

Association Between Psoriasis and Erectile Dysfunction: A Meta-Analysis

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ABSTRACT

Background: Several studies have shown a relationship between psoriasis and erectile dysfunction (ED), but a meta-analysis of the data has not been performed.

Aim: To conduct a comprehensive meta-analysis of existing evidence to quantify and compare the risk of ED with psoriasis.

Methods: A systematic literature search was conducted using MEDLINE, EMBASE, Cochrane databases, and Google Scholar. We calculated pooled odds ratios (OR), standardized mean difference (SMD), and 95% CI.

Outcomes: Outcome measures included characteristics of included studies, association between psoriasis and ED risk, and association for adjusted-for-covariates studies between psoriasis and ED risk.

Results: In total, 9 studies with 36,242 psoriasis patients and 1,657,711 controls (participants without psoriasis) met inclusion criteria and showed that there was statistically significant association between psoriasis and ED risk (OR 1.35; 95% CI 1.29–1.41; $P < .00001$; $I^2 = 44\%$). A significant association for adjusted-for-covariates studies between psoriasis and ED risk was also observed (OR 1.22; 95% CI 1.08–1.37; $P = .002$; $I^2 = 43.8\%$). It revealed the International Index of Erectile Function-5 score was statistically significantly lower in the psoriasis group than controls (SMD -3.09 ; 95% CI -4.81 to -1.37 ; $P = .0004$; $I^2 = 77\%$). A subgroup analysis was performed to potentially explain heterogeneity. It examined the main potential sources of inter-study variance including variance sample sizes and different assessment tools for ED.

Clinical Translation: The risk of ED in psoriasis patients should also be assessed by physicians.

Conclusions: This study is a well-designed and comprehensive meta-analysis to examine the relationship between psoriasis and risk of ED. However, the included studies are mostly cross-sectional or have small sample cohorts, which could bring bias and heterogeneity into the analysis. Our findings support the hypothesis that psoriasis is associated with an increased risk of ED. Furthermore, additional prospective cohort studies are needed to elucidate these relationships and to advance knowledge in this field. **Wu T, Duan X, Chen S, et al. Association Between Psoriasis and Erectile Dysfunction: A Meta-analysis. J Sex Med 2018;XX:XXX–XXX.**

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Key Words: Psoriasis; Erectile Dysfunction; Sexual Dysfunction; Meta-Analysis

INTRODUCTION

Psoriasis is an erythematous-squamous dermatitis with chronic, recurrent, immune-mediated, genetic skin disease that affects approximately 2–4% of the world's population.^{1,2} It is

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well known that psoriasis can have a deleterious effect on patients' quality of life by impacting the physical, social, and psychological aspects.^{3,4} Common co-morbidities of psoriasis include depression, obesity, cardiovascular diseases (CVD), metabolic syndrome, hypertension, sexual dysfunction, and suicidal ideation.^{5–7}

Erectile dysfunction (ED) is defined as the inability to attain or maintain a penile erection sufficient for successful vaginal intercourse.⁸ It affects 2–40% of men between the ages of 40 and 69 years in the general population.^{9,10} ED is usually caused by a combination of psychogenic and organic factors (eg, neurogenic, hormonal, arterial, cavernosal, or drug induced).⁸ Recently, many studies have shown that patients with psoriasis have an increased risk of ED.^{11–16} However, several studies did not support this relationship when adjusting for confounding

factors.^{3,17,18} 1 Systematic review was performed on psoriasis and sexual dysfunction.¹⁹ Although they summarized that the risk of ED was higher in psoriasis patients, they did not perform a meta-analysis to investigate this relationship.¹⁹ To our knowledge, there is no meta-analysis to determine the association between psoriasis and ED in the literature. Therefore, the present study focused on a comprehensive meta-analysis of existing evidence to quantify and compare the risk of ED with psoriasis.

METHODS

This meta-analysis was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement.²⁰

Data Sources and Searches

A systematic literature search in the MEDLINE, EMBASE, Cochrane databases, and Google Scholar was conducted to identify relevant studies that reported the association of psoriasis with the risk of ED published in English up to November 2017. The Medical Subject Heading terms and/or key words and/or free words were “psoriasis AND (erectile dysfunction OR ED); psoriasis AND sexual dysfunction.” Additional manual searches were made using the reference lists from key studies to retrieve other articles relevant to our topic. Corresponding authors were contacted to obtain missing data from selected studies.

Study Selection

Full texts of the identified studies were reviewed by 2 reviewers (X.D. and S.C.) and were included in the meta-analysis if the following inclusion criteria were met: (1) the risk estimate was reported as an odds ratio (OR) or adjusted OR or hazard ratio (HR) with the 95% CI, or the data were presented such that OR and 95% CI could be calculated; (2) the study had a cohort design or retrospective case-control design or cross-sectional or randomized control design; (3) the study evaluated psoriasis with ED; and (4) the study language was published in English. Studies that did not meet the above criteria were excluded.

Data Extraction and Quality Assessment

Data were extracted via a standardized data extraction form, collecting information on the year of publication, country, study design, number of cases and controls, OR/HR, adjusted OR/HR, adjusted factors, and diagnosis approach of ED, when available. Each included article was appraised by 2 independent reviewers (X.C. and R.Y.) who determined the methodological quality of each study by using the Newcastle-Ottawa Scale (NOS) of quality assessment.²¹ We defined scores as 6–9 being high methodological quality and <6 being low quality. NOS quality scores are presented as part of descriptive summaries for each study and did not influence decisions to pool studies in the meta-analysis. We also used the Risk of Bias in Non-Randomized Studies of Interventions assessment tool to report the quality of the study.²²

Data Synthesis and Meta-Analysis

The results of the meta-analysis are presented in forest plots. Heterogeneity, ie, the proportion of variability across studies, was assessed using Cochran Q statistic and quantified using the I^2 statistic. Depending on whether homogeneity was accepted or rejected, we used the fixed or the random effect model. If high heterogeneity ($I^2 > 50$) was still found, subgroup analysis or influence analysis (sensitivity analysis) would be performed. For all statistical analyses, a 2-sided $P < .05$ was considered statistically significant. Data analysis was performed with Review Manager v.5.2 software (Cochrane Collaboration, Oxford, United Kingdom) and Stata v.12 software (StataCorp, College Station, TX).

RESULTS

Literature Search and Study Election

A PRISMA²⁰ flow chart of screening and selection results is shown in [Figure 1](#). Using our pre-specified search strategy, 82 extracts were retrieved and 24 additional citations were obtained through other sources. From 38 studies initially identified, 27 were considered potentially suitable. After a full-text review, 9 studies^{3,11–17,23} with 36,242 psoriasis patients and 1,657,711 controls (participants without psoriasis) met the inclusion criteria and were included in the final analysis. [Supplemental Table 1](#) provides a description of the 9 studies that were published between 2001 and 2017. There are 2,250 cases with ED in 36,242 psoriasis patients and 85,295 cases with ED in 1,657,711 controls. Among all 9 studies, 1 was a cohort study,¹¹ 1 was a prospective case series study,¹⁷ 2 were case-control studies,^{13,23} and the remaining 6 studies were cross-sectional. Study populations originated from the United Kingdom,³ Taiwan,^{11,23} Portugal,¹² Turkey,¹³ People's Republic of China,¹⁵ Spain,¹⁷ Italy,¹⁴ and Denmark.¹⁶ 6 Studies^{3,11,12,16,17,23} reported adjusted OR/HR with adjusting relative confounding factors. 2 Studies compared the severity of psoriasis with risk of ED.^{14,16} For the assessment of ED, most studies used the mean International Index of Erectile Function (IIEF)-5 or the *International Statistical Classification of Diseases, 10th Revision, Clinical Modification* (ICD-9-CM).^{3,11–15,23} 1 Study used Massachusetts General Hospital-Sexual Functioning Questionnaire.¹⁷ Another study solely defined ED by the patients' first reported usage of claimed prescription drugs used in the treatment of male ED. However, this study had limited conclusions due to subject claims of ED drug usage for recreative purposes.¹⁶ The IIEF-5 score was compared in the psoriasis group and non-psoriasis group from 3 studies.^{12–14}

Association Between Psoriasis and ED

Overall Analysis and Sensitivity Analysis

The relationship between psoriasis and the risk of ED using data from 9 studies was examined. There was a statistically significant association between psoriasis and ED risk (OR 1.93; 95% CI 1.51–2.46; $P < .00001$; $I^2 = 86\%$; random-effect

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