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Original Research Paper

The Relationship, Scientific Evidence, and Clinical Implications Between Obesity and Psoriasis: A Literature Review

Eka Lustikawati[1] , Dwi Sarwani Sri Rejeki[2], Siwi Pramatama[2]

[1]*Master of Hospital Management, Universitas Jenderal Soedirman Purwokerto*
[2]*Public Health Study Program, Faculty of Health Sciences, Universitas Jenderal Soedirman Purwokerto*

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Email Corresponding:
eka.lustikawati126@gmail.com

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Abstract

Background: Obesity and psoriasis are chronic diseases often found together. Obesity not only increases the risk of developing psoriasis but also worsens its clinical severity. **Objective:** This study aims to systematically review the association between obesity and psoriasis and examine their clinical implications. **Methods:** A systematic literature review was conducted following PRISMA guidelines. Literature searches were performed using Google Scholar, PubMed, and ScienceDirect. From 19,150 articles identified, 10 studies were selected based on inclusion and exclusion criteria. **Results:** The findings show a positive correlation between higher body mass index (BMI) and increased severity of psoriasis, measured by PASI (Psoriasis Area and Severity Index), BSA (Body Surface Area), and DLQI (Dermatology Life Quality Index). This relationship is mediated by the role of adipokines, pro-inflammatory cytokines, and the activation of the Th17 immune pathway. Genetic predisposition and unhealthy lifestyles further contribute to the association. **Conclusion:** Obesity is an important factor that worsens psoriasis severity. Comprehensive clinical management should integrate weight control and lifestyle interventions to improve treatment outcomes for patients with psoriasis.

Keywords: Psoriasis; obesity; IMT; autoimmune pathophysiology; review article.

Introduction

Psoriasis, long known as a systemic and complex skin disease, turns out not to be limited to skin manifestations; it has significant systemic implications and is known to be closely related to various comorbidities, one of the most frequently reported being obesity, which has now reached an alarming prevalence level worldwide. Various epidemiological and clinical studies have shown that the prevalence of obesity in psoriasis patients is significantly higher compared to the general population, with evidence of a bidirectional relationship.

Based on data from the World Psoriasis Day consortium, this condition affects approximately 125 million individuals globally, or about 2 to 3 percent of the total world population. The distribution between men and women is almost equal, at 2.8% and 3.2%, with the highest prevalence found in the white population at 3.6%, followed by the Asian group at 2.5% and the black population at 1.5%. The prevalence of psoriasis increases starting from late teens aged 20-29 at 1.6%, and is highest in adults aged 50-59 at 4.3%, followed by age 70 at 3.9%[1]. A study noted the prevalence of psoriasis in Indonesia is reported at 2.5%, although national epidemiological data is still limited and requires further study[2].

Meanwhile, obesity has become one of the most serious public health problems in the 21st century. The World Health Organization (WHO) reports that more than 2.5 billion adults worldwide are now overweight or obese. The prevalence of obesity in Indonesian adults increased from 21.8% (2018) to 23.4% (2023), making it one of the main factors for various chronic diseases, including psoriasis[3]. Obesity is defined as excessive accumulation of body fat, with classification according to WHO as a BMI ≥ 30kg/m², while according to PERKENI it starts from a BMI ≥ 25kg/m² [4]. Various factors are identified as causes of obesity, such as unhealthy diet, lack of physical activity, and genetic factors, as explained by Hanum (2023) and Kisielnicka et al. (2023); obesity can occur from adolescence due to low physical activity, consumption of fast food, skipping breakfast, complex genetic predisposition from parents, excessive macronutrient consumption, poor nutrition knowledge, and sleep duration[5,6]. Sumarni et al. (2023) highlighted that there are still differences in public perception regarding health, especially obesity, which often creates problems in health programs launched by the government[7]. This underscores the need for an evidence-based educational and socialization approach in controlling obesity as part of psoriasis management. Various factors contribute to obesity, necessitating comprehensive public health strategies for its prevention and management[8].

The link between psoriasis and obesity is not merely epidemiological but also involves complex immunological mechanisms. Obesity triggers inflammatory changes that can alter adipokine and cytokine levels in the body. These obesity-induced inflammatory changes can trigger various immune-mediated inflammatory diseases[9]. There is a positive correlation between various adiposity measurements and the severity level of psoriasis[10]. Excess visceral adipose tissue in obesity triggers the secretion of inflammatory cytokines such as TNF-α, IL-6, and leptin. These cytokines contribute to the activation of the Th1 and Th17 immune pathways, which are key pathways in the pathogenesis of psoriasis. Additionally, increased leptin levels and decreased adiponectin in obesity worsen immune dysregulation, increase effector T cell activity, and strengthen systemic inflammatory responses. Conversely, chronic inflammation in psoriasis can also cause insulin resistance and metabolic disorders that accelerate the accumulation of body fat, thus forming a mutually reinforcing pathophysiological loop[11-14]. Several studies have shown that an increase in Body Mass Index (BMI) is positively related to the severity of psoriasis, both in terms of lesion area (Body Surface Area/BSA) and clinical scores like Psoriasis Area Severity (PASI). Weight loss through a low-calorie diet has been proven to improve clinical outcomes in psoriasis patients15,16.

However, not all research shows consistency in the causal relationship between obesity and psoriasis. Some study results show the influence of confounding variables such as genetic factors, lifestyle, stress, smoking, and the therapies used. Therefore, a systematic review is needed to summarize and analyze findings from previous studies to obtain a more comprehensive and evidence-based understanding of the link between the two. This study is present to fill that gap through a recent systematic review, including national literature that has been less raised.

The purpose of this literature review is to deeply examine the scientific evidence regarding the relationship between obesity and psoriasis, especially from the aspects of pathophysiology, clinical severity, and potential therapeutic interventions that can be applied. By understanding how obesity contributes to psoriasis, both from a molecular, clinical, and population perspective, it is hoped

that this research can contribute to the development of more effective and integrated psoriasis management strategies.

In this context, a systematic review that can integrate empirical findings comprehensively is needed. This study aims to evaluate the relationship between obesity and psoriasis based on available scientific literature, both clinically, molecularly, and at the population level, and to identify relevant potential therapeutic interventions. The main question this study seeks to answer is: "Does obesity significantly affect the severity and pathogenesis of psoriasis, and to what extent is this relationship causal or merely comorbidity?".

Materials and Methods

Study Design

This study uses a systematic literature review design, referring to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This design was chosen to collect, analyze, and synthesize relevant research results regarding the relationship between obesity and psoriasis systematically and structuredly.

Sample

The sample in this study consists of scientific articles discussing the topic of obesity and psoriasis. The initial identification process found 19,150 articles from the Google Scholar, PubMed, and ScienceDirect databases. After going through a multi-layered selection process, 10 articles were obtained that met the inclusion criteria and were considered most relevant.

Data Collection Technique

Data were collected through literature searches using Indonesian and English keywords, such as "hubungan obesitas dengan autoimun," "hubungan obesitas dan psoriasis," and "Association between Increased BMI and psoriasis." Article selection was based on inclusion criteria: empirical articles, relevance, in English or Indonesian, and published between 2009-2025. Incomplete or paywalled articles were excluded from the analysis.

Data Analysis Technique

Analysis was conducted using a descriptive approach to identify patterns of relationships, consistency, and variations in results between studies. A PRISMA flow diagram was used to illustrate the article selection and exclusion process, thereby enhancing transparency and research validity.

Ethical Consideration

This study did not involve human subjects directly, so it did not require ethical approval. However, the entire process was conducted with attention to research ethics, such as academic honesty, respect for intellectual property rights, and the use of legitimate and publicly accessible data sources.

Results

This literature review found 10 research articles that met the inclusion criteria and relevance with a focus on the relationship between obesity and psoriasis. These studies come from various countries (Asia, Europe, and America) with diverse methodological backgrounds and populations, including cross-sectional, case-control, and Mendelian randomization research designs. Using both clinic-based observational approaches and large-scale population genetic data (PASI, BSA, DLQI). Some studies indicate a possible causal and comorbidbidity relationship, while others highlight multifactorial involvement. The following table summarizes the methodological characteristics, research population, and main results of the 10 reviewed articles.

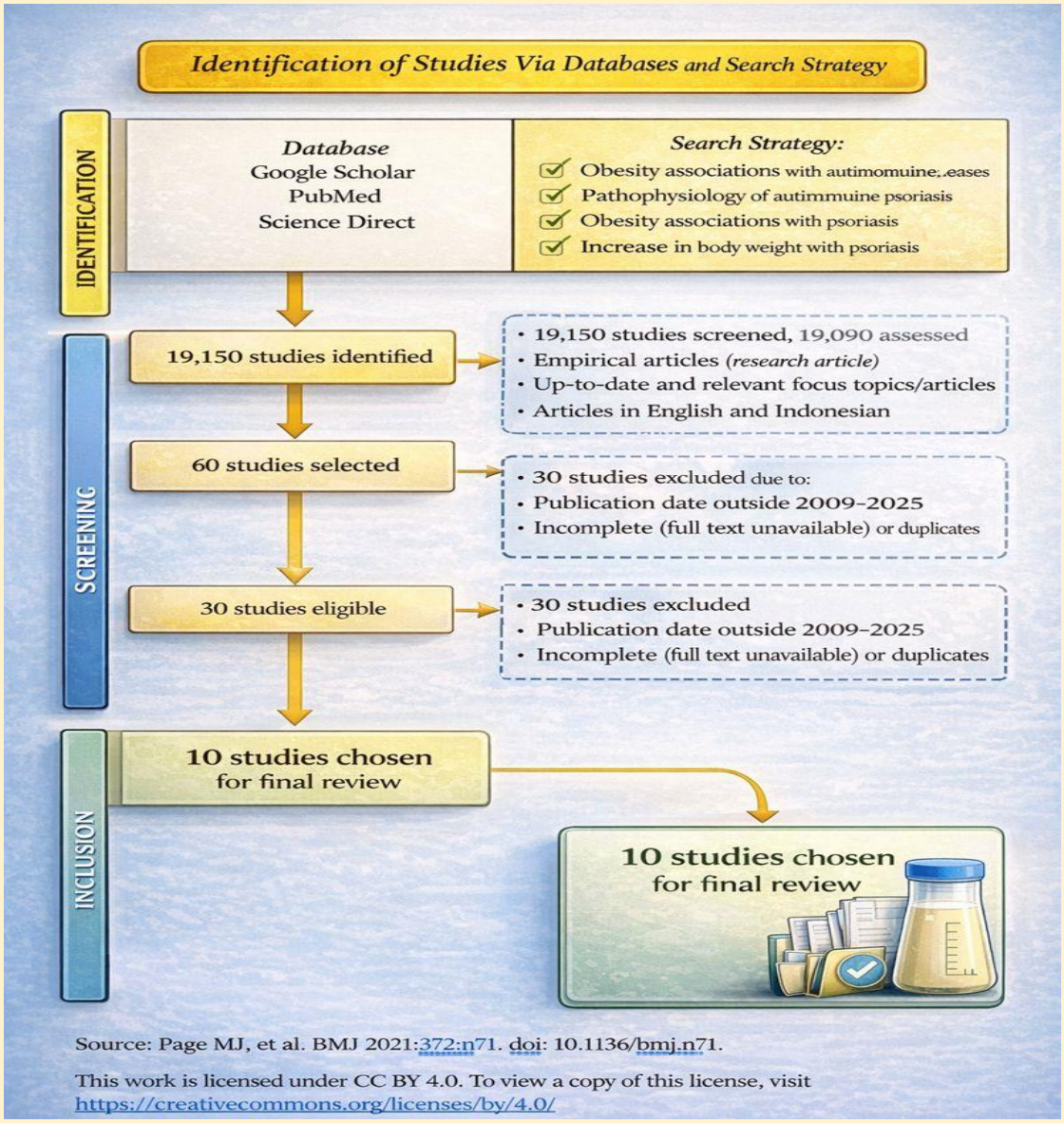

Figure 1. PRISMA literature search flow diagram

Table 1. Literature Review Results

Author	Title	Year	Country	Research Method	Population Characteristics	Research Findings
Budu-Aggrey et al[17]	Evidence of a causal relationship between body mass index and psoriasis: A Mendelian randomization study.	2020	England	Mendelian Randomization (MR)	UK Biobank (for BMI and genetic relationship) 337,000 individuals of European descent, age range 40–69. Data from 2006-2010. GIANT Consortium (for genetic and psoriasis relationship) 322,000 individuals of European descent, age range 40–69. Data from 2010-2015.	Observational data showed psoriasis patients have a higher BMI than controls. Each 1kg/m² increase in BMI increases the risk of psoriasis by 4%. MR analysis showed each 1kg/m² increase in BMI causally increases psoriasis risk by 9%.
Rinaldi et al[18]	Hubungan antar Indeks Massa Tubuh terhadap Skor Psoriasis Area and Severity Indeks pada Pasien Psoriasis di RSUD dr. Soedarso Pontianak.	2015	Indonesia	Cross-sectional	35 psoriasis patients at RSUD dr.Soedarso Pontianak, Jan 2020-July 2022. 23 male, 12 female. 57.14% aged ≥40 years.	Underweight-normal BMI (n=21): Mild-moderate PASI score 19 people, severe-very severe PASI 2 people. Overweight-obese BMI (n=14): Severe-very severe PASI score 14 people. Higher BMI correlates with increased PASI.
Sajjad et al[19]	Relationship between Stress Level, Body Mass Index (BMI), and Smoking Behavior with Severity of Psoriasis at Hospital X in Central Lombok Region	2024	Indonesia	Cross-sectional	52 new psoriasis patients at RS X, Central Lombok, Jan 2023-May 2024. 63.5% male, 38.4% aged 31–40.	Psoriasis severity: Mild 32.7%, Moderate 15.4%, Severe 51.9%. Stress level (p=0.002), BMI (p=0.006), and smoking (p=0.000) were significantly associated with psoriasis severity.
Ahdout et al[20]	Modifiable lifestyle factors associated with metabolic syndrome in patients with psoriasis	2012	USA	Case-control pilot study	65 plaque psoriasis patients (UCLA, 2006-2008), 52 controls. Mean age ~50.	Obesity prevalence (BMI ≥ 30) higher in psoriasis patients (30%) vs controls (18%). Increased BMI correlated with higher PASI (r=0.35, P=0.004). Active smoking increased PASI 3.47 times (P=0.005).
Jacobi et al[21]	Prevalence of Obesity in Patients with Psoriasis: Results of the National Study PsoHealth3	2015	Germany	Cross-sectional	1,265 psoriasis patients (mean age 52; 43.4% female) from 83 practices. Data from 2013/2014.	Mean BMI in psoriasis patients was higher than the general population. The difference in obesity levels between mild and severe psoriasis was less significant, possibly due to systemic therapy improving symptoms.
Wang et al[22]	BMI Matters: Understanding the Link between Weight and Severe Psoriasis	2025	China	Bidirectional Mendelian Randomization (MR) study.	MR: GWAS data 366,776 individuals (BMI), 334 psoriasis, 212,242 controls. Observational: 1,979 new plaque psoriasis patients from 12 hospitals, 2019-2022.	Logistic regression: Each 1-unit BMI increase raised risk of PASI ≥10 by 6%, BSA ≥10% by 6%, DLQI ≥10 by 3%. Linear regression: Each 1-unit BMI increase caused a PASI increase of 0.25 points, BSA 0.34 points, DLQI 0.14 points.
Czarnecka et al[23]	Analysis of Clinical and Genetic Factors of Obesity and Psoriasis Concomitance-The Influence of Body Mass	2023	Poland	Cross-sectional	30 chronic plaque psoriasis patients with underweight or obesity (4F, 26M, age 18-64). 30 overweight/obese controls (10F, 20M, age 21-61).	Psoriasis patients had significantly higher visceral adipose tissue (VAT) levels, especially males. Women with psoriasis had body fat closely related to disease

Author	Title	Year	Country	Research Method	Population Characteristics	Research Findings
	Composition, Prevalence of Mood Disorders, Environmental Factors and FTO Gene Polymorphisms (rs9939609, rs1558902)					severity. Psoriasis patients showed higher rates of moderate to severe depression.
Love et al[24]	Prevalence of the Metabolic Syndrome in Psoriasis: Results From the National Health and Nutrition Examination Survey 2003-2006	2012	USA	Cross-sectional	NHANES 2003-2006 data. 6,549 participants, ~4% (n=260) with psoriasis.	Metabolic syndrome prevalence: 40% in individuals with psoriasis vs 23% without. The most common components: abdominal obesity 62.9%, hypertriglyceridemia 44%, low HDL 33.9%.
Miao et al[25]	Obesity and dyslipidemia in patients with psoriasis: A case-control study	2019	China	Case-control study	222 psoriasis patients (China-Japan Friendship Hospital, 2015-2017), 445 controls matched by age and gender.	Obesity prevalence higher in patient group (20.3%) vs control (11.9%) (P=0.004). Psoriasis can increase obesity risk, but this was not significant after adjusting for confounders. The link with dyslipidemia was more significant.
Wolkenstein et al[26]	Psoriasis in France and Associated Risk Factors: Results of a Case-Control Study Based on a Large Community Survey	2009	France	Community-based case-control	6,887 respondents from a 2005 French survey (68.9% response rate). 356 reported psoriasis (5.2%).	Current and former smoking increased psoriasis risk. High BMI (obesity) increased psoriasis risk, but was a weaker factor than

Discussion

Findings from the analysis of articles from various studies show a consistent tendency towards a positive relationship between high BMI (overweight-obesity) and psoriasis, although there is some variation in study results. A large-scale study based on Mendelian Randomization by Budu-Agrey et al. (2020) in England confirmed a causal relationship between increased BMI and psoriasis. This method is superior because it reduces confounding bias often present in conventional observational studies. This study is limited to populations in North America and Europe, so it cannot be generalized. This study used 97 genetic markers (SNPs) related to BMI to assess their impact on psoriasis and found that each 1kg/m² increase in BMI was associated with an increased odds ratio for psoriasis of 9% (OR 1.09, 95% CI 1.06-1.12; p<0.001)[17]. Significantly, this indicates that obesity is not just correlated but also has the potential to be a direct cause of psoriasis.

Similar results were also found in the Indonesian population context. Rinaldi et al. (2015) conducted a cross-sectional study with psoriasis patient samples at RSUD dr.Soedarso Pontianak and found that an increase in BMI was significantly correlated with an increase in disease severity score based on PASI (Psoriasis Area and Severity Index). Patients with overweight-obesity BMI tended to have higher PASI scores compared to those with normal or underweight BMI (p=0.000)[18]. However, this study used a small sample (n=35) and selected subjects using consecutive sampling without controlling for confounding variables like metabolic status or systemic therapy, which reduces internal validity. The positive correlation between BMI and psoriasis severity was reinforced by a cross-sectional study in Lombok by Sajjad et al. (2024), which noted a relationship between increased BMI and psoriasis severity level (p=0.006), although stress and smoking behavior were also found to be significant co-factors[19]. The strength of the Sajjad et al. study lies in its multivariate approach and the inclusion of psychosocial factors. However, this study only used interviews to measure psoriasis severity, and for stress, it lacked validated measurement tools like DASS or PSS, thus limiting objective clinical assessment.

Nevertheless, some studies highlight that obesity is not the only dominant risk factor. A case-control study by Ahdout et al. (2012) investigated modifiable lifestyle factors, such as diet, stress levels, and physical activity, on metabolic syndrome in psoriasis patients. The results showed that besides obesity, poor nutrition (measured using REAP Score), stress, and smoking behavior also worsened psoriasis severity, as reflected in higher PASI scores among patients with unhealthy lifestyle habits[20]. From this study's results, obesity is often part of a more complex metabolic syndrome where various metabolic factors work together to worsen systemic inflammatory status. As in the study by Love et al. (2012), in the analysis of NHANES 2003-2006 data, they also found that metabolic syndrome occurred in 40% of psoriasis patients, much higher than in individuals without psoriasis (23%). The most common factors included abdominal obesity, hyperlipidemia, and low HDL levels. The odds ratio in multivariate analysis reached 1.96, indicating a strong relationship between psoriasis and metabolic syndrome[24]. The study by Miao et al (2019) reinforces this link, showing psoriasis patients had higher triglyceride and lipoprotein(a) levels compared to the control group, as well as lower HDL and apoA1 levels[25]. The hypothesis that metabolic disorders worsen the clinical manifestations of psoriasis is strengthened by the fact that the high BMI group has a positive correlation with dyslipidemia. This study is strong in its wide

range of metabolic parameters (HDL, TG, ApoA1, and Lp(a)) included, but it did not control for factors like lipid-lowering therapy or food intake[23,24,26]. Thus, although this study shows a significant relationship between metabolic disorders and psoriasis, the lack of control for these confounding variables limits conclusions about direct causality. Nevertheless, these findings still provide strong support for the role of dyslipidemia as a comorbidity that can worsen the clinical condition of psoriasis.

In the PsoHealth3 survey using a large sample and wide geographical representation in the study by Jacobi et al. in Germany (2015), they found that the average BMI of psoriasis patients was 28 kg/m², higher than the population average of 25.9 kg/m² [27]. However, not all obese patients suffered from severe psoriasis, showing clinical variations that may be influenced by environmental or genetic factors. This study also could not assess a causal relationship and did not control for psychological and immunological variables that might be mediators; this is important because psychological factors like chronic stress and abnormal immune systems can worsen inflammation in psoriasis.

The study conducted by Wang et al (2025) in China combined MR (Mendelian Randomization) and multivariate regression methods to explain the relationship between BMI and psoriasis severity. This study used GWAS data to identify the relationship between genetic variation and disease or traits in a large population >360,000 individuals for MR and data from 1,978 psoriasis patients in Chinese hospitals, giving it strength in genomic and clinical data validity. This study also used important clinical and functional indicators for measuring psoriasis severity: PASI, BSA, and DLQI[28]. It also accounted for confounding variables (age, gender, comorbidities, and medication) using linear and logistic regression models. They found that a one-unit increase in BMI was associated with a 0.25-point increase in PASI score and a 6% increased risk of severe psoriasis. Verification of a bidirectional relationship testing whether psoriasis also causes an increase in BMI found no such relationship[29]. So, the results of Wang et al. (2025) show significantly that obesity worsens the clinical severity of psoriasis based on genetic and clinical analysis, and psoriasis was not proven to cause an increase in BMI.

Czarnecka et al (2023) in Poland investigated the relationship between body mass composition and FTO gene polymorphisms (rs9939609, rs1558902) with metabolic control and obesity. This study found that psoriasis patients with high visceral fat distribution also experienced higher moderate to severe depression. The results showed that obesity, mood disorders, and psoriasis have interacting inflammatory and neuropsychiatric pathways[30]. The integration of genetic, psychiatric, and bioimpedance analysis (BIA) elements is a strength of this research. However, the inferential power is limited by the cross-sectional design, which cannot establish a cause-and-effect relationship between variables. The small sample size (n=30 per group), mostly male (86.67%), also limits statistical power and generalizability of results.

However, not all studies yielded the same findings. Wolkenstein et al. (2009) conducted the largest population-based study on psoriasis in France, using a survey of 10,000 people with a 68.9% response rate, and a case-control design with age and gender matching in the community, thus strengthening comparative validity between groups. This study found that obesity is a major risk factor for psoriasis. However, in multivariate analysis, smoking and beta-adrenergic drug use also emerged as stronger factors[26]. This study found that although obesity contributes to psoriasis, it is not the sole primary cause in all populations.

This study found a new interesting finding, namely that statin drugs were associated with a reduced risk of psoriasis, a finding that has not been widely reported before and could open opportunities for new therapeutic research.

Linked to pathophysiological theory, the accumulation of visceral adipose tissue is known to trigger the secretion of various pro-inflammatory cytokines, including TNF-α, IL-6, and leptin. This strengthens evidence that the Th17 and IL-23 inflammatory pathways, responsible for psoriasis, are activated[11-13,27,28]. Inflammatory changes due to obesity and other metabolic disorders can affect lipid and adipokine levels, which play a role in the pathogenesis of psoriasis. This sustained systemic inflammation not only worsens skin conditions but also increases the risk of cardiometabolic comorbidities in patients. In general, the results of the review of ten journals evaluated agree that obesity plays a major role in increasing susceptibility and severity of psoriasis through inflammatory and metabolic pathways. Some clinical and genetic evidence shows that intervention against obesity is an important part of psoriasis treatment, although this applies to certain populations. This includes education on weight management, implementing a healthy lifestyle such as avoiding smoking, psychosocial interventions to manage stress and depression[31,32]. Physical activity, both aerobic and anaerobic, has been proven to significantly improve treatment response and metabolic profile (High Density Lipoprotein (HDL) levels), which plays an important role in cholesterol transport from peripheral tissues to the liver via the Reverse Cholesterol Transport mechanism in psoriasis patients[33,34].

Thus, the results from the assessment of these 10 journals, in general, indicate that obesity is one of the factors consistently found to be related to the severity of psoriasis. Although some are less strong in supporting this result, possibly due to differences in research methods, populations, and samples. The results of this article analysis show the importance of multidisciplinary collaboration between dermatology, endocrinology, and psychiatry is needed to plan comprehensive interventions in holistic psoriasis management.

Conclusion

There is a correlation between obesity and psoriasis, both as a risk factor and a complication, although most evidence supports a relationship between obesity and psoriasis in the context of causality and comorbidity, this link cannot be definitively concluded. Based on the analysis of these studies, it can be concluded that obesity can be a target in psoriasis treatment, based on inflammatory pathways, treatment response, genetic links, and metabolic comorbidities. To improve psoriasis treatment outcomes efficiently, a multidisciplinary approach is very important to achieve good treatment outcomes, such as healthy lifestyle education, weight loss, stress management, and smoking cessation. The diversity of methodologies and design limitations in each study emphasize the importance of more comprehensive, longitudinal, and biomarker-based future research.

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Conflict of Interest Statement

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