



Study on the Prevalence of Hyperuricemia and Ethnobotanicals Associated with Gouty Arthritis in Rawalakot, Azad Kashmir

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Abstract

Hyperuricemia prevalence is an exclusive condition in the global populace as it seems to have increased day by day for a long time now. Recent studies recommend that hyperuricemia is an issue and is considered an independent risk. The prevalence of hyperuricemia in the patients of Azad Kashmir and the surveillance of medicinal plants used for this gouty arthritis is relatively low. However, to assess hyperuricemia prevalence in the Rawalakot region of Azad Kashmir, a review study was conducted. The data of the previous three years were retrieved from the Eastern Medicine Teaching Clinic at the University of Poonch, Combined Military Hospital (CMH) Rawalakot, as well as Ali Imran Hospital Rawalakot. Additionally, an ethnobotanical survey was performed to investigate the therapeutic plants utilized to cure gouty arthritis in the Rawalakot region of Azad

Kashmir. The study observed a high incidence of hyperuricemia with joint pain in 17.4% of the 189 patients. The percentage of hyperuricemia in males was higher (10.5%) than in females (6.87%). These plants were identified and then evaluated by the local elder people and traditional healers (Hakims). Later on, it was then confirmed by the Botanical Department of University and then preserved. The ethnobotanical study revealed 13 medicinal plants belonging to 11 families used as medicines to treat gouty arthritis. Solanaceae was the most popular family with three species, *Datura stramonium*, *Solanum nigrum*, and *Withania somnifera*. It has been observed that people taking these medicinal plants have significant improvement in gouty arthritis. However, further study needs to be carried out to explore the bioactivity of the plants.

Keywords: Medicinal Plants; Gouty Arthritis; Uric Acid; Hyperuricemia; Traditional Healers

Introduction

Hyperuricemia is a condition in which the level of saturated uric acid is greater than 7 mg/dl with 6 mg/dl in the blood of men as well as women. Hyperuricemia develops in synovial joint cavities due to the increase of sodium urate crystals in joint fluid. In about 90% of patients, the first metatarsophalangeal joint is affected by gouty arthritis. It can also impact identifying joints, such as the fingers, wrists, elbow joint and bursae, ankle joint, and subtalar joint. The pathogenesis starts with the deposition of uric acid inside the joints, which causes the joints to become infected and polluted with great pain, known as gouty arthritis. A pathological state of affairs is created due to increased uric acid synthesis or ample storage in the body, particularly in the joints, leading to severe joint pain and several other symptoms. When uric acid is more synthesized, or the excretion is hampered, it results in a wide range of uric acid levels or hypothesized gouty etiologies. Uric acid deposits in joints can irritate both the joint and its membrane linings. Irritation, pain, and joint redness are caused by immune system replication as it begins to produce itself. If the sickness is not treated correctly, then it could become more serious [1]. Sodium urate has also been shown to affect the kidneys and ureters, resulting in renal and kidney failure. The discomfort might last for a short period or sometimes for a long time. Protein metabolism is principally characterized by the production of purine in the form of uric acid, and it is regulated by the liver.

Gouty is a chronic, excruciatingly painful condition that is increasing all over the world rapidly. Gouty can be triggered by many factors, including obesity, high blood pressure, a high protein diet, excessive consumption of energy drinks, and alcohol consumption [2]. Consumption of high-energy meals, including meat or large amounts of alcohol, increases purine catabolism and decreases renal excretion, resulting in reduced gouty symptoms [3]. Diet has a significant role in the reduction of hyperuricemia. It is necessary to consume a purine-rich diet to raise uric acid quantity in the body. The kidneys are responsible for removing uric acid from the body. If uric acid levels rise and the kidneys are no longer capable

of removing acid from the body, crystals will accumulate in the joints, causing gouty symptoms to manifest themselves. The first step toward alleviating intense pain is to lower uric acid levels to avoid gouty episodes. A transition to a high purine diet can be implemented to lower blood uric acid levels and prepare for weight loss. Weight loss also has the additional benefit of lowering the uric acid level in the blood. Patients are recommended to consume foods that contain high purine contents, such as animal meat and shellfish. High levels of uric acid were found in alcoholic people. Therefore, patients with hyperuricemia must avoid alcoholic beverages. It is appropriate to pay attention to the signs and symptoms of gout.

Acute gouty medication includes nonsteroidal anti-inflammatory drugs, colchicines, corticosteroids, and therapy for urate reduction. These treatments have side effects, including nonsteroidal anti-inflammatory drugs (NSAIDs), inducing gastro-duodenal ulcers and reducing the signs and symptoms of infection and severe illness. NSAIDs are the most often prescribed therapeutic drugs. They provide relief to patients, but they also have several adverse side effects. As a result, there is an urgent requirement for alternative treatments for gouty arthritis. Herbal medications are generally considered to be safe and possess fewer adverse effects. The Rawalakot area of Azad Jammu and Kashmir is rich in medicinal plants. The people of the Rawalakot area are consuming several medicinal plants as a preventive measure for gouty arthritis. Owing to the high prevalence of hyperuricemia in the region of Kashmir, more specifically in the Rawalakot area, the present study attempts to investigate the medicinal herbs that were traditionally used to treat gouty arthritis.

Study Objectives

Predominant purposes of this study work have been to

- Evaluate hyperuricemia superiority in the area of Rawalakot, Azad Jammu as well as Kashmir.
- Carry out an ethno-botanical survey, for identification of the traditional medicinal plants in Rawalakot, Azad Jammu and Kashmir which are being used for the

treatment of gouty arthritis.

Methodology

Study Area

The study was carried out in several places such as Dreak, Hussain-kot, Banjosa, Toli-peer Khaigala, Paniola and Hurnamara, Kharick, Rehara, Soon-Topa, Poonch district Tehsil Rawalakot of Azad Jammu and Kashmir. Situated at 73° 45'34.93" East, 33°51'32.18" North, and about 5374 feet high, Rawalakot covers an area of 390 square miles. Rawalpindi is roughly about 120 kilometres away, and Kahuta is around 76 kilometres. It is connected by Tain and Goi Nala roads to Rawalpindi and Islamabad. Rawalakot enjoys subtropical highland weather with 38°C ± 3°C temperature.

Sample Collection

The level of blood uric acid was analyzed among the male and female individuals who participated in Eastern Medication Clinics, Poonch University, Rawalakot Central Military Hospital (CMH) and Rawalakot Ali Imran Hospital during the last years 2013-2016). The serum uric acid reference varieties vary from 2.6-6.0 mg/dl in womens as well as 3.5-7.0 mg/dl in men. Serum uric acid is considered hyperuricemia if the level is higher than 7.0 mg/dL in mature mens with >6.0 mg/dL in females.

Ethnobotanical Survey

An ethnobotanical survey was carried out in the Tehsil Rawalakot area of Poonch District to collect medicinal plants used to treat gouty arthritis. A face-to-face interview was carried out to gather the ethnomedicinal data from the tribal physicians, conventional healers and older adults of various ages using a ready-made questionnaire. Ethnomedicinal data included the number of plants utilized, traditional formulation methods and mode of administration. Similar evidence is provided by move checking from the Botanical Department, University of the Poonch, Rawalakot.

Botanical identification of plants

The plant samples were identified and preserved, maintained, and voucher specimens were submitted to the herbarium at the University of Poonch, Rawalakot, Eastern Medicine and Surgery Department.

Results

Hyperuricemia Prevalence

The serum uric acid record in modern studies has been taken from clinical records of CMH Rawalakot and

Ali Imran Hospital, Eastern Medicine Hospital. The total number of patients examined was 2588 for a particular disease. Among the 2588 patients, serum uric acid was examined in 189 individuals. Of the 189, the hyperuricemic condition was observed among 33 patients (20 male and 13 female). The prevalence of hyperuricemia patients with joint pain was reported at 17.4% (Table, 1). The prevalence of hyperuricemia in men has grown to 60% and 39% in women.

Parameters	No. of patients
Total number of patients in CMH Rawalakot to investigate for different ailments	2588 pt.s
Number of patients for the investigation uric acid level	189 pt.s
Hyperuricemic patients	33 (17.4%) pt.s
Male	20 (10.5%) pt.s
Female	13 (6.87%) pt.s
Hyperuricemia Prevalence in both male and female	17.4%
Hyperuricemia Prevalence in male	10.5%
Hyperuricemia Prevalence in female	6.87%

Table 1: Parameters to evalaute the prevalence hyperuceemia.

Ethnobotanical Survey

The present study investigated the indigenous understanding of the most widely utilized medicinal herbs of Rawalakot, Azad Jammu and Kashmir to treat gouty arthritis. A total of 73 informants were interviewed during the period of the survey (Table, 2). Among the 73 participants, eleven were traditional healers, while 62 were older people with ethnomedicinal knowledge. Male participants outnumbered the female participants with 71% and 29%, respectively. Meanwhile, the study did not find female Hakims.

Informants	Gender	No. of questionnaires
Traditional healers (Hakims)	Male	11
	Female	Nil
Older people	Male	41
	Female	21
Total		73

Table 2: Questionnaire distribution depending upon age and gender among local informants.

Table 3, showed the ethnomedicinal plants used in the traditional healing practices of gouty arthritis. A total of 13

plant species belonging to 11 families were documented from the study area. *Solanaceae* was the most popular plant family with three species, *Datura stramonium*, *Solanum nigrum*, and *Withania somnifera*. In contrast, other plant families contain a single species. All the plants were found to be wild in their

habitat and grow during the spring season. Leaves were the most common plant part used in the traditional formulations, followed by roots and seeds. Fruit, pulps, flowers, barks, and stems were also reported in a few plants.

Sr. No.	Scientific Name and Voucher No	Local Name	Family	Habitat	Parts Used	Growth Season	Medicinal Uses	Dosage (grams)
1	<i>Aloe barbadensis</i> Mill UPR-FMHS-DEMS-AB-101	Kunwar Gandal	<i>Liliaceae</i>	wild	leaves (gel)	Spring	Gouty arthritis, wound eruption, leucorrhoea cold, fungal and bacterial skin infections	0.125-0.500
2	<i>Amaranthus viridis</i> UPR-FMHS-DEMS-AV-102	Gunhar	<i>Amaranthaceae</i>	wild	leaves, seeds	Spring	Gouty arthritis, kidney disorders, anti-dropsy and healing wounds	2.0 – 5.0
3	<i>Azadirachta Indica</i> UPR-FMHS-DEMS-AI-103	Neem	<i>Meliaceae</i>	wild	root, bark, flowers, leaves	Spring	Gouty arthritis, hysteria, amenorrhoea, earache, syphilis	6.0 - 12
4	<i>Berberis lycium</i> Royle UPR-FMHS-DEMS-BL-104	Sumble	<i>Berberidaceae</i>	wild	root, fruit	Spring	Gouty arthritis, ulcers, boils, abscesses, skin disorders, periodic fever, wounds, cough, delirium, carbuncles and hoarseness	3.0 – 5.0
5	<i>Cassia fistula</i> UPR-FMHS-DEMS-CF-105	Cassia stick	<i>Caesalpiaceae</i>	wild	pulp	Spring	Gouty arthritis, tonsillitis, cough, pharyngitis, catarrh, asthma, and constipation	0.250-0.500
6	<i>Coriandrum sativum</i> UPR-FMHS-DEMS-CS-106	Kishniz, coriander	<i>Umbelliferae</i>	wild	seeds, stems, leaves	Spring	Gouty arthritis, neuralgia, dyspepsia, ulcers, flatulence, bleeding piles, vomiting, bilious affections, carbuncles and eyewash	5.0 - 7.0
7	<i>Datura stramonium</i> UPR- DEMS-FMHS- DS-107	Thorn apple	<i>Solanaceae</i>	wild	leaves, fruits, seeds, oil	Spring	Gouty arthritis, asthma, whooping cough, backache, and local application for burns	1.0 - 1.5
8	<i>Geranium wallichianum</i> UPR-FMHS-DEMS-GW-108	Ratanjo, Rattan jot	<i>Geraniaceae</i>	wild	Roots	Spring	Gouty arthritis, peptic ulcer, and duodenal ulcer	3.0 – 5.0
9	<i>Ricinus communis</i> UPR-FMHS-DEMS-RC-109	Hernoli, arand	<i>Euphorbiaceae</i>	wild	leaves, roots, seeds	Spring	Gouty arthritis, warts, asthma, Swelling, freckles, hair tonic	7.0 - 12

10	<i>Saussurea lappa</i> UPR-DEMS-FMHS-SL-110	Kuth	<i>Asteraceae</i>	wild	Roots	Spring	Gouty arthritis, rheumatism, toothache, and cough	1.0 – 2.0
11	<i>Solanum nigrum</i> UPR-DEMS-FMHS-SN-111	Kachmach	<i>Solanaceae</i>	wild	whole plant	Spring	Gouty arthritis, break urate stone in kidney or bladder, break uric acid stones	2.0 – 5.0
12	<i>Withania somnifera</i> UPR-FMHS-DEMS-WS-112	Ashwagandha	<i>Solanaceae</i>	wild	root, leaves	Spring	Gouty arthritis, leukoderma, insomnia, anxiety, asthma, bronchitis, backache and chronic liver disease	2.0 – 5.0
13	<i>Ziziphus jujuba</i> UPR-FMHS-DEMS-ZJ-113	Unab, jujuba fruit	Rhamnaceae	wild	dried fruits bark, leave.	Spring	Gouty arthritis, cough, skin disorders, gout, ulcers, periodic fever, wounds, delirium, abscesses, boils, carbuncles, and hoarseness	3.0 - 5.0

Table 3. Ethnobotanical survey of Medicinal Plants.

Discussion

Gouty joint pain is an intense, fiery disease affecting 1 in 100 people in Pakistan. It is an acquired sickness. Gouty severely affects those who have a family history or ancestry of gouty joint inflammation. The hyperuricemia rate has been expanded globally over the last few decades [4,5]. In the most recent exploration, patients with hyperuricemia had a family history of gouty joint inflammation. Present findings show that male gouty inflammation is much higher compared to the females. Previous research has shown that 95% of the time, an acute attack occurs at age 40 to 50 years and is associated with intensive gouty joint inflammation Age (such as is common in women earlier than menopause and not abnormal after menopause) is the most significant risk segment for serum uric corrosive expansion. Hyperuricemia predominance develops directly as a result of changes in presence and age style [6]. In the present investigations, hyperuricemic prevalence is similarly low in the age group 21–30 years.

This announcement is in settlement with going before to take a gender-wise statement, wherein age association of 61–70 and above have the most chances of hyperuricemia in both male and female. The hyperuricemia event contrasts with Pakistan's special regions and population. In the present investigation, the commonness of hyperuricemia was 17.4% among patients with the complaint of joint torment. In previous investigations, the frequency of hyperuricemia in unfastened states was remarkably more than two folds. In the 1960s and 1990s, about 2.2 million females and 6.1 million men died due to hyperuricemia [7]. In invigorating grown-ups, the prevalence is 6% over 8%, and 1 out of 3 grown-ups

has an increased uric corrosive stage with hypertension and a high possibility of cardiovascular infections [8]. In western countries, about 1% of the population is suffering from gouty joint pain, and it is reported as a common infection in the population over 40 years of age [9]. Increased uric corrosive level made the basis for future incidences of cerebral pains, and its pervasiveness in the developing world reaches from 15% to 35%. The association between hyperuricemia and blood vessel circulatory strain became referenced, and significant danger of oxygen-consuming vascular ailments was recognized [10]. In the most recent investigation, hyperuricemia rates in males and females with joint pain transformed into 10.5% and 6.87%, respectively. In a similar study in Turkey, hyperuricemia was reported in 12.1% of the city populace, wherein the predominance of hyperuricemia was 5.8% and 19% in females and males, respectively. As indicated by an investigation of Nepal, 3794 individuals from Chitwan regions have been explored wherein the casualties of hyperuricemia were 21.42%. Among the male grown-ups of Japan, the pervasiveness of hyperuricemia was about 30%. In contrast, the pervasiveness was 1-2% less in females underneath multi-year age and 3% in those over 50 years old [11]. In Seychelle Island, a cross-sectional study of 1011 patients of 25-64 years of age demonstrated a marked difference in the predominance of hyperuricemia with about 35.2% and 8.7% cases in male and female respectively. The cross-sectional examination directed by Lohsoonthorn, et al. [12]. In Thailand indicated that the general predominance of hyperuricemia was 10.6% from July 1999 to February 2000.

The pervasiveness of high level of uric acid in blood was 7.8% in females as well as 18.4% in males (N=1381 patients). In Java, an overview of an all-out population of 4683 country

grown-ups was researched, in which the commonness of hyperuricemia was 24.3%. In our study, 2 to 13% of the overall public has been assessed for the pervasiveness of asymptomatic hyperuricemia. Okinawa's well-known well-being upkeep affiliation screened 9,914 people in Japan, incorporating 3751 females and 6163 males between 18 to 89 years of age. It was observed that the normal event of hyperuricemia was 25.8%, with the female along with male were 34.5% as well as 11.6%, correspondingly. In New Zealand, hyperuricemia changed into additional typical in females (26.6%) and males (27.1%) than young European ladies (10.5%) as well as European males (9.4%). However, the frequency of hyperuricemia transformed into the most straightforward 8.84% in Saudi Arabia. In Japan, roughly 30% of grown-up men are tormented by hyperuricemia. In Qingdao town of China, Nan et al. (2006) performed a sectional overview among 2438 grown-ups, 903 were men, and 1535 were female with an age association of 20-74 years [4]. The results of this examination affirmed that while creating worldwide areas, the predominance of hyperuricemia becomes high. An examination was made by methods of Amin, et al. [6], wherein they examined the alliance of hyperuricemia with blood urea and serum creatinine.

The expanded phase of corrosive uric finishes in strange renal highlights. An investigation performed by Lai, et al., characterized the connection between the cardiovascular risk components and socio-statistic factors with hyperuricemia in adults [13]. This study shows that hyperuricemia is habitually found in old females and is substantially less influenced than adult males. Rajavel, et al. studied the connection between hypertension and hyperuricemia, revealing a significant correlation between uric acid concentration and hypertension, particularly in a populace of over 45 years. An examination was transformed into completed to research the predominance of gouty and hyperuricemia in 153 male patients dwellings in North America, with a frequency of hyperuricemia in patients living in Europe and Asia with standard people of the USA. All the seven victims with gouty joint pain were male, with a middle age of 50 years. The individuals with gouty joint inflammation experienced renal trouble and Glomerulus Filtration rate was found to be drastically lower when contrasted with further people with hyperuricemia. The pervasiveness of hyperuricemia was 65.8% in sufferers with low GFR in North America. Instances of gouty joint inflammation and unending hyperuricemia have been added in igan sufferers of North America contrasted with the common populace of North America and with igan sufferers in other parts of the division [14].

However, the predominance of gouty has improved over the last various years due to the utilization of creature protein rich in purine, utilization of diuretic cases, organ

transplantation and renal ailments [15]. There are several dangerous components of hyperuricemia, whereby the most major aspect is corpulence. An examination was done by Katrine, et al. to determine the predominance of hyperuricemia in controlled consideration individuals for more than ten years, wherein they explored that the general pervasiveness is extended all through 10 years.

Plants have been the source of medicine since ancient times. In the present study, 13 plants were reported from the Rawalakot region of Azad Kashmir traditionally used to treat gouty arthritis. Similarly, in the Mayurbhanj district of India, 23 plants of 18 families with 22 genera are utilized to control gouty joint pain [16]. Leaves of *Solanum nigrum* are applied as a poultice for gouty and rheumatic joint pains [17]. Leaves concentrate of *Spartosperma leucanthum* is remarkable for reducing the monosodium gem urate [18]. Different herbs and segments in the Unani gadget of prescription cure gouty joint inflammation and have overwhelming benefits. In Kenya, 37 blooms of 23 families with 32 genera have been observed throughout the ethnobotanical investigation. These medicinal botanicals are utilized for the management of chronic joint discomfort [19].

Polyherbal parts (Gouticin) containing unmistakable therapeutic plant added substances incorporating *Withania somnifera* have xanthine oxidase inhibitory outcome. Its adequacy to diminish serum uric corrosive level as well as cure gouty joint pain has been tried incredibly in medicinal preliminary in correlation with allopurinol [20]. *Zizyphus vulgaris* has been applied as a laxative and remotely for stiffness and gouty joint inflammation [21]. *Datura stramonium* leaves are approved as a poultice for gouty joints [22]. *Withania Somnifera* roots have long been employed to remedy illness and gouty joint irritation. It delivers quercetin, which is a xanthine oxidase inhibitor [23]. Common experts utilize home-produced drugs for therapy. This sort of inquiry promotes indigenous mastery frameworks to be informed and documented. The total number of herbal names, neighbourhood names, family name hovers, component composites, propensity, and method of executives, usages and dose was identified for 13 plant species with 11 families. The majority of those surveyed were between 50 and 60 years old. This study showed extensive data on the number of people living in Rawalakot using medicinal vegetation on their premises. Rawalakot groups were included to assess their understanding of others. This study is essential to saving data from Rawalakot therapeutic flowers. These flowers are of extremely considerable pharmacological and ethnobotanical significance in studies of phytopharmacological literature. This analysis allows for new equations and advances in new medicines in various fields. Such an ethnobotanical investigation is essential in order to provide medicinal greenery facts to future individuals.

Conclusion

The present study observed a high prevalence of hyperuricemia in the Rawalakot area of Azad Jammu and Kashmir. The risk aspects are planning to reduce purine and live a great life. Plants have been assessed and analyzed by utilizing regular healers and vintage individuals of various territories of Rawalakot. Thirteen medicinal plants from 11 families were perceived in ethnobotanical concentrates. As provided for this investigation of data on therapeutic vegetation, a large population group in Rawalakot is a rich wellspring. Therefore, this review is essential to maintain the data on healthy plants utilized by the population of Rawalakot.

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