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PREVALENCE OF PHOTOSENSITIVITY IN CUTANEOUS SYSTEMIC LUPUS ERYTHEMATOSUS IN PAKISTAN: A SYSTEMATIC REVIEW AND META-ANALYSIS.

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Abstract

Background: SLE, a complex autoimmune disorder, manifests in diverse organ systems, with cutaneous involvement being particularly debilitating. The purpose of this study is to examine studies concerning the rate of photosensitivity in individuals with CLE living in Pakistan and its associated demographics. **Methods:** We conducted a thorough assessment of databases including PubMed, Embase, and Google Scholar from 1996 to 2024. We subjected all qualifying data to a random-effect systematic review and meta-analysis. This meta-analysis encompassed 18 studies, totaling 2761 individuals diagnosed with photosensitivity. The analysis was performed through R-software (version 4.4.1). **Results:** The pooled photosensitivity prevalence was 34.2% (95 % CI: 20.5-49.5, I^2 = 98 %, 1^2 studies). Based on geographic location, KP had the highest pooled prevalence estimate (62.8%; 95% CI: 58.9–66.4%) of photosensitivity in SLE patients. The prevalence rates were lower in Punjab (49.3%; 95 % CI: 30.4%–68.3%) and Sindh (12.9%; 95 CI: 3.6%–26.5%). A time-based subgroup meta-analysis revealed an increase in the reported prevalence of cutaneous photosensitivity among SLE patients after 2010, with rates rising to 45.8% (95% CI: 27.0%–65.1%) compared to 17.9% (95% CI: 3.6%–39.5%) before 2010. **Conclusion:** This meta-analysis demonstrates the high and increasing prevalence of photosensitive patients, as well as regional variations, which correspond to an expanding burden of photosensitivity among SLE patients throughout Pakistan. The disease's growing trend, especially since 2010, underscores the need for greater clinical awareness and more targeted methods in studying the population health issue. Guidelines for managing lupus in a nation, particularly one with a high prevalence of the condition, such as Khyber Pakhtunkhwa, must include early detection and proactive management of photosensitivity. Policymakers and healthcare providers must enhance screening, education, and access to care for the communities they serve.

PROSPERO Registration #: CRD42024606778

Keywords: Systemic Lupus Erythematosus; Cutaneous Lupus erythematosus; autoimmune disease; photosensitivity; meta-analysis; Pakistan

Introduction

Cutaneous lupus erythematosus (CLE) is an autoimmune skin disease that manifests itself in a variety of ways (1). Acute cutaneous lupus erythematosus (ACLE), subacute cutaneous lupus erythematosus (SCLE), and chronic cutaneous lupus erythematosus (CCLE) are the three subtypes, with photosensitivity lupus erythematosus being the most prevalent (2). Up to 85% of cases with systemic lupus erythematosus (SLE) involve photosensitivity, and it may be the only organ involved in cutaneous lupus erythematosus (CLE) (3). Gender is the most important risk factor for SLE, with a female-to-male prevalence ratio of 7 to 15 in adults and 3 to 4 in children (4). Cases with isolated cutaneous lesions exhibit a less striking gender preponderance. However, the female-to-male ratio in these patients is still 3:1. It is worth noting that SLE is one of the top 20 major causes of death among women aged ranges 5 to 64 (5). Exposure to UV light triggers flare-ups of photosensitivity. A macular or widespread erythematous rash develops on sun-exposed areas of the body, including the face, arms, or hands, and persists for over one day (6). Occasionally, erythematous papules or macules appear on the dorsal sides of the hands, sparing the knuckles (7).

Over the past few years, the number of people in Pakistan with photosensitivity to CLE has increased (8). Pakistan has published several regional studies on the incidence of photosensitivity in CLE. However, there is currently no systematic nationwide survey or data on this prevalence. Therefore, the main goal of this study is to collect, summarize, synthesize, and measure the pool prevalence of photosensitivity in people with CLE in Pakistan in a planned way.

Methods

This study followed the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (9). On November 7, 2024, the study was registered with PROSPERO under the registration number CRD42024606778.

Search Techniques

Search techniques for electronic photosensitivity in CLE

Medline (PubMed) Search	(“CLE,” “Cutaneous lupus erythematosus,” “Systemic lupus erythematosus” OR “Cutaneous lupus,” “Photosensitivity in cutaneous systemic lupus erythematosus” OR “Photosensitivity in cutaneous lupus *” OR “Photosensitivity in lupus” OR “CLE,” “SLE,”) AND (“Pakistan” OR “Pakistani”) AND (“Prevalence”, “incidence”). Result= 202 articles. Searched on 20/04/2024
EMBASE	(“CLE,” “Cutaneous lupus erythematosus,” “Systemic lupus erythematosus” OR “Cutaneous lupus,” “Photosensitivity in cutaneous systemic lupus erythematosus” OR “Photosensitivity in cutaneous lupus *” OR “Photosensitivity in lupus” OR “CLE,” “SLE,”) AND (“Pakistan” OR “Pakistani”) AND (“Prevalence,” “incidence”). Result= 109 articles. Searched on 20/04/2024
Web of Sciences	(“CLE,” “Cutaneous lupus erythematosus,” “Systemic lupus erythematosus” OR “Cutaneous lupus,” “Photosensitivity in cutaneous systemic lupus erythematosus” OR “Photosensitivity in cutaneous lupus *” OR “Photosensitivity in lupus” OR “CLE,” “SLE,”) AND (“Pakistan” OR “Pakistani”) AND (“Prevalence,” “incidence”). Result= 124 articles. Searched on 20/04/2024
Manual Search	Google Scholar (121 articles); Pakistani Journals Online (65 articles) Hand searching of reference list of selected articles (8 articles)

Two authors, F.H. and S.A., used an amalgamation of MeSH terms to search for articles in MEDLINE (via PubMed), Web of Science, and local databases that were about photosensitivity in people with CLE in Pakistan from the beginning of the study until April 25, 2024. We conducted

searches using terms such as "CLE," "Cutaneous lupus erythematosus," "Systemic lupus erythematosus," "Cutaneous lupus," "Photosensitivity in cutaneous systemic lupus erythematosus," "Photosensitivity in cutaneous lupus*," "Photosensitivity in lupus," "CLE," "SLE," "Pakistan" or "Pakistani"), and "Prevalence," "incidence." In addition, we thoroughly scrutinized the bibliographies of all pertinent primary and secondary research articles to identify potential new sources of data.

Study Selection

The inclusion criteria for studies are as follows:

i. Study design: The review included only those with observational study designs (cross-sectional, case-control or cohort), as they allow for estimating how many people are affected.

ii. Population: The studies must provide data on people diagnosed with Cutaneous Lupus Erythematosus (CLE) or Systemic Lupus Erythematosus (SLE) with skin symptoms, particularly among Pakistan's population.

iii. Outcome**:** The study must clearly state how common photosensitivity is or provide the data needed to calculate it.

iv. Geographic scope: Only studies from Pakistan were chosen so that the context for the prevalence stayed the same.

The exclusion criteria are as follows:

i. Geographic mismatch: Research carried out among Pakistani-origin groups outside Pakistan was excluded to ensure the research stayed relevant to Pakistan.

ii. Publication type: Case reports, editorials, commentaries, perspectives, reviews and conference abstracts were omitted because strong data for meta-analysis was insufficient.

iii. Duplicates: Publications found more than one time, whether in a single database or several, were taken out.

iv. Data sufficiency: To ensure the review's credibility, studies that lacked sufficient data to assess the prevalence of photosensitivity were excluded.

Extraction of data

The authors collaboratively designed the data extraction form using Microsoft Excel. The information extraction sheet comprised the first author's name, publication year, total patient count, prevalence of photosensitivity, study setting, geographical location, sex (male or female), mean patient age, SLE criteria, and study quality. Finally, the authors thoroughly examined the dependability of the eliminated data files and resolved any discrepancies through a discussion among themselves.

Analysis of data

We thoroughly integrated the prevalence of photosensitivity in CLE across studies, using random effect models to account for estimated between study heterogeneity. Before integrating the data, we built pooled proportions using DerSimonian and Laird random effects models (10) and stabilized the raw proportions' variances. Forest plots display the results of the meta-analyses, including prevalence proportions, corresponding 95% confidence intervals, and the overall random-effects pooled estimate for each study. We conducted the study using the statistical software R (ver. 4.3.2), which included two packages ('meta' and' metafor'). In pooled trials, we used the I^2 index to assess between-study heterogeneity (11).We used funnel plots and the Begg-Mazumdar and Egger linear regression tests to examine publication bias visually (12,13). We used subgroup analysis and univariable meta-regression to identify potential sources of heterogeneity. We did not develop a multivariate meta-regression model because we discovered only a few components to be independently relevant. The R^2 statistic was employed to quantify the degree to which components in meta-regression models accounted for the aggregate between-study heterogeneity. We performed

sensitivity analyses by methodically deleting each study in sequential order to evaluate the impact of individual studies on the total effect size (14) . We used the Cohen kappa coefficient to assess inter-rater agreement regarding article inclusion and methodological quality (15).

Diagnosis

We collected the requirements needed to diagnose SLE in every included paper. The analysis showed that three main frameworks appeared consistently in the 18 studies. For studies in the 1985–2002 period, the American Rheumatism Association (ARA) (16) criteria were applied. According to most mid- to late-period research (2003–2024), the ACR criteria were used. Better known than other sets in recent studies, the SLICC criteria treat cutaneous lesions more extensively. Importantly, cutaneous photosensitivity is considered by both ACR and SLICC criteria (17), resulting in some studies developing circularity when measuring the prevalence of photosensitivity. We also recorded the study period for each paper to observe any temporal trends in diagnostic criteria usage that might influence the reporting of photosensitivity prevalence.

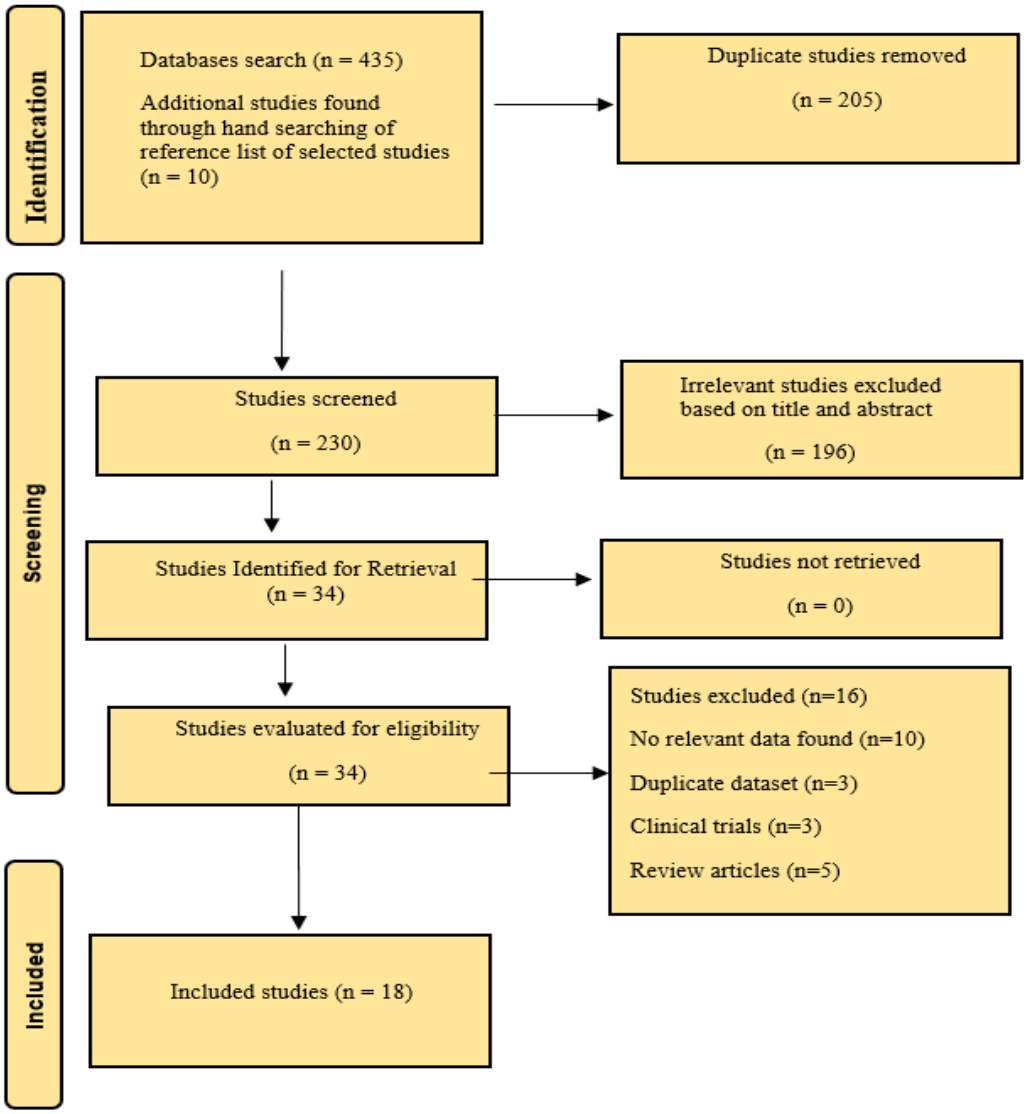

Figure 1: displays the PRISMA flow chart (9).

Table 1: Study characteristics of photosensitivity and its prevalence among SLE patients in Pakistan (n = 18)

Author	Publication Year	Study Design	Sample	Cases	Prevalence%	Setting	Province	Sex	Female	Working year	Mean Age	Criteria of SLE	Quality
Manzoor et al (8)	2024	P.P.	98	62	63.2	Urban	Punjab	Both	93	2020-2023	30.9	ACR	Moderate

Siddique et al (18)	2023	R.P.	388	32	8.2	Urban	Punjab	Both	360	2021-2023	32.8	ACR	Moderate
Khan et al (19)	2022	C.S.	140	119	85.0	Urban	Punjab	Both	138	2019-2020	42.0	ACR	Moderate
Khan et al (20)	2021	P.P.	57	35	82.5	Urban	Punjab	NA	NA	2018-2019	27.8	ACR	Moderate
Shamim et al (21)	2020	C.S.	23	7	30.4	Urban	Punjab	Both	21	2018-2019	11.0	SLICC	Low
Ahmed et al (22)	2018	C.S.	32	3	9.0	Urban	Sindh	Both	28	2011-2015	10.5	ACR	Low
Khan et al (23)	2017	C.S.	663	416	62.7	Urban	KP	Both	606	2014-2016	33.1	ACR	Low
Batool et al (24)	2016	C.S.	61	49	80.3	Urban	Punjab	Both	12	2015-2016	26.2	ACR	Moderate
Naheed et al (25)	2014	C.S.	100	40	40.0	Urban	Punjab	Both	92	NA	25.9	ARA	Moderate
Ishaq et al (26)	2013	R.P.	105	39	37.1	Urban	Sindh	Both	99	2008	31.6	ARA	Moderate
Raza et al (27)	2012	P.P.	65	20	30.8	Urban	Punjab	Both	61	2008-2011	28.5	SLICC/ACR	Moderate
Rabbani et al (28)	2009	C.S.	149	12	8.1	Urban	Sindh	Both	174	1992-2005	31.1	SLICC/ACR	Moderate
Rabbani et al (29)	2006	C.S.	198	12	6.0	Urban	Sindh	Both	172	1986-2001	31.0	ARA	Moderate
Rabbani et al (30)	2005	C.S.	198	8	4.0	Urban	Sindh	Both	158	1985-2000	27.0	ARA	Moderate
Rabbani et al (31)	2004	C.S.	196	12	6.0	Urban	Sindh	Both	172	1986-2001	31.1	ARA	Moderate
Rabbani et al (32)	2003	C.S.	198	65	33.0	Urban	Sindh	Both	175	1986-2001	31.0	ARA	Moderate
Ahmad et al (33)	2002	C.S.	50	18	36.0	Urban	Punjab	Both	38	2002	22.0	ARA	Low
Kapadia et al (34)	1996	C.S.	40	24	60.0	Urban	Punjab	Both	32	1992-1993	20.0	ARA	Low

P.P.: Prospective; R.S.: Retrospective; C.S.: Cross-sectional; NA: Not applicable; SLE: Systemic Lupus Erythematosus; ACR: American College of Rheumatology; SLICC: Systemic Lupus International Collaborating Clinics; ARA: American Rheumatism Association; KP: Khyber Pakhtunkhwa

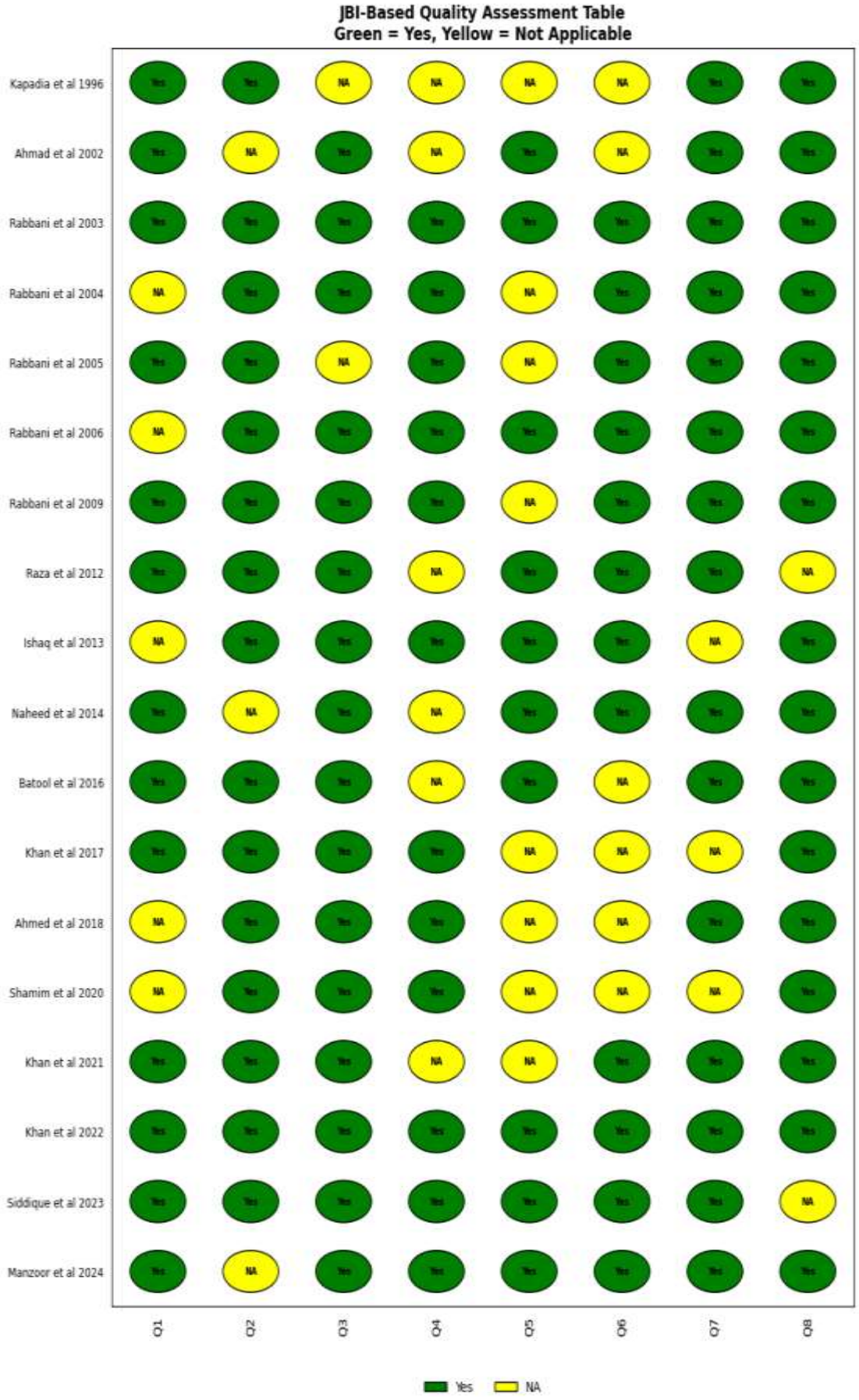

Figure 2 (a): JBI based quality Assesment.

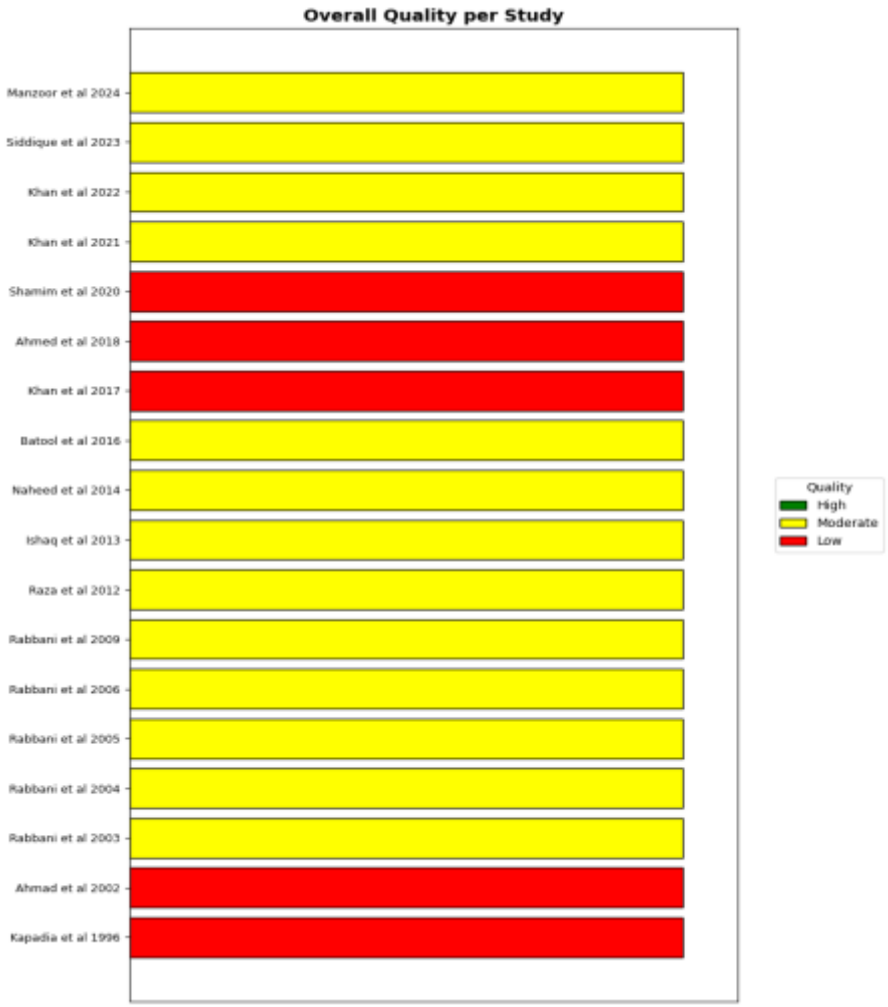

Figure 2 (b): Over all quality per study.

Result

Characteristics of the articles involved

After considering all of the inclusion and exclusion criteria, we included a total of 18 published articles on the prevalence of photosensitivity in mucocutaneous systemic lupus erythematosus. Figure 1 displays the number of research articles and the complete screening and eligibility selection steps at each level. All the papers included in this review utilized the ACR, ARA, and SLICC classification criteria. We selected articles published from 1996 to 2024, with the majority (78%) appearing in the past ten years. Research done in Pakistan had the smallest sample size of all the studies examined, with only 23 patients (21). Another study was done, which had the largest sample size, with 663 patients (23). The median sample size was 99 participants, with an interquartile range (IQR) of 139 people. Eighteen studies documented the ages of participants, reporting averages ranging from 10 to 42 years. There were a total of 10 studies conducted in the Punjab province (8,18–21,24,25,27,33,34), 7 studies in the province of Sindh (22–26,28–32), and 1 study in the province of Khyber Pakhtunkhwa (KP) (23). Out of all the studies examined, 5 were found to have a low risk of bias (21–23,33,34), while 13 were found to have a moderate risk (15–18,22–30). None of the studies exhibited a high risk of bias. All articles included in this systematic review were evaluated using the JBI quality assessment method, and each received a satisfactory rating (Table 1) (Figure 2a and Figure 2b). A coefficient of 0.79 indicated that the raters agreed to some extent during the research selection procedure. Comparably, a value of 0.83 indicated that the authors agreed on some aspects of the data extraction procedure.

Table 2: Meta-analysis estimates of the prevalence of Photosensitivity among SLE patients in Pakistan

Variable	Studies	Sample	Cases	Prevalence, % (95% CI)	I^2, %	95% Prediction Interval	p-Heterogeneity	p-Begg's	p-Egger	p-Difference
Photosensitivity	18	2761	973	34.2 (20.5–49.5)	98	0.0–95.9	< 0.01	0.2546	0.9387	
By Location										0.001
Punjab	10	1022	406	49.3 (30.4–68.3)	98	0.0–100.0	< 0.01			
Sindh	7	1076	151	12.9 (3.6–26.5)	95	0.0–59.1	< 0.01			
Khyber Pakhtunkhwa	1	663	416	62.8 (58.9–66.4)	89		< 0.01			
By Year										0.0208
After 2010	11	1732	822	45.8 (27.0–65.1)	98	0.0–100.0	< 0.01			
Before 2010	7	1029	151	17.9 (3.6–39.5)	96	0.0–71.7	< 0.01			

The Prevalence of Photosensitivity in Cutaneous Systemic Lupus Erythematosus in Pakistan

Eighteen studies involving a total of 7916 people assessed the photosensitivity prevalence. The photosensitivity prevalence ranged from 4.04% (95% CI: 1.76%–157.81%) to 85.00% (95% CI: 77.99% to 90.47%). The overall rate of photosensitivity in people with CLE was 34.2% (95% CI: 20.46%–49.49%; prediction interval: 0.00%–95.87%) (fig. 3). Significant variation was observed (I^2 = 98%, P < 0.001). The Egger linear regression test (t = 0.08, p = 0.9387), the Begg-Mazumdar test (z = 1.14, p = 0.2546), and the visual assessment of the funnel plot (fig. 4) collectively suggest no evidence of publication bias in the meta-analysis performed. The sensitivity analysis (fig. 5) revealed that the systematic exclusion of each study ranged the pooled photosensitivity prevalence from 31.20% (95% CI: 18.92%–46.12%) to 37.45% (95% CI: 23.54%–52.39%). When we systematically excluded any individual study, the results showed no significant impact on the pooled outcome. This suggests that our meta-analysis is statistically robust and stable.

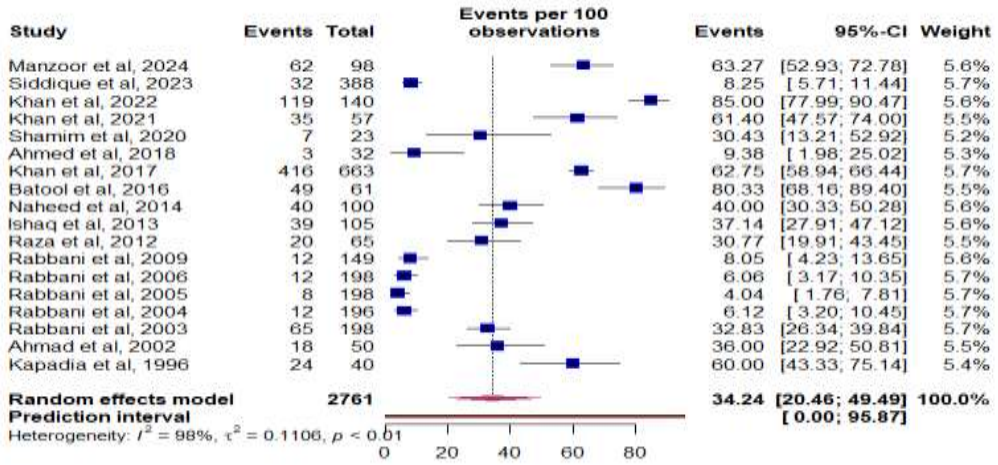

Figure 3: Forest plot of the pooled prevalence of photosensitivity among SLE patients in Pakistan

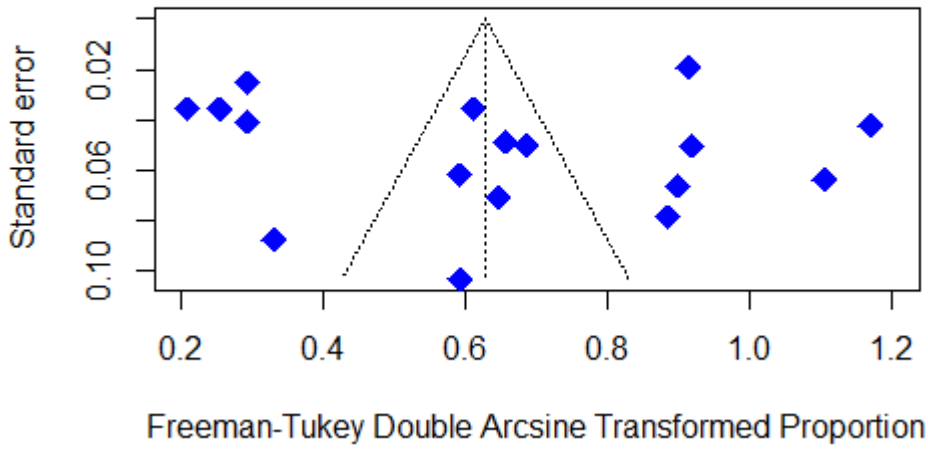

Figure 4: Funnel plot of the prevalence of photosensitivity among SLE patients in Pakistan

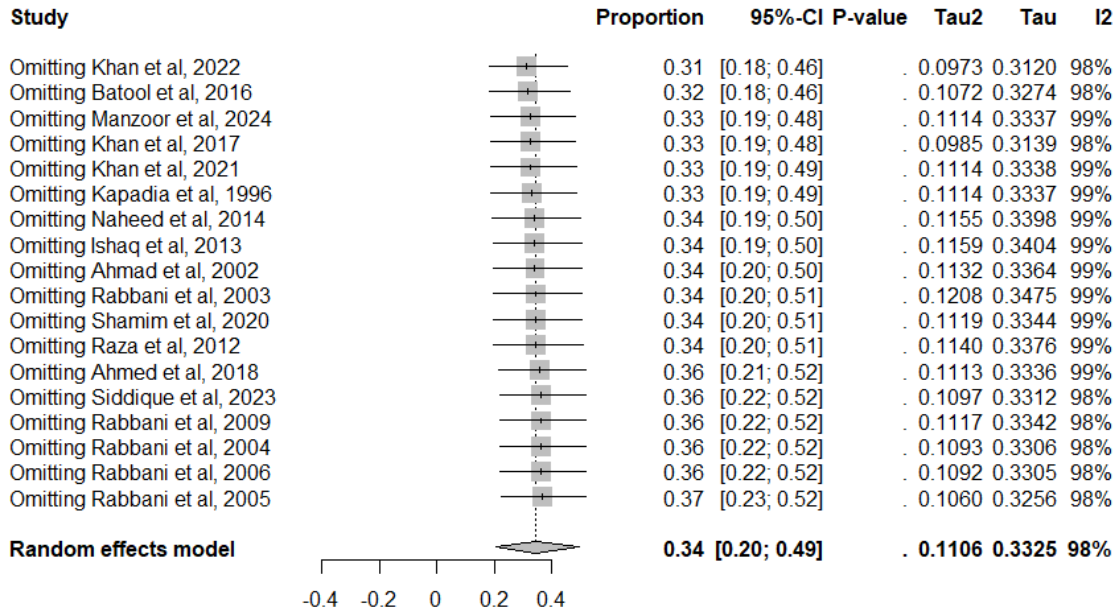

Figure 5: Sensitivity analysis plot of photosensitivity among SLE patients in Pakistan

Subgroup Analysis

Table 2's subgroup meta-analysis reveals significant variations in the prevalence of photosensitivity among SLE patients based on their geographical location. The study sorted the data by location and found that among people with SLE, those living in KP had the highest estimated prevalence of photosensitivity (62.8%; 95% CI: 58.9%–66.4%). Conversely, the prevalence rates were comparatively lower in Punjab (49.3%; 95% CI: 30.4%–68.3%) and Sindh (12.9%; 95% CI: 3.6%–26.5%). Furthermore, a time-based subgroup meta-analysis revealed an increase in photosensitivity

prevalence in individuals with SLE after 2010. The prevalence rates following 2010 were 45.8% (95% CI: 27.0%–65.1%), whereas the prevalence rate before 2010 was 17.9% (95% Cl: 3.6%–39.5%).

Meta-Regression

We performed univariate meta-regression to study the association between the study's variables and the overall prevalence. The only significant result was that more SLE patients were female in the studies (β = 1.1052; 95% CI, 1.0841–1.1263; P = 0.0025). Accordingly, more studies reporting a higher fraction of women found a greater prevalence of cutaneous photosensitivity. These results are important since there is a larger number of women with SLE, and autoimmune skin reactions might cause female patients to experience or notice photosensitivity more frequently. As shown in Table 3, no statistically significant associations existed between prevalence and other variables such as age, publication year, or year of research.

Table 3: Univariate meta-regression analysis

Variable	Beta (β)	P-value	95% CI	R^2 %
Publication Year	0.0123	0.1770	-0.0062 - 0.0308	6.4
Year of Research	0.0183	0.3442	0.0058 - 0.0309	40.2
Age	0.0081	0.4281	-0.0130 - 0.0292	3.9
Female ratio	1.1052	0.0025	1.0841 - 1.1263	100.0

Univariate meta-regression analysis showing the relationship between various variables and the outcome of interest. The table presents beta coefficients (β), P-values, 95% confidence intervals (CI), and the percentage of variance explained (R^2) for each variable analyzed.

Discussion

Scientists describe photosensitivity as an excessive response to UV light, resulting in symptoms such as burning, itching, and redness (35,36). These responses can manifest as skin lesions specific to LE, but they can also manifest as non-LE-specific sunburn reactions (37). UVA or UVB radiation can cause photosensitivity. For some people, sun exposure might cause systemic symptoms such as weakness, exhaustion, fever, and joint discomfort. We should rule out other mimics, such as medication-induced photosensitivity (38,39).

Estimates of photosensitivity prevalence among SLE patients in Pakistan vary significantly. As a result, we conducted the first systematic review and meta-analysis on this topic in Pakistan. Our investigation collected data from 18 published studies covering various provinces in Pakistan, with photosensitivity prevalence rates ranging from 4.0% to 85.0%.

This meta-analysis aims to improve public health activities by providing significant insights into the frequency of photosensitivity in individuals with SLE and the accompanying problems. We identified a total of 973 cases of photosensitivity among the 2761 persons examined, yielding a pooled prevalence rate of 34.2%. However, our meta-analysis showed a high level of heterogeneity (I^2 = 98%) because the diagnostic methods, geographic areas, number of participants and times of data collection differed among studies. The subgroup and meta-regression analyses were done to discover reasons for the variability. Even though the cases are diverse, this strong relationship allows us to draw valuable conclusions about differences by gender, region and time. Recognizing that prevalence estimates may vary depending on the study group and diagnosis methods is crucial. Furthermore, enduring variations in healthcare practices and diagnostic processes may influence the numbers. Our results support previous research, which found that photosensitivity is common in people with SLE. In Saudi Arabia, 39% of lupus patients were found to react to sunlight, compared to Egypt (up to 91.5%) and lower rate in Lebanon (16%) (40). Genetic, environmental, and

methodological factors may explain the differences in studies conducted in various regions. Moreover, research on photosensitivity in people with SLE discovered that 73% had reported it, which emphasized the major effect it had on their quality of life (41). Our research adds new information from Pakistan, highlighting why public health strategies for managing photosensitivity should be designed for patients with SLE.

Table 4. Global comparison of photosensitivity prevalence among SLE patients

Country/Region	Author(s) & Year	Sample Size	Reported Photosensitivity (%)
International (50 countries)	Gilles Battesti et al. 2024 (42)	600	64.80%
Jordan	Marwan H Adwan et al. 2024 (43)	275	60.70%
USA	Kristen Foering BS et al. (2011) (44)	169	68%
Saudi Arabia	Mohammed AlOmair et al. (2023) (45)	108	39%
USA	A J Wysenbeek et al. (1989) (46)	281	73%

We compared information on photosensitivity in patients with SLE from various international studies (Table 4). Estimates from different places are very different, from 39% in Saudi Arabia (45) to up to 73% among a group in the United States (46). Results from a recent global survey in 50 countries indicated that 64.8% (42) of people experienced clinical depression, which is much greater than the pooled prevalence we recorded in Pakistan. These differences might be caused by how much UV light people experience, their genetic susceptibility, healthcare access or different methods of diagnosis. These findings urge for greater uniformity in global studies and highlight the differences in photosensitivity caused by regional aspects in SLE patients.

A subgroup meta-analysis revealed differences in the prevalence of photosensitivity among patients with SLE depending on their geographic location. KP had the greatest prevalence rate at 62.75%, followed by Punjab at 49.31%, and Sindh had the lowest prevalence rate at 12.88%. Several causes, including socioeconomic disparities, differences in screening procedures, and lifestyle factors, can account for these disparities. The reported prevalence of cutaneous photosensitivity among individuals with SLE has significantly increased in recent years, particularly after 2010, with higher rates observed compared to earlier periods. This surge may reveal superior clinical awareness, fluctuations in diagnostic emphasis, and enhanced documentation of cutaneous symptoms over time rather than a true biological rise in photosensitivity incidence. Additionally, more recent diagnostic frameworks like SLICC emphasize cutaneous features more explicitly, which may contribute to increased reporting in newer studies. Emphasizes the importance of monitoring and managing arthritis in individuals with SLE to promote their overall health and well-being.From our analysis, we found that there was a strong relationship between the number of females affected and the frequency with which cutaneous photosensitivity was reported. Many populations have SLE rates 9 times greater for females than males (47). Also, women's skin tends to react more to ultraviolet (UV) light and experience more autoimmune reactions, often known as photosensitivity (48). Our model indicates that changes in female participation between studies account for the biggest differences in reported photosensitivity prevalence. It shows how important it is to consider sex differences when looking at and comparing the skin symptoms of SLE.We should remember that existing SLE diagnostic criteria, such as ACR and SLICC, already include the factor of cutaneous photosensitivity. Due to this circularity, the number of photosensitive patients officially recognized could also often seem higher. We observed that the sequence of criteria used shifted from ARA to ACR and SLICC, suggesting a change in how rheumatologists made their diagnoses. That new

criteria, especially SLICC, are more specific in their skin-related signs might, in part, contribute to the rise in cases of photosensitivity lately.

Limitation

Since all the studies in this meta-analysis are from Pakistan, they focus on this region and present unique information that may improve global research work in underrepresented areas. Secondly, most of the examined studies had small sample sizes and moderate methodological quality. The generalizability of the overall findings may be limited by the range of studies, which is typical for this type of study. However, this study offers the most comprehensive synthesis of photosensitivity prevalence in SLE patients in Pakistan to date. Our robust technique, which incorporates subgroup analysis and meta-regression, enhances the reliability of our findings and contributes to the understanding of this important clinical issue.

Conclusions

This meta-analysis offers an inclusive prevalence estimate of photosensitivity among people with SLE in Pakistan, with pooled results showing an overall prevalence of moderate and provincial variability. Our findings also propose a potential prevalence rising trend over time and higher rates for female patients. However, across included studies, high heterogeneity and moderate risk of bias were observed, and these outcomes should be interpreted with attention. Though our meta-analysis emphasizes the need for better clinical acknowledgment of SLE cutaneous manifestations, we do not give direct privileges to clinical results or intervention efficiency. Future studies should assess the clinical influence, management strategies, and economic burden of photosensitivity in SLE to improve and inform healthcare development and policy.

Declaration of conflicting interests

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Ethical approval:

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Authors contribution:

All authors have equally contributed to the manuscript.

Data Availability:

All the data is available in Table 1.

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