

Chapter

Psoriasis: Clinical Features and Its Impact on Quality of Life

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Abstract

Psoriasis is a chronic, papulo-squamous, non-infectious, immune-mediated, and inflammatory skin disorder clinically characterized by erythematous sharply demarcated papules and rounded plaques covered by silvery micaceous scales. It is associated with comorbidities such as psoriatic arthritis, depression, obesity, and cardiovascular disease. Psoriasis can also be a source of self and social rejection, thus contributing to stigmatization, alienation, and a decrease in the quality of life (QoL). Due to its complex pathogenesis, a holistic approach is necessary when treating psoriasis. In addition to treating physical symptoms, the patient's psychological and emotional health should be highly considered to help individuals cope with stigma. Likewise, an increased social awareness of psoriasis may contribute to a better understanding of the disease. Alternative stress management therapies such as spa therapies using dead sea mud and or balneotherapy, yoga, and aromatherapy may be effective in stress management to improve overall well-being and QoL.

Keywords: psoriasis, quality of life, stigmatization, therapy, treatment

1. Introduction

Psoriasis is a chronic, recurrent, autoimmune-mediated, and inflammatory skin disease characterized by distinct demarcated erythematous plaques with whitish scales [1–4]. It affects about 3% of the world's population which varies according to regions [5]. It predominantly involves the skin and joints, and it affects all genders equally [6]. Beyond the physical appearance of psoriasis, the skin disease can evoke an extensive emotional and psychological effect on patients which can result in poor self-esteem and increased stress affecting interpersonal relationships and social functioning [6].

The most prevalent form is vulgar psoriasis, which accounts for more than 80% of all psoriasis cases [7, 8]. In addition to plaque psoriasis, there are other clinical forms, such as flexural or inverse psoriasis, and these are characterized by red scales with a shiny appearance and can occasionally be mistaken for seborrheic dermatitis due to specific localization and often greasy scales [8, 9]. General psoriasis, pustular, inverse, and guttate psoriasis are less common forms of psoriasis with erythroderma, a severe condition that can develop from any type of psoriasis [9].

The pathologic process of psoriasis is multifactorial and involves dysregulated inflammation and strong genetic associations [6]. Approximately a third of patients with psoriasis have a first-degree relative with the skin condition [10]. External factors such as environmental factors, changes in season, a dry environment, sun exposure, humidity, cold, and heat can aggravate skin disease [1, 2].

When comparing psoriatic with uninvolved skin, the histological examination of chronic psoriasis plaques is distinguished by typical changes in both the dermis and epidermis [11, 12]. In the epidermis, there is hyperproliferation of keratinocytes, which leads to epidermal thickening, the elongated rete ridges that form fingerlike protrusions into the dermis. The granular layer of the epidermis becomes either reduced or missing. The epidermis becomes infiltrated by neutrophils and activated CD8⁺ T lymphocytes.

The epidermal hyperplastic changes are associated with low expression of keratins K1 and K10, which are keratinocyte differentiation markers. There is also loss of the granular cell layer, hyperkeratosis with para-keratosis (retention of nuclei in stratum corneum cells), elongated rete ridges, the presence of micro-pustules of Kogoj and micro-abscesses of Munro as well as dilated vessels in the dermal papillae; however, the keratinocytes in the hair follicle are unaffected [2, 8, 10–12]. In the dermis, an inflammatory infiltrate composed of lymphocytes, macrophages, mast cells, and neutrophils is observed. Elongated and dilated blood vessels in the dermal papillae are caused by the increase of vascular endothelial growth factor (VEGF), as it has been shown that VEGF serum levels correlate with the clinical severity of psoriasis [8]. The presence of cytokines, dendritic cells, and T lymphocytes in psoriasis prompted the development of biological therapies [10]. Recent studies which were conducted both in mice and humans identified the IL-23/Th17 axis as a major factor in the pathogenesis of psoriasis [13, 14].

Treatment can range from topical to systemic, and the treatment choice depends on the form and severity of the disease, with biological therapies being the last resort but also the most effective [4, 8, 15–17]. Biological therapies work by suppressing the immune-mediated process that causes inflammation in most autoimmune disorders. There is a wide range of biological therapies available for treating moderate to severe psoriasis, depending on the pathway targeted by each agent [18].

2. Prevalence in population

Psoriasis is a common disease as such it has a global prevalence ranging between 0.91% and 8.5% [19, 20]. Some studies have shown that it affects around 1–3% of the population [21, 22]. Population-based studies indicate that psoriasis affects 2–3% of the UK population [23] approximately 1.7% of the Canadian population [6], 0.2–0.3% of Chinese/Taiwanese populations [24], and ≤1% of the population is affected in South Africa [25]. Age of onset is between the ages of 16–22 (early) and 57–60 (late) years [11, 25] and affects both genders equally [26, 27]. Significant differences in prevalence rates depended on whether the study population included children only or adults only, also whether individuals of all ages, as well as on the underlying age and sex structure of the whole population [20].

In a recent review commissioned as part of the World Health Organization (WHO) Global report on psoriasis, it was estimated that the prevalence of psoriasis ranged from 0.51% to 11.43% in adults and from 0% to 1.37% in children [28]. Although the prevalence was significant in this study, results could be debatable as reviewed data was provided from only 20 countries out of 194 WHO member states.

In the United Kingdom (UK), a cohort study indicated a prevalence of psoriasis from 2.3% (2297 cases per 100,000) in 1999 to 2.8% (2815 per 100,000) in 2013 while adult psoriasis ranged from 1.3% in the UK (95% CI:1.21–1.39) 5 to 8.5% in Norway (95% CI: 8.03–8.97) 6 depending on gender and geographic region [20, 23]. Other studies conducted in the United States of America (USA) among adults reported age- and sex-adjusted annual incidence of psoriasis as 62.3/100,000 if the diagnosis was restricted to dermatologist-confirmed subjects [28]. In Italy, a 5-year observational study reported a higher incidence among the adult population of – 321 and 230 per 100,000, in the year 2001 and 2005, respectively [29].

Psoriasis is common in women and certain ethnic groups; however, it was practically absent in Africa until the HIV pandemic [30, 31]. Prevalence studies reported the psoriasis incidence as 10.26 in Algeria, 15.04 in Morocco, and 13.26 in Tunisia per 1000 adults, and the study results were calculated based on a 2-week screening study via medical consultation [32]. Estimates in the Republic of Tanzania were the lowest at 0.96% [28]. In a survey of dermatology out-patients, involving five academic hospitals in South Africa (SA), Johannesburg, it was observed that there has been an increase in dermatological conditions, with psoriasis being the most common (9.6%) among Indian patients. The increase in dermatological conditions was associated with the HIV pandemic as it was first diagnosed in 1982 in SA [31]. Another study, which included mainly indigent [33] non-Caucasian South Africans in Johannesburg, showed that cardiometabolic disease is highly associated with severe psoriasis, and also, an association existed between increasing obesity and psoriasis. However, the findings of this study were limited as they may not be generalizable to all South African patients as data was collected from public hospitals [19].

3. Clinical types of psoriasis

The diagnosis of psoriasis is primarily clinical, based on the presence of erythematous scaly patches, pustules, and plaques (**Figure 1**) [10], and differs depending on the psoriasis variant [2, 10]. These variants include plaque psoriasis,



Figure 1.
Clinical features of psoriasis. Source: Image courtesy of Prof Dlova, Nelson Mandela Medical School, University of KwaZulu-Natal.

flexural, guttate psoriasis, erythrodermic psoriasis, and pustular psoriasis [6, 15]. Due to psoriasis being a disease of systemic inflammation, it is associated with multiple comorbidities such as psoriatic arthritis, cardiovascular disease, metabolic syndrome, obesity, hypertension, diabetes dyslipidemia, and depression [2, 3].

3.1 Plaque psoriasis

Plaque psoriasis also known as psoriasis vulgaris [5] is the most common variant presenting 80–90% of all manifestations of psoriasis. It occurs anywhere on the body (**Figure 2a and b**), commonly on extensor surfaces of the arms, legs, scalp, buttocks, and trunk [10], but may also affect skin folding areas, palms, soles, and nails [2]. It is usually characterized by well-defined oval or round plaques which differ in size and often join together [10]. The pathogenesis of plaque psoriasis involves a feed-forward mechanism of inflammation predominantly including the T-helper cell type 17 ($T_{H}17$) pathway [2]. The affected areas are typically well-demarcated and systemic [2]. According to the Koebner phenomenon, stressful physiological, and psychological events and external factors are associated with the development of new lesions on sites of trauma, such as cuts, scratching, or pressure [2, 10]. Bleeding can occur when the dry scales are picked and lifted from the plaque. This is due to the skin under the scales being thin, making it more prone to damage [2].

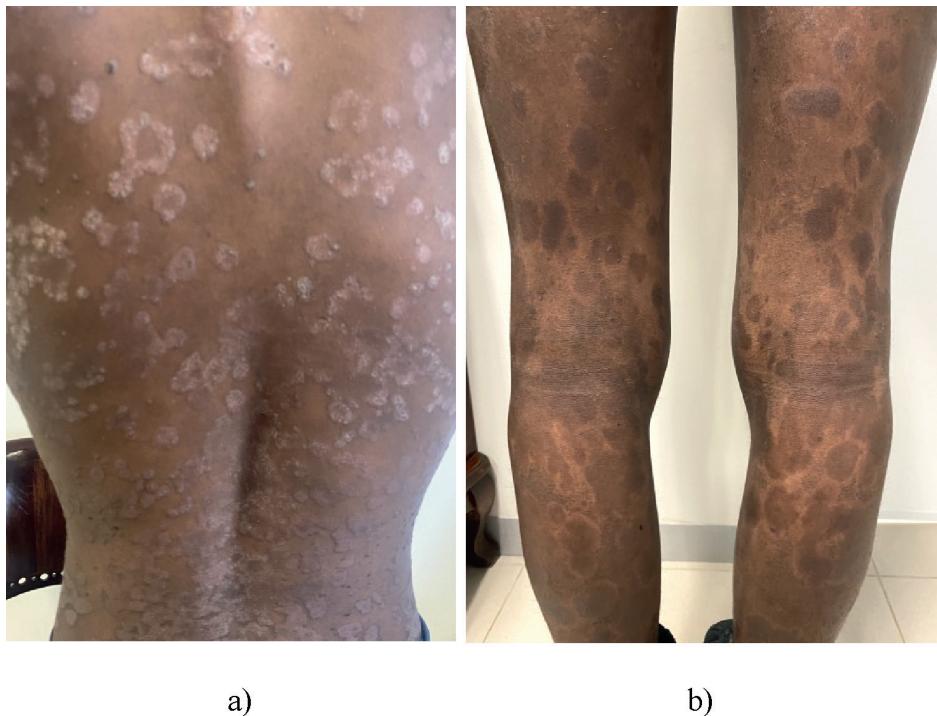


Figure 2.
Chronic plaque-type psoriasis with erythematous well-demarcated plaques covered with silvery scales. (a) Full back involvement. (b) Legs involvement. Source: Image courtesy of Prof Dlova, Nelson Mandela Medical School, University of KwaZulu-Natal.

3.2 Flexural psoriasis

Inverse psoriasis, also called flexural psoriasis [5], is less scaly than plaque psoriasis. It is characterized by slightly erosive erythematous patches occurring in the intertriginous locations of the flexor surfaces and perineal area, such as the axillary, inguinal, and intergluteal folds (**Figure 3**) [5].

3.3 Guttate psoriasis

Guttate psoriasis (**Figure 4**) is characterized by multiple 3–5 mm confetti-like scaly pink patches [2] and causes an acute systemic eruption of papules or plaques mainly on the trunk and limbs [15]. Guttate psoriasis usually affects children and adolescents [5]. It makes up 2% of psoriasis cases, and approximately 66% of new-onset guttate psoriasis are led by an upper respiratory tract infection such as streptococcal infection [2]. In some cases, these resolve naturally within weeks to months, however, can also become chronic [2], and may later develop into plaque psoriasis [15].

3.4 Erythrodermic psoriasis

Erythrodermic psoriasis (**Figure 5**) is characterized by widespread generalized erythema and inflammation covering 90% of the total body surface [5]. Although it only occurs in 2–3% of psoriasis cases, it requires emergency treatment due to it being associated with systemic symptoms [10] and can be life-threatening due to complications such as hypothermia, risk of infection, acute kidney injury, and cardiac failure [15]. Development may be slow from long-standing psoriasis or may appear abruptly in patients who present with mild psoriasis [10].

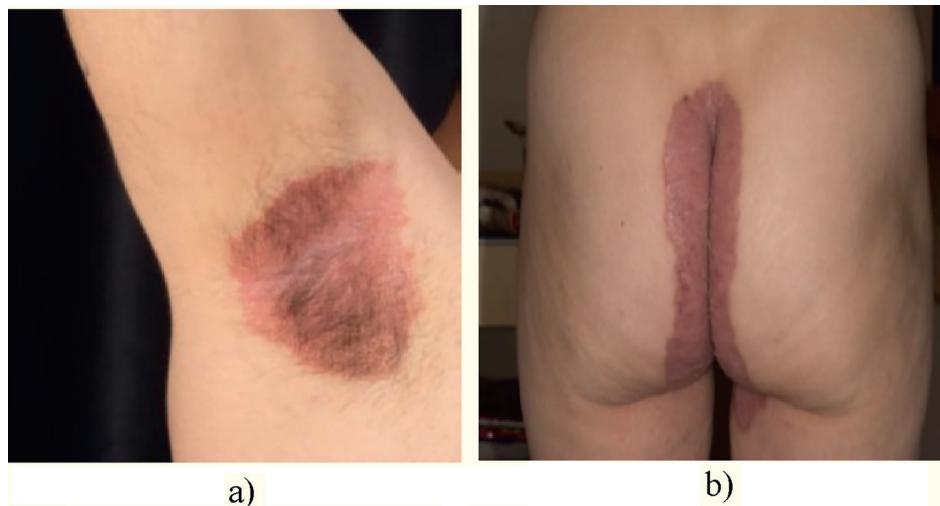


Figure 3.
Clinical involvement of the skin folds [5]. (a) Axillary fold involvement. (b) Intergluteal involvement.



Figure 4.
Clinical manifestation of guttate psoriasis [5].



Figure 5.
Clinical manifestation of erythrodermic psoriasis [5].

3.5 Pustular psoriasis

Pustular psoriasis is characterized by multiple sterile pustules [15]. It can be localized or generalized (**Figure 6**).

Localized phenotypes of pustular psoriasis have been described as psoriasis pustulosa palmo-plantaris (PPP) and acrodermatitis continua of Hallopeau (ACH) which both affect the hands and feet (**Figure 7**).

PPP is limited to the palms and soles, whereas ACH presents at the fingertips and toe tips and affects the nail apparatus [5]. Localized pustular psoriasis can negatively impact day-to-day activities [15]. Generalized pustular psoriasis (GPP) can present acutely and rapidly progress with a widespread eruption of superficial pustules. It is often accompanied by systemic symptoms and can be life-threatening [5, 15]. Various treatment types are available to treat mild to severe psoriasis.



Figure 6.
Clinical manifestation of generalized pustular psoriasis [5].



Figure 7.
Clinical manifestation of pustular psoriasis localized to the soles of the feet [5].

3.6 Psoriatic arthritis (PsA)

It is estimated that about 14–40% of people who suffer from psoriasis develop PsA [34–37]. It is estimated that 15% of those suffering from psoriasis have undetected PsA [38]. PsA is characterized by involvement of the metacarpophalangeal and interphalangeal joints of the hands and feet, as well as the ankles and knees [38]. There can also be extra-articular involvement, such as eye and/or bowel involvement, and occasionally involvement of the sacroiliac joints and/or the spinal cord [10]. Other distinguishing features of PsA include the absence of rheumatoid factor and anti-cyclic citrullinated peptide (CCP) antibodies [39]. Through ultrasonography and magnetic resonance imaging, it has been discovered that the enthesis might be the first site of inflammation in PsA [40]. When compared to rheumatoid arthritis (RA), PsA is distinguished by synovium inflammation which is characterized by more intense hypervascularity and infiltration of polymorphonuclear leukocytes [39, 40]. Moreover, PsA is frequently associated with HLA-B27 in patients who have axial involvement [41]. These findings suggest that angiogenesis plays a central role in the early events in PsA.

Clinically (**Figure 8**), PsA manifests with oligoarticular or polyarticular dactylitis and enthesitis, which the polyarticular variety is commonly linked with nail involvement [42]. Psoriatic nail involvement has been associated with joint involvement, and nail manifestations can occur in as many as 80% of patients who suffer from PsA [43]. The clinical appearance of nail psoriasis is determined by the structure impacted by the inflammatory process. Pitting, leukonychia, and onychodystrophy are symptoms of nail matrix involvement, whereas oil-drop discoloration, splinter hemorrhages, and onychodystrophy are symptoms of nail bed inflammation [43–45].



Figure 8.
Psoriatic arthritis with nail involvement. Source: Image courtesy of Prof Dlova, Nelson Mandela Medical School, University of KwaZulu-Natal.

4. Association of psoriasis to different organ systems

Although psoriasis affects the skin, being a metabolic syndrome it may also affect the joints and has been associated with numerous diseases since inflammation is not limited to the skin but can affect different organ systems as well [5]. These comorbidities include psoriatic arthritis, cardiovascular disease, Crohn's disease, mild liver disease, chronic kidney disease, end-stage kidney disease, obesity, hypertension, diabetes, and dyslipidemia [3, 46–50]. Large studies have shown that a higher occurrence of patients with cardiovascular disease and diabetes correlates with the severity of psoriasis [51–53].

Obesity is more prevalent and common in people who suffer from psoriasis compared to the general population [54]. While the exact mechanism underlying the link between psoriasis and obesity is unknown, a number of studies of basic as well as translational research indicate that adipocytes and inflammatory-type macrophages may play a role in both disease processes [54]. The adipose tissue is a living endocrine organ that regulates lipid and glucose metabolism, inflammation and coagulation,

and insulin-mediated processes [55, 56]. Macrophages are the primary immune cell type responsible for adipose tissue inflammation. Adipose tissue-activated macrophages stimulate adipocytes to secrete inflammatory mediators that promote and sustain an inflammatory state in obesity. Adipose tissue, in particular visceral adipose tissue, secretes bioactive products known as adipocytokines or adipokines. The function of adipokines and their downstream effects are thought to play a role in the coexistence of psoriasis and obesity [6, 55–58].

Due to the notably weight gain, people who suffer from psoriasis may not be motivated to participate in physical activity due to the appearance of their skin as well weight gain which they may be embarrassed about. Considered together, the various elements that contribute to psoriasis as a systemic illness can have a substantial impact on patient's quality of life and disease burden. The high disease burden is assumed to be due to the disease's symptoms, which include discomfort, pruritus, and bleeding, in addition to the previously mentioned related conditions.

5. Treatment interventions

Psoriasis often requires long-term therapy [5], which can control the signs and symptoms [59]. There are various treatment options ranging from mild, to moderate to severe [2], and the choice of therapy is determined by the severity of the psoriasis, comorbidities, and access to health care [5]. First-line treatment for mild psoriasis includes topical agents such as vitamin D analogues and corticosteroids. Phototherapy such as narrowband ultraviolet B radiation (NB-UVB), psoralen with ultraviolet A radiation (PUVA), and conventional systemic agents (methotrexate, cyclosporin, and acitretin) are used as second-line therapy [15] for moderate to severe psoriasis [2]. Additional treatments include targeted biologics (tumor necrosis factor (TNF), interleukin (IL)-17, and IL-23 inhibitors), as well as oral molecule inhibitors (dimethyl fumarate and a premilast) [15].

5.1 Vitamin D analogues

Vitamin D analogues are a first-line topical agent for treating plaque psoriasis and scalp psoriasis [6]. Vitamin D analogues such as calcipotriol bind to vitamin D receptors on T-cells and to vitamin D receptors on keratinocytes. This causes a blockage of keratinocyte proliferation and increases keratinocyte differentiation [2]. The effectiveness of topical agents is modest when used on its own [2]; however, it can be increased with occlusion or combination therapy with systemic agents [15]. Randomized trials have shown that vitamin D is safe and effective for patients with mild psoriasis; however, it is not inferior to most corticosteroids [4, 60].

5.2 Corticosteroids

Topical corticosteroid therapy is used to treat patients with mild or localized psoriasis. Corticosteroids are considered the cornerstone of topical treatments and are often well tolerated when used as prescribed and effective at appropriate strengths for patients [2, 6]. Their method of operation is to exert anti-inflammatory, antiproliferative, and local vasoconstriction effects through the downregulation of genes coding proinflammatory cytokines [2].

5.3 Phototherapy

Phototherapy such as psoralen plus UVA (PUVA), broadband UVB, and narrowband UVB (NB-UVB) treats moderate to severe psoriasis, especially those that are unresponsive to topical treatment agents [6]. Treatment using narrowband UV-B is preferred over broadband UV-B due to it being more effective. The narrowband UV-B is also preferred over PUVA [2] due to the risks of skin cancer with cumulative doses of PUVA [15].

UV-B: UV-B therapy consists of broadband (290–320 nm) and narrowband (311 nm) bandwidths which are both able to treat plaque psoriasis [2]. The treatment can be administered in a clinic office or at home usually three times per week. After 2–3 months, the treatment frequency can be decreased to twice a week to maintain the treatment results. Adverse effects of UV-B phototherapy include erythema, pruritus, blistering, photoaging, and photo-carcinogenesis [2].

Although there is no evidence that NB-UVB increases the risk of skin cancer [6], it is most commonly used due to its greater effectiveness and decreased adverse effects [2]. NB-UVB treatment can be given to almost any patient, including children and pregnant women [6]. A combination of systemic retinoids may also increase the effectiveness and reduce potential carcinogenic adverse effects of NB-UVB [2].

5.4 PUVA

Psoralen plus UVA involves a combination treatment consisting of a psoralen such as methoxalen which is either administered orally or topically before being exposed to long-wave UV-A (320–400 nm) irradiation [2]. Psoralens cause the skin to become temporarily sensitive to UVA and interject into DNA to suppress DNA synthesis [2]. PUVA treatment can initially be administered two to three times per week. Once the psoriasis is almost clear, or clear, the frequency is then decreased. Adverse effects include gastrointestinal upset, burning, pruritus, hypertrichosis, and photoaging. The effectiveness of PUVA is superior to UV-B; however, it is no longer the preferred treatment due to the risks of skin malignancies with long-term use [2, 15]. The use of phototherapy for moderate to severe psoriasis has decreased since the introduction of biologics [2].

5.5 Systemic agents

- *Methotrexate*—Methotrexate is a folate derivative that inhibits several enzymes responsible for nucleotide synthesis that leads to the suppression of inflammation and prevention of cell division [15]. Potential complications include nausea, vomiting, diarrhea, fatigue pneumonitis, hepatitis, liver fibrosis, and teratogenicity [6, 15]. Its most serious adverse effects include bone marrow suppression [6]. Due to its toxic adverse effect, it is used to treat moderately severe to severe psoriasis if first-line treatments have failed, as well as psoriatic arthritis [6]. Methotrexate is also contraindicated in pregnancy [15].
- *Cyclosporine* is a calcineurin inhibitor [61] used in the treatment of moderate to severe psoriasis [6]. Cyclosporine works rapidly to suppress the immune system and slows down the growth of certain immune cells [15]. Adverse effects include nephrotoxicity, hepatotoxicity, hypertension, increased

risk of infection, lymphoma, tremors, hyperplasia, drug interactions, and malignancies [6, 61]

- *Acitretin* is a synthetic oral retinoid used in the treatment of moderate to severe psoriasis [5]. It normalizes keratinocyte proliferation and differentiation [15]. Its function as an adjunctive therapy has been reported to enhance efficacy, lower doses, and reduce the occurrence of side effects [6]. The side effects of Acitretin include hair loss, dry skin, high cholesterol, and liver damage. Acitretin is also contraindicated in pregnancy [15].

5.6 Biologics

Biologic therapy is one of the most significant therapeutic advancements in dermatology for the treatment of psoriasis [2] and has been developed as a highly potent treatment for patients who are unresponsive to traditional systemic treatments or are not tolerated due to adverse effects or comorbidities [6]. These drugs are monoclonal antibodies or soluble receptors [15] which target specific parts of the immune system that overact in psoriasis. They are medicines made from living cells that are genetically changed in a laboratory to make certain proteins. Biologics are designed to block only the parts of the immune system that are responsible for the overgrowth of skin cells [62] and have a dramatic effect on the outcome of moderate to severe psoriasis [15]. Approved biologic therapies include TNF (adalimumab, etanercept, infliximab, and certolizumab), IL-17 (ixekizumab and secukinumab), IL-17 receptor inhibitors (brodalumab) and IL-12/23 rizankizumab, guselkumab, and tildrakizumab [15]. Biologic therapies can be administered as a shot or an infusion through an IV drip [62].

TNF inhibitors—Tumor necrosis factor (TNF) is considered the oldest approved biologic treatment for psoriasis [63]. TNF therapists include adalimumab, etanercept, infliximab, and certolizumab. While all blocks of TNF in vivo, they differ in structure and mechanism of action [63]. These biologics decrease the downstream inflammatory cascade central to the psoriasis pathogenesis. Among the TNF-a inhibitors for psoriasis, infliximab has the highest efficacy, followed by certolizumab and adalimumab and then etanercept being the least effective [2]. The most common adverse effects are nasopharyngitis, upper respiratory tract infection, and injection site reactions [2].

Interleukin-12/23 (IL-12/23) targets a type of cytokine called IL-23 which are a class of proteins that help transmit signals from one cell to another. The role of IL-23 signals pathways that trigger inflammation. The IL-23 inhibitors block this action which helps limit the inflammation that causes psoriasis symptoms [2]. Types of IL-23 inhibitors include Guselkumab, Rizankizumab, and Tildrakizumab. IL-23 inhibitors cause fewer side effects, and adverse effects are very rare. Adverse effects include upper respiratory infections, certain fungal infections, herpes simplex infections, and infectious diarrhea [64].

Interleukin-17 (IL-17) is a class of biological therapy that targets either the IL-17 ligand or its receptors. They have a rapid onset of action, robust response, and great sustainability in treating plaque psoriasis. There are three types of monoclonal antibodies of IL-17 inhibitors which [5] include ixekizumab, secukinumab, and brodalumab. IL-17 inhibitors have an acceptable safety profile with no increased risks of serious infections or malignancies [2]. The main adverse effects are candidiasis, neutropenia, inflammatory bowel disease and depression, and the risk of suicide in brodalumab [61].

6. Effects of psoriasis on quality of life

The World Health Organization (WHO) defines quality of life (QoL) as an individual's perception of their position in life, concerning their goals, expectations, standards, and concerns, in the context of the culture and value system in which they live [65]. Being a visible skin disorder, psoriasis has a significant impact on the quality of life. It is widely accepted today and has been known since ancient times in Ayurveda that there is an association between the skin and the mind [66]. As such psoriasis causes stress and has an impact on self-image, psoriasis can trigger processes that lower self-esteem and can contribute to feelings like anxiety, sadness, or even depression [67, 68]. Reciprocally, psoriasis is evoked by stress [59, 66, 69, 70].

Psoriasis can cause physical distress, pain, and itching, which can negatively impact a patient's daily activities and well-being [71]. Psoriasis patients may also encounter psychological and social challenges, such as stigmatization, humiliation, and social inhibition [60]. Additionally, smoking and alcohol abuse are more prevalent perhaps as a consequence or as a coping mechanism [60, 70]. Children and adolescents also experience a substantial impact on the quality of life as their physical, psychosocial, and emotional health gets affected [72, 73]. The disease symptoms such as societal stigmatization, appearance-related social anxiety, impairment of professional activities as well as the lack of a cure-all have a negative impact on the perceptions of those who suffer from psoriasis [68, 74].

Its impact on QoL largely depends on the severity and type. For example, palmo-plantar psoriasis, i.e., an affliction of the palms of the hands and soles of the feet, has been linked to a greater decline in health-related quality of life compared with moderate-to-severe plaque psoriasis [75]. Patients with palmoplantar psoriasis were more likely to report moderate impairments in quality of life, mobility, self-care, and routine activities [37]. Gåñemo et al., for example, discovered that joint complaints and pruritus substantially diminish the QoL of patients [73].

Contrary to intuition, the impact on QoL does not necessarily correlate to the severity of psoriasis. However, the subjective experience of psoriasis is a stronger predictor of QoL than severity [72]. The psychological burden of psoriasis can range from mild reductions in quality of life to suicidal thoughts [76]. Psoriasis can also adversely affect relationships and environmental aspects of QoL [77]. In addition, psoriasis can have economic consequences too. The economic impact of psoriasis increases as disease severity worsens, resulting in greater psychosocial morbidity [78] decreased work productivity, higher healthcare costs, and diminished QoL [40].

6.1 Measuring QoL in psoriasis

Various instruments and questionnaires can be used to evaluate the QoL for psoriasis patients. The most common is the Dermatology Life Quality Index (DLQI). DLQI is a self-administered questionnaire that assesses the impact of skin diseases on various aspects of a patient's life [75] such as effects on daily activities, work or school performance, intimate relationships, and emotional well-being [55, 56]. Higher DLQI scores indicate a larger decline in QoL. Likewise, another clinical assessment tool questionnaire for psoriasis, the Psoriasis Area and Severity Index (PASI) does not appropriately measure the impact that the condition has on patients' lives but rather offers only an index of clinical severity based on clinical appearance [1].

In dermatology, the perception of quality of life is regarded as a critical metric. In this sense, quality of life assessment has evolved into an indicator used to guide healthcare practices and aid in the development of public policy strategies [68, 79]. Public health policies are needed to increase the general population's knowledge and awareness of psoriasis. This approach may help to explain the impact of psoriasis on a person's life, reducing prejudice and facilitating social inclusion [79, 80].

The Children's Dermatology Life Quality Index (CDLQI) and the Infant's Dermatitis Quality of Life Index (IDQOL) are additional questionnaires that evaluate the effect of psoriasis on the QoL of children and adolescents [73]. These instruments accommodate the unique difficulties and experiences of younger psoriasis patients. There is currently a need to improve the quality of life measures for psoriasis patients to determine issues that are significant to them, such as disease prejudice, stigma, and social injustices [68]. It has also been discovered that social support plays a role in adjusting to life with psoriasis [81]. There is a correlation between higher levels of social support and improved QoL and lower levels of depression, and therefore, a form of tangible support is crucial for enhancing acceptance of life with psoriasis [72, 81].

6.2 Effective treatments known to improve QoL in psoriasis patients

Both systemic and topical therapies are effective treatments for psoriasis patients who want to enhance their QoL. Systemic therapies, such as biologic agents (e.g., TNF inhibitors and IL-17 inhibitors) and non-biologic systemic agents (e.g., methotrexate and cyclosporine), have demonstrated considerable efficacy in reducing psoriasis symptoms and enhancing QoL [82]. These treatments target the underlying immune dysregulation associated with psoriasis and can result in long-term remission or marked improvement of symptoms [42]. Topical therapies for localized psoriasis, such as corticosteroids, vitamin D analogues, and calcineurin inhibitors, can provide symptomatic relief and enhance QoL [82] which are generally well-tolerated and can be combined with systemic therapies for increased efficacy [42].

Psychosocial interventions such as cognitive-behavioral therapy (CBT) can help patients manage the emotional and social effects of psoriasis and improve their overall health [83]. Individuals with psoriasis can benefit from patient education, support groups, and counseling as additional resources and support. Importantly, the choice of therapy should be individualized based on disease severity, comorbidities, patient preferences, and treatment objectives [82]. To ensure optimal control over symptoms and minimize the impact on QoL, regular monitoring and adjustment of treatment regimens are required.

6.3 What patients can do to reduce its effects

Several evidence-based strategies can be employed to mitigate the impact on QoL. These strategies seek to alleviate the physical symptoms of psoriasis, mitigate its psychological effects, and improve overall health. Establishing treatment objectives for psoriasis is of paramount importance for enhancing patient care and reducing the problem of undertreatment [84]. The severity of the disease should determine the treatment objectives, which may include reducing the affected body surface area and minimizing the impact on QoL [84]. Implementing this holistic treatment approach in daily psoriasis management can help guide treatment decisions and ensure better outcomes.

Systemic therapy may be required for moderate to severe psoriasis. Specific objectives can be established for the induction and maintenance phases of treatment [33]. Its selection should, once again, be individualized for each patient [85]. To ensure optimal control of symptoms and minimize the impact on QoL, regular monitoring and adjustment of treatment regimens are essential [33].

The psychosocial burden of psoriasis should not be disregarded. It is necessary to include psychosocial morbidity measures when evaluating psoriasis severity and treatment efficacy [86]. Psychosocial support and counseling can help patients manage the emotional and social effects of psoriasis [87]. Medication cognitive-behavioral therapy (MCBT) has been demonstrated to be effective in this regard [46]. The MCBT technique helps to teach patients to focus their attention and maintain positive thinking. It is believed that patients practicing meditation can detach from the negative emotions associated with psoriasis [88].

People living with chronic psoriasis are encouraged to adhere to their treatment plan, for example, use their medication as prescribed. Non-adherence to medication often results in missed opportunities to optimize the efficacy of a treatment, and dermatologists should embrace a nonjudgmental approach and accept non-adherence as the norm [89]. Studies have revealed that non-adherence is due to psychological distress from a patient's inability to manage his or her condition resulting in reduced motivation or they get worried about the treatment side effects [90].

Lifestyle changes should be an important consideration. The World Health Organization identifies insufficient physical activity as a key risk factor for cardiovascular diseases, cancer, and diabetes [91]. Patients with moderate to severe psoriasis are especially vulnerable to suboptimal lifestyles because they have an elevated risk of both cardiovascular and metabolic disease [91]. Consequently, a suboptimal lifestyle is particularly dangerous and has a negative impact on psoriasis itself. Lifestyle improvement for patients with psoriasis may involve numerous areas of improvement such as diet, smoking, alcohol, and relaxation techniques. However, physical activity should be highly encouraged given the apparent positive influence on psoriasis itself alongside the potential cardiovascular and metabolic comorbidities associated with psoriasis [91].

Relaxation therapies should form part of the treatment regimen. Holistic treatments used in the management of psoriasis include aromatherapy, massage, spa therapies, mud baths, and flotation tanks. Aromatherapy uses therapeutic blends of oils to allow healing and relaxation and to lift a patient's mood [1, 92]. Manipulative techniques are beneficial as they help with pain reduction and increase joint mobility in the case of psoriatic arthritis; massage is the most popular technique used [93].

Mud applications are usually in the form of packs and baths, with the head not being immersed. The most common indicated treatments are moor mud baths which incorporate dead sea mud [94]. The mud bath provides a notable increase in magnesium and bromine in the skin, both of these compounds might play a vital role in psoriatic skin [94–96]. While the mud bath is not accepted as a well-established treatment modality due to a lack of clinical trials, thermal balneotherapy is used throughout the world in psoriatic therapy owing to its ability to offer natural, multifactorial, complementary, and nontoxic alternative treatments [95, 96]. The most important attribute of the therapy for psoriatic patients is safety; many of them accept the possibility of using safe natural treatments with enthusiasm despite their variable efficacy [1].

The skin barrier function in psoriatic skin is compromised, as such, hydration therapy becomes a key factor. Hydrating treatments offered in a skin care clinic or

a health spa such as balneotherapy using the dead sea mud could help enhance the cutaneous barrier function as well as address hydration of the stratum corneum [1, 94]. The use of products with natural ingredients such as *Aloe vera* could help restore the disturbed skin's barrier function as they have hydrating properties [1, 97].

7. Psychosocial management of psoriasis

Visible psoriatic lesions on exposed body parts can elicit feelings of anxiety, disgust, aversion, and even intolerance [81, 98]. Furthermore, some people who are unfamiliar or with limited knowledge of psoriasis believe that the disease is contagious, which may further contribute to the social isolation of people with psoriasis [86, 98]. People who suffer from psoriasis are often in denial and suffer from a great deal of stigmatization [98]. There are two types of stigma: social stigma (social exclusion and unfair discriminatory treatment) and self-stigma (low self-esteem with feelings of shame and hopelessness as a result of the disease) [99–101]. According to Goffman's theory, stigmatized people are rejected as a result of having a deeply discredited attribute in their society [102].

Both social and self-stigmatization can occur independently, but they can also coexist [98, 100]. People who have psoriasis are vulnerable to comments and remarks about their disease, which can lead to social withdrawal, depression, and even suicide attempts [103]. Additionally, the internalization of illness-related stigma can lead to feelings of guilt, and the fear of being judged by others can jeopardize one's emotional state and even lead to mental illness [104]. Due to stigmatization, people with psoriasis often experience loneliness in addition to decreased quality of life, which further impairs their social functioning [98, 100]. Loneliness is caused by physical and mental illnesses, as well as psychological disturbances such as low self-esteem, inability to establish social contacts, and stigmatization [103, 104].

A recent scholarly review by Nguyen et al. on the psychosocial impact of acne, vitiligo, and psoriasis suggests that all these conditions have a negative psychosocial impact on the affected individual in that conditions result in increased levels of anxiety and depression among patients [80]. Another similar study conducted in Croatia found that while depression and anxiety were prevalent among patients affected by psoriasis, gender differences existed concerning the extent of anxiety and depressive symptoms [105]. Another study conducted to investigate the impact of psoriasis on quality of life and explore the determinant factors found that there is a close relationship between stress and the disease. This perpetuates a vicious cycle, which may explain the cause of the disease in certain instances and others may exacerbate the negative symptoms leading to poor treatment and a deteriorated health state [106].

Strober et al. [107] reported that moderate to severe psoriasis as manifested by poor patient outcomes was attributed to a longer stay away from work which subsequently has occupational and financial implications for the individual diagnosed with the condition. Similarly, other studies on patient outcomes related to psoriasis have also reported that the condition has physically and mentally debilitating effects on one's life, thus necessitating psychological and educational interventions [108]. Earlier studies conducted on the quality of life and work productivity impairment among psoriasis patients have also revealed that patients who experience arthritic symptoms associated with the disease suffer significant impairments related to the quality of life and occupational productivity [109].

Similar studies conducted among children and adolescents also suggest that psoriasis has a negative impact on quality of life. There is evidence to suggest that the prevalence of psoriasis among children and adolescents may perpetuate learning difficulties and disturbances in school. The condition may also lead to long-term sequel of mental health disorders among children with consequences to family life [83]. The families affected by the individual diagnosed with psoriasis could also face financial burdens associated with the disease. Since stigma is also a consequence faced by the individual, associative stigma is also faced by families who have their family members diagnosed with the condition.

Based on current empirical evidence, there is consensus among authors that the condition greatly affects the quality of life as it has a profoundly negative impact on the affected individuals' self-image, self-esteem, and overall sense of personal well-being [110, 111]. Studies conducted on the impact of the diagnosis of psoriasis on the individual have suggested that the condition affects all aspects of life including psychological, physical, social, sexual, and occupational components [112, 113].

Due to the multiple effects of the condition, a strictly biomedical approach to managing the condition may result in unmet health needs of individuals affected by the condition. Empirical evidence alludes to the multiplicity of effects that the condition has which extends beyond the individual to include family and other individuals of influence. In addition to the adoption of standardized medical interventions encompassing diagnostics, treatment, and related follow-up procedures, the psychosocial management plan thus becomes an integral part of facilitating the holistic management of the patient. This psychosocial management approach must be tailored to the individual's needs and should be cognizant of various socio-demographic factors that may affect the health and health-seeking behaviors of the patient diagnosed with psoriasis.

The health interventions that should form part of the psychosocial approach to managing these clients are thus formulated with the health worker adopting a holistic and comprehensive lens of enquiry to understand the challenges and needs faced by individuals diagnosed with psoriasis. In this regard, drawing on the discipline of health promotion, social sciences, and behavioral sciences becomes necessary if effective interventions are to be designed and offered to patients. Psychological intervention programs should consider patients' opinions and attitudes toward their illness, their level of self-acceptance, and the emotions associated with the disease, and also, non-pharmacological interventions such as biofeedback, relaxation training, and cognitive behavioral therapy may improve patients' quality of life [98].

The socio-ecological model for understanding the health needs and challenges of people with varying health conditions is an example of a theoretical lens of enquiry that may be adopted by health workers in the enquiry process [114]. It may help to frame the specific areas of intervention that may be directed at the individual level and population levels especially if a large-scale public health intervention is to be designed for a specific community or society of individuals that may be affected by psoriasis.

At the individual level, health workers in these instances are to be empathic toward patients, provide relevant counseling advice as needed, and be on the alert for anxiety and depressive symptoms so that relevant psychotherapy and intervention may be provided. The skin specialist (dermatologist) and healthcare provider managing the patient diagnosed with psoriasis must be equipped with the necessary knowledge and skills to manage the condition from a holistic perspective. The healthcare provider

must be able to address queries and concerns that the patient may have about the nature of the condition and the side effects of treatment. Before the treatment intervention is chosen, patients must be allowed to be an integral part of decision-making about the treatment process, so that informed decisions are taken.

In this regard, healthcare workers are to ensure that patients have information about various treatment options with specific discussion about the risk-benefit ratio concerning physical well-being and overall health. The patient should also be made aware of any cost implications related to the treatment process and the anticipated outcomes concerning the management of the condition. Through the provision of comprehensive information, the patient is empowered to exercise their right to autonomy which is critical in instances of debilitating conditions as one's self-worth is often compromised in the process. Allowing patients an opportunity to ask questions, clarify misconceptions, and empower them to make their own decisions could be an effective means of considering a patient's sense of self-worth and esteem which are often compromised in such conditions.

Being able to develop screening mechanisms to assess the extent to which psoriasis has affected quality of life is also an important factor and is one of the first steps to ensuring that patients are holistically managed in terms of their psychosocial needs. The development of validated screening tools for patient function concerning physical, mental, emotional, occupation, and spiritual well-being. These screening tools could also be effective in terms of problem identification so that relevant supportive measures may be instituted. In the cases of mental and emotional disturbances related to the condition, relevant interventions in the form of counseling and supportive rehabilitative, promotive, and curative therapy using a combination of approaches through biomedicine, cognitive behavioral therapy, and alternative practices have been proven to be effective at managing the psychological stresses that may be associated with the condition [98].

Another key aspect of psychosocial management is the assessment and prevention of complications associated with physical impairments that are related to psoriasis. In this regard, prevention may be facilitated through education regarding various approaches to prevent situations that may lead to immobility and related complications. Moreover, in instances of side effects such as arthritis, management also entails referral to other physical therapists who may further educate or institute measures to maximize mobility.

In instances where children and adolescents are affected by psoriasis, an integral part of psychosocial management also entails managing the family of the child or adolescent. In such instances, the family is often overwhelmed by the diagnosis due to the complications associated with the disease. Moreover, the financial implications of treatment have a strain on individual family members and the family unit. Provision of counseling to the family as a unit thus also becomes important so that they are empowered on how to deal with the condition. Moreover, counseling may also help them to come to terms with the diagnosis and understand the role that they have to play in the treatment process. The family of a child, adolescent, or even adult diagnosed with psoriasis may also be at risk for associative stigma by their relation to someone diagnosed with psoriasis. Research on stigma by association as reported in other non-communicable diseases has suggested that associative stigma is a determinant for health-seeking behavior both from the part of the family and the individual affected by the condition [98–100]. Assisting families through the provision of mental support and counseling against stigma thus becomes important for instituting sustained treatment options.

In low- to middle-income settings with a high burden of communicable and non-communicable diseases, adopting differentiated models of care is effective at managing health conditions [115]. The adoption of a differentiated approach to care and management of psoriasis within a low- to middle-income context has important public health implications within the context of multi-morbidity. This is because the differentiated approach allows for patient self-management within the context of an in-depth understanding of multiple determinants affecting their health and access to care. Through a differentiated approach, patient-centered care is provided whilst upholding the universal principles of primary health care.

8. Conclusions

Psoriasis is linked to a slew of comorbidities, particularly cardiovascular diseases, which are the leading cause of death worldwide. Due to its physical discomfort, pain, irritation, and numerous psychological and social challenges, psoriasis has a significant impact on the QoL. Its impact is dependent on the type and its severity with palmoplantar psoriasis and joint complaints causing the greatest impairment on QoL.

Topical therapies remain the cornerstone for treating mild psoriasis, whereas phototherapy, systemic, and biologic therapy are used to treat moderate to severe psoriasis; however, there are various adverse effects associated with each treatment option and depending on the severity of psoriasis determines the treatment option used and is carefully evaluated. The subjective experience of disease should be a more important determinant of overall QoL than objective severity measurements.

To resolve the complex effects of psoriasis, a comprehensive and holistic strategy is required. Diet, non-smoking, no consumption of alcohol, and relaxation techniques can all help patients with psoriasis improve their lifestyle. However, given the apparent positive influence on psoriasis itself, as well as the potential cardiovascular and metabolic comorbidities associated with psoriasis, physical activity should be considered a starting point. Dermatologists ought to cease treating psoriasis as if it were a single skin condition rather than a complex condition requiring a discussion of lifestyle choices.

In addition to treating physical symptoms, the patient's psychological and emotional health should be highly considered. Increased stress has been demonstrated to have a negative impact on psoriasis. Alternative stress management therapies such as hydrating and spa therapies using dead sea mud and/or balneotherapy may be effective in stress management to improve overall well-being and QoL. Psychosocial support interventions should also be incorporated into a psoriasis management plan to help those who suffer from psoriasis cope with the stigmatization, thereby improving their quality of life.

Acknowledgements

We would like to acknowledge Professors, Ncoza Dlova and Knut Schäkel, for providing us with the photographs.

Conflict of interests

The authors declare no conflict of interest.

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