

Research Article

Ethnopharmacological Studies of *Argemone mexicana* for the Management of Psoriasis Followed by Molecular Techniques through Metabolomics

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Abstract

Objective: Psoriasis is an autoimmune condition which results in the body attacking itself. It occurs in the age group of 30 years to ≥ 65 years. More than 100 million individuals around the world are affected with this disease. The main objective of this study is to provide patients with more effective and safer treatment to this disease.

Methods: A prospective study was carried out in randomly selected individuals from Madhya Pradesh (Chhatarpur and Bhopal). Patients with psoriasis of different ages were randomly selected and formulation made with the plant extract was applied twice a day externally on the marks for 3 months to 4 months.

Results: We studied around 12 patients from each of the cities of Madhya Pradesh. The condition was confirmed by physical examination and by their previous disease and medical history. This study was carried out for a period of 4 months and the cream was applied twice a day on the affected area. It was found that in Chhatarpur about 8 of 12(66.6%) patients the marks were completely disappeared and in other 2 of 12(16.6%) patients showed mild response and 2 of 12(16.6%) of them showed no response to the formulation. Whereas in Bhopal around 6 of 12(50%) showed complete cure, 4 of 12(33.3%) with mild response and 2 of 12(16.6%) with no response to the drug. No side effects were observed in any of the age groups.

Conclusion: Psoriasis was reduced by the use of the product extracted from the leaves of *A. Mexicana*. The patients of different age groups showed different response to this formulation. The patients of younger age and patients with recent stage of development of the disease showed highly positive response to the medication. High amount of positive response was shown in the areas of Chhatarpur than Bhopal this shows environmental factors also effect the treatment and management of the disease. But no side effects were shown in any of the cities and in any of the age groups which shows that the extract is safer use and even effective unless the patient has any allergic history from the plant.

Graphical Abstract

Psoriasis is an autoimmune condition which results in the body attacking itself. It occurs in the age group of 14 years to ≥ 65 years. The average age is 28 years. More than 10 million cases per year in India are being recorded. Around 15% of cases emerge before the age of 10 years. Psoriasis is an immune-mediated (or autoimmune) disorder that occurs when immune cells known as T lymphocytes, or T cells, attack healthy skin cells in both the nonvascular horny outer layer of the skin and its deeper vascular layer. This attack causes the life span of the skin cells to shorten to about 3 days to 5 days (skin cells normally live about 20 days to 28 days) and forces the cells to reproduce more rapidly than normal. Psoriasis occurs in both sexes with equal frequency, being most prevalent between the ages of 10 and 30 (Graph 1).

Keywords: *Argemone Mexicana*; Autoimmune disease; Environmental; Psoriasis; Side effects

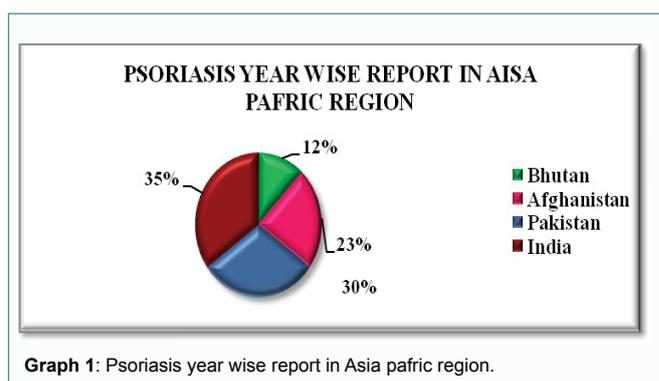
Citation: Gayoor KM, Kanta SN, Umama Y, Baskar H, Ayush K, Prasad TS. Ethnopharmacological Studies of *Argemone mexicana* for the Management of Psoriasis Followed by Molecular Techniques through Metabolomics. 2019; 1(1): 1003.

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Publisher Name: Medtext Publications LLC

Manuscript compiled: Dec 03rd, 2019

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Graph 1: Psoriasis year wise report in Asia pacific region.

Introduction

Psoriasis is a very common tropical neglected disease in India more than 10 million cases per year are being observed. It causes the cell to build up rapidly on the surface of the skin and itchy or dry patches something painful. Psoriasis is chronic disease it can be for years and lifetime lab test must be required Psoriasis treatments include steroid creams, occlusion, light therapy and oral medications, such as biologics. There are mainly five different types of psoriasis: plaque, guttate, inverse, pustular, and erythrodermic.

Psoriasis diagnoses based on patient symptoms but if person with darker skin the patches may be purple in colour. The skin can trigger psoriatic skin changes at that spot referred to as the "Koebner phenomenon". Recently, the worldwide prevalence of psoriasis in adults ranged from 0.53% to 13.43%. C- Reactive Protein (CRP) is a key biomarker of acute-phase systemic inflammation and risk for future vascular disease. It can be diagnosed by the elevated level of CRP which is used as a predictor of inflammation in different diseases, including psoriasis. It was found that the level of CRP increases with the increasing number of signs of metabolic syndrome. Psoriasis is referred to as a multisystem chronic disease connected to different co morbidities like obesity. Obesity is a relevant risk factor for the development and complication onset of non-communicable diseases [1-4].

Signs and symptoms

Sometimes psoriasis cause itching on the affected part of the skin, nails, and scalp which is referred to Plaque Psoriasis which is most common Psoriasis, treatment may not scientifically proved but management is possible which is totally depends upon patient past records or Medical history. The goals of treatment are very few, less severe flare-ups. Light therapy: If the rash is more widespread, may treat it with ultraviolet light.

Biologic drugs

Another kind of systemic drug also targets your immune system. Biologic drugs used to treat psoriasis include adalimumab (Humira), etanercept (Enbrel), Brodalumab (Siliq), guselkumab (Tremfya), infliximab (Remicade), ixekizumab (Taltz), secukinumab (Cosentyx), and ustekinumab (Stelara). They're given either by a shot or through a vein in the arm. They have affect on specific type of immune cell or keep certain proteins from causing inflammation. But these drugs can make it harder to fight infection.

Systemic drugs

Plaque psoriasis may need medicines that work throughout the body. They calm the immune system or make skin cells grow more slowly. But they cause serious side effects, such as depression, aggressive thoughts, liver problems, or a higher risk of skin cancer.

Plaque psoriasis

Tropical treatments especially cream are first preference it helps to reduce skin inflammation and minimize cell growth in skin example includes Vitamin A, Vitamin D, Corticosteroid, etc. Salicylic acid and coal tar also used in the management of psoriasis and few Natural ingredients for smooth itch like *Aloe Vera* gel etc. Topical emollients that put on after a shower or bath can help keep the skin moist.

Psoriasis Vulgaris (which is also known as chronic stationary psoriasis or plaque-like psoriasis) is the most common form and affects 85% to 90% of people with psoriasis. Plaque psoriasis is typically

appeared as raised areas of inflamed skin covered with silvery white scaly skin. These areas are called plaques and are most commonly found on the elbows, knees, scalp, and back (Figures 1 and 2).

Psoriasis can affect the nails and produces a variety of changes in the appearance of finger and toenails which occurs in 40% to 45% of people with psoriasis affecting the skin and has a lifetime incidence of 80% to 90% in those with psoriatic arthritis. These changes include dent in the nails (i.e., pinhead-sized depressions) in the nails is seen in 70% with nail psoriasis [4-9].



Figure 1: Psoriasis on sole of foot.



Figure 2: Psoriasis on palms.

Background

Plants are being used in traditional medicine for several thousand years. The knowledge of medicinal plants has been collected since many centuries based on different medicinal systems like (Ayurveda, Unani, and Siddha). It has been reported that traditional healers in India use 2500 plants species of plants and 100 species of plants serve as regular and continuing sources of medicine. In the last few decades, there has been increased interest in the study of medicinal plants and their traditional use in different parts of the world documenting the indigenous knowledge by ethno botanical studies is an important aspect for the conservation and utilization of biological resources. The important thing is the World Health Organization (WHO) shows that as many as 80% of the World's people depends on traditional medicine for their preliminary health care needs. Major parts of the world's population in developing countries still rely plants for their primary healthcare systems to treat Psoriasis [10-15].

The Ethno pharmacological is the Ethno pharmacology (occasionally also called ethno pharmacy) is a related study of ethnic groups and their use of drugs. It is undoubtedly linked to medicinal

plant use, ethno botany, as this is the main delivery of pharmaceuticals. It deals with the study of the pharmaceutical means considered in relation to the cultural contexts of their use, for example, *A. mexicana* is used in Plaque and guttate Psoriasis. Ethno medicinal Plant *A. mexicana* used for the treatment of Psoriasis diseases.

The botanical name, family name & plant characters: *A. Mexicana*, *L. papaveraceae* Prickly, annuals, flowers bright yellow, fruits prickly with blackish-brown seeds (Figure 3).



Figure 3: *A. Mexicana*, *L. papaveraceae* Prickly, annuals, flowers bright yellow, fruits prickly with blackish-brown seeds.

Local name, english name & plant photo: Mexican poppy, Mexican Prickly Poppy, Flowering thistle, Sathanashi (Hindi), The name Sathanashi is given because of its ability to successfully treat and cure diseases.

Tribes name- Meena & Gurjar, Bhil etc.

Plant parts used & mode of use- Fresh plant sap and paste of root powder applied externally.

Districts/Area- Madhya Pradesh (Chhatarpur, Bhopal).

Remarks- Very effective in plaque and guttate psoriasis.

Experimental

Objective selection of argemone mexicana

1. To provide treatment that is natural with least side effects.
2. To provide a better and effective treatment for the skin diseases like psoriasis.
3. Regulate a cost effective treatment.
4. To provide a treatment with less time duration.
5. To reduce the cost of treatment.
6. To increase the quality of life of the patient.
7. To provide treatment this can easily be used by everyone.

Phytochemical properties of *A. mexicana*

Parameters:

1. Polaration of the scales.
2. Appearance of the scales.
3. Immunohistopathology.
4. Histopathology (skin).
5. Percentage % scales reduction (Table 1).

Materials and Methods

Material was collected from previous reviews and also from patient's previous history and lab reports.

Table 1: physiochemical components of argemone Mexicana based on different plant parts.

Compound	Plant Part
Dehydrocheilanthifoline	Whole plants
Jatrorrhizine	Whole plants
Dehydrocorydalmine	Whole plants
Columbamine	Whole plants
Coptisine	Whole plants
Argemexicaine A	Whole plants
Argemexicaine B	Whole plants
Muramine	Whole plants
Oxyhydrastinine	Whole plants
Chelerythrine	Whole plants
Thalifoline	Whole plants
Dihydrocoptisine	Whole plant
Sanguinarine	Seeds
Dihydrosanguinarine	Seeds
Berberine	Apigeal parts, seeds
Pancorine	Aerial parts
Dihydropalmatine hydroxide	Seeds
Protopine	Apigeal parts, seeds
(-)-Argemonine	Plant resins
Dihydrochelerythrine	Tissues

HPTLC (High Performance Thin Layer Chromatography).

Study design

This is the prospective study on randomly selected samples from patient of different age over a period of 3 months to 4 months using analysis as a tool [10-13].

The Research will be conducted in Truba Institute of Pharmacy, Bhopal, Madhya Pradesh, India.

Collection of data

1. The data is being collected from the previous reviews and is analyzed and then the experimentation will begin.
2. Data from the diseases patients.
3. Psoriasis Samples from various areas of Bhopal, Hyderabad India.

Inclusion criteria

1. Patients with skin infections.
2. Patients with chronic diseases.
3. Patient requiring for long term therapy.
4. Patient of every age group.
5. Patients with recurrent hygiene routine.

Exclusion criteria

1. Patients from some other district.
2. Patients with some other similar condition other than psoriasis.
3. Patients enrolling after this 4 months study.

Management of plaque psoriasis: (a new approach)

Formulation of cream 20 Mg using externally in management of plaque psoriasis.

Materials required- salicylic acid, *Aloe Vera* gel, distilled water, argemone Mexicana.

Procedure- 5% Salicylic acid, 5 Mg *Aloe Vera* gel, Distilled water,

Prepared Thick gel from root *A.mexicana* as per followed standard Guideline of Indian Pharmacopoeia Commission.

Dosing and dosage form- Twice a day externally applied on marks.

Side effects- There are no side-effects observed in 3 months study.

Although it has not been clinically proven cure of psoriasis but this formulation helps in its management and minimizes the psoriasis in its early stage.

Follow up evaluation

The patients should follow up after every 2 months to see whether the condition is being repeated or not. In this physical examination, examination of the skin and blood samples is to be collected to get the appropriate results.

Results and Discussion

The present study documented an *A. mexicana* plant commonly used by the indigenous people of Rajasthan as anti-psoriatic. The findings documented in Figure 3 and for easy identification of used plants, their photographs have also been given. Hence, this research proves that *A. mexicana* can be used in the management and treatment of psoriasis in a more effective way and with minimum side effect at a minimal cost to the patient (Figure 4).

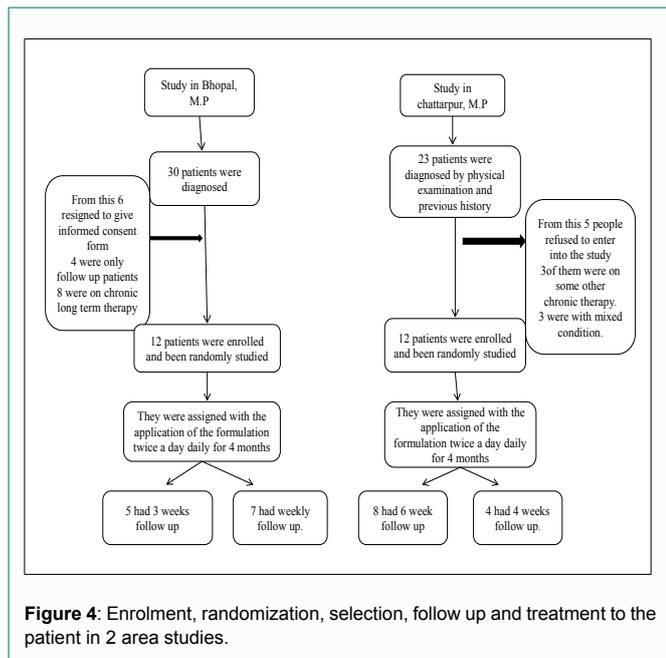


Figure 4: Enrolment, randomization, selection, follow up and treatment to the patient in 2 area studies.

In the duration of 4 months from March 2019 to June 2019, a total of 24 patients were enrolled in the study (i.e., 12 from Bhopal, 12 from Chhatarpur) and were of different age groups. More patients were of the middle age group from 16 years to 24 years of age. The summary of the patients enrolled and their follow up details are being mentioned in Table 2.

Clinical response

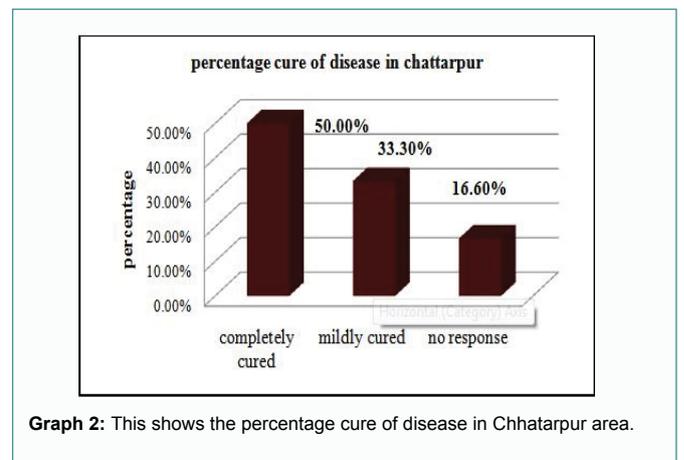
When this formulation was applied to the patient the outcomes were markedly slow in Bhopal than in chattarpur because of the environmental factors of each place. In chattarpur the condition (psoriasis) in 35% of the diseased people got cured with in a period of 5 weeks and other 30% in 6 weeks. The others with serious type of condition took a long time to cure the disease but no any kind of side effect was observed in the patients. However in Bhopal it took a long

Table 2: Percentage of cure in patients based on 2 different areas.

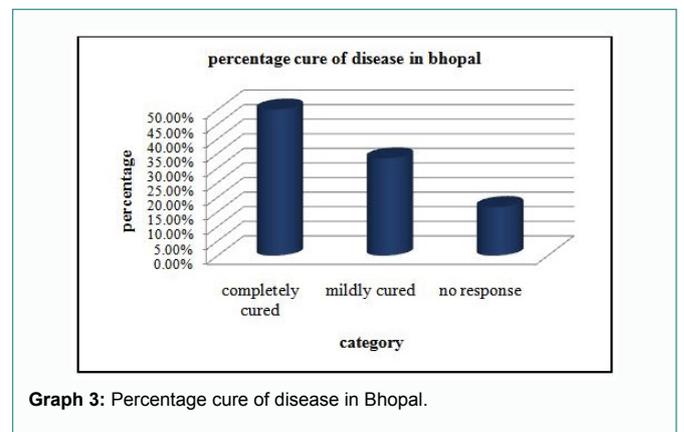
	Study in Chattarpur (n=12)		Study in Bhopal (n=12)	
	No	%	No	%
Completely cured	8	0.666	6	0.5
Mildly cured	2	0.166	4	0.333
No response	2	0.166	2	0.166

time for the patients to cure the disease around 20% of the people started recovery within 3 weeks and 30% in 7 weeks, 20% of them in 8 weeks and others were recovering very slowly.

It was found that in chattarpur about 8 of 12(66.6%) patients the marks were completely disappeared and in other 2 of 12(16.6%) patients showed mild response and 2 of 12(16.6%) of them showed no response to the formulation. Whereas in Bhopal around 6 of 12(50%) showed complete cure, 4 of 12(33.3%) with mild response and 2 of 12(16.6%) with no response to the drug this is shown in Table 2. No side effects were observed in any of the age groups (Graphs 2 and 3).



Graph 2: This shows the percentage cure of disease in Chhatarpur area.



Graph 3: Percentage cure of disease in Bhopal.

Conclusion

Psoriasis is an autoimmune condition which results in the body attacking itself. It occurs in the age group of 14 years to ≥ 65 years. The average age is 28 years. More than 10 million cases per year in India are being recorded. Tropical treatments especially cream are first preference it helps to reduce skin inflammation and minimize cell growth in skin example includes Vitamin A, Vitamin D, Corticosteroid, etc. Natural medicines such as herbal medicines are a safer mode of therapy because of its presumed lack of adverse/ side effects. The value of medicinal plants as herbal remedies is being lost due to lacking of awareness, and deforestation. There are more than 19 types of natural medicine plant including *A.Mexicana*, *Adiantum incisum*, *Adiantaceae*, *Aloe Vera*, *Annona squamosa L*, *Aristolochia*

bracteolata, *Cannabis sativus*, *Capsicum*, *Cassia auriculata*, *Holoptelea integrifolia*, *Momordica charantia*, *Ocimum canum*, etc. are helpful in the management of six different types of Psoriasis naturally. First central government or state government should implement take immediate action to preserve the knowledge of medicinal plants species and herbal remedies for the overcome of side effects it is very essential and it also helps in Homeopathic, Unani, Ayurveda, Siddha, and Allopathic Formulations.

Psoriasis was reduced by the use of the product extracted from the leaves of *A. mexicana*. The patients of different age groups showed different response to this formulation. The patients of younger age and patients with recent stage of development of the disease showed highly positive response to the medication. High amount of positive response was shown in the areas of chattarpur than Bhopal this shows environmental factors also effect the treatment and management of the disease. But no side effects were shown in any of the cities and in any of the age groups which shows that the extract is safer use and even effective unless the patient has any allergic history from the plant.

Acknowledgment

First of all I would like to Thank my co-author Ms. Umama Yezdani (Department of Clinical and Pharmacy Practice) MRM college of Pharmacy Hyderabad, India. The authors are thankful to Dr. Nalini kanta Sahoo for proper guidance and encouragement, also thankful to Dr. Rajesh Singh PAWAR, PhD. Principal Truba Institute of Pharmacy for ceaseless encouragement during the study. We are also thankful to Prof. Sharad Prakash Panday for all time support.

References

- Manmohan S, Niraj K. Cassia tora Linn Cream inhibits ultraviolet-B-induced psoriasis in Rats. *ISRN Dermatol*. 2012;2012:346510.
- Kameshwari S, M N, Paramasivam G. *Urginea indica* and its role in psoriasis: A review. *Int J Pharm & Life Sci*. 2012;3(12):2236-42.
- Isha P, Bohra VD, Ajay B, Krishnendra SN. Ethnomedicinal important plants of Rajasthan used disease the treatment of psoriasis disease: *WJPS*. 2016;5(3):846-59.
- Albuquerque UP, Ramos MA, Melo JG. New strategies for drug discovery in tropical forests based on ethnobotanical and chemical ecological studies. *J Ethnopharmacol*. 2012;140(1):197-201.
- Kenney J. Sarsaparilla as a treatment Psoriasis. 2008.
- Vijaylakshmi A. Psoriasis treatment. 2012.
- Gazi S, Ali S, Talmale SY, Surwase US, Bhalchandra K, Luqman S. Alternative medicines for psoriasis – Natural herbal, Ayurvedic treatment-A review. *Int J Ayurvedic Herb Med*. 2012;2(3):455-63.
- Vijaylakshmi A, Geetha M. Psoriasis treatment with pure Aloe Vera plant. 2012;15:1-3.
- Salihbegovic EM, Hadzigrabic N, Cickusic AJ. Psoriasis and metabolic syndrome. *Med Arch*. 2015;69(2):85-7.
- Borska L, Andrys C, Krejssek J, Palicka V, Chmelarova M, Hamakova K, et al. Oxidative Damage to Nucleic Acids and Benzo(a)pyrene-7,8-diol-9,10-epoxide-DNA Adducts and Chromosomal Aberration in Children with Psoriasis Repeatedly Exposed to Crude Coal Tar Ointment and UV Radiation. *Oxid Med Cell Longev*. 2014;2014:302528.
- Langan SM, Seminara NM, Shin DB, Troxel AB, Kimmel SE, Mehta NN, et al. Prevalence of metabolic syndrome in patients with psoriasis: A population-based study in the United Kingdom. *J Invest Dermatol*. 2012;132(3 Pt 1):556-62.
- Vadakayil AR, Dandekeri S, Kambil SM, Ali NM. Role of C-reactive protein as a marker of disease severity and cardiovascular risk in patients with psoriasis. *Indian Dermatol Online J*. 2015;6(5):322-5.
- Balci A, Balci DD, Yonden Z, Korkmaz I, Yenin JZ, Celik E, et al. Increased amount of visceral fat in patients with psoriasis contributes to metabolic syndrome. *Dermatol*. 2010;220:32-7.
- Coimbra S, Oliveira H, Reis F, Belo L, Rocha S, Quintanilha A, et al. C-reactive protein and leucocyte activation in psoriasis vulgaris according to severity and therapy. *J Eur Acad Dermatol Venereol*. 2010;24(7): 789-96.
- Rajappa M, Rathika S, Munisamy M, Chandrashekar L, Thappa DM. Effect of treatment with methotrexate and coal tar on adipokine levels and indices of insulin resistance and sensitivity in patients with psoriasis vulgaris. *J Eur Acad Dermatol Venereol*. 2015;29(1):69-76.