

The Analysis Study of Relationship of Psoriasis and Hypertension: A Comprehensive Systematic Review

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ABSTRACT

Background: Psoriasis patients have a higher prevalence of hypertension, a significant risk factor for cardiovascular disease. The association between psoriasis and hypertension is complex, with psoriasis often presenting with additional risk factors. Treatment approaches are complex, and understanding the bidirectional relationship between psoriasis and hypertension is crucial for optimizing treatment strategies and improving patient care. **Methods:** This systematic review adhered to PRISMA 2020 guidelines, focusing exclusively on full-text articles published in English between 2014 and 2024. Editorials and review articles without a DOI were excluded to ensure the utilization of high-quality sources. A literature review was conducted utilizing reputable databases including ScienceDirect, PubMed, and SagePub to identify relevant studies. **Result:** The initial database search yielded over 1,000 relevant publications on the topic. Following a rigorous three-stage screening process, eight studies met the predefined inclusion criteria and were selected for in-depth analysis. Each study underwent a comprehensive critical evaluation, enabling a thorough examination of the relationship between psoriasis and hypertension. This systematic approach ensured that the analysis was grounded in high-quality evidence, closely aligned with the study's objectives, and capable of providing meaningful insights into this complex association. **Conclusion:** Psoriasis and hypertension are linked due to various factors, including confounding variables, shared inflammatory pathways, and treatment-related factors. Further research is needed to understand causal mechanisms and the impact of disease severity on hypertension risk. Understanding these factors will help healthcare providers develop personalized treatment approaches and improve patient outcomes for those affected by both conditions.

Keywords: hypertension, psoriasis, relationship, cardiovascular, inflammatory

INTRODUCTION

Hypertension (HTN) is one of the most prevalent conditions encountered in primary care and a significant modifiable risk factor for severe health complications, including stroke, myocardial infarction, chronic kidney disease (CKD), and mortality.¹ In the United States, approximately 30% of the population is affected by HTN, with its prevalence remaining stable over the past decade.² Extensive research underscores the importance of effective hypertension management in reducing the burden of chronic disease and improving overall health outcomes.³ Despite advancements in treatment, HTN continues to be a major public health concern, necessitating further investigation into its contributing factors, including its association with other chronic conditions.

A growing body of evidence indicates that patients with psoriasis have a higher prevalence of HTN compared to the general population. This association was first identified in a landmark survey by Farber in 1968, with numerous subsequent studies confirming the link between psoriasis and elevated blood pressure.^{4,5} Cardiovascular disease (CVD), a major consequence of hypertension, is a leading cause of increased morbidity and mortality among individuals with psoriasis.⁵ Moreover, patients with psoriasis often present with additional risk factors for HTN, including obesity, diabetes, tobacco use, and alcohol consumption, further complicating the understanding of their relationship.^{6,7} The interplay of these factors makes it challenging to isolate psoriasis as an independent risk factor for HTN and adds complexity to treatment approaches.

Hypertension is frequently underdiagnosed and inadequately treated in individuals with psoriasis, contributing to poorer cardiovascular outcomes.^{7,8} Additionally, patients with psoriasis often experience more severe HTN, requiring multiple antihypertensive medications for adequate blood pressure control.⁹ Certain psoriasis treatments, such as cyclosporine, have been found to exacerbate hypertension, while some antihypertensive drugs have been reported to trigger psoriasis flares, complicating disease management further.¹⁰ Given these

interactions, understanding the bidirectional relationship between psoriasis and HTN is crucial for optimizing treatment strategies. This review aims to synthesize current evidence on the association between psoriasis and hypertension, providing insights that can inform clinical decision-making and improve patient care.

METHODS

Protocol

This study was conducted in strict accordance with the PRISMA 2020 guidelines, ensuring methodological precision and high research quality. By adhering to these comprehensive protocols, the review maintained transparency, reproducibility, and scientific rigor throughout. Key procedures, such as thorough literature searches, precise data extraction, and systematic synthesis of findings, were meticulously executed to minimize bias. This rigorous approach strengthens the study's credibility and reliability, reinforcing its contribution to evidence-based research.

Criteria for Eligibility

This study aims to evaluate the relationship between psoriasis and hypertension by systematically reviewing and synthesizing data from a diverse range of studies. By identifying patterns and emerging trends in the existing literature, the research seeks to provide valuable insights that can inform more effective diagnostic approaches and patient care strategies. The overarching goal is to enhance the understanding of the association between psoriasis and hypertension, ultimately contributing to improved clinical outcomes for affected individuals.

To ensure analytical rigor, the study employed strict inclusion and exclusion criteria. Only peer-reviewed articles published in English between 2014 and 2024 were considered, with each study's authenticity verified through DOI validation. To maintain a focused and high-quality dataset, non-research materials such as reviews, editorials, and duplicate entries were excluded. This meticulous selection process strengthens the reliability of the analysis by ensuring that the findings are based on relevant and credible sources.

By implementing a systematic and comprehensive methodology, the study ensures that its conclusions are supported by robust evidence. The anticipated findings aim to advance the current understanding of the link between psoriasis and hypertension, providing a foundation for improved clinical management. Ultimately, this research aspires to drive advancements in patient care and contribute to better health outcomes for individuals affected by both conditions.

Search Strategy

A rigorous search strategy was employed to identify relevant studies for this systematic review, utilizing the key terms "psoriasis," "hypertension," "hypertensive disease," and "relationship." The search was conducted across three major academic databases—PubMed, SagePub, and ScienceDirect—to ensure a comprehensive and in-depth exploration of the topic. This systematic approach facilitated the selection of diverse, high-quality sources, strengthening the evidence base for analysis and enhancing the reliability and validity of the review's findings.

Table 1. Search Strategy

Database	Search Strategy	Hits
Pubmed	("psoriasis" AND "hypertension" AND "relationship")	126
Science Direct	("psoriasis" AND "hypertension" OR "hypertensive disease" AND "relationship")	80
Sagepub	("psoriasis" AND "hypertension" AND "relationship")	988

Data retrieval

The authors conducted a meticulous preliminary review of each article, systematically assessing titles and abstracts to determine their relevance before proceeding with a detailed analysis. Only studies that aligned with the research objectives and met the predetermined inclusion criteria were selected for further examination. This structured and methodical approach facilitated the identification

of consistent and meaningful patterns across the literature, ensuring a targeted focus on studies directly relevant to the research question.

To maintain uniformity and enhance comparability, only full-text articles published in English were included in the analysis. A rigorous screening process was implemented to verify that all selected studies adhered to the established inclusion criteria and effectively addressed the study's objectives. Articles failing to meet these standards were excluded, ensuring a precise, high-quality dataset that remained closely aligned with the research focus.

The evaluation process encompassed a comprehensive assessment of multiple factors, including study titles, authorship, publication dates, research locations, and methodologies. This thorough review ensured the inclusion of only the most relevant and reliable studies. By employing a systematic and robust selection process, the authors enhanced the credibility and rigor of the findings, providing a strong foundation for drawing reliable and actionable conclusions.

Quality Assessment and Data Synthesis

The authors employed a meticulous initial screening process, systematically evaluating the titles and abstracts of each article to identify studies relevant for further analysis. Only those meeting predefined relevance and quality criteria were selected for a comprehensive, in-depth review. This rigorous approach ensured the inclusion of high-quality studies that directly aligned with the research objectives. By refining the selection process, the authors curated a dataset composed of contextually significant and methodologically robust studies. This strategy not only enhanced the precision and focus of the analysis but also reinforced the overall quality, relevance, and scientific rigor of the review.

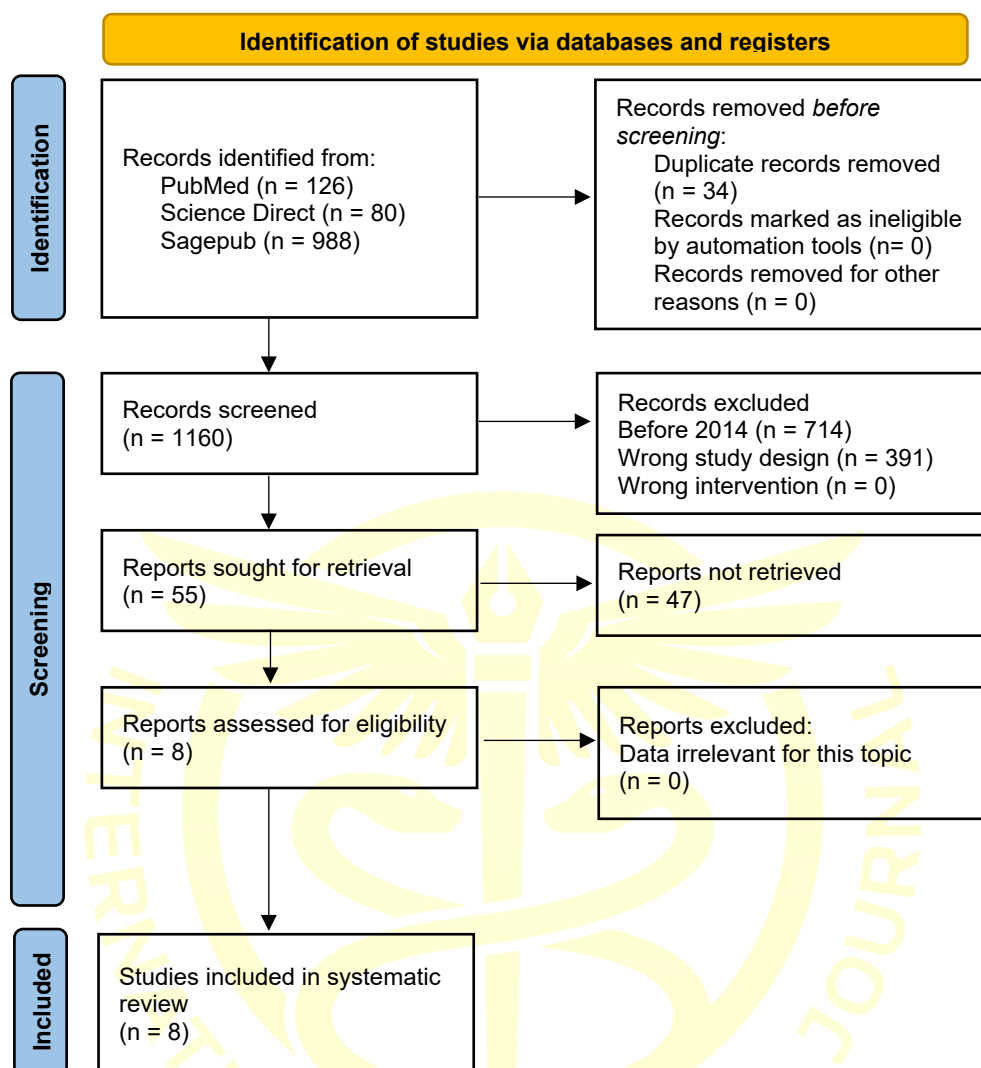


Figure 1. Article search flow chart

Table 2. Critical appraisal of Study

Parameters	(Salih begovic et al., 2015)	(Take shita et al., 2015)	(Kim et al., 2018)	(deShazo et al., 2020)	(Duan et al., 2020)	(Hu et al., 2020)	Masson et al., 2020)	(Gumilang et al., 2021)
1. Bias related to temporal precedence								
Is it clear in the study what is the “cause” and what is the “effect” (ie, there is no confusion about which variable comes first)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Bias related to selection and allocation								
Was there a control group?	No	No	No	No	No	No	No	No
3. Bias related to confounding factors								
Were participants included in any comparisons similar?	Yes	Yes	Yes	No	Yes	No	No	Yes
4. Bias related to administration of intervention/exposure								
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes.	Yes.	Yes.	No.	Yes.	No.	No.	Yes.
5. Bias related to assessment, detection, and measurement of the outcome								
Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	No	No	No	No	No	No	No	No
Were the outcomes of participants included in any comparisons measured in the same way?	Yes	No	Yes	No	No	No	No	No
Were outcomes measured in a reliable way?	Yes	Yes	Yes	No	Yes	No	No	Yes
6. Bias related to participant retention								
Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	Yes	No	Yes	No	No	No	No	No
7. Statistical conclusion validity								
Was appropriate statistical analysis used?	Yes	Yes	Yes	No	Yes	No	No	Yes

RESULT

The investigation began with a systematic search of reputable academic databases, including ScienceDirect, PubMed, and SagePub, to identify studies relevant to the review. A rigorous three-stage screening process was employed to filter and select the most pertinent studies, ultimately refining the selection to eight papers that met the predefined inclusion criteria. These studies underwent a comprehensive analysis, with key topics meticulously extracted for in-depth examination. To enhance clarity and facilitate effective presentation, the findings are succinctly summarized in Table 3, offering a well-structured and concise overview of the analyzed data.

Table 3. The literature included in this study

Author	Origin	Method	Sample	Result
Salihbegovic et al.¹¹ (2015)	Bosnia & Herzegovina	Retrospective Study	70 participants	Psoriasis is a common condition causing high blood pressure, with an average age of 53.79 years and duration of 17.19 years. The severity of psoriasis is strongly associated with increased PASI score values, indicating a correlation between the two. This suggests a significant link between psoriasis and high blood pressure.
Takeshita et al.¹² (2015)	Japan	Cross Sectional	1,322 participants	Psoriasis is associated with a greater likelihood of uncontrolled hypertension in a dose-dependent manner, with the greatest likelihood observed among those with moderate to severe psoriasis. This suggests a need for more effective blood pressure management, particularly among patients with more severe psoriasis, as the severity of psoriasis can significantly impact the

				likelihood of uncontrolled hypertension.
Kim et al.¹³ (2018)	Korea	Cohort	256,356 participants	A nationwide study of 256,356 adults found that hypertension was significantly associated with an increased risk of psoriasis incidence. The hypertension group had a higher risk of psoriasis, even after adjusting for comorbidities, antihypertensive medication, and sociodemographic factors. Further studies are needed to confirm this association.
deShazo et al.¹⁴ (2020)	USA	Review	-	Psoriasis is a common dermatologic diagnosis in the US, with hypertension being more prevalent and severe. Dermatologists should be aware of appropriate screening, diagnosis, and initial hypertension management in this population to improve morbidity and mortality.
Duan et al.¹⁵ (2020)	China	Systematic Review	16 studies	Psoriasis is associated with an increased risk of hypertension, as demonstrated by a systematic review of 16 studies. The prevalence of hypertension in severe psoriasis patients was higher than in mild psoriasis patients. The risk of hypertension in psoriasis patients was also higher than in nonpsoriasis patients in Europe and Asia.
Hu et al.¹⁶ (2020)	China	Review	-	Psoriasis, a chronic skin disease with recurrent

				inflammation, is linked to cardiovascular events, metabolic syndrome, diabetes, obesity, and hypertension. Severe cases of psoriasis have a higher risk of hypertension, particularly difficult-to-control hypertension. Overexpression of pathogenic cytokines in psoriasis leads to immune cascade, oxidative injury, and collagen deposition in arteries. Antipsoriatic drugs, including immunosuppressants, have shown beneficial effects on blood pressure and the cardiovascular system.
Masson et al.¹⁷ (2020)	Argentina	Review	-	Psoriasis, a systemic inflammatory disorder, increases cardiovascular risk due to its association with traditional cardiovascular risk factors and metabolic abnormalities. Understanding these risk factors and implementing effective cardiovascular prevention strategies can help manage this risk in patients with psoriasis.
Gumilang et al.¹⁸ (2021)	Indonesia	Cross Sectional	28 participants	Psoriasis and hypertension have a significant association, as evidenced by a correlation coefficient of 0.757, indicating a strong correlation between the two variables, indicating a significant correlation.

DISCUSSION

The relationship between psoriasis and hypertension is influenced by numerous confounding factors. Psoriasis itself can contribute to stress, anxiety, and depression, which may lead to unhealthy lifestyle choices such as smoking, excessive alcohol consumption, and physical inactivity—factors that are known to contribute to abnormal blood pressure regulation. Additionally, certain medications used in psoriasis treatment, such as cyclosporine and compound glycyrrhizin, have been shown to impact blood pressure levels, further complicating the association between the two conditions.^{19,20} Other metabolic disorders, including diabetes mellitus and metabolic syndrome, are also recognized as confounders in the link between psoriasis and hypertension.²¹ A previous meta-analysis by Armstrong et al. in 2016 identified 24 observational studies with approximately 2.7 million participants, evaluating the effect of psoriasis on hypertension. However, the meta-analysis had limitations, as many included studies did not fully adjust for critical confounders such as obesity and smoking.²²

The underlying mechanisms linking psoriasis and hypertension remain unclear; however, both conditions share common inflammatory pathways. Psoriasis is a chronic inflammatory skin disease mediated by T lymphocytes. While its exact etiology is still not fully understood, it is widely recognized as a condition that significantly impacts patients' quality of life.²³ Hypertension, conversely, is a complex clinical syndrome influenced by genetic, environmental, and lifestyle factors, characterized by persistent elevation of systemic arterial blood pressure. As a major risk factor for cardiovascular and cerebrovascular diseases, including coronary artery disease and stroke, hypertension poses a significant global health burden.²⁴ Given that both psoriasis and hypertension are chronic diseases with high prevalence rates, it is recommended that all patients diagnosed with psoriasis undergo routine screening for hypertension.¹⁵ However, despite the growing recognition of their coexistence, the precise biological mechanisms underlying their association remain poorly understood, necessitating further investigation.

Recent research on the correlation between psoriasis and hypertension has been a topic of increasing interest in both dermatology and internal medicine. Multiple epidemiological studies, basic research, cohort studies, cross-sectional studies, and case-control studies have explored this association.¹⁵ Several studies have proposed potential biological mechanisms linking psoriasis and hypertension, including systemic endothelial dysfunction, increased oxidative stress, and dysregulation of the renin-angiotensin system.^{25,26} Findings from a meta-analysis study indicated a higher prevalence of hypertension among psoriasis patients, with both mild and severe psoriasis being associated with elevated blood pressure.²² Additionally, a study conducted in the Middle East reported that severe psoriasis correlated more strongly with hypertension compared to mild psoriasis, suggesting that the severity of psoriasis may directly influence hypertension risk.²⁷ However, a population-based study in the United Kingdom found no significant trend between psoriasis severity and hypertension.²⁸ Thus, there is a need for further research to elucidate the correlation between psoriasis

Hypertension prevalence varies worldwide, ranging between 10% and 20% of the global population. In general, hypertension is more common among individuals of European descent, followed by Asian populations, with a lower prevalence observed in African populations. Additionally, the incidence of hypertension is often higher in economically developed regions, high-altitude areas, and populations with high-salt diets.²⁹ Despite these known geographic variations, there is limited research examining the effect of regional differences on the incidence of hypertension among psoriasis patients. A study in 2020 indicates that psoriasis is associated with an increased risk of hypertension, particularly in European and Asian populations. However, due to the lack of population stratification based on ethnic origin in the included studies, it was unable to analyze the correlation between psoriasis and hypertension across different racial and ethnic groups.¹⁵ Future well-designed studies should aim to address this gap and provide more definitive evidence regarding regional and ethnic variations in this association.

In addition to geographic factors, medication effects must also be considered when evaluating the relationship between psoriasis and hypertension. Certain systemic treatments for psoriasis, particularly cyclosporine, have been linked to elevated blood pressure levels, posing an additional risk for hypertension in these patients. Conversely, some antihypertensive drugs, such as beta-blockers and angiotensin-converting enzyme inhibitors, have been reported to exacerbate psoriasis symptoms, creating challenges in the management of both conditions.^{19,20} This bidirectional interaction between psoriasis treatment and hypertension management highlights the importance of an individualized therapeutic approach to minimize adverse effects and optimize patient outcomes. Given these complexities, interdisciplinary collaboration between dermatologists and cardiologists is crucial for developing tailored treatment plans that address both conditions effectively.

CONCLUSION

In conclusion, the association between psoriasis and hypertension is multifaceted, influenced by confounding variables, shared inflammatory pathways, and treatment-related factors. While epidemiological studies provide strong evidence linking these two conditions, further research is necessary to establish causal mechanisms and determine the impact of disease severity on hypertension risk. Additionally, regional and ethnic differences in hypertension prevalence among psoriasis patients warrant further investigation. A deeper understanding of these factors will enable healthcare providers to develop more precise screening strategies and personalized treatment approaches, ultimately improving patient outcomes for individuals affected by both psoriasis and hypertension.

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