Journal of Drug Discovery and Health Sciences

journal home page : https://jddhs.com/index.php/jddhs/index

Review Article

An Overview on Recent Advancements in the Treatment of Psoriasis and Its Challenges

Saumya Srivastava[1], Rishabh Maurya[2], Shibu Das[3*], Anubhav Shukla[1], Manish K. Pathak[1]

[1]*Maharishi School of Pharmaceutical Science, Maharishi University of Information Technology, Lucknow, Uttar Pradesh, India.*
[2]*Faculty of Pharmacy, Dr. APJ Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India.*
[3]*Milestones Institute of Pharmaceutical Sciences, Gomati Tripura, Tripura University (A Central University).*

ARTICLE INFO

Article history:
Received: 08 March, 2024
Revised: 20 April, 2024
Accepted: 10 May, 2024
Published: 20 June, 2024
Keywords:
Biologic therapy, Inflammation, Psoriasis, Systemic drug.
DOI:
10.21590/ijddhs.01.01.01

ABSTRACT

About 2 to 3% of people worldwide suffer from the chronic autoimmune skin disease psoriasis. Globally, the prevalence of psoriasis is rising, raising serious public health concerns. Access to efficient therapies, as well as knowledge and education, are now more important than ever. Though psoriasis research and treatment have made significant strides, there is still much to be done to address the disease's effects on both individuals and society. Ayurvedic formulations are also very useful in treating the skin problems in various forms. All the formulations are herbal based in which specific parts of plants are utilized for developing the dosage forms that are easy to apply and give relief. Psoriasis may be brought on by a combination of hereditary and environmental factors, according to recent studies. Topical medicines, light therapy, pharmacological drugs administered systemically, and biologics are available as psoriasis treatments. Psoriasis, however, is incurable and frequently requires lifetime therapy. The current focus of psoriasis treatment is to bring about long-term symptom management, lessen inflammation, and enhance patient quality of life. This can be accomplished by mixing ayurvedic remedies like neem, turmeric, and aloe vera with conventional medicines, including topical corticosteroids, vitamin D analogs, and phototherapy. The objective is to determine the best treatment regimen for each patient in order to maximize benefits and reduce negative effects.

INTRODUCTION

Millions of individuals across the world struggle with the chronic autoimmune skin disorder known as psoriasis. It is characterized by skin areas that are red and scaly and can itch, hurt, and even bleed. It can manifest anywhere on the body, including the genitalia, scalp, face, hands, and feet. Psoriasis' exact etiology is unknown; however, it is assumed to be connected to an overactive immune system that results in inflammation and unchecked skin cell development. The chronic illness psoriasis can significantly impact a person's quality of life and mental health (WHO, 2016).

It is believed that psoriasis is an immune system issue triggered by infections, stress, and colds. Although a skin rash is the most common symptom, it can occasionally spread to the joints or nails. Scales are to be removed, and skin cell growth is to be slowed down. Relief is possible with topical creams, light treatment, and drugs (Hay *et al.*, 2017). According to a recent psoriasis study by the National Psoriasis Foundation, there are around 8 million Americans who have this chronic skin condition. Over half of the respondents to the survey reported experiencing feelings of depression and anxiety, indicating that psoriasis can have a significant negative impact on a person's mental health. The poll also showed that many psoriasis sufferers struggle to obtain appropriate therapies for their symptoms and feel stigmatized and misunderstood. Despite improvements in treatment options, the survey

***Corresponding Author:** Shibu Das

Address: Milestones Institute of Pharmaceutical Sciences, Gomati Tripura, Tripura University (A Central University).

Email ✉**:** dasshibu2014@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

shows that there is still a need for more education and assistance for those who have psoriasis (WHO, 2016; Hay *et al*., 2017).

A substantial genetic tendency and autoimmune pathogenic features characterize this chronic inflammatory skin disorder. The incidence varies by area and is around 2% globally (Convit, 1962). Asian and certain African people have a lower incidence than Caucasian and Scandinavian populations, where it can reach 11% (Burch and Rowell, 1981; Smith *et al*., 1993).

Millions of individuals worldwide suffer from psoriasis, which significantly compromises both physical and mental health. There are regional and ethnic variations in the prevalence of psoriasis worldwide, with some places reporting rates as high as 11%. Due to healthcare costs and lost productivity, psoriasis has significant economic effects in addition to the personal burden it places on sufferers. To better manage this chronic illness, current initiatives seek to increase awareness and expand access to efficient therapies (Boehncke and Schön, 2015; Rendon and Schäkel, 2019).

Psoriasis affects people and society significantly, according to the World Psoriasis Day Consortium. A breakdown of how much psoriasis is now affecting the world's population is shown below:

- A considerable influence on one's quality of life is reported by 73% of psoriasis patients.
- The condition has a negative impact on mental health, according to 63% of psoriasis patients.
- Psoriasis patients indicate that 47% of the time, the condition has made it difficult for them to go to job or school.
- The condition has made them feel stigmatized or discriminated against, according to 32% of psoriasis patients.
- 19% of psoriasis patients claim that they have been denied service in public settings because of their illness.

Epidemiology of Psoriasis

Millions of individuals throughout the world suffer from this prevalent chronic skin ailment. The World Health Organization (WHO) estimates that psoriasis prevalence ranges from 0.09% to 11.43%, with industrialized nations reporting the greatest rates (Christophers, 2001). The number of Americans who have psoriasis is thought to be over 8 million. Although psoriasis can strike at any age, it usually starts between the ages of 15 and 35. Psoriasis is thought to develop as a result of both hereditary and environmental causes (Parisi *et al*., 2013; Gibbs, 1996).

Clinical Classifications

The most prevalent variety of the condition's dermatological symptoms is psoriasis vulgaris, sometimes referred to as plaque-type psoriasis. The many clinical subtypes of psoriasis differ significantly from one another despite the fact that the terms "psoriasis" and "psoriasis vulgaris" are used interchangeably in scientific literature (Rachakonda *et al*., 2014). As shown in Figure 1, it clearly seems that the different body parts get affected by the psoriasis conditions and, due to which the persons have to suffer physical and mental problems, due to which they have to cut off from their social life and personal life as well (Danielsen *et al*., 2013).

Clinical signs of psoriasis are as previously mentioned. Psoriasis vulgaris is characterized by erythematous scaly plaques on the trunk and extensor areas of the limbs (A, B). (C) Pustular and extensive psoriasis. Option (D) represents pustular psoriasis that exclusively affects the bottoms of the feet (Nestle *et al*., 2009). This kind, which typically also impacts the palms of the hands, is known as psoriasis pustulosa palmoplantaris. Inverse psoriasis, also known as axillary, intergluteal, inframammary, and vaginal involvement, affects the skin folds (Ko *et al*., 2010).

Psoriasis Vulgaris

About 90% of all cases of the condition are chronic plaque-type psoriasis. Clinical signs include clearly defined; erythematous, silvery scales covering itchy plaques. Large

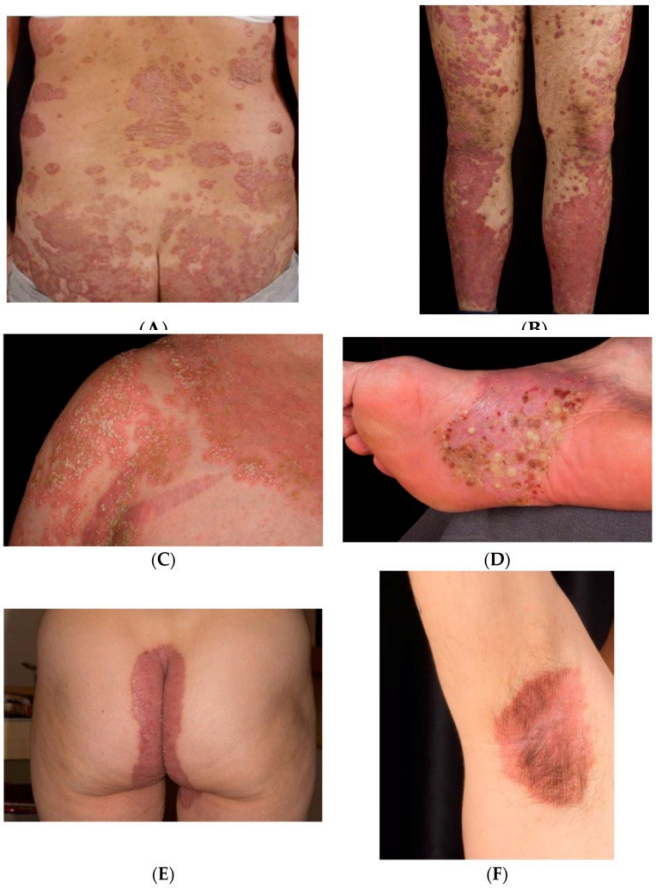

Figure 1: Clinical classification of psoriasis at different body parts (Ortonne *et al*., 2009)

skin-covering plaques have the potential to develop and cover skin areas. The scalp, limb extensor surfaces, and the trunk are common locations (Figure 2) (Gelfand *et al*., 2009). Around 2 to 3% of people worldwide suffer from plaque psoriasis, also known as psoriasis vulgaris, a chronic autoimmune skin condition. It can appear anywhere on the body, but the scalp, knees, elbows, and lower back are where it is most frequently found. These areas also tend to develop red, scaly, and occasionally itchy skin patches (Kimball *et al*., 2010). Psoriasis is assumed to be brought on by a mix of genetics, immune system disorders, and environmental factors, while the precise origin is unknown. Topical creams, light therapy, oral drugs, and biologic pharmaceuticals are all available as psoriasis treatments. Although there is no known cure for psoriasis, many people can successfully manage their symptoms with the right care (Stern, 2010; Stern and Huibregtse, 2011).

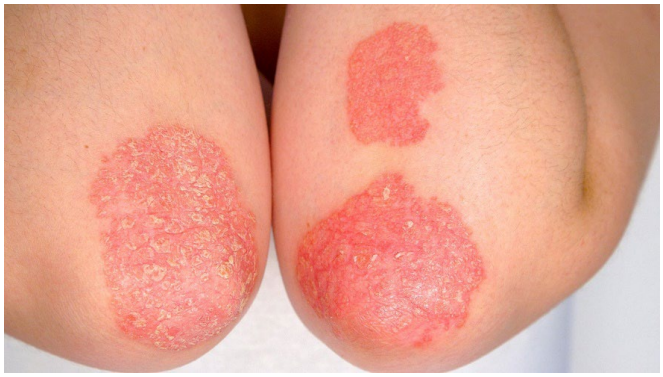

Figure 2: Skin covering plaques caused due to Psoriasis Vulgaris (Prodanovich *et al*., 2009)

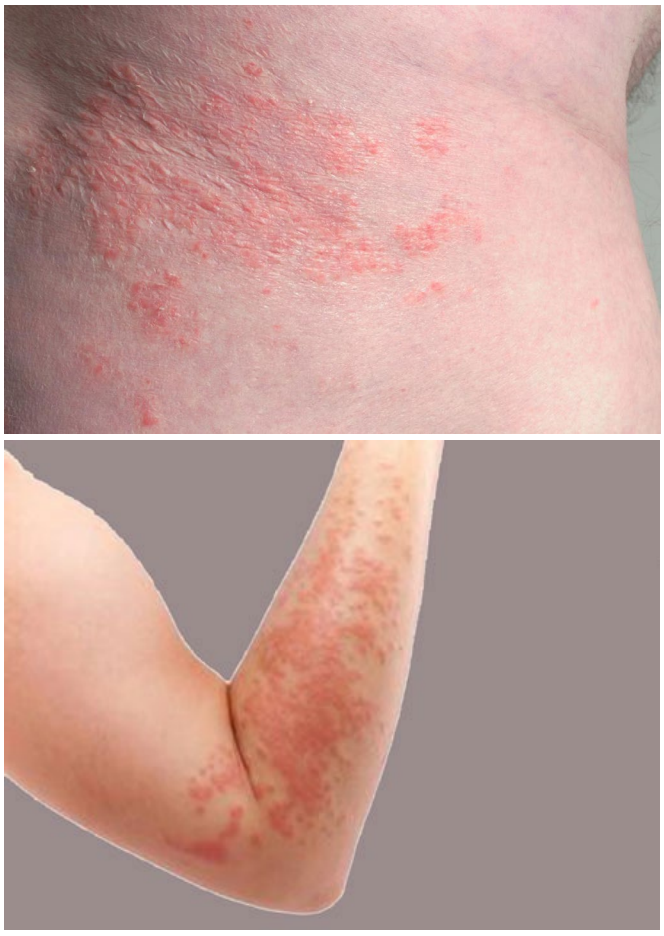

Figure 3: Inverse Psoriasis effect on the skin

Inverse Psoriasis

Clinical signs of inverse psoriasis, also known as flexural psoriasis, include slightly erosive erythematous plaques and patches that affect intertriginous tissues. In skin folds, such as the groin, armpits, and beneath the breasts, inverse psoriasis can develop. It appears as smooth, irritated, or itchy red areas. People with deep skin folds or excess body weight are more likely to develop inverse psoriasis (Armstrong *et al*., 2013). Due to the sensitive areas, it affects, the possibility of friction and sweating, it can be challenging to treat (Figure 3). Topical creams, oral drugs, and light therapy are all available as treatment options, but individualized management regimens are crucial to reducing symptoms and enhancing quality of life (Gaeta *et al*., 2013; Gu *et al*., 2013).

Guttate Psoriasis

Tiny, sudden-appearing erythematous plaques are a symptom of a subtype of guttate psoriasis. Children or teens are commonly affected, and tonsillitis brought on by group A streptococcal bacteria is a common cause. A third of persons with guttate psoriasis will also develop plaque psoriasis during the course of their adult lives.[24] It is a kind of psoriasis that manifests as minute, scaly, red patches on the skin that resemble water droplets. It sometimes appears quickly, frequently following a streptococcal infection, and can affect sizable portions of the body, such as the scalp, arms, and legs (Figure 4) (Horreau *et al*., 2013). Children and young people are more likely to develop guttate psoriasis, which may go away on its own or with treatment such as topical creams, light therapy, or oral drugs. In the future, those with guttate psoriasis may be more likely to acquire other types of psoriasis (Miller *et al*., 2013; Pietrzak *et al*., 2013).

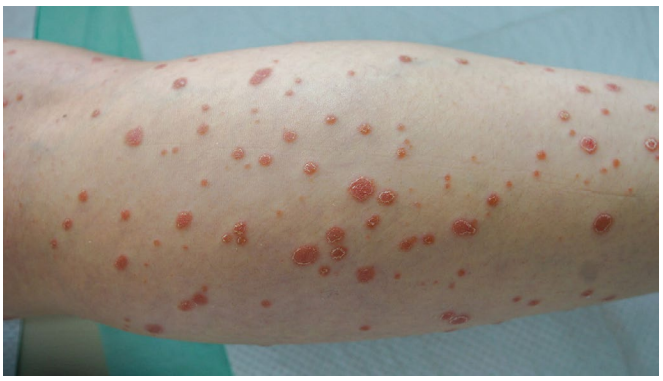

Figure 4: Effect of guttate psoriasis on skin

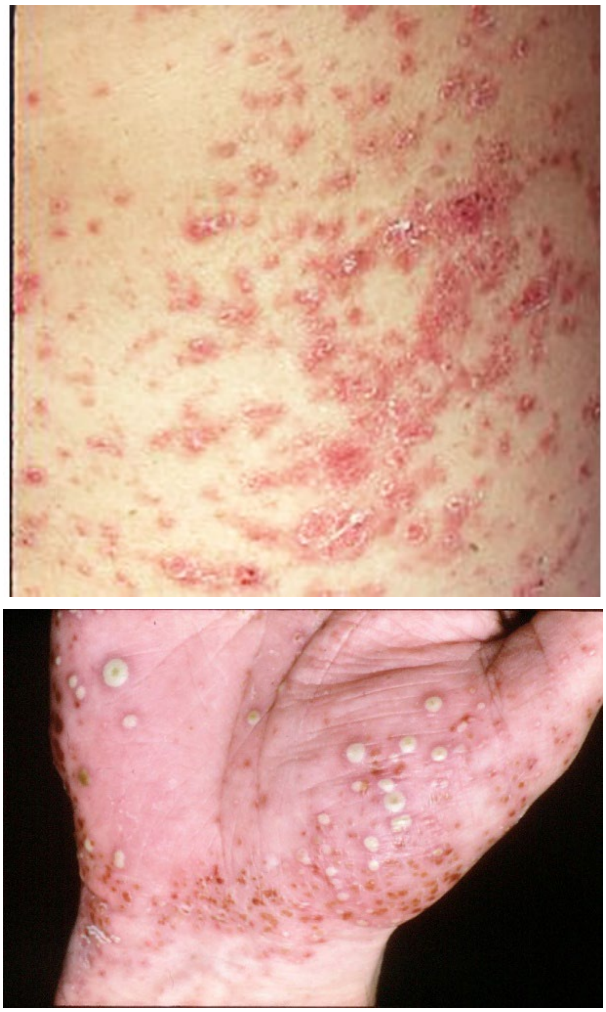

Figure 5: Effect of pustular psoriasis on the skin

Pustular Psoriasis

An uncommon form of psoriasis known as pustular psoriasis is characterized by the development of tiny, pus-filled blisters called pustules on the skin. A fever, chills, and weariness could also accompany these pustules. They might also be painful, itchy, and sensitive (Figure 5). Pustular psoriasis can develop locally or all over the body, and certain drugs, infections, or stress can cause it to flare up (Samarasekera *et al*., 2013; Xu and Zhang, 2012). Topical creams, oral drugs, and light therapy are all available as treatment options, but the exact course of action will depend on how severe and widespread the problem is. Dermatologists must carefully manage and monitor pustular psoriasis to avoid complications and enhance quality of life (Egeberg *et al*., 2017).

Comorbidities in Psoriasis

Numerous comorbidities, or additional medical conditions that may coexist with psoriasis, are linked to the skin condition. Cardiovascular disease, diabetes, obesity, depression, anxiety, and inflammatory bowel disease are a few examples of these comorbidities (Mehta *et al*., 2011). Psoriasis and comorbidities may be related, and the presence of one condition may increase the likelihood of the presence of others. Inflammation and immunological dysfunction may play a part in this association. To enhance general health and well-being, it is crucial for persons with psoriasis to get frequent medical checkups and manage any comorbidities with the proper care (Joshi *et al*., 2016; WTCCC, 2007).

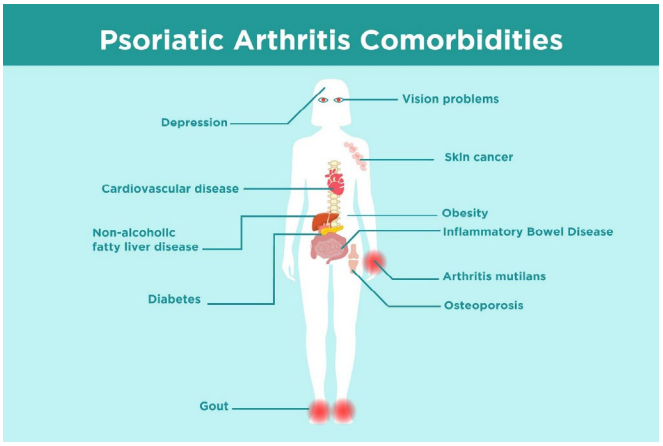

Figure 6: Diseases and affected organs by the Psoriatic arthritis comorbidities

Psoriasis is most frequently associated with the skin, although it may also harm joints and has been connected to a number of ailments. On organ systems other than psoriatic skin, inflammation has been shown to have negative effects (Yeung *et al*., 2013; Wan *et al*., 2013). As a result, it has been proposed that psoriasis is a systemic disorder rather than a skin-specific ailment. Psoriasis patients exhibited greater levels of hyperlipidemia, hypertension, coronary artery disease, type 2 diabetes, and body mass index when compared to control persons, it was shown. Patients with psoriasis had twice as much of a chance of developing the metabolic syndrome, which combines the aforementioned illnesses in a single patient (Rapp *et al*., 1999; Szepietowski and Reich, 2016).

Additionally, compared to controls, psoriasis patients had twice as many coronary plaques. The body of evidence, however, consistently shows that psoriasis raises the risk of myocardial infarction, stroke, and mortality from cardiovascular disease (CVD) on its own (Fleming *et al*., 2017; Sampogna *et al*., 2012). As an independent cardiovascular risk factor, psoriasis is thought to perform a variety of roles (Figure 6). Additionally, although to a lesser extent, it was discovered that patients with mild psoriasis were also at risk (Villani *et al*., 2015; Stoll *et al*., 2006).

Pathophysiology & Diagnosis of Psoriasis

Pathophysiology of Psoriasis

Genetic, immunological, and environmental factors combine intricately to cause psoriasis. Inflammation, aberrant skin cell development, and an overactive immune

system are its defining features. Psoriasis is assumed to have a genetic tendency, and several genes have been linked to the condition (Dand *et al*., 2020).

Psoriasis can start or worsen due to environmental factors such as infections, stress, and drugs. Activated T cells and cytokines, which promote inflammation and the growth of skin cells, are important players in the pathophysiology of psoriasis. For instance, biologic drugs like adalimumab target TNF-, a pro-inflammatory cytokine that is elevated in psoriasis and is implicated in the disease. These intricate connections between the immune system, environment, and heredity have a role in the pathophysiology of psoriasis (Schön and Erpenbeck, 2018).

Diagnosis of Psoriasis

The clinical examination of the skin, including the appearance of recognizable plaques with erythema and scale, is the primary method used to diagnose psoriasis. However, in cases of mild or atypical presentations, the diagnosis may be challenging, necessitating the use of additional diagnostic tools (Budu-Aggrey *et al*., 2019). To confirm the diagnosis and differentiate psoriasis from other skin disorders, skin biopsy is frequently utilized. In some circumstances, blood tests like a complete blood count and testing for autoimmune markers may also be beneficial. Psoriatic arthritis can be diagnosed using imaging methods, such as magnetic resonance imaging. Pustular or erythrodermic psoriasis are two examples of unusual presentations that may need extra diagnostic techniques since they might resemble other skin disorders (Onoufriadis *et al*., 2011).

Treatment of Psoriasis with Different Methods

Psoriasis is a chronic autoimmune disease that can be difficult to treat. Biologics, systemic therapies, phototherapy, and topical treatments are only a few of the current therapeutic alternatives (Table 1). The patient's medical history, the severity of the ailment, and the prevalence of concomitant conditions all have an impact on the therapeutic option. Psoriasis can be successfully treated to enhance quality of life and avoid negative consequences in the future (Finlay and Khan, 1994).

Topical Therapies

For mild to severe psoriasis, topical treatments are frequently used as the initial course of therapy. Retinoids, vitamin D analogs, and corticosteroids are a few of the therapies that are applied directly to the affected skin. Inflammation, irritation, and redness are all reduced by corticosteroids (Feldman and Krueger, 2005). Skin cell proliferation can be slowed down and scaling and redness can be lessened by vitamin D analogs such as calcipotriene. To normalize skin cell proliferation and reduce inflammation, retinoids can be used, such as tazarotene. Although topical treatments are typically safe and well tolerated, if applied frequently or to certain body parts, like the face or genital region, they may irritate the skin or cause it to thin (Torsekar and Gautam, 2017).

Phototherapy

Psoriasis can be treated using phototherapy, which includes being exposed to ultraviolet (UV) radiation. The two most often utilized forms of phototherapy are UVB and PUVA. UVB treatment includes exposing the damaged skin to a particular wavelength of UV radiation, which can assist in reducing inflammation and slowing the proliferation of skin cells (Puig, 2011). Psoralen is a drug that is used prior to exposure to UVA rays as part of PUVA treatment. Although this type of phototherapy carries a higher risk of side effects than UVB therapy, it has the potential to be

Table 1: Different drugs that are used in different clinical classifications of psoriasis with their treatment methods (Rajagopalan and Mital, 2016)

S. No.	*Drugs*	*Clinical classifications*	*Treatment methods*
1.	Topical corticosteroids (e.g., betamethasone)	Anti-inflammatory	Topical therapy
2.	Topical calcineurin inhibitors (e.g., tacrolimus)	Immunosuppressant	Topical therapy
3.	Coal tar preparations (e.g., T/Gel)	Keratolytic	Topical therapy
4.	Salicylic acid	Keratolytic	Topical therapy
5.	Vitamin D analogues (e.g., calcipotriene)	Anti-proliferative	Topical therapy
6.	Retinoids (e.g., tazarotene)	Anti-proliferative	Topical therapy
7.	Methotrexate	Immunosuppressant	Systemic medication
8.	Cyclosporine	Immunosuppressant	Systemic medication
9.	Acitretin	Retinoid	Systemic medication
10.	Ustekinumab	Biologic	Biologic therapy
11.	Adalimumab	Biologic	Biologic therapy
12.	Infliximab	Biologic	Biologic therapy

Note: This table is intended for informative purposes only and may not include all drug and pharmaceuticals used to treat psoriasis. With a healthcare professional, you should discuss your treatment choices.

more effective (Mahil *et al*., 2020). Using phototherapy alone or in combination with other treatments, such as topical or systemic drugs, can help psoriasis sufferers see greater outcomes. Based on the patient's unique demands and the severity of their ailment, phototherapy should be chosen above alternative therapies (Wong *et al*., 2013).

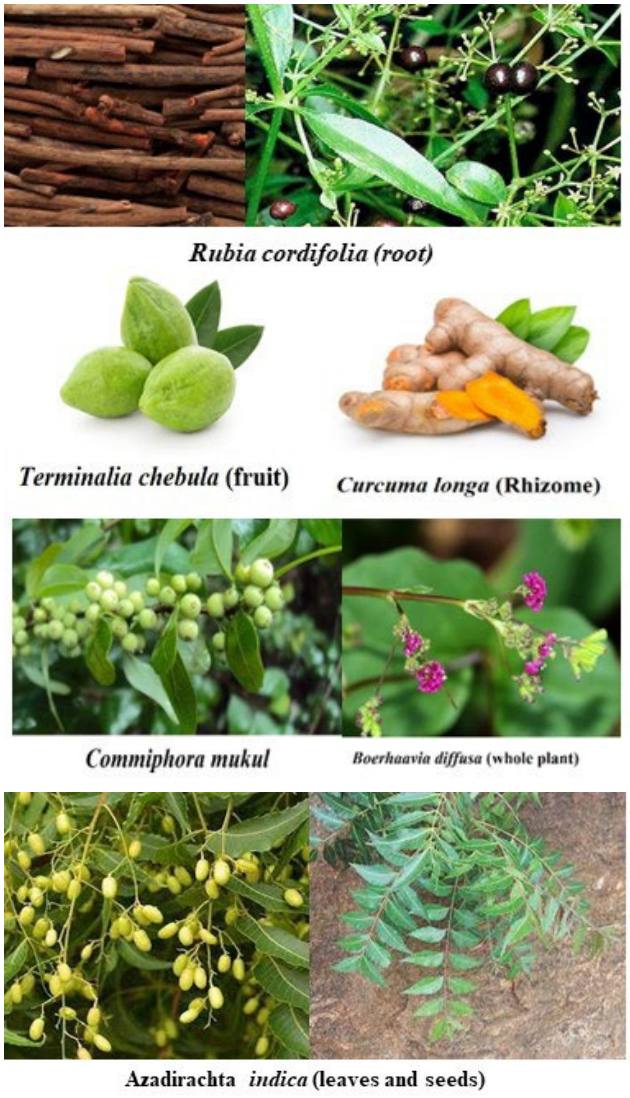

Figure 7: Different plants & their parts used in treatment

Systemic Drug

Only moderate to severe instances of psoriasis that have not responded to topical or phototherapy therapies should be treated with systemic drugs. The systemic drug methotrexate, a folic acid antagonist, is frequently used for psoriasis (Ling *et al*., 2016). It acts by preventing the synthesis of DNA and the growth of new cells. Another choice is the immunosuppressant cyclosporine, which acts by lowering the immunological response that results in inflammation (Warren *et al*., 2016). Acitretin, a retinoid, is also used to treat psoriasis and reduces inflammation by controlling the proliferation of skin cells (Balak *et al*., 2020). These drugs do, however, have potential side effects and need close observation. During therapy with systemic drugs, close observation of liver function, renal function, blood counts, and blood pressure is required. They should only be prescribed and kept under observation by a licensed healthcare professional (Nast *et al*., 2021).

Biologics

Biologics are a class of drugs used to treat psoriasis by targeting specific parts of the immune system involved in the disease process. For moderate to severe instances of psoriasis that are resistant to other therapies, these drugs are frequently utilized (Smith *et al*., 2020). Tumor necrosis factor (TNF) inhibitors, interleukin (IL)-17 inhibitors, and IL-23 inhibitors are examples of biologics that can be given intravenously or intramuscularly (Mahil *et al*., 2020). Adalimumab and etanercept are examples of drugs that suppress TNF, whereas ixekizumab and secukinumab are examples of drugs that inhibit IL-17. Drugs like guselkumab and risankizumab are examples of IL-23 inhibitors (Rajagopalan and Mital, 2016). Biologics are effective in improving skin symptoms and quality of life for many people with psoriasis but can be expensive and may have side effects, including increased risk of infection. During treatment, close supervision by a healthcare professional is essential (Dand *et al*., 2019).

Table 2: Few ayurvedic formulations are widely preferred in the treatment of different clinical psoriasis in various dosage forms (Nille and Chaudhary, 2021; Abraham *et al*., 2019)

Formulations	*Biological name*	*Plant parts*	*Dosage forms*	*Type of psoriasis*
Kaishore Guggulu	*Boerhaavia diffusa*	Whole plant	Tablet	Pustular psoriasis
Arogyavardhini Vati	*Terminalia chebula*	Fruit	Tablet	Plaque psoriasis
Manjisthadi Kwath	*Rubia cordifolia*	Root	Decoction	Guttate psoriasis
Mahamanjishthadi Kwath	*Rubia cordifolia*	Root	Decoction	Plaque psoriasis
Neem oil	*Azadirachta indica*	Leaves, seeds	Topical oil	Plaque psoriasis
Turmeric	*Curcuma longa*	Rhizome	Topical cream	Plaque psoriasis

Note: This isn't a complete list; it's just one example. Before taking any of these formulations for the treatment of psoriasis, it is vital to speak with an experienced Ayurvedic practitioner. Additionally, a medical expert should decide whether the clinical classification of psoriasis listed in the table is accurate in each case.[61]

Treatment of Psoriasis Using Phytodrugs

Plant-based remedies called phytomedicines, commonly referred to as herbal drugs, have been used for millennia to treat a variety of conditions, including psoriasis. They include bioactive substances that may have anti-inflammatory, antioxidant, and immunomodulatory actions, which can help lessen the symptoms of psoriasis (Dand *et al*., 2019).

Aloe vera, turmeric, chamomile, and tea tree oil are some examples of often-used phytomedicines for psoriasis. These can be taken orally as supplements or applied topically as creams, gels, or ointments (Table 2).

Phytomedicines may help with some psoriasis symptoms, however, it is unclear how effective and safe they are. Before using any phytomedicines, patients should speak with their healthcare professional because they may interact negatively with other drugs and create additional side effects.

Psoriasis has long been treated using Ayurveda, an age-old Indian medical practice (Figure 7). Ayurvedic psoriasis treatments attempt to balance the body's doshas, or energies, through food, lifestyle modifications, herbal treatments, and detoxification techniques. Neem, turmeric, and guggul are a few of the plants that are frequently used in Ayurveda to cure psoriasis.

Ayurvedic treatments may also include procedures like Swedana, a steam therapy, and Panchakarma, which involves purging the body of impurities. However, the effectiveness of Ayurvedic treatments for psoriasis is not well documented, so care should be taken when utilizing this drug. Before utilizing any Ayurvedic treatments for psoriasis, it is crucial to speak with a trained practitioner (Nille and Chaudhary, 2021).

Pharmacological Studies For Psoriasis

In the past 15 years, advances in our understanding of the etiology of psoriasis have been converted into very successful, targeted medicines that provide us with a basic understanding of how chronic inflammatory illnesses develop. Our understanding of the processes behind the onset and progression of psoriasis, as well as the treatment possibilities that result from the breakdown of the inflammatory psoriatic pathways, is provided in this article. The topic of inflammation and important cell types involved in psoriatic inflammation is covered at the outset of the entire talk. We also go into the interplay between the skin flora and the pathophysiology of psoriasis, as well as the function of genetics, related epigenetic processes, and these factors in psoriasis (Jacobson *et al*., 2011).

Mild to severe psoriasis is often treated with topical medications such as corticosteroids and vitamin D analogs. Systemic medications such as immunosuppressants and

Table 3: Advantages of ayurvedic drugs over the allopathic drugs in different psoriasis conditions

Type of psoriasis	*Allopathic drugs*	*Ayurvedic drugs*	*Benefits of Ayurvedic products*
Plaque psoriasis	Methotrexate, cyclosporine, retinoids	Neem *(Azadirachta indica),* Turmeric *(Curcuma longa),* Guggulu *(Commiphora mukul)*	Ayurvedic drugs could be less likely to cause negative effects and are suitable for long-term usage. Neem possesses antibacterial and anti-inflammatory effects. Redness and inflammation can be reduced with turmeric. The immune system may be regulated by guggulu (Mahil *et al*., 2020; Wong *et al*., 2013; Ling *et al*., 2016).
Guttate psoriasis	Corticosteroids	Manjistha *(Rubia cordifolia),* Haridra *(Curcuma longa),* Tulsi *(Ocimum sanctum)*	Without the negative effects of corticosteroids, ayurvedic drugs may strengthen the immune system and lessen inflammation. Manjistha possesses antibacterial and anti-inflammatory effects. Haridra helps lessen itchiness and irritation. Tulsi possesses antioxidant and anti-inflammatory effects (Warren *et al*., 2016; Balak *et al*., 2020; Nast *et al*., 2021).
Inverse psoriasis	Topical calcineurin inhibitors, corticosteroids	Aloe vera, Yashtimadhu *(Glycyrrhiza glabra),* Lodhra *(Symplocos racemosa)*	Drugs from the Ayurvedic tradition may be useful in lowering inflammation and redness without the negative effects of corticosteroids. Aloe vera helps relieve inflammation while soothing the skin. Anti-inflammatory and antioxidant effects are present in yashtimadhu. The herb lodhra is astringent and anti-inflammatory (Smith *et al*., 2020; Mahil *et al*., 2020; Rajagopalan and Mital, 2016).
Pustular psoriasis	Acitretin, methotrexate, cyclosporine	Guduchi *(Tinospora cordifolia),* Triphala *(Emblica officinalis, Terminalia bellirica, Terminalia chebula),* Kutaja *(Holarrhena antidysenterica)*	The anti-inflammatory and anti-redness benefits of ayurvedic drugs may be superior than those of conventional drug.[58,59] Immune-suppressant qualities are seen in guduchi. Both inflammation and immunity can be improved by triphala. The immune system's balance can be improved by kutaja (Dand *et al*., 2019).
Erythrodermic Psoriasis	Methotrexate, cyclosporine, retinoids	Amalaki *(Emblica officinalis),* Guggulu *(Commiphora mukul),* Brahmi *(Bacopa monnieri)*	Drugs from the Ayurvedic tradition may help boost the immune system and decrease inflammation without the negative side effects of Western drug. Amalaki is an effective immune system builder and antioxidant. The immune system may be regulated by guggulu. Anti-inflammatory and antioxidant effects are found in brahmi (Nille and Chaudhary, 2021).

biologics may be recommended for more severe instances. Targeting certain immune system components that support psoriasis is how these drugs function (Schmitt and Wozel, 2005).

Newer therapies with the potential for treating psoriasis, such as JAK inhibitors and IL-17 inhibitors, have also been the subject of recent studies. But before beginning any new therapy, it's crucial to consider the advantages and hazards, just as with any medicine, and speak with a healthcare professional (Langley and Ellis, 2004).

Challenges Related to Treat Psoriasis

Psoriasis may be effectively treated using a variety of methods, but there are also a number of difficulties in doing so. Treatment resistance, which occurs when patients do not respond to a certain therapy or, over time, develop resistance to a treatment, is one of the biggest problems (Table 3). This may necessitate the employment of other therapies and cause dissatisfaction for both patients and doctors (Weischer *et al*., 2004).

The possibility of negative therapeutic effects is another difficulty. Systemic drugs and biologics, two types of psoriasis therapies, can cause major adverse effects such as liver damage, infections, and an increased risk of cancer. Topical drugs can potentially irritate the skin or trigger allergic responses (Lebwohl *et al*., 2001).

Additionally, treatment can be expensive and time-consuming, particularly for patients who need to visit medical professionals or phototherapy clinics frequently. A patient's quality of life may suffer as a result of the requirement for continual therapy because they may feel self-conscious about their skin or endure physical discomfort (Roenigk, 1999).

In addition, there are difficulties with the social and psychological aspects of psoriasis therapy. It is crucial for healthcare professionals to address these issues and offer proper assistance since stigma and prejudice associated with visible skin disorders can cause social isolation and despair in patients (Koo, 1999).

Despite the fact that psoriasis has effective therapies, managing the illness can be difficult owing to treatment resistance, unfavorable side effects, financial and time restrictions, as well as social and psychological problems. Healthcare professionals must collaborate closely with patients to create individualized treatment programs that take into account all of these difficulties and offer sufficient assistance to handle them (Menter *et al*., 2009).

Psoriasis is one of several disorders that have been treated with ayurvedic drugs for ages. In contrast to allopathic drugs, which mainly aim to manage symptoms, ayurvedic therapy treats psoriasis holistically by addressing the underlying cause of the condition (Saurat *et al*., 2008).

Conclusion

Millions of individuals worldwide suffer from the chronic autoimmune skin disorder known as psoriasis. The review article examines psoriasis' biology, clinical manifestation, diagnosis, and available treatments. To successfully manage symptoms, it emphasizes the value of early diagnosis and customized treatment approaches. The difficulties of treating psoriasis, including treatment resistance and unfavorable consequences, are also covered in the article. The analysis also highlights the importance of conducting more research to create novel treatment plans, particularly for patients who do not react to existing drugs. The review paper emphasizes the value of a multidisciplinary approach to treating psoriasis in clinical practice as well as the necessity of continual patient monitoring to modify treatment as necessary.

Acknowledgement

I want to thank our dean, Dr. (Prof.) Shikhar Verma, and my other faculty members for their encouragement and support, which gave me the drive and inspiration I needed to continue this project.

References

Abraham, N., Krishnan, N., & Raj, A. (2019). Management of psoriasis-Ayurveda and allopathy-A review. International Journal of Dermatology and Clinical Research, 5(1), 018-023. https://doi.org/10.17352/2455-8605.000033

Armstrong, E. J., Harskamp, C. T., & Armstrong, A. W. (2013). Psoriasis and major adverse cardiovascular events: A systematic review and meta-analysis of observational studies. Journal of the American Heart Association, 2(2), e000062. https://doi.org/10.1161/JAHA.113.000062

Balak, D. M. W., Gerdes, S., Parodi, A., & Salgado-Boquete, L. (2020). Long-term safety of oral systemic therapies for psoriasis: A comprehensive review of the literature. Dermatology and Therapy, 10(4), 589–613. https://doi.org/10.1007/s13555-020-00409-4

Bhatt, K., Bhatt, S., & Shukla, S. K. (2023). A comprehensive overview of different aspects of phytomedicine in conventional dosage forms and treatment of disease. World Journal of Pharmacy and Pharmaceuticals Sciences, 12(2), 1225-1241.

Boehncke, W. H., & Schön, M. P. (2015). Disease burden and epidemiology. The Lancet, 386(9993), 983-994.

Budu-Aggrey, A., Brumpton, B., Tyrrell, J., *et al.* (2019). Evidence of a causal relationship between body mass index and psoriasis: A Mendelian randomization study. PLoS Medicine, 16, e1002739.

Burch, P. R., & Rowell, N. R. (1981). Mode of inheritance in psoriasis. Archives of Dermatology, 117(4), 251–252.

Christophers, E. (2001). Psoriasis—Epidemiology and clinical spectrum. Clinical and Experimental Dermatology, 26(4), 314–320. https://doi.org/10.1046/j.1365-2230.2001.00832.x

Convit, J. (1962). Investigation of the incidence of psoriasis amongst Latin-American Indians. In Proceedings of 13th Congress on Dermatology (p. 196). Amsterdam: Excerpta Medica.

Dand, N., Duckworth, M., Baudry, D., *et al.* (2019). HLA-C06:02 genotype is a predictive biomarker of biological treatment response in psoriasis. Journal of Allergy and Clinical Immunology, 143, 2120–2130.

Dand, N., Mahil, S. K., Capon, F., *et al.* (2020). Psoriasis and genetics. Acta Dermato-Venereologica, 100, adv00030.

Danielsen, K., Olsen, A. O., Wilsgaard, T., & Furberg, A. S. (2013). Is the prevalence of psoriasis increasing? A 30-year follow-up of a population-based cohort. British Journal of Dermatology, 168(6), 1303–1310. https://doi.org/10.1111/bjd.12230

Egeberg, A., Skov, L., Joshi, A. A., Mallbris, L., Gislason, G. H., Wu, J. J., Rodante, J., Lerman, J. B., Ahlman, M. A., & Gelfand, J. M., *et al.* (2017). The relationship between duration of psoriasis,

vascular inflammation, and cardiovascular events. Journal of the American Academy of Dermatology, 77, 650–656.e3. https://doi.org/10.1016/j.jaad.2017.06.057

Feldman, S. R., & Krueger, G. G. (2005). Psoriasis assessment tools in clinical trials. Annals of the Rheumatic Diseases, 64(Suppl 2), ii65–ii68.

Finlay, A. Y., & Khan, G. K. (1994). Dermatology Life Quality Index (DLQI)—a simple practical measure for routine clinical use. Clinical and Experimental Dermatology, 19, 210–216.

Fleming, P., Bai, J. W., Pratt, M., Sibbald, C., Lynde, C., & Gulliver, W. P. (2017). The prevalence of anxiety in patients with psoriasis: A systematic review of observational studies and clinical trials. Journal of the European Academy of Dermatology and Venereology, 31, 798–807. https://doi.org/10.1111/jdv.14142

Gaeta, M., Castelvecchio, S., Ricci, C., Pigatto, P., Pellissero, G., & Cappato, R. (2013). Role of psoriasis as an independent predictor of cardiovascular disease: A meta-regression analysis. International Journal of Cardiology, 168(3), 2282–2288. https://doi.org/10.1016/j.ijcard.2013.01.240

Gelfand, J. M., Dommasch, E. D., Shin, D. B., Azfar, R. S., Kurd, S. K., Wang, X., & Troxel, A. B. (2009). The risk of stroke in patients with psoriasis. Journal of Investigative Dermatology, 129(10), 2411–2418. https://doi.org/10.1038/jid.2009.112

Gibbs, S. (1996). Skin disease and socioeconomic conditions in rural Africa: Tanzania. International Journal of Dermatology, 35(9), 633–639. https://doi.org/10.1111/j.1365-4362.1996.tb03698.x

Gu, W. J., Weng, C. L., Zhao, Y. T., Liu, Q. H., & Yin, R. X. (2013). Psoriasis and risk of cardiovascular disease: A meta-analysis of cohort studies. International Journal of Cardiology, 168(5), 4992–4996. https://doi.org/10.1016/j.ijcard.2013.07.243

Hay, S. I., Abajobir, A. A., Abate, K. H., *et al*. (2017). Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2016: A systematic analysis for the Global Burden of Disease Study 2016. The Lancet, 390(10100), 1260–1344.

Horreau, C., Pouplard, C., Brenaut, E., Barnetche, T., Misery, L., Cribier, B., Jullien, D., Aractingi, S., Aubin, F., & Joly, P., *et al*. (2013). Cardiovascular morbidity and mortality in psoriasis and psoriatic arthritis: A systematic literature review. Journal of the European Academy of Dermatology and Venereology, 27(Suppl. 3), 12–29. https://doi.org/10.1111/jdv.12163

Jacobson, C. C., Kumar, S., & Kimball, A. B. (2011). Latitude and psoriasis prevalence. Dermatology, 65, 870-873. [PubMed] [Google Scholar]

Joshi, A. A., Lerman, J. B., Aberra, T. M., Afshar, M., Teague, H. L., Rodante, J. A., Krishnamoorthy, P., Ng, Q., Aridi, T. Z., Salahuddin, T., *et al*. (2016). Glyca is a novel biomarker of inflammation and subclinical cardiovascular disease in psoriasis. Circulation Research, 119, 1242–1253. https://doi.org/10.1161/CIRCRESAHA.116.308555

Kimball, A. B., Guerin, A., Latremouille-Viau, D., Yu, A. P., Gupta, S., Bao, Y., & Mulani, P. (2010). Coronary heart disease and stroke risk in patients with psoriasis: Retrospective analysis. American Journal of Medicine, 123(4), 350–357. https://doi.org/10.1016/j.amjmed.2009.07.029

Ko, H. C., Jwa, S. W., Song, M., Kim, M. B., & Kwon, K. S. (2010). Clinical course of guttate psoriasis: Long-term follow-up study. Journal of Dermatology, 37(10), 894–899. https://doi.org/10.1111/j.1346-8138.2010.00900.x

Koo, J. (1999). Systemic sequential therapy of psoriasis: A new paradigm for improved therapeutic results. Journal of the American Academy of Dermatology, 41(3 Pt 2), S25–S28. [PubMed] [Google Scholar]

Langley, R. G., & Ellis, C. N. (2004). Evaluating psoriasis with psoriasis area and severity index, psoriasis global assessment, and lattice system physician's global assessment. Journal of the American Academy of Dermatology, 51, 563-569. [PubMed] [Google Scholar]

Lebwohl, M., Drake, L., Menter, A., Koo, J., Gottlieb, A. B., & Zanolli, M., *et al*. (2001). Consensus conference: Acitretin in combination with UVB or PUVA in the treatment of psoriasis. Journal of the American Academy of Dermatology, 45(4), 544–553. [PubMed] [Google Scholar]

Ling, T. C., Clayton, T. H., Crawley, J., *et al*. (2016). British Association of Dermatologists and British Photodermatology Group guidelines for the safe and effective use of psoralen-ultraviolet A therapy 2015. British Journal of Dermatology, 174, 24–55.

Mahil, S. K., Ezejimofor, M. C., Exton, L. S., *et al*. (2020). Comparing the efficacy and tolerability of biologic therapies in psoriasis: An updated network meta-analysis. British Journal of Dermatology, 183, 638–649.

Mahil, S. K., Wilson, N., Dand, N., *et al*. (2020). Psoriasis treats to target: Defining outcomes in psoriasis using data from a real-world, population-based cohort study (the British Association of Dermatologists Biologics and Immunomodulators Register, BADBIR). British Journal of Dermatology, 182, 1158–1166.

Martin, B. A., Chalmers, R. J., & Telfer, N. R. (1996). How great is the risk of further psoriasis following a single episode of acute guttate psoriasis? Archives of Dermatology, 132(6), 717–718. https://doi.org/10.1001/archderm.1996.03890300125025

Mehta, N. N., Yu, Y., Saboury, B., Foroughi, N., Krishnamoorthy, P., Raper, A., Baer, A., Antigua, J., Van Voorhees, A. S., Torigian, D. A., *et al*. (2011). Systemic and vascular inflammation in patients with moderate to severe psoriasis as measured by [18f]-fluorodeoxyglucose positron emission tomography-computed tomography (FDG-PET/CT): A pilot study. Archives of Dermatology, 147, 1031–1039. https://doi.org/10.1001/archdermatol.2011.243

Menter, A., Korman, N. J., Elmets, C. A., Feldman, S. R., Gelfand, J. M., & Gordon, K. B., *et al*. (2009). Guidelines of care for the management of psoriasis and psoriatic arthritis: Section 4. Guidelines of care for the management and treatment of psoriasis with traditional systemic agents. Journal of the American Academy of Dermatology, 61(3), 451–485. [PubMed] [Google Scholar]

Miller, I. M., Ellervik, C., Yazdanyar, S., & Jemec, G. B. (2013). Meta-analysis of psoriasis, cardiovascular disease, and associated risk factors. Journal of the American Academy of Dermatology, 69(6), 1014–1024. https://doi.org/10.1016/j.jaad.2013.06.053

Nast, A., Smith, C., Spuls, P. I., *et al*. (2021). EuroGuiDerm Guideline on the systemic treatment of psoriasis vulgaris – Part 2: Specific clinical and comorbid situations. Journal of the European Academy of Dermatology and Venereology, 35, 281–317.

Nestle, F. O., Kaplan, D. H., & Barker, J. (2009). Psoriasis. The New England Journal of Medicine, 361(5), 496–509. https://doi.org/10.1056/NEJMra0804595

Nille, G. C., & Chaudhary, A. K. (2021). Potential implications of Ayurveda in psoriasis: A clinical case study. Journal of Ayurveda and Integrative Medicine, 12(1), 172–177. https://doi.org/10.1016/j.jaim.2020.11.009

Onoufriadis, A., Simpson, M. A., Pink, A. E., *et al*. (2011). Mutations in IL36RN/IL1F5 are associated with the severe episodic inflammatory skin disease known as generalized pustular psoriasis. American Journal of Human Genetics, 89, 432–437.

Ortonne, J., Chimenti, S., Luger, T., Puig, L., Reid, F., & Trueb, R. M. (2009). Scalp psoriasis: European consensus on grading and treatment algorithm. Journal of the European Academy of Dermatology and Venereology, 23(12), 1435–1444. https://doi.org/10.1111/j.1468-3083.2009.03388.x

Parisi, R., Symmons, D. P., Griffiths, C. E., & Ashcroft, D. M. (2013). Global epidemiology of psoriasis: A systematic review of incidence and prevalence. Journal of Investigative Dermatology, 133(2), 377–385. https://doi.org/10.1038/jid.2012.339

Pietrzak, A., Bartosinska, J., Chodorowska, G., Szepietowski, J. C., Paluszkiewicz, P., & Schwartz, R. A. (2013). Cardiovascular aspects of psoriasis: An updated review. International Journal of Dermatology, 52(2), 153–162. https://doi.org/10.1111/j.1365-4632.2011.05388.x

Prodanovich, S., Kirsner, R. S., Kravetz, J. D., Ma, F., Martinez, L., & Federman, D. G. (2009). Association of psoriasis with coronary artery, cerebrovascular, and peripheral vascular diseases and mortality. Archives of Dermatology, 145(6), 700–703. https://doi.org/10.1001/archdermatol.2009.94

Puig, L. (2011). Obesity and psoriasis: Body weight and body mass index influence the response to biological treatment. Journal of the

European Academy of Dermatology and Venereology, 25, 1007–1011.
Rachakonda, T. D., Schupp, C. W., & Armstrong, A. W. (2014). Psoriasis prevalence among adults in the United States. Journal of the American Academy of Dermatology, 70(3), 512–516. https://doi.org/10.1016/j.jaad.2013.11.013
Rajagopalan, M., & Mital, A. (2016). Biologics use in Indian psoriasis patients. Indian Dermatology Online Journal, 7(6), 489–497. https://doi.org/10.4103/2229-5178.193915
Rapp, S. R., Feldman, S. R., Exum, M. L., Fleischer, A. B., Jr., & Reboussin, D. M. (1999). Psoriasis causes as much disability as other major medical diseases. Journal of the American Academy of Dermatology, 41, 401–407. https://doi.org/10.1016/S0190-9622(99)70112-X
Rendon, A., & Schäkel, K. (2019). Psoriasis pathogenesis, and treatment. International Journal of Molecular Sciences, 20(6), 1475. https://doi.org/10.3390/ijms20061475
Samarasekera, E. J., Neilson, J. M., Warren, R. B., Parnham, J., & Smith, C. H. (2013). Incidence of cardiovascular disease in individuals with psoriasis: A systematic review and meta-analysis. Journal of Investigative Dermatology, 133(10), 2340–2346. https://doi.org/10.1038/jid.2013.149
Sampogna, F., Tabolli, S., & Abeni, D. (2012). Living with psoriasis: Prevalence of shame, anger, worry, and problems in daily activities and social life. Acta Dermato-Venereologica, 92, 299–303. https://doi.org/10.2340/00015555-1302
Schmitt, J., & Wozel, G. (2005). The psoriasis area and severity index is the adequate criterion to define new severity in chronic plaque-type psoriasis. Dermatology, 210, 194-199. [PubMed] [Google Scholar]
Schön, M. P., & Erpenbeck, L. (2018). The interleukin-23/interleukin-17 axis links adaptive and innate immunity in psoriasis. Frontiers in Immunology, 9, 1323.
Smith, A. E., Kassab, J. Y., Rowland Payne, C. M., & Beer, W. E. (1993). Bimodality in age of onset of psoriasis, in both patients and their relatives. Dermatology, 186(3), 181–186.
Smith, C. H., Yiu, Z. Z., Bale, T., *et al.* (2020). British Association of Dermatologists guidelines for biologic therapy for psoriasis 2020: A rapid update. British Journal of Dermatology, 183, 628–637.
Stern, R. S. (2010). Psoriasis is not a useful independent risk factor for cardiovascular disease. Journal of Investigative Dermatology, 130(4), 917–919. https://doi.org/10.1038/jid.2009.417
Stern, R. S., & Huibregtse, A. (2011). Very severe psoriasis is associated with increased noncardiovascular mortality but not with increased cardiovascular risk. Journal of Investigative Dermatology, 131(5), 1159–1166. https://doi.org/10.1038/jid.2010.411
Stoll, M.L.; Zurakowski, D.; Nigrovic, L.E.; Nichols, D.P.; Sundel, R.P.; Nigrovic, P.A. Patients with juvenile psoriatic arthritis comprise two distinct populations. Arthritis Rheum. 2006, 54, 3564–3572. [CrossRef]
Szepietowski, J. C., & Reich, A. (2016). Pruritus in psoriasis: An update. European Journal of Pain, 20, 41–46. https://doi.org/10.1002/ejp.742
Torsekar, R., & Gautam, M. M. (2017). Topical therapies in psoriasis. Indian Dermatology Online Journal, 8(4), 235–245. https://doi.org/10.4103/2229-5178.209622
Villani, A. P., Rouzaud, M., Sevrain, M., Barnetche, T., Paul, C., Richard, M. A., Beylot-Barry, M., Misery, L., Joly, P., Le Maitre, M., *et al.* (2015). Prevalence of undiagnosed psoriatic arthritis among psoriasis patients: Systematic review and meta-analysis. Journal of the American Academy of Dermatology, 73, 242–248. https://doi.org/10.1016/j.jaad.2015.05.001
Wan, J., Wang, S., Haynes, K., Denburg, M. R., Shin, D. B., & Gelfand, J. M. (2013). Risk of moderate to advanced kidney disease in patients with psoriasis: Population-based cohort study. BMJ, 347, f5961. https://doi.org/10.1136/bmj.f5961
Warren, R. B., Weatherhead, S. C., Smith, C. H., *et al.* (2016). British Association of Dermatologists guidelines for the safe and effective prescribing of methotrexate for skin disease 2016. British Journal of Dermatology, 175, 23–44.
Weischer, M., Blum, A., Eberhard, F., Röcken, M., & Berneburg, M. (2004). No evidence for increased skin cancer risk in psoriasis patients treated with broadband or narrowband UVB phototherapy: A first retrospective study. Acta Dermato-Venereologica, 84(5), 370–374. [PubMed] [Google Scholar]
Wellcome Trust Case Control Consortium. (2007). Genome-wide association study of 14,000 cases of seven common diseases and 3000 shared controls. Nature, 447, 661–678. https://doi.org/10.1038/nature05911
Wong, T., Hsu, L., & Liao, W. (2013). Phototherapy in psoriasis: A review of mechanisms of action. Journal of Cutaneous Medicine and Surgery, 17(1), 6–12. https://doi.org/10.2310/7750.2012.11124
World Health Organization. (2016). Global report on psoriasis. World Health Organization.
Xu, T., & Zhang, Y. H. (2012). Association of psoriasis with stroke and myocardial infarction: Meta-analysis of cohort studies. British Journal of Dermatology, 167, 1345–1350. https://doi.org/10.1111/j.1365-2133.2012.11000.x
Yeung, H., Takeshita, J., Mehta, N. N., Kimmel, S. E., Ogdie, A., Margolis, D. J., Shin, D. B., Attor, R., Troxel, A. B., & Gelfand, J. M. (2013). Psoriasis severity and the prevalence of major medical comorbidity: A population-based study. JAMA Dermatology, 149, 1173–1179. https://doi.org/10.1001/jamadermatol.2013.5015

HOW TO CITE THIS ARTICLE: Srivastava, S., Maurya, R., Das, S., Shukla, A., Pathak, M. K. An Overview on Recent Advancements in the Treatment of Psoriasis and Its Challenges. J. of Drug Disc. and Health Sci. 2024;1(1):1-10. **DOI:** 10.21590/ijddhs.01.01.01