include 57 species representing 34 families (Figure 2). The majority of abundant were species belonging to the family Euphorbiaceae (5) and Fabaceae (4). The remaining families were represented by fewer species. The most frequently mentioned plants being used were *Andrographis paniculata* (Burm. f.) Wall. ex. Nees., *Annona squamosa* L., *Azadirachta indica* A. Juss., *Calophyllum inophyllum* L., *Cissampelos pareira* L., *Croton sparsiflorus* Morong., *Glinus oppositifolius* (L.) A. DC., *Lantana camara* L., *Ocimum sanctum* L., *Pongamia pinnata* (L.) Pierre. and *Tridax procumbens* L. The analysis of the recorded medicinal plants based on growth habits showed highest proportion of herbs with 28 species (49.1%), followed by 18 trees (31.6%), 8 shrubs (14%) and 3 climbers (5.3%). Leaves were utilized more often constituting 55.9%, followed by bark (10.2%), seeds and whole plant (8.5%) each, and the remainders were root, latex, bulb, and gum.

Discussion

Skin health is fundamental to total health. The skin, along with the hair, glands and nails is the part of the integumentary system, the largest and most versatile organ system in the body [30]. It serves to protect our bodies from our external environment but is extremely susceptible to microbes that influence human health. Plants have traditionally served as man's most important weapon against pathogens. In aboriginal system of traditional medicines, people have been heavily dependent on plant products and have believed in their various remedial properties for a very long time. In certain areas, these folk medicinal prescriptions are endemic and have survived over hundreds of years. This traditional knowledge accumulated over the years is improved upon and disseminated orally from one generation to another in the form of folklore and folk sayings and contributed to the accumulation of a complex wealth of knowledge and skills. The most cited plant species to cure skin disorders in the current investigation are, *Azadirachta indica* A. Juss., followed by *Cassia tora* L., *Annona squamosa* L., *Pongamia pinnata* (L.) Pierre., *Lantana camara* L., *Tridax procumbens* L., *Argemone mexicana* L., *Calophyllum inophyllum* L., *Andrographis paniculata* Nees., *Amaranthus spinosus* L., *Bauhinia variegata* L., *Butea monosperma* (Lam.) Taub. Similar plant use is recorded earlier in different parts of India [16-18,20,21,23,31,32], indicating the importance of traditional medicine in the treatment



Figure 2: (a) *Andrographis paniuclata* (Burm. f.) Wall. ex. Nees. (b) *Boerhavia diffusa* L. (c) *Butea monosperma* (Lam.) Taub. (d) *Calophyllum inophyllum* L. (e) *Calotropis gigantea* R. Br. (f) *Cassia alata* L. (g) *Cissampelos pareira* L. (h) *Couroupita guianensis* Aubl. (i) *Croton sparsiflorus* Morong. (j) *Datura metel* L. (k) *Eclipta alba* L. Hassk. (l) *Glinus oppositifolius* (L.) A.DC. (m) *Lantana camara* L. (n) *Leucas aspera* (Wild.) Link. (o) *Peperomia pellucida* (L.) Kunth. (p) *Tephrosia purpurea* (L.) Pers.

of skin disorders. Moreover, these reports differ in the parts of the plant used or in preparation and mode of use. For instance, bark of *Achyranthes aspera* is used by the people of Gujarat for skin diseases (itching) [33]; root paste of *Cassia fistula* and whole plant extract of *Eclipta prostrata* is used for skin disease by Tribals of Bankura Districts, West Bengal [34]; *Cissampelos pareira* root paste is used by the people of Villupuram district of Tamil Nadu for wound healing and skin disorders [35]; fresh and dried fruits of *Phyllanthus emblica* is used by the people of Assam and Manipur for the treatment of skin diseases [36]; whole Plant of *Tridax procumbens* is used by the inhabitants of Varanasi, Uttar Pradesh for boils, cuts and wounds, eczema and skin disorders [37]. Similarly, various workers have reported the effective use of several herbal remedies for skin ailments and have confirmed potentials for *Acalypha indica* and *Plumbago zeylanicum* [38], *Amaranthus spinosus* [39], *Buchanania lanzan* [40], *Ficus religiosa* [41], *Flacourtia indica* [42], *Michelia Champaca* [43] and *Solanum nigrum* [44]. External applications are more preferred for the management of skin disorders [19]. Of the reported growth forms, herbs make up the highest proportion of the medicinal species. Literatures on medical ethnobotany explain the potential use of herbs for the treatment of

diseases [45] and could be attributed to their wide range of bioactive ingredients [46]. In the present study leaves are predominantly utilized in herbal medication followed by fruit, root and whole plant. These findings are also similar to other countries including India [47-49].

Conclusion

The results suggest that the people of Bhadrak district possessed quite extensive knowledge of the medicinal properties of plants that they used for treatment of skin ailments. The emergences of increasingly pathogenic and resistant microbes have stimulated a search for safer and more natural alternatives to the current conventional treatment methods. Thus the wealth of medicinal plants points to a great potential for research and the discovery of new drugs to fight skin diseases.

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