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REVIEW

Effectiveness and Safety of Antidiabetic Medications in Hidradenitis Suppurativa: A Systematic Review

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Purpose: Hidradenitis suppurativa (HS) is a chronic inflammatory skin condition often linked with metabolic dysfunction and insulin resistance. Antidiabetic medications have been explored as adjunctive therapies due to their anti-inflammatory and anti-androgenic effects. This systematic review evaluated the effectiveness and safety of antidiabetic agents in HS management.

Patients and Methods: A comprehensive search was conducted in PubMed, Scopus, Web of Science, CINAHL Ultimate, and Google Scholar. Eligible studies assessed the efficacy or safety of antidiabetic drugs in HS patients. Fifteen studies, comprising 3721 participants, met inclusion criteria.

Results: Metformin was the most studied drug, included in 10 studies. Several investigations showed reductions in HS lesion counts, flare frequency, and disease severity scores (Hurley stage, Sartorius score, Visual Analog Scale). Quality of life improvements, measured by the Dermatology Life Quality Index (DLQI), were observed with metformin, liraglutide, and tirzepatide. Gastrointestinal side effects were the most frequently reported, particularly with metformin. However, no severe or unexpected adverse events were linked to GLP-1 receptor agonists or SGLT2 inhibitors.

Conclusion: Overall, antidiabetic medications, especially metformin and GLP-1 receptor agonists, appear beneficial for HS. They may reduce disease severity and improve quality of life while maintaining a favorable safety profile. Nevertheless, additional high-quality randomized controlled trials are urgent to confirm these findings.

Keywords: hidradenitis suppurativa, antidiabetic agents, metformin, GLP-1 receptor agonists, SGLT2 inhibitors

Introduction

Hidradenitis Suppurativa (HS) is a chronic inflammatory skin disease characterized by painful, deep nodules, abscesses, and sinus tracts, typically affecting areas such as the axillary, inguinal, mammary, and anogenital regions.[1] In addition to physical symptoms, HS significantly impairs psychological well-being and overall quality of life.[2] A systematic review and meta-regression analysis estimated a global prevalence of 0.4%.[3] Clinical studies have suggested a higher prevalence (1.7%) compared to population-based studies (0.3%).[3] Recent studies have demonstrated that individuals with HS are more likely to develop metabolic disorders, including obesity, type II diabetes, and dyslipidemia, than the general population. These metabolic abnormalities contribute to chronic systemic inflammation, which plays a critical role in HS progression and may be exacerbated by adipose tissue dysfunction and insulin resistance.[4] Although the exact pathogenesis of HS remains unclear, the condition is widely considered multifactorial, involving genetic, hormonal, environmental, and immunological factors.[5] HS typically manifests after puberty and is more prevalent in females, particularly in Western countries.[1]

Mild cases of HS may be managed with lifestyle modifications, such as weight loss, and topical therapies, which are considered first-line treatments. Systemic retinoids, such as acitretin, are recommended as second-line options, while

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third-line therapies may include hormonal agents, which include antiandrogens and insulin-sensitizing drugs such as metformin.[6] In moderate cases, biologic therapies have demonstrated efficacy,[7] alongside laser and surgical interventions. Considering the role of inflammation, obesity, and insulin resistance in HS pathogenesis, antidiabetic medications can potentially offer superior symptom control compared to some conventional treatments.[8] Although these agents are primarily prescribed to regulate blood glucose levels in diabetic patients, they also possess anti-inflammatory properties that may benefit individuals with HS. Several classes of antidiabetic medications, including metformin, sodium-glucose cotransporter-2 (SGLT2) inhibitors, and glucagon-like peptide-1 (GLP-1) receptor agonists, have been investigated for their potential role in HS management.[9–11]

Metformin acts via multiple mechanisms: it reduces hepatic gluconeogenesis, enhances glucose uptake in muscle tissues, and decreases intestinal glucose absorption. Additionally, it improves insulin sensitivity, promotes weight loss, and reduces hyperandrogenism, making it effective in conditions such as polycystic ovary syndrome (PCOS).[12,13] Metformin has also been shown to lower levels of pro-inflammatory cytokines implicated in HS pathogenesis.[13] Similarly, GLP-1 receptor agonists may improve chronic inflammatory skin conditions by reducing systemic inflammation and improving insulin sensitivity.[10] SGLT2 inhibitors have also been explored for HS treatment; in one study, Cheng et al[14] reported that SGLT2 inhibitors use significantly reduced obesity, all-cause mortality, and skin disease-associated inflammation. The application of antidiabetic medications in HS treatment is a relatively novel concept, and no formal guidelines or standardized recommendations currently exist. The available evidence primarily consists of small-scale studies[11,15] and case reports, which provide limited and inconclusive support. As such, a systematic evaluation of the existing literature is essential to assess the efficacy, optimal dosing, and safety profile of antidiabetic therapies in HS management.

HS is increasingly recognized as a systemic, immunometabolism inflammatory disease in which obesity, insulin resistance, and related metabolic comorbidities may amplify inflammatory signaling and worsen clinical severity. Meta-analyses demonstrate that HS is associated with metabolic syndrome and diabetes mellitus, supporting the biologic plausibility of targeting metabolic inflammation as an adjunctive therapeutic strategy.[16] Consequently, antidiabetic agents, especially metformin and incretin-based therapies, have attracted interest in HS not only for their metabolic benefits (weight reduction and improved insulin sensitivity) but also for potential anti-inflammatory effects. Early clinical reports and small observational studies suggest that GLP-1 receptor agonists (eg, liraglutide and semaglutide) and metformin may improve disease control and quality-of-life outcomes in selected patients, although the current evidence is limited in scale, heterogeneous in outcomes, and largely nonrandomized.[11,14,15]

The objective of this systematic review is to evaluate and synthesize the current evidence regarding the efficacy and safety of antidiabetic medications in the treatment of HS.

Materials and Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The review protocol was prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO) under registration number 1035025.

Search Strategy

A comprehensive literature search was performed across several databases, including PubMed, Scopus, Web of Science, CINAHL Ultimate, and Google Scholar. The reference lists of included studies and relevant review articles were also manually screened to capture any studies not retrieved through database searches. The search strategy included terms related to hidradenitis suppurativa, such as “Hidradenitis Suppurativa” and “Acne Inversa”, and antidiabetic agents, such as “metformin”, “GLP-1 receptor agonist”, “thiazolidinedione”, “SGLT2 inhibitor”, and “antidiabetic medication”. Full search terms and combinations are detailed in Appendix 1.

Study Eligibility

The PICOS framework for this systematic review were as follows:

Population (P): Patients of any age and sex with a clinical or guideline-based diagnosis of HS;

Intervention (I): Use of any antidiabetic medication (eg, metformin, liraglutide, pioglitazone, and dapagliflozin);

Comparison (C): Placebo, standard-of-care HS treatments (eg, antibiotics and biologics), or other non-antidiabetic interventions;

Outcomes (O): Improvement in HS clinical symptoms, disease severity scores, quality of life (eg, DLQI), and incidence of adverse events; and

Study design (S): Original human studies, including randomized controlled trials, non-randomized trials, cohort studies, and case-control studies.

The studies included reported on at least one of the predefined efficacy or safety outcomes. These studies included those that compared antidiabetic medications with placebo, standard HS therapies, and alternative interventions. Only full-text articles published in English were included. Studies were excluded if they were conference abstracts without full data, review articles, editorials, animal studies, or in vitro experiments. Studies were also excluded if they lacked extractable HS-related efficacy or safety data or if they included duplicated or overlapping cohorts.

Study Selection and Data Extraction

Following the database search, all records were exported to Rayyan, a web-based platform designed to facilitate systematic reviews.[17] Prior to screening, duplicate records were identified and removed. Two independent reviewers (RE and AB) conducted the study selection and data extraction process. Initially, records were screened based on titles and abstracts. Both reviewers were blinded to each other's decisions during this screening phase. After the initial screening, blinding was removed, and decisions were compared. Any discrepancies were resolved through consensus or, if necessary, by consultation with a third reviewer. Data from the included studies were extracted using a pre-piloted Excel spreadsheet. Extracted information included study characteristics, participant demographics, intervention details, efficacy outcomes, and safety outcomes.

Risk of Bias Assessment

Two reviewers independently assessed the risk of bias, with disagreements resolved by a third reviewer. For observational studies, the Newcastle–Ottawa Scale (NOS) was used to evaluate study quality across three domains: selection, comparability, and outcome. For case reports and case series, the Joanna Briggs Institute (JBI) Critical Appraisal Checklist was applied. This tool assesses methodological quality across several key domains, including the clarity of patient demographics and clinical history, description of the presenting condition, diagnostic tests or assessments, treatment interventions or treatment procedures, post-intervention outcomes, adverse events or unanticipated outcomes, and conclusions or lessons learned.

Results

Included Studies

The initial database search yielded 1799 records, including 103 from PubMed, 133 from Web of Science, 3 from CINAHL Ultimate, and 1526 from Scopus. An additional 34 studies were identified through Google Scholar. After removal of 243 duplicates and screening according to predefined inclusion and exclusion criteria, 15 studies met eligibility requirements and were included in this systematic review. Figure 1 presents the PRISMA flow diagram outlining the study selection process.

Across the included studies, a total of 3721 participants were evaluated. Sample sizes varied considerably, ranging from single-patient case reports to a large population-based cohort study including 3394 individuals. Study designs comprised prospective studies, retrospective chart reviews, cohort studies, a case-control study, cross-sectional observational research, and five case reports. Metformin was the most frequently investigated antidiabetic agent (10/15 studies), while other therapies included liraglutide, semaglutide, tirzepatide, and sodium-glucose cotransporter-2 (SGLT2) inhibitors. Summary and baseline characteristics of included studies are demonstrated in Table 1.

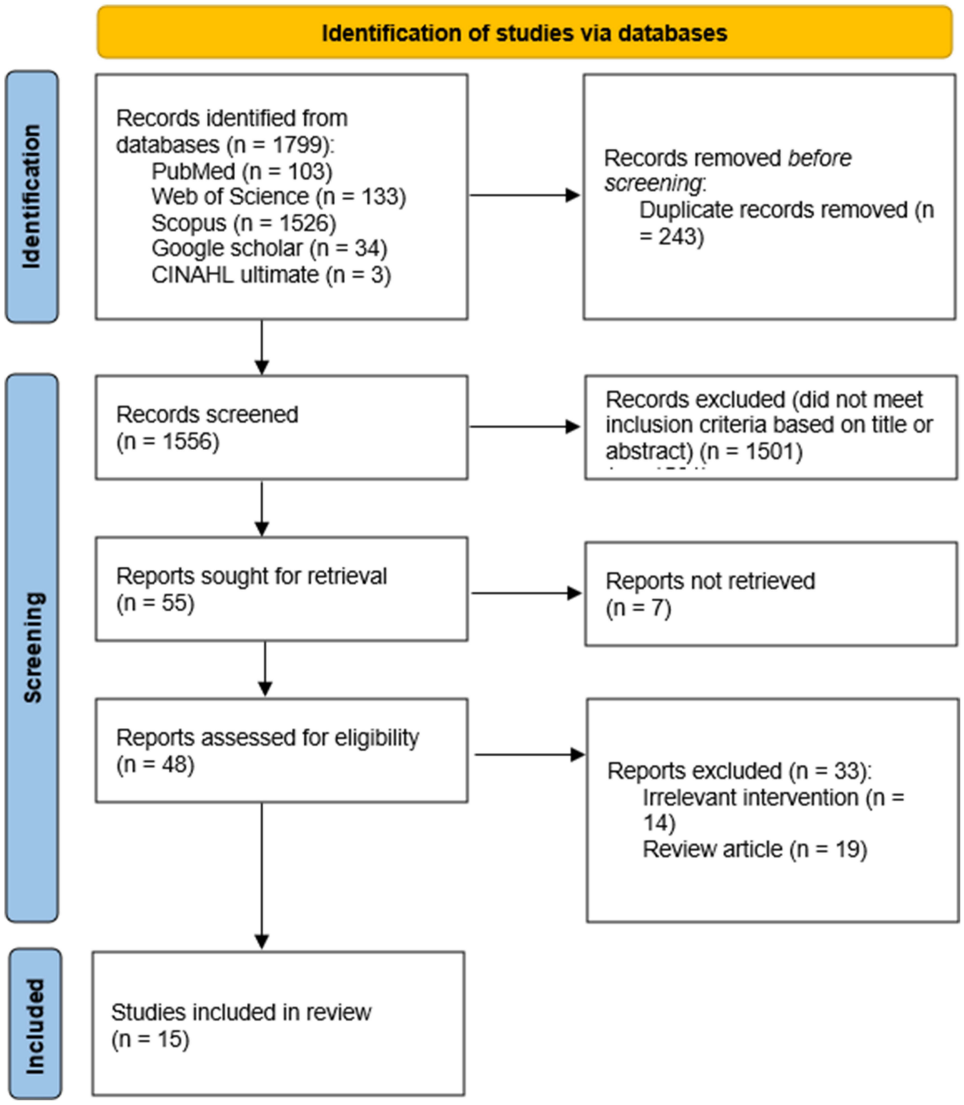

Figure 1 PRISMA Flowchart.

Clinical Improvement in HS Symptoms

Most studies reported measurable improvement in hidradenitis suppurativa (HS) clinical manifestations following antidiabetic therapy. Metformin demonstrated clinical benefit in several investigations. Jennings et al reported symptom improvement in 68% of patients over a 12-month period. Jabur observed notable improvements during 12 months of follow-up, while Moussa et al described reduced flare frequency in 5 of 16 patients alongside overall clinical improvement. Verdolini et al22 found clinical improvement in 18 of 25 patients, with a mean reduction in Sartorius score of 12.7 points. Similarly, Gandhi et al and Arun and Loffeld reported reduced flare frequency and symptom severity in individual case reports, although recurrence was noted after treatment discontinuation in the latter study.

Prospective data from Segura Palacios et al over 24 weeks did not demonstrate improvement in Physician's Global Assessment scores, despite improvements in other outcomes. Sanz et al reported partial metabolic improvement but limited dermatologic benefit, with only two patients achieving a ≥30% reduction in Sartorius score and two discontinuing therapy due to worsening flares. GLP-1 receptor agonists showed promising results. Nicolou et al reported significant improvements in skin lesions and metabolic parameters with liraglutide, including a statistically significant reduction in Hurley stage ($p = 0.002$). Drumm et al described marked improvement in objective and subjective clinical scores after six months of semaglutide therapy without reported adverse effects. Chan and Kaffenberger observed reduction in

Table 1 Summary of the Studies Included and Observed Outcomes

Author(s)	Year	Type of Study	Number of Participants	Antidiabetic Medication	Follow-Up Period	Improvement in HS Symptoms	Reduction in Disease Severity	Improvement in Quality of Life	Adverse Events	Final Remarks
Nicolou et al[18]	2024	Prospective study	14	Liraglutide	N/A	Improvements in skin lesions and ameliorated metabolic conditions were observed.	Hurley stage improved significantly ($p = 0.002$).	DLQI was observed to have improved significantly ($p = 0.04$).	N/A	3 mg liraglutide is a safe and effective option for patients with HS and obesity.
Chan and Kaffenberger[19]	2024	Case study	1	Tirzepatide	N/A	There was a decrease in the number of lesions from baseline 1 abscess to 0 and baseline 4 inflammatory nodules to 3. There were no draining inflammatory fistulas.	VAS decreased from 3 to 1, and Hidradenitis Suppurativa Physician's Global Assessment score changed from 3 (severe) to 2 (mild).	DLQI was observed to have decreased from 14 to 3.	N/A	She lost 16% of her body weight and had an improved glycemic control and lipid profile.
Cheng et al[14]	2024	Population-based cohort study	3394	SGLT2 inhibitor	6 years	N/A	N/A	There was a low risk of obesity and emergency visits, contributing to the improved quality of life.	N/A	SGLT2 inhibitor treatment in HS patients and concomitant T2DM was associated with reduced all-cause mortality, risk of obesity, cardiorenal complications, and emergency visits.
Hambly et al[20]	2023	Case-control study	40	Metformin	N/A	Metformin improved insulin resistance and cardiovascular risk biomarkers. Serum adipokines and CRP, however, saw an increase.	N/A	N/A	N/A	Metformin was observed to be effective against HS.

(*Continued*)

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Table 1 (Continued).

Author(s)	Year	Type of Study	Number of Participants	Antidiabetic Medication	Follow-Up Period	Improvement in HS Symptoms	Reduction in Disease Severity	Improvement in Quality of Life	Adverse Events	Final Remarks
Drumm et al[21]	2023	Case study	1	Semaglutide	6 months	There were significant improvements in clinical outcomes.	N/A	N/A	No adverse effects were reported	There was a significant improvement in both objective and subjective clinical scores in patients with HS.
Petrasca et al[22]	2023	Cross-sectional observational study	116	Metformin	N/A	Improved peripheral blood mononuclear cells and inflammatory markers were noted.	N/A	N/A	N/A	Metformin was observed to reduce the expression of inflammatory chemokines, cytokines, and glycolytic genes in lesions and tracts of patients with HS.
Gandhi et al[23]	2021	Case study	1	Metformin	1 week	Improved outcomes were observed.	N/A	N/A	N/A	Metformin was found to be effective against HS.
Segura Palacios et al[24]	2021	Prospective study	27	Metformin	24 weeks	There was no improvement in the physician's global assessment.	N/A	DLQI reduced significantly (median: 13 to 9, P = 0.001).	Three patients had gastrointestinal complaints.	N/A
Jennings et al[25]	2020	Retrospective chart review	53	Metformin	12 months	Metformin was observed to improve HS symptoms in 68% of the patients.	N/A	N/A	The majorly observed side effect was gastrointestinal (in 11% of the patients).	Metformin was found to be an effective and well-tolerated option in the treatment of HS patients.
Jabur[26]	2019	Cohort study	20	Metformin	12 months	There were notable improvements.	N/A	N/A	Gastrointestinal side effects were observed in 40% of the patients.	Metformin was an efficient and safe oral therapy for the treatment of HS.

Moussa et al[27]	2020	Retrospective chart review	16	Metformin	N/A	There was a decrease in the frequency of flares in 5 patients.	There was improvement.	N/A	Mood changes and gastrointestinal distress were observed in two patients.	Metformin is an effective adjunctive therapy that improves HS symptoms with minimal side effects.
Sanz et al[28]	2017	Cohort study	11	Metformin	24 weeks	Glucose tolerance normalization was observed in 5 patients, while 2 discontinued treatment due to increased severity of flares.	Sartorius's score was found to be reduced by ≥ 30% in 2 patients.	Four patients presented a DLQI improvement (reduction of 5.5 median points), while 4 presented an increase in DLQI (median 4.2 increase in points).	Mild gastrointestinal discomfort was reported.	Metformin was ineffective at improving the outcomes.
Khandalavala[29]	2017	Case study	1	Liragltutide and metformin	3 years	All the metabolic and hematological abnormalities in HS patients were completely resolved. Flares were also diminished.	The intensity and duration of the flares diminished.	N/A	N/A	A combination treatment involving antidiabetic and other types of medications successfully improved the abnormalities related to HS.
Verdolini et al[15]	2013	Prospective study	25	Metformin	24 weeks	There were improvements.	Clinical improvements were seen in 18 patients, with an average reduction in Sartorius score of 12.7 (used to measure the severity).	Sixteen patients exhibited a significant improvement, with a drop in the DLQI score by 7.6.	N/A	Metformin was observed to control the symptoms of HS with minimal side effects and good patient compliance.
Arun and Loffeld[12]	2009	Case study	1	Metformin	4 months	There were less frequent and shorter flares at 3 months with no leaking and reduced pain.	N/A	N/A	None	Recurrence of flare occurred after the discontinuation of metformin.

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inflammatory nodules and complete resolution of abscesses in a patient treated with tirzepatide, accompanied by improvements in pain and physician global assessment scores.

The population-based cohort study by Cheng et al, which evaluated SGLT2 inhibitors over six years, did not primarily focus on lesion counts but demonstrated broader health benefits, including reduced obesity rates, emergency visits, cardiorenal complications, and all-cause mortality in patients with concomitant type 2 diabetes mellitus.

Disease Severity Outcomes

Disease severity was assessed using validated tools including Hurley staging, Sartorius score, Visual Analog Scale (VAS), and Physician's Global Assessment. Significant reductions in severity were reported with liraglutide in Nicolou et al (Hurley stage improvement, $p = 0.002$). Verdolini et al demonstrated a substantial decrease in Sartorius score, while Chan and Kaffenberger noted improvement in both VAS (3 to 1) and Hidradenitis Suppurativa Physician's Global Assessment (from severe to mild). Metformin showed variable effects on disease severity. While several studies documented reductions in flare frequency and inflammatory burden, others reported modest or inconsistent changes in standardized severity scores.

Quality of Life Outcomes

Quality of life was commonly assessed using the Dermatology Life Quality Index (DLQI). Significant improvements in DLQI were observed in multiple studies. Verdolini et al reported a mean reduction of 7.6 points after 24 weeks of metformin therapy. Segura Palacios et al[7] documented a significant reduction in median DLQI score from 13 to 9 ($p = 0.001$), despite unchanged Physician's Global Assessment scores. Nicolou et al also observed significant DLQI improvement ($p = 0.04$) with liraglutide. In the tirzepatide case reported by Chan and Kaffenberger, DLQI decreased markedly from 14 to 3, reflecting substantial improvement in patient-perceived disease burden. In contrast, Sanz et al reported heterogeneous DLQI responses, with improvement in four patients and worsening in another four.

Metabolic and Inflammatory Markers

Several studies highlighted the metabolic and immunologic effects of antidiabetic therapies. Hambly et al demonstrated improvement in insulin resistance and cardiovascular risk biomarkers with metformin, although increases in serum adipokines and C-reactive protein were noted. Petrasca et al reported reductions in inflammatory chemokines, cytokines, and glycolytic gene expression in HS lesions following metformin therapy. GLP-1 receptor agonists were associated with weight loss and improved glycemic control. Chan and Kaffenberger reported a 16% reduction in body weight along with improved glycemic and lipid parameters. Nicolou et al similarly described amelioration of metabolic conditions in addition to dermatologic improvement.

Adverse Events and Tolerability

Overall, antidiabetic medications were generally well tolerated. Gastrointestinal adverse effects were the most frequently reported side effects, particularly with metformin. These ranged from mild discomfort to gastrointestinal complaints in 11% of patients in Jennings et al and up to 40% in the cohort described by Jabur. Mood changes and gastrointestinal distress were reported in two patients by Moussa et al Three patients in Segura Palacios et al experienced gastrointestinal symptoms, and two patients in Sanz et al discontinued therapy due to worsening flares. Importantly, no severe or unexpected adverse events were reported in studies evaluating liraglutide, semaglutide, or tirzepatide.

Methodological Quality and Risk of Bias

Methodological assessment using the Newcastle-Ottawa Scale (NOS) indicated generally strong quality among cohort and case-control studies, particularly regarding cohort selection, exposure ascertainment, and outcome verification (Table 2). Most studies clearly defined exposed populations and confirmed absence of outcomes at baseline. However, variability was observed in the control of confounding factors and the adequacy of follow-up duration. While some studies, such as Cheng et al, provided long-term follow-up (six years), others did not clearly specify follow-up periods.

Table 2 Risk of Bias Measured with the Newcastle–Ottawa Scale (NOS)

Study	Selection				Comparability		Outcome			Total Quality Score
	Representativeness of the Exposed Cohort	Selection of the Non-exposed Cohort	Ascertainment of Exposure	Demonstration that Outcome of Interest was not Present at Baseline	Controls for the Most Important Risk Factors	Controls for Other Risk Factors	Assessment of Outcome	Was follow-up Adequately Long for Outcomes to Occur?	Adequacy of Follow-up for the Cohorts	
Nicolou et al[18]	1	1	1	1	0	0	1	1	1	**7**
Cheng et al[14]	1	1	1	1	1	0	1	1	1	**8**
Hambly et al[20]	1	1	1	1	0	0	1	0	0	**5**
Petrasca et al[22]	1	1	1	1	0	0	1	0	0	**5**
Segura Palacios et al[24]	1	1	1	1	1	1	1	1	1	**9**
Jennings et al[25]	1	1	1	1	1	1	1	1	1	**9**
Jabur[26]	1	1	1	1	1	0	1	1	1	**8**
Moussa et al[27]	1	1	1	1	1	1	1	0	0	**7**
Sanz et al[23]	1	1	1	1	0	0	1	1	0	**6**
Verdolini et al[26]	1	1	1	1	1	1	1	1	1	**9**

Table 3 JBI Critical Appraisal Checklist for Case Studies

JBI Critical Appraisal Checklist Questions	Chan and Kaffenberger[19]	Drumm et al[21]	Gandhi et al[23]	Khandalavala[29]	Arun and Loffeld[12]
Were the patient's demographic characteristics clearly described?	Yes	Yes	Yes	Yes	Yes
Was the patient's history clearly described and presented as a timeline?	Yes	Yes	Yes	Yes	Yes
Was the current clinical condition of the patient on presentation clearly described?	Yes	Yes	Yes	Yes	Yes
Were diagnostic tests or assessment methods and the results clearly described?	Yes	Yes	Yes	Yes	Yes
Was the intervention(s) or treatment procedure(s) clearly described?	Yes	Yes	Yes	Yes	Yes
Was the post-intervention clinical condition clearly described?	Yes	Yes	Yes	Yes	Yes
Were adverse events (harms) or unanticipated events identified and described?	Yes	No	Yes	Yes	Yes
Does the case report provide takeaway lessons?	Yes	Yes	Yes	Yes	Yes

The case reports demonstrated high reporting quality when assessed using the JBI Critical Appraisal Checklist (Table 3), with comprehensive documentation of patient history, intervention details, and outcomes.

Discussion

This systematic review, based on 15 studies involving a total of 3721 participants, indicates that antidiabetic medications may offer therapeutic benefits in managing HS. These benefits include improvements in clinical outcomes, reductions in disease severity, and enhancement in patients' quality of life, all with a generally favorable safety profile. Metformin was the most frequently studied medication and was associated with reduced lesion count, lower flare frequency, and improved DLQI in multiple studies. GLP-1 receptor agonists, such as liraglutide and semaglutide, also showed promising results.

To our knowledge, only a few systematic reviews have specifically investigated the role of antidiabetic medications in HS treatment. For example, Tsentemeidouet al conducted a systematic review focusing solely on metformin.[30] Similar to the findings of this systematic review, they reported positive effects on HS-related outcomes. However, their review had notable limitations, including a narrow scope (only metformin) and a small sample size (6 studies with 133 patients), which were addressed in this study. Similarly, Theut Riss explored metformin's potential in HS management but did not focus exclusively on antidiabetic medication, instead reviewing all treatment options for HS.[31] The findings of the present review align with those of Krajewski et al, who specifically investigated GLP-1 receptor agonists in HS and reported significant improvements in lesion severity and quality of life.[10] These improvements were attributed to a reduction in systemic inflammation, particularly involving TNF-α, IL-17, and NF-κB signaling pathways.[10] Sung et al also highlighted the efficacy of metformin across several dermatological conditions, including HS, psoriasis, and acne.[32]

The biological plausibility of using antidiabetic medications for HS treatment is supported by a growing body of evidence linking metabolic syndrome, insulin resistance, and chronic systemic inflammation to HS pathogenesis. Metformin, in particular, exerts anti-inflammatory effects by inhibiting the NF-κB pathway and reducing the levels of inflammatory cytokines such as IL-6 and TNF-α levels.[33] Notably, Cameron et al demonstrated that metformin's anti-inflammatory benefits are evident even in non-diabetic individuals.[34] Metformin also enhances insulin sensitivity, potentially targeting one of the underlying drivers of HS flares. Another plausible mechanism through which metformin may improve HS outcomes is its anti-androgenic activity. Androgens have been shown to contribute to HS pathogenesis, with some patients showing elevated testosterone levels or an increased free androgen index.[35] However, it may not be

the case with all patients, as normal androgen levels have also been reported in the literature.[36] A study by Kraft and Searles found that anti-androgen therapy worked better than antibiotic therapy on female patients (55% vs. 26%).[6] Similarly, finasteride, an androgen block, has been reported as an effective treatment option for women with HS.[37] Metformin's anti-androgenic mechanism includes reducing Insulin-like Growth Factor 1 (IGF-1); increasing Insulin-like Growth Factor Binding Protein 1 (IGFBP-1), which leads to decreased androgen receptor signaling; and downregulating mTORC1 and the TLR4-NF-κB pathway, both of which are influenced by hyperandrogenism.[11] Similarly, the efficacy of GLP-1 receptor agonists was evident in the present systematic review. These agents not only promote weight loss and glycemic control but also reduce levels of pro-inflammatory cytokines.[38] Their dual action on metabolic and inflammatory pathways makes them particularly attractive for patients with comorbid obesity or type 2 diabetes.

Strengths and Limitations

A key strength of this systematic review is that it is the first to comprehensively assess multiple classes of antidiabetic medications in the context of HS. Furthermore, a systematic search was carried out across multiple databases to capture all relevant studies. However, several limitations must be acknowledged. The majority of included studies were observational or consisted of small case studies, limiting the ability to establish causality or generalize findings. Furthermore, no randomized controlled trials were included. There was also considerable heterogeneity in outcome measures, including the use of different severity scoring systems and variable follow-up durations, which precluded meaningful quantitative synthesis or meta-analysis. Moreover, almost all the studies investigated monotherapy and lacked a comparator group, further limiting interpretability.

Implications for Practice and Research

Considering the chronic and often treatment-resistant nature of HS, especially in patients with metabolic syndrome or obesity, the adjunctive use of antidiabetic medications represents a promising therapeutic strategy. Metformin, due to its low cost, accessibility, and well-documented safety profile, may be considered for off-label use in selected patients, particularly those with insulin resistance or poor response to conventional therapies. Future research should focus on high-quality randomized controlled trials comparing antidiabetic medications to standard HS treatments or placebo in patients both with and without metabolic comorbidities. The use of standardized outcome measures, such as the International Hidradenitis Suppurativa Severity Score System (IHS4) and consistent reporting of the DLQI, would enhance comparability across studies. Additionally, studies should aim for longer follow-up periods to assess the durability of treatment effects and long-term safety.

Conclusion

This systematic review indicates that antidiabetic medications may be effective in the treatment of HS. Across the included studies, these agents were used both as monotherapy and in combination with conventional HS treatments, including antibiotics and biologics. In several reports, antidiabetic medications were introduced as adjunctive therapy in patients with refractory disease, while some case reports and cohort studies described their use alone, particularly metformin. Overall, these agents were associated with reductions in clinical symptoms, decreased disease severity, and improvements in quality of life, while maintaining a favorable safety profile.

However, the current body of evidence is largely derived from small observational studies and case series, often without control groups or standardized outcome measures. Additionally, heterogeneity in treatment regimens, particularly regarding concomitant HS therapies, limits definitive conclusions about their independent therapeutic effect. Therefore, although the findings are encouraging, they should be interpreted with caution. High-quality randomized controlled trials are urgently needed to clarify the role of antidiabetic medications such as monotherapy versus adjunctive therapy and to inform evidence-based clinical guidelines.

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