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Ethnobotanical Study of Plants Used Against Gout and Rheumatism in Asansol Coalfield Region of West Bengal

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Abstract

An ethnobotanical survey was carried out in Asansol region of West Bengal and the investigations revealed that it sustains a very rich medicinal plant wealth. It is one of the notable abode of tribals and people of other castes. The socioeconomic status and culture of tribals is woven around the coalmines and its adjoining forests. In this study many plants were reported to cure gout and rheumatism apart from other diseases cured. The use of plants, plant parts has been discussed.

Keywords: Ethnobotanical, Asansol, West Bengal, Gout, Rheumatism.

Introduction

Asansol is situated on the western part of Burdwan district of West Bengal. It lies on exposed Gondwana rocks and the different tribes found in this area are Santhals as dominant besides Mahi, Mali, Modikor, Munda, Parhaya, Ho and Bhumjis, etc. It is surrounded by hills of Chotanagpur, districts of Bankura, Purulia and Birbhum. It is a coal mining, industrial metropolis and one of the ethnically diverse places in India. It is one of the most important coalfield regions of Eastern India. This area lies in the Damodar Valley region surrounded by Durgapur-Asansol industrial belt. It is bounded by latitude 23° 55° N and longitude 86° 45° E to 87° 20° E. Rheumatism and gout in the inhabitants of the Asansol coalfield region of West Bengal are some of the dominant reason causing acute illnesses. It is characterized by pain and swelling of the muscles ligaments and tendon. According to WHO, 0.3-1% of the world population is affected by rheumatism [1].

Review of Literature

Rheumatism is commonly called as “vat” or “Gathia” in Hindi. Rheumatoid arthritis (RA) causes joints all over the body to become inflamed, stiff, painful, and swollen. It can cause damage that can be disabling and permanent. RA is also a systemic disease and so it can affect other parts of the body like heart, kidneys and brain if left untreated. Although the word "rheumatism" is no longer in the medical dictionary, it is still used informally to describe symptoms similar to those experienced in osteoarthritis. There is no real difference between rheumatism and RA but it remains in the general language. Rheumatism and arthritis both tend to be used as descriptions for a variety of symptoms, such as joint pain and inflammation. Osteoarthritis is one of the most common forms of arthritis. It is caused by wear and tear on the joints. Rheumatoid arthritis is a form of arthritis which is an autoimmune disease. In this disease the body mistakes its own tissues as foreign and attacks them. The immune system attacks joints and other parts of the body, producing symptoms that often involve pain, fatigue, and warm, swollen, inflamed-looking joints[2].

Gout (also called hyper uricemia) is an intensely painful type of arthritis that occurs mainly in the joints of the big toe. This disease has been associated with an overabundance of rich food and drink since ancient times[3]. But until the 20th century, only the wealthy could afford such luxuries. The Greek philosopher-physician Hippocrates called gout the “arthritis of the rich”. Rich food and drink can cause gout indirectly as the real cause is purines. These chemical compounds are found in certain foods like meats, fish, shellfish, whole grain breads, cereals and even some vegetables like ladies finger etc. The body converts purines into uric

acid. Gout can occur whenever there is too much uric acid in the blood. Uric acid, a normal waste product is normally excreted in the urine. But if too much uric acid builds up or cannot be filtered by the kidneys, high levels can form sharp acid crystals in the joints, causing inflammation and intense pain. Our immune system sees the crystals as "foreign bodies" and attacks them, causing local inflammation, redness, heat, and a lot of pain. Gout often affects the first joint in the big toe, causing a condition known as podagra. The disease can also affect joints in other parts of the body, including the top of the foot, ankles, wrists, knees, or elbows. It is usually in later stages of gout when small joints in the hands are involved. RA, however, tends to involve the smaller joints in the hands early on. The pattern of joint involvement is very helpful to physicians in differentiating between gout and RA. Men outnumber women 3-to-1 on gout. It's also more common in men over 40. Women are more likely to get it after menopause[4]. Colchicine, which is a drug derived from a flowering plant called the autumn crocus, meadow saffron or naked ladies (*Colchicum autumnale* L.), was first used as a purgative in ancient Greece to treat gout. Today, doctors still use colchicine to treat an acute gout attack. Colchicine when given early during an attack relieves gout pain[5].Other medications like probenecid and allopurinol are used to prevent gout. But the allopathic drugs are costly and have various side effects on the body so development of natural drugs from ethnomedicinal plants for the cure of these diseases will be more effective and cheaper to the common people [6.] The risk of developing gout increases as the serum uric acid level rises [>7 mg/dl]. In the allopathic system of medicine there is no permanent cure of the disease gout and rheumatism but it is only controlled [7].Rout et al. (2009) documented ten plant species for the treatment of gout and rheumatism during their ethnobotanical study in Mayurbhanj district of North Orissa [8]. Fifty medicinal plants belonging to thirty six families were identified by Sutha et al. (2010) which have been employed by the Kannikkar tribal community of Kalkad Mundanthurai Tiger reserve of Western Ghats, Tirunelveli, Tamil Nadu for the treatment of rheumatism [9].Saha and Sahu (2012) also reported few plants for the cure of above diseases in their ethnomedicobotanical survey of the use of medicinal plants by tribals of Asansol coalfield area [10]. A total of twenty six medicinal plant species were documented by Mutyala et al. (2015) for the treatment of rheumatoid arthritis used by the tribes of Papikondalu forest, Andhra Pradesh[11]. Ecofloristic survey of the plants growing in Asansol industrial belt of West Bengal with reference to their medicinal value was compiled by Mandal and Mandal (2016)[12]. About 20 plants were reported by Chaturvedi P.(2018) in ethnobotanical study on traditional medicinal plants used against rheumatism in Shivpuri district of Madhya Pradesh[13]. In this survey some ethnomedicinal plants were recorded which cures these ailments.

Objective of the Study

To systematically enumerate and document the use of ethnomedicinal plants to cure diseases with special emphasis on gout and rheumatism in Asansol coalfield region of West Bengal. Since there in no permanent remedy to cure gout and rheumatism in modern systems of medicine, screening of the ethnomedicinal plants may help in the preparation of herbal and modern drugs to cure these diseases.

Materials and Methods

The ethnobotanical field survey was conducted in tribal localities of Kalipahari, Damra, Sripur and Bhanora collieries in Asansol coalfield region of West Bengal. For collecting information regarding plants used for medicinal purpose by tribals a number of field trips were made to document the ethnomedicinal plant diversity from January 2014 to December 2015. The tribal areas were visited in different seasons to avail most of the plant materials in their flowering condition. The information about medicinal uses of the plants were collected on the basis of interview with tribal herbal healers and experienced old persons belonging to different tribal communities in different collieries (Table 1). In the present study, safety considerations were properly maintained and abundant plants were recorded. Herbarium specimens and photographs were identified by taxonomists and stored for future use. The ethnomedicinal plants used for cure against gout and rheumatism was confirmed by tribal medicinal practitioners and tribal volunteers. The queries were done by the authors to indigenous community as suggested by Jain (1964); Martin (1995) and Maundu (1995) for carrying out systematic study in ethnobotanical investigations[14,15,16]. Information about the medicinal plants and their uses has been collected from authentic tribal medicinal practitioners and by consulting them repeatedly. The views of medicine men and informants on Prior Informed Consent (PIC) and intellectual property rights (IPR) were taken on traditional knowledge and practices. They had agreed that their knowledge can be used for research and academic purposes for the welfare of the mankind. No conflict of interest was observed in this ethnobotanical study. In case information differed from experts to experts, rule of maximum was applied. Regular visits to patients regarding information about recovery were noted; 55% -60% positive answers were taken as confirmed.

Table: 1- Name of Some of the Medicinal Practitioners Contacted in Asansol Coalfield Area

Name of the medicinal practitioner/informant	Sex	Age	Experience
Sonathan Kisku	Male	72	35
Kalipada Marandi	Male	68	28
Ram Vilas Mahato	Male	*70*	30
Raju Sinduri	Male	*62*	26

Results and Discussion

The autoimmune disease has no cure and early diagnosis is the key control. So it is important for a medical practitioner to diagnose the correct disease and prescribe the right medicine. At first glance, rheumatoid arthritis (RA) and gout seem almost

interchangeable. Both diseases cause redness, swelling, pain in the joints and can cause serious disability. But there are some tendencies that differentiate the diseases. Gout usually occurs in the foot, most commonly at the base of the big toe. RA can affect any joint on either side of the body, but most commonly occurs in the small joints of the hands, wrists, and feet. Gout is always accompanied by redness, swelling, and intense pain. A joint affected by RA also may become painful, but won't always be red or swollen. RA pain varies in quality and intensity. While RA is painful, a gout attack is often so intense that the sufferer has great difficulty walking. People with RA can have difficulty walking as well, but the sudden intensity and immediate loss of function is usually more dramatic in gout. The onset of RA pain is more gradual, while the pain from gout generally reaches its peak within 24 hours. The duration of gout flares is typically limited even without treatment, lasting two weeks or less but RA flares usually last longer unless treated[17].In this survey forty seven plant species were recorded of which thirty five are used against rheumatism and twelve are used against gout. However, four plants were recorded which was commonly used for the cure of both the diseases. The different plant parts were mostly applied topically as a paste, juice, and oil on the affected muscles, swellings and joints to get relief from pain followed by decoctions and extracts that were taken orally. The following plant species were identified for their use in Asansol coalfield area against rheumatism and gout. (Table2,3). The findings suggest that ethnomedicinal plants have great potentiality to cure different kinds of arthritis.

Table: 2- List of Ethnomedicinal Plants Used to Cure Rheumatism in Asansol Coalfield Region

Botanical Name	Family	Local Name/ Santhali Name	Uses
Abrus precatorius L.	Papilionaceae	Kunch/Kawet	The extract of the roots, fruits and leaves is taken.
Acacia pennata Wild.	Mimosaceae	Kuchui/Undaru	The juice of the leaf is applied on joints to get relief from rheumatic pain.
Agave americana L.	Amaryllidaceae	Bans keora	The extract of the roots and leaves is taken.
Alangium salvifolium (L.f) Wang.	Alangiaceae	Ankar/Dela	The juice of the leaf is used to get relief from rheumatic pain.
Aparagus officinalis L.	Asparagaceae	Hillua	Paste of the tuber roots is applied to get relief from pain.
Artemisia absinthium L.	Asteraceae	Mastaru	Oil extracted from the whole plant is externally applied on the muscles to treat rheumatism.
Bauhinia purpurea L.	Caesalpiniaceae	Raktakanchan/Singyara	The root is powdered and taken with water till cure of the rheumatic pain.
Cardiospermum halicacabum L.	Sapindaceae	Shibjhul	The extract of the whole plant and leaves is applied on muscles and joints.
Cinnamomum camphora Nees	Lauraceae	Karpur	Camphor prepared from the plant is applied with oil.
Cinnamomum zeylanicum Blume	Lauraceae	Daru chini	The powdered bark of the plant is taken orally till cure.
Cynodon dactylon (L.) Pers	Poaceae	Durba	Fresh juice of the whole plant is applied.
Datura innoxia Mill.	Solanaceae	Krishna dhutra	The extract of the whole plant is applied on rheumatic swellings.
Euphorbia tirucalli L.	Euphorbiaceae	Siju	Fresh milky juice from the plant is applied and is useful in curing the disease.
Gardenia gummiferaa L. f.	Rubiaceae	Narihingu	The gum extracted from the plant is applied on swellings along with mustard oil.
Gloriosa superba L.	Liliaceae	Siric samano	The paste of the root is applied on swellings.
Hiptage benghalensis Kurz.	Malpighiaceae	Madhavi/ Basanti	The extract of the leaves is used in chronic rheumatism.
*Holarrhena pubescens (*Bunch.- Ham.) Wall. ex G.Don.	Apocynaceae	Kurchi/Indrajab	The powder of the stem bark is taken orally for acute rheumatism till cure.

Hyptis suaveolens Poit.	Labiatae	Ban tulsi	The extract of the flowering shoots is applied on swellings.
Kaempferia galangal L.	Zingiberaceae	Ekangi	The paste of the rhizome, root stock and leaves is applied.
Lantana camara var. aculeata (L.) Moldenke	Verbenaceae	Chotra/Khus	The extract of the whole plant is applied on rheumatic swellings.
*Litchi chinensis (*Gaertn.) Sonn.	Sapindaceae	Lichu	The seed extract is applied in rheumatism.
Paederia scandens(Lour.)Merill	Rubiaceae	Gandhal	The decoction of the roots is taken orally to get relief from the pain.
Piper longum L.	Piperaceae	Pipul/Ralli	The juice of the fruits is prescribed orally till cure.
Ricinus communis L.	Euphorbiaceae	Rerhi/Eradom	The seed oil is applied in rheumatic pain.
Saraca asoca (Roxb.) de Wilde	Caesalpiniaceae	Ashoka	The paste of the bark is prepared and used.
Semecarpus anacardium L.f.	Anacardiaceae	Soso/Bhela	The nut oil is applied on swellings.
Solanum nigrum L.	Solanaceae	Kakmachi	The decoction of the whole plant is taken orally.
*Spondias pinnata (*L.f.) Kurz.	Anacardiaceae	Amrah	Paste is prepared from the bark of the stem and applied to affected areas.
Symplocos racemosa Roxb.	Symplocaceae	Lodam	The paste of the bark is applied to treat rheumatism.
Synedrella nodiflora Gaertn.	Compositae	Syndrela	The paste of the leaves is applied.
Thevetia peruviana (Pers.) Merill	Apocynaceae	Kalkephul	The seed oil is applied.
Tylophora indica (Burm. f.) Merill	Asclepiadaceae	Antamul	The paste of the roots is applied on rheumatic pains.
Urena lobata L.	Malvaceae	Ban okra	The decoction of the roots is used.
Vitex negundo L.	Chotra/Khus	Sinduri	The tincture of the root bark is used.
Zingiber officinale Rosc.	Zingiberaceae	Ada	The extract of the rhizomes is applied on rheumatic pain.

Table: 3- List of Ethnomedicinal Plants used to Cure Gout in Asansol Coalfield Region

Botanical Name	**Family**	**Local Name/Santhali Name**	**Uses**
Aparagus officinalis L.	Asparagaceae	Hillua	Paste of the tuber roots is applied to get relief from pain. Root decoction is mixed with cow's milk and taken orally till cure.
Croton bonplandianum Baill.	Euphorbiaceae	Churchuri	The oil from seeds is used to treat gout.
Eucalyptus citriodora Hook.	Myrtaceae	Lebugandha	Essential oil obtained from leaves is applied on joints.
Euphorbia antiquorum L.	Euphorbiaceae	Etkec	The extract of the stem and leaf is useful in gout.
Flacourtia indica (Burm. f.) Merr	Flacourtiaceae	Serali	The paste of the root is applied along with pepper to cure gout.
Gloriosa superaba L.	Liliaceae	Siric samano	The paste of the root is applied on swellings to get relief from pain.
Pedalium murex L.	Pedaliaceae	Bara gokhur	The juice of the fruits is used.
Piper longum L.	Piperaceae	Pipul/Ralli	The extract of the fruits and roots is prescribed orally till cure.

Semecarpus anacardium L.f.	Anacardiaceae	Soso/Bhela	The nut oil is applied on joints and swellings.
Solanum nigrum L.	Solanaceae	Kakmachi	The decoction of the whole plant is taken orally.
Spilanthes acmella (L.) Murr.	Compositae	Para cress	The extract of the whole plant is taken internally.
Tylophora indica (Burm. f.) Merill	Asclepiadaceae	Antamul	The paste of the roots is applied on gouty pains.

Conclusion

The knowledge about the ethnomedicinal plants and their uses has not been completely explored in Asansol coalfield region of West Bengal. This survey is a preliminary contribution of ethnobotany of this area using standard research methods focusing on ethnomedicinal plants used for curing rheumatism and gout. These ailments are not limited to old people any more. Young urban working professionals battling stressful lives are now the prime candidates for these diseases. The data collected in the survey can be used for botanical and pharmacological research in future for the discovery of new drugs. However, establishment of guidelines for the protection of the ethnobotanical knowledge can provide a significant control on ethical utilization of this traditional knowledge. It is suggested that for the formulation of effective phytomedicines through scientific investigations like pharmaceutical analysis, standardized doses and clinical trials should be done. Therefore, this study is an effort to document and preserve ethnomedicinal knowledge which will help in systematic and effective treatment of rheumatism and gout.

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