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Review Article

RHEUMATOID ARTHRITIS AND GOUT: MEDICINAL PLANTS AS A DRUG ALTERNATIVE

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ABSTRACT

Rheumatoid Arthritis is a mucoskeletal system condition caused by mechanical and biological processes that disrupt the normal coupling of articular cartilage breakdown and synthesis. Gout is a clinical condition caused by the deposition of urate (monosodium urate monohydrate crystal) crystals in a joint or soft tissue, which causes an early inflammatory reaction. It is defined by the development of severe acute monoarticular arthritis. Alternative medicine offers a different approach to treating RA and Gout, and a variety of medicinal plants are now being studied in the hopes of developing a new therapy. There is an urgent need to research the full therapeutic potential of these herbals, as well as any potential side effects, in order to develop novel and safer therapy choices. The traditional medications used to treat arthritis and gout have a number of serious side effects. Because of its fewer downsides and greater advantages, plant-based medicine or herbal medicine has attracted a lot of interest for the prevention and treatment of gout and arthritis. Natural therapies that are non-chemical and non-invasive have no significant side effects since they use naturally active ingredients. Alternative medicine offers a different approach to treating RA and Gout, and a variety of medicinal plants are now being studied in the hopes of developing a new therapy. There is a pressing need to research the full therapeutic potential and, if any, harmful consequences of these herbals in order to develop novel, safer therapy choices with fewer side effects.

Keywords: Rheumatoid Arthritis, Gout, Herbal Treatment.

1. INTRODUCTION

Rheumatoid arthritis is an inflammatory chronic disease of synovium whose cause is unknown [1]. It causes pain, stiffness, functional limitation, work disability [2]. It is a systemic autoimmune disease [3]. It gradually starts with small joints of feet and hands and then spreading to larger joints and then gradually leads to inflammation in joint lining or synovial [4]. Even after detection at early stage, the medication available are less effective and more toxic [1]. A wide variety of arthritis exist of the most common being osteoarthritis or degenerative arthritis which is non-inflammatory arthritis.

According to WHO, 0.3-1% of the world population is affected from arthritis. Pathological changes in RA are hyperplasia of synovial membrane, infiltration of inflammatory cells and neovascularization which results into cartilage erosion and articular destruction [5]. A wide variety of arthritis exist, most commonly occurring type of arthritis include osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, systemic lupus erythematous and juvenile arthritis [6].

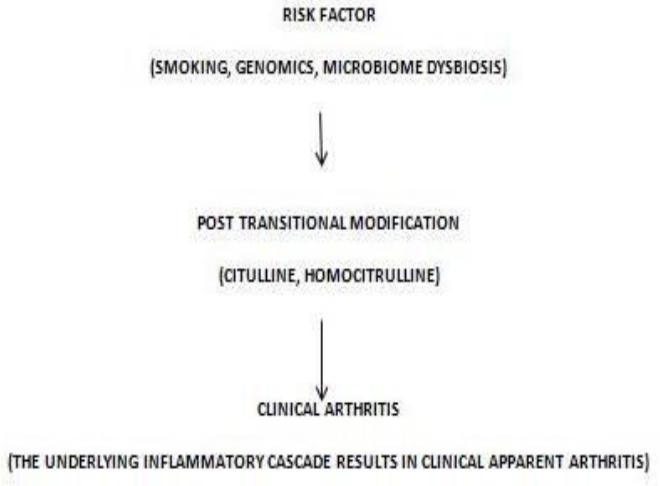

Fig. 1: Model of possible role of antibodies is disease pathophysiology

2. EPIDEMIOLOGY OF RHEUMATOID ARTHRITIS

On average, about 1% of the world's population is affected by rheumatoid arthritis, women are more prone

to the disease (about 3 times) than men [7, 8]. Arthritis is one of the most prevalent chronic health problems and is a leading cause of disability. In 2002, arthritis affected 43 million U.S. adults and this number is expected to reach 60 million by 2020 [9, 10]. Smokers are almost three times more prone than non-smokers particularly those who are heavy smokers and rheumatoid factor positive [11].

3. PREVALANCE OF RHEUMATOID ARTHRIS

Family history is a major risk factor for Rheumatoid arthritis, since the hereditary tissue type Major histocompatibility complex (MHC) antigen HLA-DR4 is significantly linked to the disease (specifically DR0401 and 0404). The condition is more common in women between the ages of 40 and 50. The incidence and frequency of Alzheimer's disease increase with age until it reaches 70 years old. The prevalence of arthritis is lower in Africa, according to various surveys [12].

Urate crystal deposition (monosodium urate mono-hydrate) causes gout [13]. Inflammation occurs in joints and soft tissues such as cartilage as a result of deposition [14]. Purine metabolism problem is multifactorial [15].

Stages for management of gout: [16, 17].

1. Treatment for an acute illness
2. Reduce your uric acid levels to avoid gouty arthritis and urate deposition.
3. Prophylaxis is used to prevent acute flare-ups.

4. EPIDEMIOLOGY OF GOUTY ARTHRIS

Gouty arthritis is a kind of inflammatory joint disease that affects males over the age of 40. The prevalence rate of self-reported gout was 13.6 cases per 1,000 males and 6.4 cases per 1,000 women, according to the National Health Survey (1983-1985). Since 1969, the frequency of gout has increased nearly thrice [19]. Physician-diagnosed gout, on the other hand, has a continuously lower prevalence rate-5.0 to 6.6 occurrences per 1,000 males and 1.0 to 3.0 cases per 1,000 women [20].

5. KEY POINTS [21]

- In recent years, the prevalence and incidence of gout have grown.
- The main gout in elderly males has experienced the most significant rise.
- Genetic factors, excessive alcohol use, a purine-rich diet, the metabolic syndrome, diuretic usage, chronic renal failure, and osteoarthritis are all risk factors for gout.
- Changes in the prevalence and incidence of gout might be explained by trends in the epidemiology of these risk variables.
- A substantial contribution to the growth in the prevalence of clinically overt, symptomatic, chronic gout is suboptimal therapy.

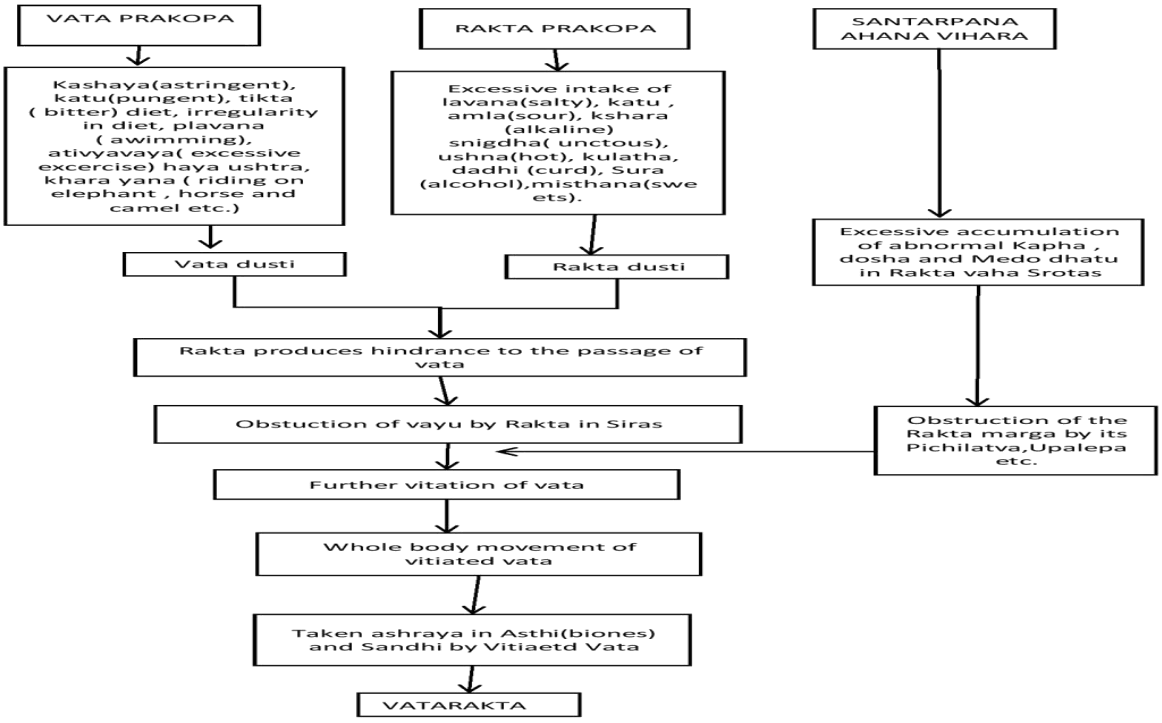

Fig. 2: Pathogenesis of gout according to Ayurveda

Medicinal plants have been used as a primary source of disease treatment for millennia. Natural products have been used to treat a variety of diseases for millennia. According to the WHO, traditional medicine is used by roughly 80% of the world's population. Herbal medicines are a fantastic choice for treating rheumatoid arthritis and gout symptoms, and they also have less downsides or side effects than allopathic pharmaceuticals [7, 10].

In osteoarthritis or any kind of arthritis, there is presently no effective pharmacotherapy capable of restoring the original structure and function of the damaged cartilage and synovial tissue. The growing popularity of herbal medicine and nutraceuticals may represent a growing dissatisfaction with orthodox medicine. Herbal medicines are an important element of India's legally acknowledged health care system. Non-allopathic medication is used by over 70% of India's population. In the next years, worldwide awareness of Ayurveda and Indian herbals will pay off handsomely [19].

5.1. Factors affecting use of herbal medicine

- It's possible that the traditional system isn't working.
- The patient wants more alleviation from their symptoms and/or impairment.
- The patient may experience problems as a result of the pharmacological treatment's adverse effects.
- Herbal and complementary therapies are often thought to be safer and more natural by patients [11].

6. ALLOPATHIC MEDICINE FOR TREATING RHEUMATOID ARTHRITIS

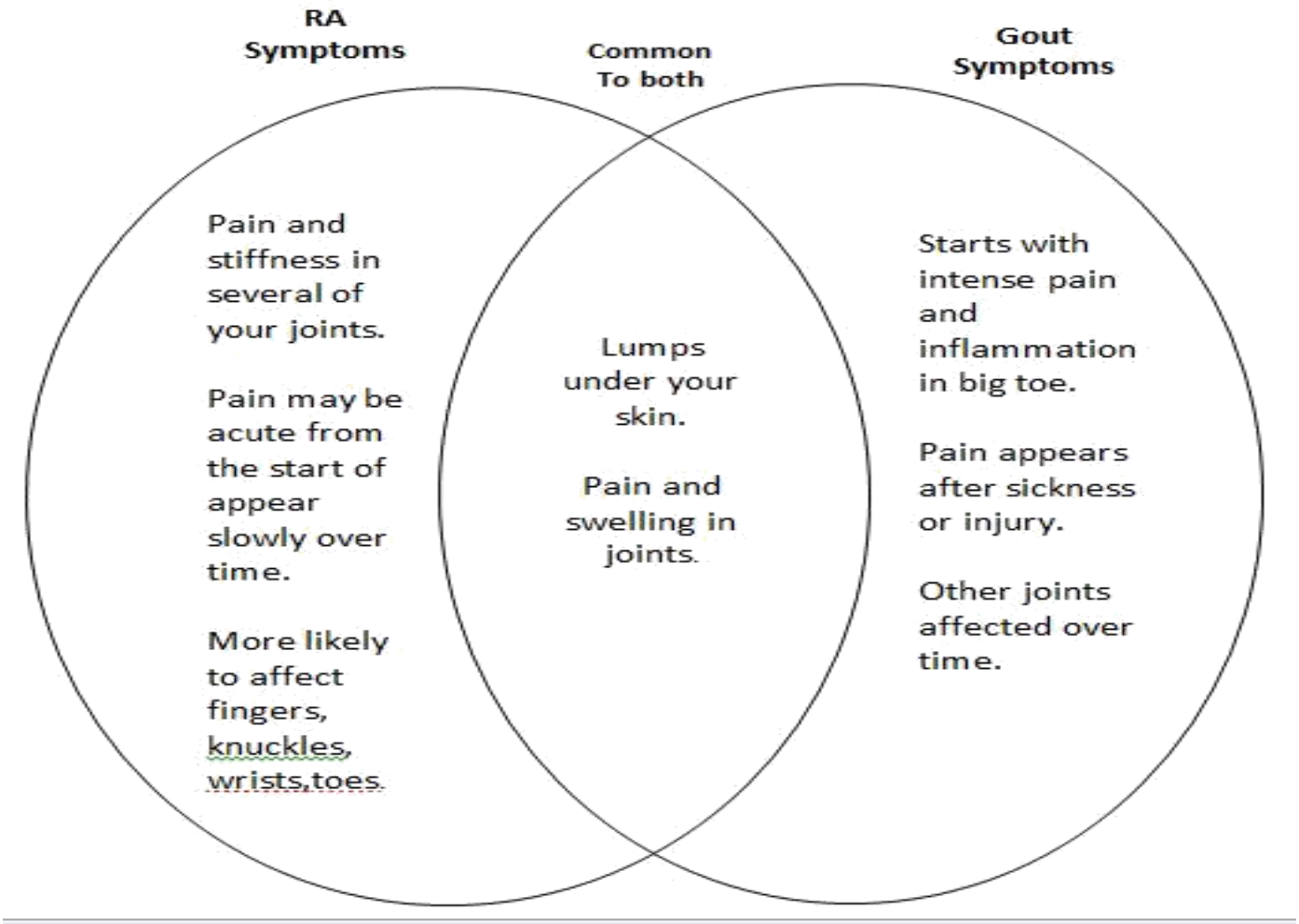

Fig. 3: Symptoms of Arthritis and Gout

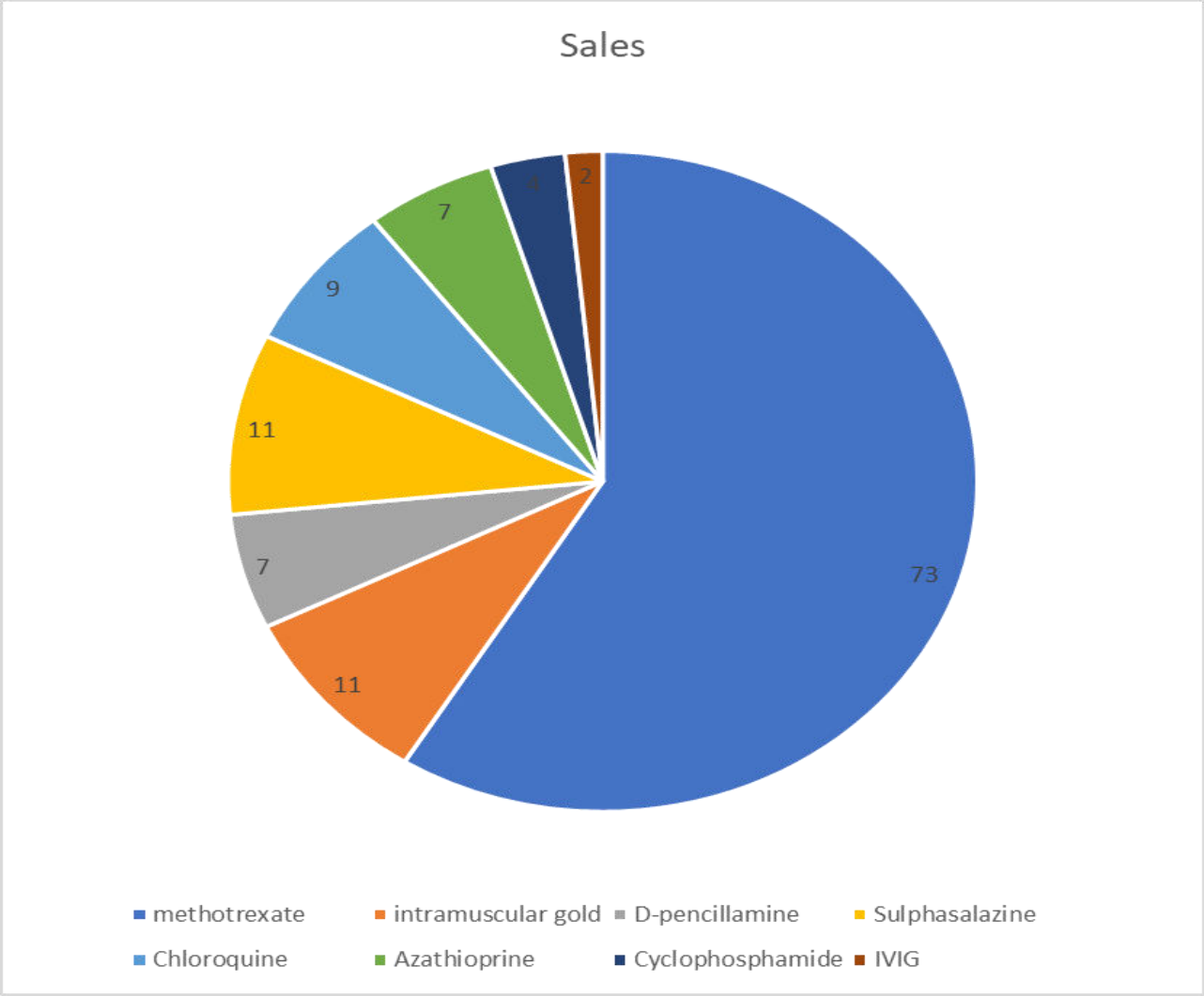

Fig. 4: Percentage of Patients Taking Drug/Drug Class

7. ALLOPATHIC MEDICINE FOR TREATING GOUT

Table 1: Allopathic treatment options for acute gout

S. No	Drugs	Adverse drug effects	Contraindications
1.	NSAIDs	Renal dysfunction	Renal failure
2.	Corticosteroids	Overproduction of stomach acid, Cushing's syndrome, metabolism disorder, hypertension/hypotension	Infection in particular, Poorly managed diabetes mellitus or arterial hyper-tension, Ulcerating wound(s)
3.	Colchicine	Gastrointestinal effects in particular	Reduced creatinine clearance or liver failure; concomitant administration of CYP3A4 inhibitors, e.g. statins
4.	Cortisone	Overproduction of stomach acid, Cushing's syndrome, metabolism disorder, hypertension /hypotension	
5.	Interleukin-1-antagonists	Infections (e.g. urinary tract infections, airway infections); local skin reactions at site of injection	If active infections present

8. HERBAL PLANTS FOR TREATING RHEUMATOID ARTHRITIS AND GOUT

Table 2: Herbal plants for treating Rheumatoid Arthritis and Gout

Sr.No	Biological Source	Family	Active Ingredients	Parts Used	Therapeutic Uses	References
1.	*Annona montana*	Annonaceae	Cyclomontanins A-D (1-4), annomuricatinC (5), and (+)-corytuberine	Leaves,seeds, roots,	Antirheumatic, Anthelminitic, anticonvulsant, antidepressant, antimicrobial, antineoplastic, antiparasitic, anti spasmodic, antiviral, astringent,cardio-depressant, cytostatic, cyt otoxic, febrifuge, hypotensive, insecticide, nervine, pectoral, sedative, stomachic, vasodilator, vermifuge	20
2	*Vernoni a anthel mintica*	Asteraceae	Alkaloid, polyphenols,flavonoids, steroid, triterpenes	Seeds, dried seeds, leaves and roots	Anti-inflammatory, anti-arthritic	21
3	*Pistacia khinjuk*	Anacardiaceae	Flavonoid; gallic acid, methyl gallate, galloylatedcompounds, quercetin-3-O- β -d-(4)C(1)-galacto-pyranoside (hyperin), myricetin-3-O- β -l-(1)C(4)-rhamnopyranoside (myricitrin), 1,6- digalloyl- β -d-glucose,1,4-digalloyl- β d-glucopyranoside, and 2,3-di-O-galloyl-α-β -(4)C(1)-gluco-pyranose(nilocitin)	leaf	Anti-inflammatory	22
4	*Callophyllum innophyllum*	Clusiaceae	Xanthone dehydrocylogua- nadine, callophlin-B	nuts	Anti-inflammatory	23
5	*Calluna vulgaris*	Ericaceae	Kaemferol-3-O-β-D- galactoside, a common flavonol derivative		Treatment of urinary infection, Anti-inflammatory and anti-nociceptive, antirheumatic,diuretic, astringent	24
6	*Barringtonia racemosa*	Lecythidaceae	Diterpenoids andtriterpenoids, bartogenic acid, lycopene,	Fruits,leaves	Anti-inflammatory, anti- nociceptive, α-glucosidase inhibitory, anti-bacteria, anti-tumor	25
7	*Phyllanthus emblicasyn. Emblica officinalis*	Phyllanthaceae	Flavonoids, kaempferol, vitaminC, ellagic acid andgallic acid; and otherantioxidants like emblicanin A, emblicanin B,punigluconin, pedunculagin	Leaves,fruit, bark	Osteoporosis, Hypercholesterolemic, rheumatoid arthritis	26
8	*Nyctanthes arbortristis*	Oleaceae	Nyctanthoside, polysaccharides, henylpropanoid glycoside, benzoicacid, glycosides, ß-sitosterol, ß-amyrin, hentri-acontane, iridoid glycosides	Leaves,stems	Anti-inflammatory, Sciatica,arthritis and	27

9	*Premna serratifolia*	Verbenaceae	Iridoid glycosides, alkaloids, fl avonoids and phenoliccompoud	wood	Cardiovascular disease, inflammatory disease, skin disease, arthritis, gonorrhoea, rheumatism, jaundice andanorexia	28
10	*Aristolochia bracteolata*	Aristoloch iaceae	Aristolochic acidaristolactam a nitrogen containingcompound and magnoflorine, Ceryl alcohol, β-sitosterol, aristolochicacid, alkaloid, myristic, palmitic, stearic,ignoceric, oleic and aristolochic acid,	Wholeplant	Painful joints, Anthelmintic,fever, purgative	30
11	*Cardiosperum helicacabum*	Sapindaceae	Luteolin and chrysoeriol, Saponins, alkaloids, (+)-pinitol,apigenium	Leaves	Anti-inflammatory	31
12	Alchornea cordifolia	Euphorbia ceae	Flavonoids: quercetin, hyperin and guaijaverin and analkaloid: triisopentenylguanidine, Tannins, phenolicacids: gallic acid,ellagic acid, protocatechic acid,	Leaf	Anti-inflammatory: Caries, toothache, guminflammation and Conjunctivitis, chancre, yawswounds, cicatrisation, ulcers,	32
13	*Asparagus racemosus*	Liliaceae	flavonoids: quercitin, rutin and hyperoside,an isoflavone, and a mucilage, Steroidal glycosides including shatavarins I-IV, diosgenin and various sterols, alka loid asparagamine A,	Fruits, Roots, Leaves,flowers	Treatment of thirst, fainting, dyspnoea, gout, ulcerogenesis,antioxidant	33
14	*Anacardium occidentale*	Anacardiceae	Myricetin, quercetin,kaempferol, glycosides, and apigenin	Leaves	Skin diseases, mouth ulcers, anti-inflammatory, diarrhoea,diabetes, swelling	34
15	*Antrodia cinnamomea*	Fomitopsi daceae	Ergostane-type triterpenoids, polyacetylenes ,Antrocamphin A	(Fungus)Fruiting bodies	Inflammatory disorders,antioxidant and Cancer	35
16	*Borassus flabellifer* L	Arecaceae	Spirostane-type steroid saponins, Alka loids, terpenoids,and phenolic compounds	Male flowers (inflorescences)	Diuretic, antiphlogistic, stomachic, sedative, laxative,aphrodisiac, immu-nosuppressant, Anti-inflammatory, anti-aprotic	36
17	*Boswellia serrata* Roxb.	Burseraceae	Resin which ispenta-cyclic triterpenoid in naturein which boswellic acids(β-boswellic acid, acetyl-β-boswellic acid, keto-β-boswellicacid and acetyl-11-keto-β-boswellic acid)	Oleogum resin	Arthritis, asthma, psoriasis, colitis, hyperlipidemia, Cancerand inflammation	37
18	*Commiphora mukul*	Burseraceae	Gugulipid andGuggulsterones (E- and Z-stereoisomers)	Stem	Arthritis, obesity	38
19	*Aegle marmel os*	Rutaceae	Sterols and ortriterpenoids, including lupeol, β-sitosterol and αamyrin flavanoids (mainly rutin) andcoumarins, includingaege line, marmesinand umbelliferone, Glycoside, alkaloids,coumarins, fatty acidand sterols, tannins,	Fruits,Roots, leaves	dysentery, colitis, loss ofappetite and abdominal dull pain, anti-inflammatory, Vata diseases, insomnia, seizures, and hysteria, for diarrhoea	39

			skimmianine, essentialoil (mainly caryophyllene, cineole, citral, eugenol)			
20	*Cleome rutidosperma*	Capparidaceae	Steroids, flavonoids, alkaloids	Aerialparts	Carminative, antiplasmodial,analgesic, locomotor,antimicrobial, diuretic, laxative,Stimulant,antiscorbutic, anthelmintic, vesicant, rubifacient,	40
21	*Justicia gendarussa*	Acanthaceae	Sterols and flavonoids	Leaves	Digestive trouble, fever,hemiplegia, rheumatism, arthritis, headache, ear ache,muscle pain, respiratorydisorders	41
22	*Rosa multiflo ra* Thunb	Rosaceae	Fatty acid, mainly including dodecanoicacid (8.72%), hexadecanoic acid(9.24%), penta-decanoic acid1.58%), linoleic acid (26.04%), oleicacid (22.58%) and octa-decanoic acid(6.3%	Hips	Dietary and medicinal purposes like cold, flu, inflammation, osteoarthritis,rheumatoid arthritis andchronic pain	42
23	*Cistus laurifoli us*	Cistaceae	Favonoids; 3-O-methylquercetin (1), 3,7-Odime-thylquercetin (2) and 3,7-O-dimethyl-kaempferol	Leaves	Inflammatory ailmentsincluding rheumatism and renal inflammations	43
24	*Moringa oleifera*	Moringaceae	niazirinin, sterol components–stigmasterol, campisterol, Nitrileglycosides, niazirin,	Flowers,leaves	Anti-arthritic	44
25	*Ficus religiosa*	Moraceae	Amino acids, Sterols, glycosides, tannins	Leaves,bark, stem	migraine, gastric problems, haematuria and memoryenhancing activity, Laxative,diarrhoea, asthma, cough,earache, toothache,	45
26	*Butea frondos a*	Fabaceae	Lectins, Flavanoids,Glucosides	Roots, leaves	Anti-inflammatory	46, 47
27	*Azadirachta indica*	Meliaceae	Phenolic compounds,carotenoids, steroidsketones, alkaloids, flavonoids, triterpenoids	Leaf	antimalarial, antitumour, antiulcer, antidiabetic,antifertility, anti-inflammatory, antipyretic	48, 49,
28	*Alliumcepa*	Liliaceae	Organic sulfurcompounds, includingtrans-S-(1-propenyl) cysteine sulfoxide, S–methyl–cysteine sulfoxide, S–propylcysteine sulfoxide andcycloalliin; flavonoids; phenolicacids; sterolsincluding cholesterol, stigma sterol, β-sitosterol; saponins;sugars and a trace ofvolatile oil composedmainly of sulfurcompounds, includingdipropyl disulfide, fructans	Bulbs	anti- inflammatory, antimicrobial	50-53

29.	*Cyperus rotundus*	Cyperaceae	D-fructose, D-glucose, flavonoids, gamma-cymene, isocyperol, isokobusone, kobusone, limonene, linoleic-acid, magnesium, mnganese, mustakone,myristic-acid, oleanolic-acid, oleanolic-acid-3-o-neohesperidoside, oleic-acid, Pcymol,patchoulenone, pectin, polyphenols, rotundene, rotun-denol, rotundone, selinatrien stearicacid, sugeonol, sugetriol, β-sitosterol, 1,8-cineole,4-alpha,5-alpha- oxido-eudesm11-en-3- alpha-ol, alkaloids,alpha-cyperone, alpharotunol, beta- cyperone, beta-pinene,beta-rotunol, betaselinene, calcium,camphene, copaene, cyperene, cyperenone, cyperol, cyperolone cyperotundone Dcopadiene, D-epoxyguaiene	Tubers	Menstrual pain, as a digestive stimulant, for memory, Anti- inflammatory, cervical cancer, liver, menstrual disorders	54
30	*Abrus precator ius*	Fabaceae/ Leguminosae)	Triterpenoids (abrusosides A-D)	Fresh leaves	convulsion, fever, rheumatism,conjunctivitis, ulcers by traditional healers, cold and coughs	55,56
31	*Alpinia conchigera* Griff.		Galangoflavonoid,1'S-1'-acetoxychavicol acetate, 1'-acetoxychavicol acetate (galangal acetate), β-Sitosteroldiglucoside (AG-7)and β-sitsterylArabinoside	Rhizomes	anti-inflammatory, analgesics	57-59

Table 3: Traditionally used plants for Rheumatoid Arthritis (Used Externally)

S. No.	Plant	Family	Parts usedin arthritis	Other Uses	Compounds	References
1.	*Abutilon indicum* L.	Malvaceae	Leaves	demulcent, aphrodisiac, laxative, diuretic, pulmonary andsedative	β-sitosterol, oleanic acid, (24R)-5α- stigmastane-3,6- dione, daucostero l,2,6-dimethoxy-1,4-benzoquinone, vanillic acid	60-63
2.	*Acacia leucophloea* Willd.	Mimosaceae	Bark	astringent, demulcent, constipating, expectorant andantipyretic, vulnerary, demulcent, bitter,thermo-genic, styptic, alexeteric,antihelmintic, vulnerary, constipating, bronchitis, cough,diarrhoea, dysentery, vomiting, wounds,ulcers, internal	steroids, alkaloids, flavonoids, tannins, glycosides, polyphenols,	63-64

				andexternal haemorrhages, dental caries, oralulcers, procto-ptosis, stomatitis and intermittent fevers		
3.	*Acalypha indica* L.	Euphorbiaceae	Whole plant	diuretic, purgativeand anthelmintic properties,	aurantiamide andits acetate, succinimide calypho-lactate, 2-methyl anthraquinone,tri-Omethylellagic acid, β-sitosterol and its β-D-glucoside	65-66
					(leaves); acyanogenetic glucoside, acalyphine, twoalkaloids, viz, Acalyphine andtriacetonamine, an essential oil n-octacosanol, kaempferol, quebrachitol, β-sitosterol acetateand tannin(whole plant);	
4.	*Adansonia digitata* L.	Malvaceae	Leaves	anti- asthmatic, antihista mine and antitension	13-15% protein, 60-70% carbo-hydrate,4-10% fat	63,67
5.	*Alangium salviifolium* (Linn.f.) Wang.	Alangiaceae	Roots	diabetes, pepticulcer, arthritis,inflammation andanthelminthic activities	alangine, ankorine, tubulosine, alangicine, salsoline	68-70
6.	*Anisomeles malabarica* R. Br.	Lamiaceae	Leaves	catarrhal afflictions, intermittent fever,bowel disorder, boils,	3, 4 dihydroxy benzoic acid and 4', 5,7trihydroxyflavone	63,71
7.	*Bacopa monnieri* (L.) Penn.	Scrophulariaceae	Leaves	dyspepsia, diarrhea,vomiting, giddiness, worms,antibacterial and antimutagenic activities	Alkaloids andtannins	72-74
8.	*Brassica Alba* (L.) Rabenh.	Brassicaceae	Seed	Antihyperglycemic		75-76
9.	*Cadaba indica* Lam.	Capparidaceae	Leaves	Alzheimer's diseases, aging, cancer, inflammation, rheumatoidarthritis and atherosclerosis	DPPH, hydroxyl,superoxide, ABTS radicalcation	63,77
10.	*Calophyllum inophyllum* L.	Clusiaceae	Seed	Anti-inflammatory	nitricoxide (NO)	63,78
11.	*Cassia fistula* L.	Caesalpiniaceae	Fruit	antibacterial activity, Antifungal	4-hydroxy benzoicacid hydrate	63,79
12.	*Pongamia glabra* Vent.	Fabaceae	Roots	Treat diabetes, keratitis, hypertension, fever, leprosy, whooping	Flavonoid	80-81
13.	*Tamarindus indica* L.	Caesalpiniaceae	Leaves	hypolipomic andantioxidant, anti-inflammatory	19-Cyclo-4 ß4, 4, 14,χ-trimethyl-5ά- cholestan-3ß-ol and 24R-Ethyl cholest-5-en,3β-ol	63,82
14.	*Vitex negundo* L.	Verbenaceae	Leaves	Anti-inflammatory, antipyretic, anticonvulsant	Naloxone	63,83

15.	*Ziziphus jujuba* Mill.	Rhamnaceae	Root, bark	3-O-transpcoumaroylalphitolic acid, 3-O-cis-p- coumaroylmaslinic acid, 3-O-trans-pcoumaroylmaslinicacid, oleanolic acid, betulonic acid,	Antiulcer activity,Anti-inflammatory, antispastic effect	84-85

Table 4: Herbal Drugs for Gout

Sr. No	Plant	Family	Compounds	Other uses	Parts used	References
1.	*Acacia Confuse* Merr	Fabaceae	Okarnin, Melanoxetin	Antioxidant, radical Scavenging activity,hepatoprotective effect,anti-hyperuricemic effect,anti-inflammatory activity,Anti-osteoclastogenic andsychedelic effects	heartwood	86-88
2.	*Ajuga bractesa* Wall Ex Benth	Lamiaceae	6-Deoxyharpagide, Aaujugarin I, Withaferin A and Reptoside	rheumatism, amenorrhea,gout and palsy	Roots,leaves	89-90
3.	*Allium cepa*	Liliaceae	Quercetin,Morin, Myricetin, Kaempferol,Icariin, Apigenin, Luteolin,Baicalin	Antibiotic, antibacterial,antisclerotic, anticoagulant, anti-inflammatory, antiasthmatic, expectorant, carminative, antispasmodic, diuretic,hypotensive, antidiabetic. Loss of appetite	Bulb	91-93
4.	*Blumea balsamifera* DC	Asteraceae	Luteolin,Quercetin,Tam arixetin,Dihydroflavon Ol	expectorant, sudorific.intestinal diseases, colic, diarrhea, hypotensive, tranquilizer	All parts	94-96
5.	*Buddleja globosa* Hope	Scrophulariceae	Luteolin,Quercetin,Tam arixetin, Dihydroflavonol	antioxidant, anti-inflammatory, wound healing and analgesic activities	Leaves	97-98
6.	*Caesalpiniasappan* L	Caesalpiniaceae	Neoprotosappanin	Inflammatory disease. Antioxidants, anti-inflammatory,anticonvulsant	Heartwood	99-100
7.	*Chrysanthem um sinense*Sabine	Asteraceae	Flavone Glucoside,Acacetin Luteolin Quercetin	Fever, rheumatism, headache, inflammation, eye sight disorder	Flower	101-102
8.	*Cinnamomu m cassia* (Blume)	Lauraceae	Cassia Oil (Cinnamaldehyde Derivatives)	treating dyspepsia, gastritis, blood circulation, and inflammatory diseases	Bark and leaves	103-105
9.	*Cynara scolymus* Linn.	Asteraceae	Cafferic AcidDerivatives and Flavones	Antioxidant effect, Anti- cancer effect, Prebioticactivity, Anti-metabolicsyndrome, Functionalproperties, Anti-fungal effect, Anti-ulcerogeniceffect, Anti-obesity,Genotoxicity effect,Antiphotoaging activity,Synergetic effect,Hypoglycemic effect, Bifid genic effect, Prebioticeffect,	Leaf	106-107
10.	*Dioscorea spp*	Dioscorea	Saponin	anti-oxidative, anti-fungal,anti-mutagenic,	Tubers	108-110

		ceae		hypoglycaemic, andimmunomodulary effects		
11.	*Dioscoreae nipponicae*	Dioscorea ceae	Saponin	rheumatoid arthritis, pain in the legs and lumbar area,Kashin Beck disease, bruises, sprains, chronic bronchitis, cough and asthma	Roots and rhizomes	111-113
12.	*Dolichos falcate kelin*(DF)	Fabaceae	Doliroside A,Medicagenic Acid-3-O-B-D- Glucopyranoside (MG)	treat fracture, rheumatoidarthritis, and soft tissueinjuries	Roots andleaves	114-115
13.	*Erythrina stricta* roxb.	Fabaceae	8α-acetonylerythristemine, 8α-acetonylerysotrine, 10β-hydroxy-11β- methoxyerysotramidine and 3-epierysotrine, one undescribed pyrrolidine derivative, *S*-1-(4-hydroxy-3-methoxyphenethyl)-5-hydroxypyrrolidin-2- one	Anti microbial, antioxidantrheumatism, stomach-ache,asthma, dysentery, contact dermatitis, eczema andskin infections	Bark	116
14.	*Eunonymus laxiflorus*,	Celastraceae	lupeol, friedelin	hypoglycemic and antidiabetic effects.	Bark	117-118
	champ.exBenth		lupine ketone,3-hydroxy-4-methoxy- benzaldehyde, scopoletin,(+)-pinoresinol(-)-isoyatein coniferylaldehyde, geniposidicacid			
15.	*Flos chrysanthemum*	Asteraceae	LuteolinAndApigenin	antibacterial,anti-inflammatory; anti-oxidative, vasodilatation, antitum	Flower	119-120
16.	*Gardenia jasminoides*	Rubiaceae	volatiles,bioactive molecules, iridoids andiridoid glycoside	antioxidant properties,hypoglycemic effect, inhibition of inflammation,antidepression activity, andimproved sleeping quality		117,121
17.	*Geranium Sibiricum* L.	Geraniaceae	Geraniin	Treat diarrhea, bacterial infection, and cancer	Leaves	122-123
18.	*Gloriosa superba* L.	Liliacease	Colchicinoids	antipyretic, antihelmintic, purgative and antiabortive	Seeds and tubers	124-125
19.	*Hyoscyamus reticulates* L.	Solananceae	hyoscyamineand scopolamine	antioxidant and a hypouricemic agent,asthma, gastric ulcers, for motion sickness and in Parkinson's disease. It wasalso used as mydriatic, spasmolytic, analgesic, sedative	Leaves, roots	126-127
20.	*Isatis costata* Linn	Brassicaseae	Costinones A, B, Isatinones A, B, IndirubinAnd Trisindoline	antifungal activities,inflammation, atherosclerosis, cancer, andaging	Wholeplant	128-129
21.	*Jatropha isabellei* MullArg.	Euphorbia ceae	CrudeExtract of Jatropha Isabellei	cytotoxicity, antimicrobial,antifungal, anti-inflammatory, antioxidant,insecticidal,	Rhizome	130-132
22.	*Lagerstroemia speciosa* (L) Pers.	Lythraceae	ValoneicAcidDilactone	anti-diabetic and anti-obesity activity		133-134

23.	*Lychnophora trichocarpha*Spreng	Asteraceae	Luteolin,Apigenin, Lupeol, Lychnopholide And Eremantholide	to treat inflammation, pain, rheumatism, contusions, antifungal, bruises andinsect bites	Aerial part	135-136
24.	*Lysimachia christinae* Hance	Lysimachia	kaempferol 3-O-β-D-glucopyranoside,kaempferol 3-O-α-L-rhamnopyranosyl (1→6)-β- D- glucopyranoside, kaempferol3-O αLrhamnopyranosyl-(1→2)-β- D-glucopyranoside, quercetin, β-sitosterol , daucosterol	treatment for gall stones, hepatolithiasis, and urinarycalculi	leaves	137-139
25.	*Morinda citrifolia* L.	Rubiaceae	Luteolin andApigenin	arthritis, diabetes, high blood pressure, muscle ached and pains, menstrualdifficulties, headache,heart diseases, AIDS, gastric ulcer, sprains, mental depression, senility,poor digestion,arteriosclerosis, bloodvessel problems, and drug addiction	Leaves	140-141
26.	*Olea europaea* Ph. Eur.	Oleaceae	Aglycone, Apigenin	Antioxidant, ani-inflammatory,hypoglycemic	Leaves	142-143
27.	*Orthosiphon stamineus* Benth	Lamiaceae	Sinesetine, Eupatorine and CaffeicAcid Derivatives Rosamarinic Acid, Cichoric Acid	Antifungal, antioxidant	Leaves and stem	144-145
28.	*Paederiascandens* (Lour.) Merrill	Rubiaceae	Asperuloside Daphylloside Scandoside Methyl Ester, Loganin Deacetyl Asperulosidic	antioxidant	Roots	146-150
29.	*Palhinhaea cernua* (L.) Vasc. & Franco	Lycopodia ceae	P- Coumaroylated Apigenin Glycoside,		Wholeplant	151
30.	*Phellodendron amurense*Rupr.	Rutaceae	Berberine	antiphlogistic, antibacterial, antiinflammatory agent forthe treatment of diarrhea,icterus, ulcer, carbuncle,and eczema.	Roots	152-153
31.	*Phyllanthusniruri* L.	Euphorbia ceae	Phyllanthin,hypophyllanthin and phyltertralin	Anti-bacterial, Anti-inflammatory,anticancer	Leaves	154-156
32.	*Piper betle* L.	Piperaceae	Hydroxychavic Ol		Leaves	157-158
33.	*Pistacia integerrima* Stew. Ex Brand	Anacardia ceae	Ethyl acetateextract, rutin	Analgesic, Anti-inflammatory	Leaves	159-160
34.	*Proustia pyrifolia* DC	Asteraceae	Arachidonic acid and phorbol 12- Myristate 13acetate	Analgesic, Anti-inflammatory,antioxidant	Aerial part	161-162
35.	*Prunus avium* L	Rosaceae	Dehydroascorbic Acid	prevent cardiovasculardisease, inflammation and cancer	Fruit	163-164

36.	*Prunus mume*	Rosaceae	5-hydroxymethyl -2-furaldehyde, 4-O-caffeoylquinic acid methyl ester prunasin 5-O-caffeoylquinic acid methyl ester benzyl-O-β -D-glucopyranoside,	Antioxidant, antimicrobial	Leaves	165-168
			and liquiritigenin-7-O-β -D-glucopyranoside			
37.	*Radix salvia*	Lamiaceae	Phenolic compound	Antiplatelet aggregation effect	Roots	167-168
38.	*Ramulus mori*	Moraceae	Carbony and hydroxyl compound	Anti-inflammatory, Analgesic, antioxidant	Twigs,leaves	169-170
39.	*Rhus coriaria* L.	Anacardia ceae	Phenolic compound	Antibacterial, Antifungal, Anti ischemic	Bark	171-172
40.	*Rubia lanceolata* Hayata	Rubiaceae	anthraquinones	Treat arthritis	Roots	117,173
41.	*Salvia miltiorrhiza* Bunge	Lamiaceae	Magnesium lithospermate	Anti-inflammatory, Antiplatelet aggregation	Roots	174-175
42.	*Saraca ashoka* Roxb.	Fabaceae	Ethyl acetate fraction	Anticancer, antioxytocic	Flowers and leaves	176-177
43.	*Scrophularia ningpoensis* Hemsl.	Scrophular iaceae	Phenylpropanoid glycosides acteoside	antioxidant	Roots	178-179
44.	*Semecarpus anacardium* L.	Anacardia ceae	Tetra hydraamentoflavone (THA)	Immunomodulatory effect,Anti-inflammatory effect	Nuts	180-181
45.	*Similax China* L.	Liliaceae	Caffeicacid,resveratrol, rutiandoxyresveratrol	Anti-inflammatory,antimicrobial	Roots	182-183
46.	*Smilax glabra* Robx	Liliaceae	Palmitic acidastilbin glucuronid ,caffeic acid sulfate, glucuronide resveratrol glucuronide	Anti-hepatocarcinogenic	Rhizome	184-185
47.	*Smilaxriparia*	Lilaceae	Smilaxchinosi de A and Smilaxchinoside C Riparoside andti-mosaponi nJ	antioxidant	Rhizomes, roots	186-189
48.			Cis- polyisoprene			190
	*Termialia macroptera*Guillet Perr	Combretac eae	chebulic acidtrimethyl ester) mthyl gallateshikimic acid, corilagin rutin,narcissim chebulagic acidand chebulinic acid			191

9. CONCLUSION

Arthritis is one of the most common diseases in the world, affecting millions of individuals. People in the present world have a typical lifestyle in which they do not eat a balanced diet, donot exercise regularly, and sit in front of computers for extended periods of time; these are theprimary causes of arthritis. As a result, this sickness affects the younger generations as well. As a result, NSAIDs, steroids, and other therapies for arthritis are available. These therapies can alleviate pain and manage the condition to a degree, but they come with a slew of negative side effects. For the traditional Indigenous system of medicine, quality control and uniformityshould be strengthened. Several studies were examined in this review research, all of which discussed the possible application of medicinal plants and ayurvedic therapy of gout and arthritis. This work also contributes to the current knowledge about plants, and it may aid studies in the field of phytopharmacology. As a consequence, in light of current science, medicinal plant resources should be used to create combination pharmaceuticals and herbal formulations that might lead to the creation of suitable medications to treat gout and rheumatoidarthritis patients.

Conflict of interest

None declared

10. REFERENCES

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