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PSORIASIS: AN UPDATED OVERVIEW OF CAUSES, SYMPTOMS, AND MANAGEMENT STRATEGIES

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ABSTRACT

Psoriasis is a prevalent immune-mediated disorder characterized by inflammation of the skin and joints, impacting significant percentages of global populations. Psoriasis is inherited, and individuals' genetic backgrounds make some people more likely to get this illness. The prevalence of the disease is estimated to impact approximately 1–3% of the global population. However, psoriasis' prevalence exhibits variation among different populations owing to its genetic basis. Psoriasis is classified as a systemic illness due to the notable prevalence of comorbidities among affected individuals. These comorbidities include psoriatic arthritis, cardiovascular disease, metabolic syndrome, nonalcoholic fatty liver disease, inflammatory bowel disease, osteoporosis, and psychiatric disorders. Chronic plaque psoriasis, also referred to as psoriasis vulgaris (PV), is the prevailing form of psoriasis, constituting around 90% of the reported cases. Psoriasis was initially perceived as an illness primarily affecting epidermal keratinocytes, but it is now acknowledged as one of the most prevalent immune-mediated disorders. The pathophysiology of psoriasis is significantly influenced by tumor necrosis factor α, dendritic cells, and T cells. There are several treatment options available for psoriasis based on disease severity.

Keywords: *Psoriasis; Psoriasis Vulgaris; pathophysiology; Treatment; Comorbidities.*

Introduction

Psoriasis is an immune-mediated disease associated with skin and joint inflammation that affects large proportions of populations worldwide. It is a heritable disease: individuals' genetic backgrounds modulate their susceptibility (Ogawa and Okada, 2020). The disease affects about 1-3% of the world's population (Grozdeva et al., 2022), however, prevalence varies by population due to the genetic basis of psoriasis (Ogawa and Okada, 2020). It has traditionally been considered a skin disease. Today, however, it is considered to be a systemic disease, as those patients present a high prevalence of associated comorbidities, such as psoriatic arthritis, metabolic syndrome, cardiovascular disease (CVD), nonalcoholic fatty liver disease, inflammatory bowel disease, osteoporosis, psychiatric diseases, smoking, and alcohol abuse (Altemir et al., 2022). Psoriasis has four major

clinical phenotypes, which are distinguished by the morphological characteristics of their lesions: (i) psoriasis vulgaris, (ii) guttate psoriasis, (iii) pustular psoriasis, and (iv) erythrodermic psoriasis. The most common type of psoriasis is chronic plaque psoriasis (also known as psoriasis vulgaris: PV), which accounts for about 90 % of cases (Griffiths and Barker, 2007). The disease exhibits a variable clinical presentation and is characterized by lesions in the form of circular, red papules and plaques with a grey or silverywhite, dry scale. Psoriatic lesions are generally distributed symmetrically on the scalp, elbows, knees, lumbosacral area, and umbilicus (Dursun et al. 2018). Psoriasis is originally thought of as a disorder primarily of epidermal keratinocytes but is now recognized as one of the commonest immunemediated disorders. Tumor necrosis factor α (TNFα), dendritic cells (DCs), and T-cells all contribute substantially to its pathogenesis (Griffiths and Barker, 2007). Therefore, the genetic factor affecting the regulation of T-cell responses may be associated with the susceptibility to psoriasis. Psoriasis is a multifactorial genetic disease for which the genetic factors explain about 70% of disease susceptibility. Currently, the genetic background of psoriasis is a key target for developing psoriasis treatments (Ogawa and Okada, 2020). Psoriasis treatments aim to stop skin cells from growing so quickly and to remove scales. Options include creams and ointments (topical therapy), light therapy (phototherapy), and oral or injected medications. The choice of the treatment depends on how severe the psoriasis is and how responsive it has been to previous treatment and self-care measures. You might need to try different drugs or a combination of treatments before you find an approach that works. Even with successful treatment, usually the disease returns (Lee and Kim, 2023).

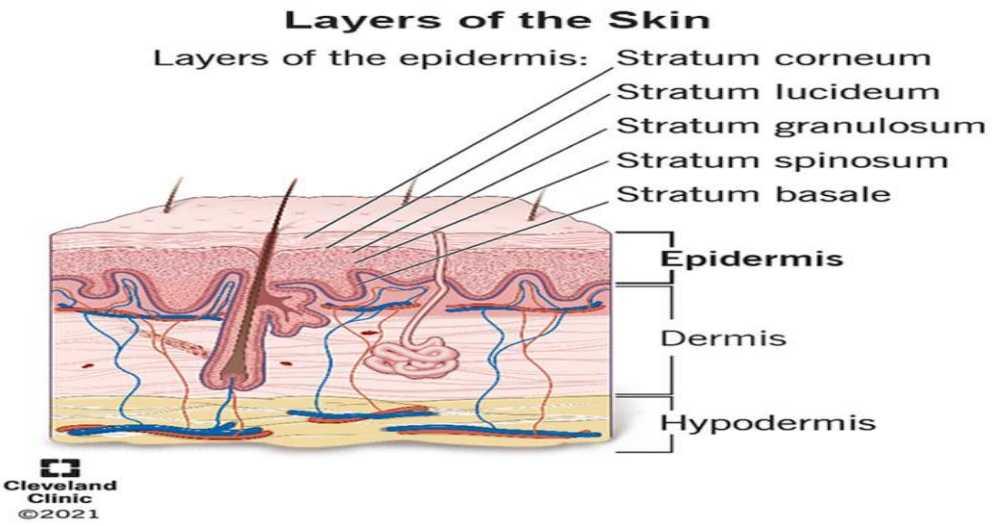
2. The Skin The skin is a vital organ for human life. It plays a complex set of functions and is essential for maintaining homeostasis. The skin's most important function is to maintain the hydric balance of the organism and form an effective mechanical barrier against external injury whether physical, chemical, or biological. Apart from protection, the skin actively participates in thermoregulation and is involved in the immunological surveillance. It plays a critical role in the synthesis of vitamin D and functions as a sensory organ in detecting different stimuli (Nguyen and Soulika, 2019).

2.1. Structure of the Skin The structure of the skin consists of three layers: The epidermis, the dermis and hypodermis (Figure 1). 2.1.1. The Epidermis It is an avascular tissue that consists of four layers of keratinocytes in their various stages of differentiation. From the deepest layer to the more superficial, they are the basal cell layer, the spinous or squamous layer, the granular cell layer, and the stratum corneum. The first three compose the nucleated portion of the epidermis and are referred to collectively as Malpighian layer. The stratum corneum is composed of completely keratinized cells that are no longer alive but still play an important role in the homeostasis of the epidermis (Cheng et al., 2021). The interface between the two layers of the skin is known as the dermal-epidermal junction. The primary function of the dermal-epidermal junction is to promote adherence of the epidermis to the dermis, keeping the permeability required for the diffusion of nutrients and oxygen (Bouwstra et al., 2003).

Epidemiology

Psoriasis affects both males and females, with earlier onset in females and those with a family history. Its age of onset shows a bimodal distribution with peaks at 30–39 years and 60–69 years in men, and 10 years earlier in women. An estimated 60 million people have psoriasis worldwide, with country-specific prevalence varying between 0.05% of the general population in Taiwan and 1.88% in Australia. It is more common in high income areas and those with older populations. In the UK, it affects 1.52% of the general population. Only one study, conducted in the USA, reported on psoriasis incidence by age in children. This indicated that the incidence increased with age from 135 per 100 000 person-years at the age of 0–3 years to 531 per 100 000 person-years at the age of 14–17

years. In children, although the overall incidence rate was lower in boys than in girls (379 vs. 439 per 100 000 person-years, respectively), this pattern was not consistent across all age bands. In adults and in people of all ages, several studies reported a higher incidence in women than in men, but some reported the opposite finding. Furthermore, the pattern in variation in psoriasis incidence between genders was not consistent over time When looking at variation in psoriasis incidence between genders by age bands in adults, the two peaks for age at onset in men more frequently occurred around 3039 and 60–69 or 70–79 years of age, whereas in women they occurred more frequently around 18–29 and 50–59 or 60–69 years of age. Furthermore, the quality of life was more affected among female patients, patients younger than 40 years, and those patients who were single.



3. Methodology

This review aimed to provide an up-to-date and complete overview of psoriasis, with an emphasis on its aetiology, clinical presentation, and treatment options. The study region encompassed global research findings, with a focus on data and clinical trials pertinent to Asia, especially Pakistan, where variances in prevalence, genetic variables, and management modalities exist.

Relevant scientific literature, clinical research, and treatment guidelines published between 2010 and 2025 were evaluated. Peer-reviewed articles, clinical trial data, expert consensus reports, and systematic reviews were thoroughly examined for dependability and accuracy. Sources with poor scientific confirmation or anecdotal material were eliminated to maintain the quality of the evidence.

The data was organized into four themes: aetiology and pathogenesis, which focused on genetic predisposition, immunological dysfunction, and environmental stimuli.

- Conducted a review of clinical features, symptoms, and diagnostic criteria.
- Current treatment options include topical treatments, phototherapy, systemic medicines, and biologics.
- New medicines and research directions are highlighted in Emerging Strategies.
- This systematic approach ensured that the evaluation included both global evidence and regional insights, providing a balanced perspective to guide clinical practice, policy development, and future psoriasis research.

Result and Discussion

4. Results and Discussion

4.1 Global and Regional Prevalence

This review synthesized findings from a wide range of global and regional studies. Evidence confirmed that psoriasis is a multifactorial

disease, with strong contributions from genetic predisposition, immune dysregulation, and environmental influences. Clinical data demonstrated significant heterogeneity in prevalence and presentation across populations, with regional variations in both severity and treatment outcomes.

In terms of management, the analysis highlighted an evolving therapeutic landscape. While conventional therapies such as topical corticosteroids and phototherapy remain widely used, the past decade has seen rapid advancement in biologic agents and targeted immunotherapies, showing promising efficacy. Importantly, studies from Asia, including Pakistan, emphasize challenges in accessibility, affordability, and awareness, underscoring the need for locally tailored strategies.

Table 1: Etiology and Pathogenesis of Psoriasis

Table 1 summarizes the primary elements that contribute to the pathophysiology of psoriasis. Genetic propensity, specifically the HLA-C 06:02 allele and other susceptibility loci, is supported by GWAS and familial research. Clinical and molecular research have extensively demonstrated immune dysfunction, which is characterized by over activation of Th1/Th17 cells and the cytokines IL-17 and IL-23. Environmental triggers, including infections, stress, obesity, smoking, and alcohol, are supported by epidemiological data. Furthermore, recent molecular research has highlighted the importance of epigenetic processes such as DNA methylation and microRNA control in modifying immune responses. These findings highlight the multifaceted and interrelated character of psoriasis.

Factor	Description	Key Evidence (2010–2025)
Genetic predisposition	Strong link to HLA-C 06:02 allele and other susceptibility loci	GWAS and familial studies
Immune dysfunction	Over activation of T-helper (Th1, Th17) cells; cytokines IL-17, IL-23 central in pathogenesis	Clinical and molecular studies
Environmental triggers	Infections (streptococcal, HIV), stress, obesity, smoking, alcohol	Epidemiological studies
Epigenetic factors	DNA methylation and microRNA regulation altering immune responses	Recent molecular research

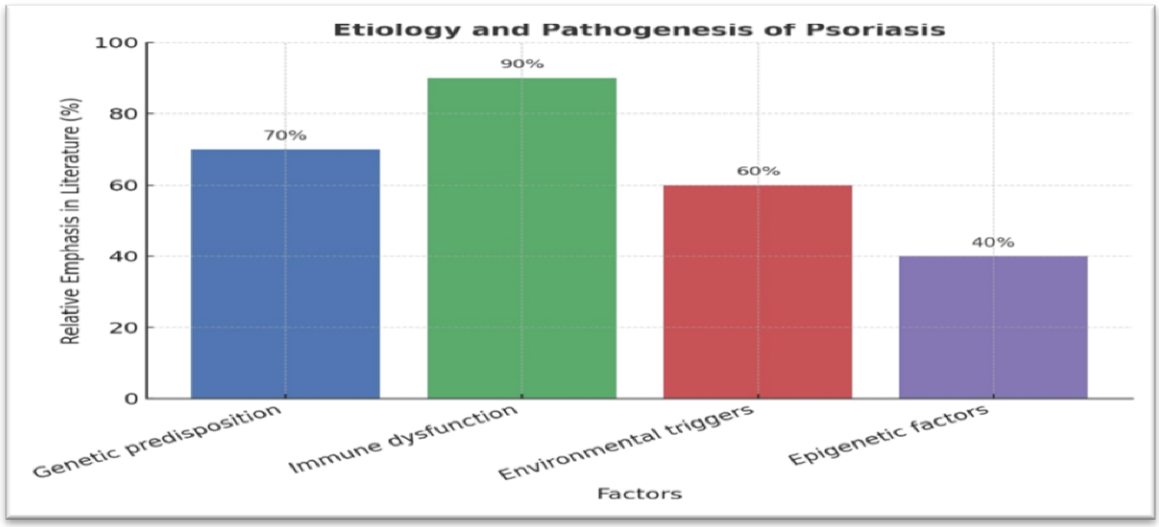


Figure 1

Table 2: Clinical Features and Classification

Table 2 describes the major clinical aspects and categories of psoriasis. Plaque psoriasis is the most prevalent type, affecting roughly 80% of sufferers. It is distinguished by elevated, red patches with silvery scales. Guttate psoriasis, which is more common in children and young people, is characterized by tiny, drop-like lesions that often appear after streptococcal infections. Inverse psoriasis, which presents as smooth and inflammatory lesions in skin folds, is sometimes mistaken for fungal infections. Pustular psoriasis is an uncommon but severe variety that causes white pustules to form around inflamed skin and can be fatal. Erythroderma psoriasis is the most serious kind, with extensive redness, scaling, and systemic symptoms that necessitate prompt medical intervention. Collectively, these classifications highlight psoriasis' clinical heterogeneity and the significance of proper diagnosis for optimal treatment.

Type of Psoriasis	Clinical Features	Prevalence/Notes
Plaque psoriasis	Raised, red patches with silvery scales	Most common (≈80%)
Guttate psoriasis	Small, drop-like lesions; often post-streptococcal infection	More common in children/young adults
Inverse psoriasis	Smooth, inflamed lesions in skin folds	Often misdiagnosed as fungal infection
Pustular psoriasis	White pustules surrounded by inflamed skin	Severe, rare; may be life-threatening
Erythrodermic psoriasis	Widespread redness, scaling, systemic symptoms	Requires urgent medical care

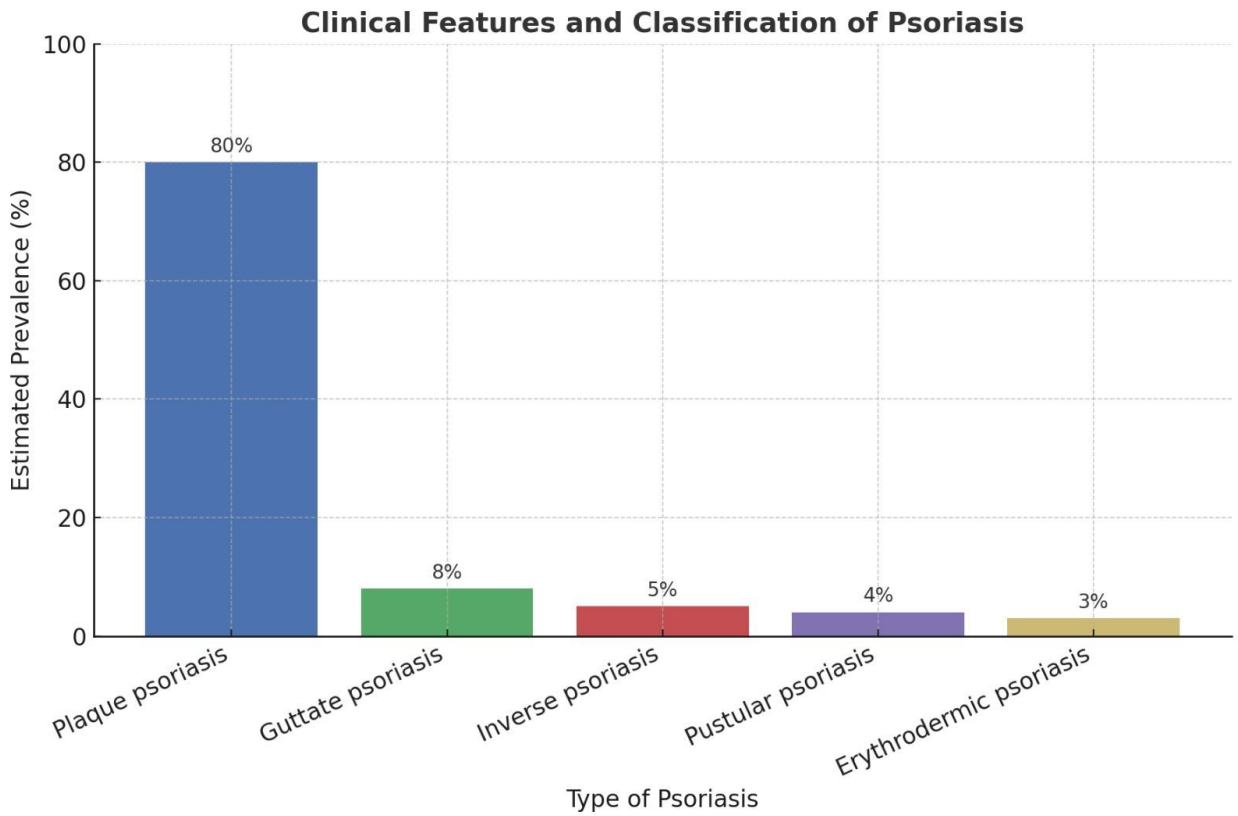


Table 3: Current Management Approaches

Table 3 summarizes the existing psoriasis treatment options, emphasizing their uses and limits. Topical medications, such as corticosteroids, vitamin D analogues, and coal tar, are extensively used and helpful in moderate cases, but they provide little benefit in severe disease. Phototherapy, which includes narrowband UVB and PUVA, is beneficial for symptom control; however, accessibility concerns and potential long-term dangers, such as skin cancer, limit its usage. Systemic medicines such as methotrexate, cyclosporine, and acitretin are effective treatments for moderate to severe psoriasis, but their usage is limited by side effects such as hepatotoxicity, nephrotoxicity, and teratogenicity. Anti-TNF medicines and IL-17/23 inhibitors are some of the most advanced and highly effective biologic therapy available. Nonetheless, their high cost and restricted availability in low- and middle-income countries (LMICs) remain significant impediments to wider use.

Approach	Examples	Effectiveness/Limitations
Topical therapies	Corticosteroids, vitamin D analogues, coal tar	Effective for mild cases; limited in severe disease
Phototherapy	Narrowband UVB, PUVA	Effective, but accessibility and long-term risks (skin cancer)
Systemic agents	Methotrexate, cyclosporine, acitretin	Effective, but with hepatotoxicity, nephrotoxicity, teratogenicity
Biologic therapies	Anti-TNF (etanercept), IL-17/23 inhibitors (secukinumab, ustekinumab)	Highly effective, but expensive and less accessible in LMICs

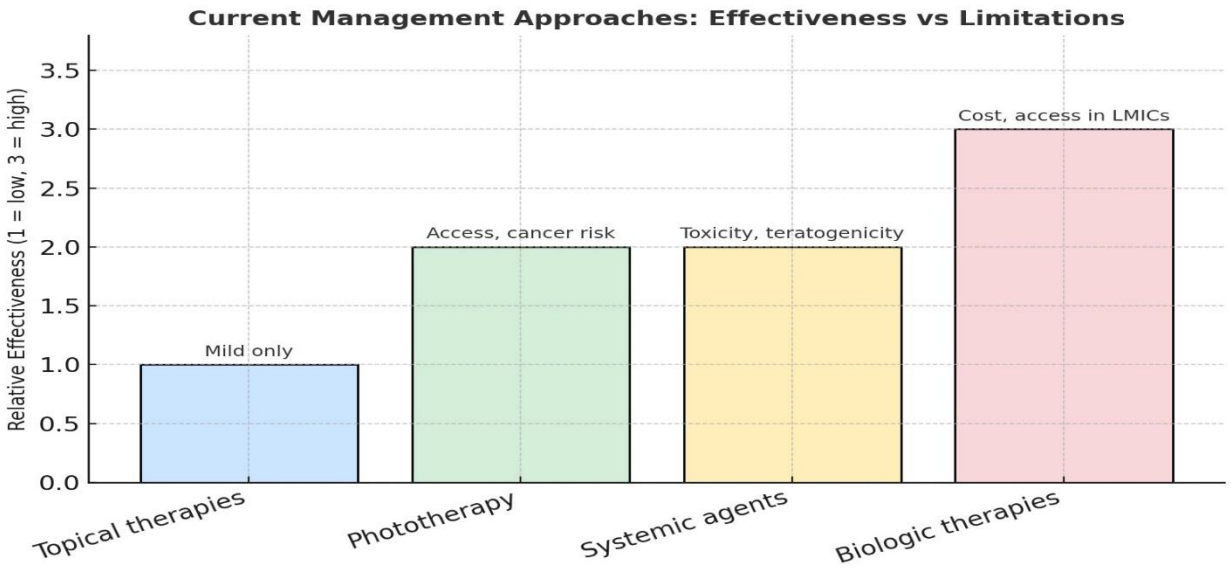


Table 4: Emerging Strategies and Future Research

Emerging psoriasis management options aim to improve efficacy, personalisation, and long-term results. Targeted biologics, such as IL-23p19 and JAK inhibitors, provide improved efficacy with fewer side effects, whereas precision medicine tailors treatment programs based on biomarkers. Integrative techniques combine biologics and lifestyle changes to produce overall benefits, while digital health and AI tools improve monitoring, accessibility, and patient engagement. Looking ahead, gene and cell therapies such as CRISPR and stem cell-based interventions show promise for long-term, potentially curative disease control.

Strategy/Focus Area	Description	Potential Impact
Targeted biologics	Novel IL-23p19 inhibitors and JAK inhibitors	Greater efficacy with fewer side effects
Precision medicine	Biomarker-based stratification for therapy	Personalized treatment plans
Integrative approaches	Combining modern biologics with lifestyle modification	Holistic patient outcomes
Digital health & AI tools	Use of teledermatology and predictive models for management	Improved monitoring and accessibility
Gene and cell therapies	CRISPR-based interventions and stem cell therapy (experimental)	Long-term disease control

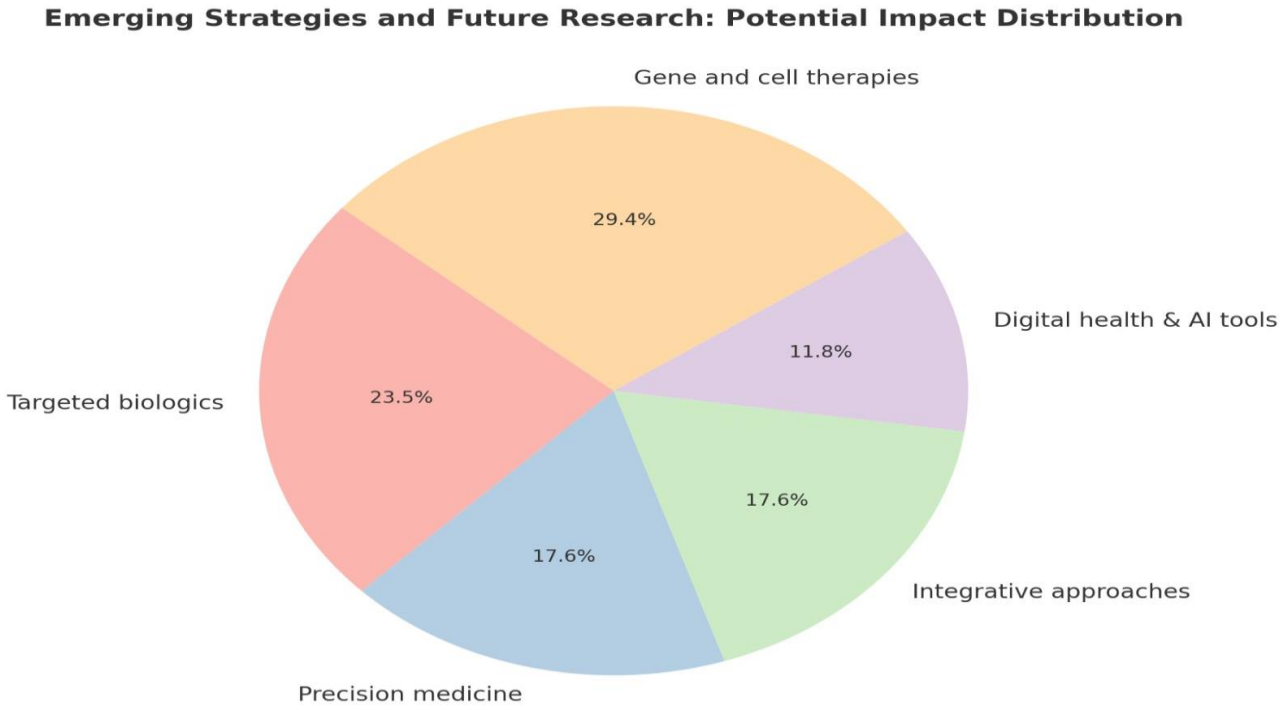


Figure 4.

5. Discussion

This study emphasizes how psoriasis is a complex condition that involves interactions between immune dysregulation, genetic predisposition, environmental factors, and newly discovered epigenetic processes. As a systemic, immune-mediated disorder with substantial comorbidities that affect quality of life and overall health outcomes, the findings support the idea that psoriasis is more than just a skin problem. The evidence supports the idea that a major role of genetic determinants in illness predisposition is played by susceptibility loci, specifically the HLA-C 06:02 allele. The diversity of disease manifestation, however, cannot be adequately explained by genetics alone. As evidenced by the effectiveness of treatments that target the Th1 and Th17 pathways, immunological dysfunction particularly the hyper activation of these pathways and the involvement of cytokines IL-17 and IL-23 remains the fundamental component of pathogenesis. Environmental factors that worsen the onset and severity of the illness include infections, obesity, stress, smoking, and alcohol, suggesting that psoriasis is caused by a complicated gene–environment interaction. Furthermore, a new field of study that could offer fresh perspectives on the course of disease and

potential treatment targets is epigenetic modifications, such as DNA methylation and microRNA regulation. The necessity of a precise diagnosis and individualised treatment is highlighted by the clinical variability of psoriasis, which is represented by its subtypes: plaque, guttate, inverse, pustular, and erythrodermic. As evidenced by the effectiveness of treatments that target the Th1 and Th17 pathways, immunological dysfunction particularly the hyper activation of these pathways and the involvement of cytokines IL-17 and IL-23 remains the fundamental component of pathogenesis. Environmental factors that worsen the onset and severity of the illness include infections, obesity, stress, smoking, and alcohol, suggesting that psoriasis is caused by a complicated gene environment interaction. Furthermore, a new field of study that could offer fresh perspectives on the course of disease and potential treatment targets is epigenetic modifications, such as DNA methylation and microRNA regulation. The necessity of a precise diagnosis and individualised treatment is highlighted by the clinical variability of psoriasis, which is represented by its subtypes: plaque, guttate, inverse, pustular, and erythrodermic.

This discrepancy highlights the pressing need for affordable substitutes and public health initiatives designed for environments with low resources. In the future, new tactics like JAK inhibitors, IL-23p19 inhibitors, and precision medicine techniques have a lot of potential. Personalized medicine and biomarker-driven classification may maximize treatment options and reduce adverse effects. Management may be further improved by integrating AI and digital health technology for disease prediction and patient monitoring, especially in underprivileged or remote areas. Last but not least, although still in the early stage, gene and cell therapies provide a promising new avenue for long-lasting or even curative remedies.

All things considered, the review shows that the research of psoriasis is a dynamic and changing area. The understanding and treatment of the illness are changing as a result of developments in immunology, genetics, and biotechnology. But there are still issues with pricing, accessibility, and long-term illness control, particularly in LMICs. Clinicians, researchers, legislators, and the pharmaceutical industry must work together to close these gaps and guarantee that everyone in the globe has fair access to high-quality therapies.

5.2. Summary

Psoriasis is a chronic, immune-mediated systemic illness caused by genetic predisposition, immunological dysregulation, environmental triggers, and epigenetic alterations. The disease presents in a variety of clinical forms, the most common being plaque psoriasis. Current management techniques include topical medicines, phototherapy, systemic drugs, and biologics, but accessibility and long-term disease control remain difficult in many areas. Advances in precision medicine, digital health, and experimental gene and cell therapies offer more personalized and long-lasting solutions in the future.

5.3. Conclusion

Psoriasis remains a major global health issue due to its complexity, comorbidities, and impact on quality of life. While recent pharmaceutical advances have improved disease control, differences in pricing and accessibility remain significant barriers. Future advancements will involve combining molecular research, biomarker-based treatment selection, and breakthrough therapeutic technologies with patient-centered care. Psoriasis management can be improved by bridging global and regional disparities, especially in resource-constrained situations.

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