



UNIVERSITÀ DEL PIEMONTE ORIENTALE

DIPARTIMENTO PER LO SVILUPPO SOSTENIBILE E LA
TRANSIZIONE ECOLOGICA

**Corso di Laurea Magistrale in Disaster and Health Crisis
Management**

Tesi di Laurea

**Scabies and disasters: a systematic review exploring Scabies
epidemiology and control measures after earthquakes, floods and
the COVID-19 pandemic**

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Anno Accademico 2025/2026

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Abstract

Background and Objectives: Acute societal crises destabilize infrastructure, frequently triggering resurgences of neglected ectoparasitic dermatoses. This systematic scoping review maps the epidemiological and clinical dynamics of *Sarcoptes scabiei* outbreaks across diverse emergency settings, focusing on the post-pandemic Italian public health landscape.

Methods: Guided by the Joanna Briggs Institute framework and PRISMA checklist, electronic searches were executed in PubMed and Scopus for primary empirical studies published between 2016 and 2026. The final corpus integrated 35 original quantitative and institutional sources, including 9 sub-national reports from Italy.

Results: Transmission mechanics depend heavily on crisis typology. Physical disasters (earthquakes and floods) destroy local water and sanitation networks, rendering topical scabicides operationally impractical and forcing a clinical shift toward systemic oral ivermectin. Conversely, pandemic lockdowns converted closed domestic environments into high-density transmission hubs. In Italy, a distinct geographical divergence emerged: Northern regions exhibit youth-driven, school-centered clusters, whereas Central and Southern territories experience outbreaks concentrated in long-term care facilities.

Regional data demonstrate that removing out-of-pocket financial barriers through subsidized drug distribution significantly curtails incidence and counteracts clinical pseudo-resistance.

Conclusions: Scabies serves as a highly sensitive indicator of structural breakdown and socioeconomic vulnerability. Emergency preparedness frameworks must elevate ectoparasitic control to a core priority by incorporating early syndromic field screening and rapid, simultaneous contact treatment protocols.

Introduction

Managing communicable diseases during humanitarian crises and acute societal disruptions represents a major challenge for international public health bodies. Disasters, including biological hazards like viral pandemics, hydrometeorological events such as catastrophic flooding, and geophysical disruptions like earthquakes, destabilize infrastructure and disrupt ordinary healthcare delivery (Froeschl et al., 2025; Mahdevar et al., 2022; Spaziante et al., 2025). Mass population displacement, crowded living conditions, and failing sanitary standards frequently trigger a resurgence of neglected tropical and parasitic dermatoses.

These conditions then become persistent drivers of secondary illness in post-disaster settings (Dayrit et al., 2018; Doğramacı et al., 2026). Among the parasitic dermatoses that disproportionately affect populations living in deprived conditions, scabies remains one of the most important.

Scabies is a highly contagious skin infestation caused by the microscopic, obligate human mite *Sarcoptes scabiei* var. *hominis* (Cerro et al., 2022). The mite completes its lifecycle on the human host, and transmission occurs primarily through direct, prolonged skin-to-skin contact. Globally, the infestation affects more than 200 million people at any given time. Although widespread, its primary burden is concentrated in tropical territories and resource-limited areas with low socioeconomic indices (Cerro et al., 2022; Spaziante et al., 2025).

Overcrowding and high-density living arrangements drive the transmission and community-wide expansion of this parasite (Cerro et al., 2022; Zengarini et al., 2025). Understanding outbreak risk patterns during crises requires a thorough re-evaluation of traditional vulnerability.

Historically, public health frameworks limited high-risk classifications to specific institutionalized populations. These classic high-risk cohorts include long-term care facilities, nursing homes, prisons, military barracks, and temporary refugee camps (Gheibi et al., 2023; Bonanno et al., 2022; Laganà et al., 2024).

The vulnerability of these groups stems from a shared challenge: the inability to maintain physical distance, the regular sharing of bedding or textiles, and frequent clinical frailties that hinder symptom recognition or reporting (Laganà et al., 2024; Spaziante et al., 2025).

However, the COVID-19 pandemic represented a turning point in the epidemiology of scabies, with a marked increase in reported cases extending beyond traditionally recognized high-risk populations (Cerro et al., 2022; Casals, 2021).

School-aged children and adolescents aged 0 to 19 have emerged as primary transmission vectors, carrying infestations from educational settings back into family households (Bonamin & Krasniqi, 2026; Regione Lombardia, 2025).

In addition, while international travel has historically served as a baseline risk factor due to general mobility, the modern landscape features a distinct vector driven by young adults and budget travelers using unregulated peer-to-peer digital networks, such as short-term holiday rentals and couch-surfing platforms (Zengarini et al., 2025).

Rather than relying on traditional hospitality channels subject to regular hygiene inspections, these decentralized arrangements fuel localized overtourism. This dynamic funnels transient populations into high-bed-turnover environments that systematically evade public health oversight and routine sanitary compliance (Zengarini et al., 2025).

When evaluating the constraints within the current literature, a distinction must be made between a historical lack of research priority and individual reporting barriers.

At the academic level, high-impact scientific literature remains scarce because scabies has long been marginalized as a low-priority disease typical of socioeconomically isolated or tropical zones.

At the individual level, public health registries are compromised by patient underreporting. Deep-seated social stigma, fueled by the misconception that parasitic infestations stem from poor personal hygiene, deters individuals from seeking care or reporting cases.

Consequently, patients frequently conceal symptoms or resort to unverified self-treatment out of fear of social exclusion (Giorgio et al., 2025; Imran, 2025). This implies that the majority of the evidence remains highly localized and descriptive, leaving disaster response planners without proper information on population-level containment interventions (Giorgio et al., 2025; Zengarini et al., 2025).

While public health systems routinely manage scabies, its impact can be substantially amplified in post-disaster environments (Dayrit et al., 2018; Mahdevar et al., 2022). Floods and severe earthquakes can destroy physical infrastructure, forcing mass evacuations into crowded tent cities, emergency shelters, and displacement camps (Beyoğlu & Gökler, 2024; Imran, 2025).

In these environments, the collapse of basic utilities and a lack of clean water undermine standard treatments. First-line therapies, such as topical 5% permethrin cream, require full-body application followed by complete washing cycles across entire contact clusters, a mandate that is nearly impossible to execute in water-deprived field shelters (Mahdevar et al., 2022; Beyoğlu & Gökler, 2024).

Despite these risks, there is a lack of unified reviews that map or predict scabies outbreak trends during crises. Although interest in scabies epidemiology has risen, the literature remains fragmented, and the infestation is rarely treated as an independent threat requiring dedicated monitoring. Instead, it is typically recorded as a secondary issue within general overviews of post-disaster skin conditions (Yucesoy et al., 2025; Demir et al., 2025).

This lack of epidemiological specificity prevents the development of clear syndromic response protocols, leaving mobile medical units ill-equipped to counter parasitic resurgences during regional emergencies (Mahdevar et al., 2022).

Ultimately, human scabies can serve as a sensitive indicator of the structural, behavioral, and socioeconomic shifts that occur within populations facing acute societal disruptions (Launay et al., 2022; Spaziente et al., 2025).

Despite this potential, ectoparasitic diseases remain poorly integrated into standard emergency public health frameworks (Mahdevar et al., 2022; Spaziente et al., 2025). Closing this gap requires integrated data systems, clear policy assessments, and context-specific environmental analyses to support targeted syndromic surveillance in vulnerable populations (Mahdevar et al., 2022; Zengarini et al., 2026).

Aim and Objectives

The aim of this systematic scoping review is to evaluate and map the epidemiological and clinical dynamics of *Sarcoptes scabiei* outbreaks across diverse disaster settings and acute public health emergencies, encompassing the COVID-19 pandemic containment periods, catastrophic floods, and earthquakes, with a dedicated focus on the Italian public health landscape.

Methods

Study design

A systematic literature review was conducted to identify and synthesize primary studies on the relationship between scabies and disasters, both natural and anthropogenic. The review was performed according to the methodological guidance of the Joanna Briggs Institute (JBI) for evidence synthesis, and its reporting was informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.

Eligibility criteria

To establish a rigorous and reproducible screening protocol, the eligibility criteria for this systematic review were formulated to isolate primary data across specific populations, exposures, and clinical outcomes. Studies were included if they evaluated human populations in which *Sarcoptes scabiei* infestation constituted a verified clinical or epidemiological outcome. Under the parameters of contextual exposure, inclusion was strictly restricted to specific crisis typologies—namely the COVID-19 pandemic, seismic events, or floods—incorporating a dedicated analytical focus on the Italian public health infrastructure. The parasitosis had to be investigated in direct temporal or environmental relation to these designated emergencies. Regarding the phenomenon of interest, eligible papers had to document a clear association between scabies transmission dynamics and the crisis framework, specifically capturing variations in incidence or prevalence, localized outbreaks, operational treatment challenges, or public health control measures directly driven by disaster-related determinants such as overcrowding, population displacement, and the breakdown of sanitary or medical networks.

In terms of methodological design, inclusion was restricted to original empirical research employing quantitative, qualitative, or mixed-methods configurations, though well-structured research letters and brief reports were deemed eligible if they contained sufficient extractable primary data or detailed outbreak investigations. In order to capture the most recent and relevant evidence, a strict ten-year temporal window preceding the search date was selected, spanning from 2 April 2016 to 2 April 2026. This specific timeframe was determined to be optimal for combining contemporary, up-to-date data with the analytical capacity to map stable, medium-term epidemiological trends within the available literature. Lastly, linguistic eligibility mandated that at least the title and abstract be available in a language interpretable by the review team, specifically English, Spanish, or Italian.

Specific exclusion parameters were applied to safeguard the empirical integrity of the synthesized data. Secondary or tertiary literature, including narrative reviews, systematic reviews, scoping reviews, and meta-analyses, was systematically excluded from the final corpus. Similarly, publications lacking extractable primary data—such as editorials, brief commentaries, opinion pieces, and unexpanded conference abstracts—were omitted. Finally, the review excluded any study where scabies was mentioned incidentally without a clear, causal link to the evaluated disaster contexts (COVID-19, earthquakes, or floods), as well as investigations that detailed an emergency scenario without establishing an explicit, data-driven correlation to the transmission, incidence, or healthcare management of the infestation.

Information sources and search strategy

A comprehensive search of literature was conducted in PubMed and Scopus on 2 April 2026. These databases were selected because they are among the main bibliographic sources recommended for health sciences systematic reviews and JBI-based evidence syntheses.

The search strategy was developed iteratively, starting from key terms identified in preliminary searches and from index terms of relevant articles. Two database-specific search strings were constructed, each combining three core concepts: scabies, disasters, and humanitarian or emergency contexts. In both databases, controlled vocabulary terms (for example MeSH in PubMed) and free-text keywords were combined using Boolean operators to maximize sensitivity.

The final search strategies were adapted to the syntax of each database; full search strings are reported in Table 1

No restrictions were applied to study design at the search stage. The 10-year time limit (2016–2026) was implemented using database filters, where available, and manually verified during screening. Reference lists of included studies and relevant reviews were also screened to identify additional eligible publications.

The two strings used were:

PubMed	Scopus
("Scabies"[Mesh] OR "scabie*" [Title/Abstract]) AND (("Disasters"[Mesh] OR disaster* [Title/Abstract] OR "natural disaster*" [Title/Abstract] OR earthquake* [Title/Abstract] OR flood* [Title/Abstract] OR hurricane* [Title/Abstract] OR cyclone* [Title/Abstract] OR tsunami* [Title/Abstract] OR wildfire* [Title/Abstract] OR "post-disaster" [Title/Abstract] OR "post disaster" [Title/Abstract] OR emergency [Title/Abstract] OR emergencies [Title/Abstract] OR shelter* [Title/Abstract] OR displacement [Title/Abstract] OR displaced [Title/Abstract] OR refugee* [Title/Abstract] OR evacuee* [Title/Abstract] OR camp* [Title/Abstract] OR overcrowding [Title/Abstract]	TITLE-ABS-KEY(scabie*) AND TITLE-ABS-KEY(disaster* OR "natural disaster*" OR earthquake* OR flood* OR hurricane* OR cyclone* OR tsunami* OR wildfire* OR "post-disaster" OR "post disaster" OR emergency OR emergencies OR shelter* OR displacement OR displaced OR refugee* OR evacuee* OR camp* OR overcrowding OR overcrowded OR "COVID-19" OR COVID19

OR overcrowded[Title/Abstract]) OR ("COVID-19"[Mesh] OR "SARS-CoV-2"[Mesh] OR COVID-19[Title/Abstract] OR COVID19[Title/Abstract] OR "SARS-CoV-2"[Title/Abstract] OR coronavirus[Title/Abstract] OR "post-COVID"[Title/Abstract] OR "post COVID"[Title/Abstract] OR pandemic*[Title/Abstract] OR lockdown[Title/Abstract] OR quarantine[Title/Abstract]))	OR "SARS-CoV-2" OR coronavirus OR "post-COVID" OR "post COVID" OR pandemic* OR lockdown OR quarantine)
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Table 1: strings used

Study selection

All records retrieved from the database searches were exported, and the duplicates were removed using Rayyan, plus a manual check based on title, DOI and authors. Titles and abstracts of unique records were screened independently and in duplicate by two reviewers to assess potential eligibility against the predefined criteria. Studies clearly not related to scabies or not set in a disaster context were excluded at this stage.

Full texts were obtained for all articles judged as potentially eligible. The same two reviewers then independently assessed full-text articles for inclusion, again using the prespecified criteria (scabies explicitly linked to a natural or anthropogenic disaster, and original data or sufficiently detailed outbreak description). Disagreements at either the title/abstract or full-text screening stage were resolved through discussion; when consensus could not be reached, a third reviewer was consulted.

The overall study selection process, including reasons for exclusion at the full-text stage, was documented and is presented in a PRISMA-style flow diagram.

The included articles were classified according to the type of disaster exposure, namely floods, earthquakes, and COVID-19. For the COVID-19 category, a subsample was defined through purposive selection of studies, with the aim of ensuring methodological and geographical representativeness (i.e., a balanced mix of countries and study designs). In addition, all studies focusing on Italy were included to ensure comprehensive coverage of the national context

Data extraction

A standardized data extraction form was developed a priori, based on JBI recommendations for data charting in evidence syntheses. The form was piloted on a small sample of included studies and refined iteratively to ensure clarity and completeness. For each included article, the following information was extracted:

- bibliographic details (first author, year, country).
- study design and setting.
- type of disaster (natural or anthropogenic) and key contextual features (for example displacement, camp setting, health system disruption).
- population characteristics.
- scabies-related outcomes (for example incidence/prevalence, outbreak description, treatment or control measures).
- reported mechanisms linking scabies to the disaster context (for example overcrowding, hygiene conditions, breakdown of services).
- main findings and authors' conclusions relevant to the research question.

Data extraction was performed by one reviewer and independently checked by a second reviewer. Any discrepancies were discussed and resolved by consensus.

Extracted data were charted in an Excel spreadsheet to facilitate comparison across studies.

Data synthesis

Given the heterogeneity of study designs, settings and outcome measures, a narrative synthesis was undertaken rather than a quantitative meta-analysis, in line with JBI guidance for non-intervention and complex context reviews.

Studies were grouped according to the type of disaster (for example earthquakes, conflicts, other natural hazards) and setting (for example refugee camps, temporary shelters, community settings).

Within these groups, findings were compared with respect to:

- Outbreak context and target populations
- Epidemiological trends and key results
- Transmission pathways
- Outbreak control interventions
- Risk factors, barriers and outcomes investigated

This thesis does not raise ethical dilemmas or controversies, as it is based solely on secondary analysis of anonymized, previously published data and reports on scabies and related dermatologic conditions in disaster and pandemic settings. The included studies either use aggregated surveillance and hospital data or explicitly report approval by the relevant ethics committees and health authorities, with no collection of new identifiable patient information or any intervention that could pose additional risk.

Results

The systematic database search culminated in the final inclusion of thirty-five primary academic sources that met all predefined eligibility criteria. The initial electronic database queries yielded a total of 405 raw records, comprising 154 articles extracted from PubMed and 251 from Scopus. Following the systematic removal of 13 duplicate records, a baseline corpus of 392 unique records underwent rigorous title and abstract screening. From this pool, 26 articles successfully satisfied the stringent eligibility criteria regarding specific disasters and ectoparasitic outcomes. Furthermore, to comprehensively enrich the review with a dedicated focus on the Italian public health infrastructure, an additional 9 relevant articles were identified and integrated through targeted manual free searches and grey literature tracking, bringing the definitive volume of synthesized literature to 35 studies (Figure 1)

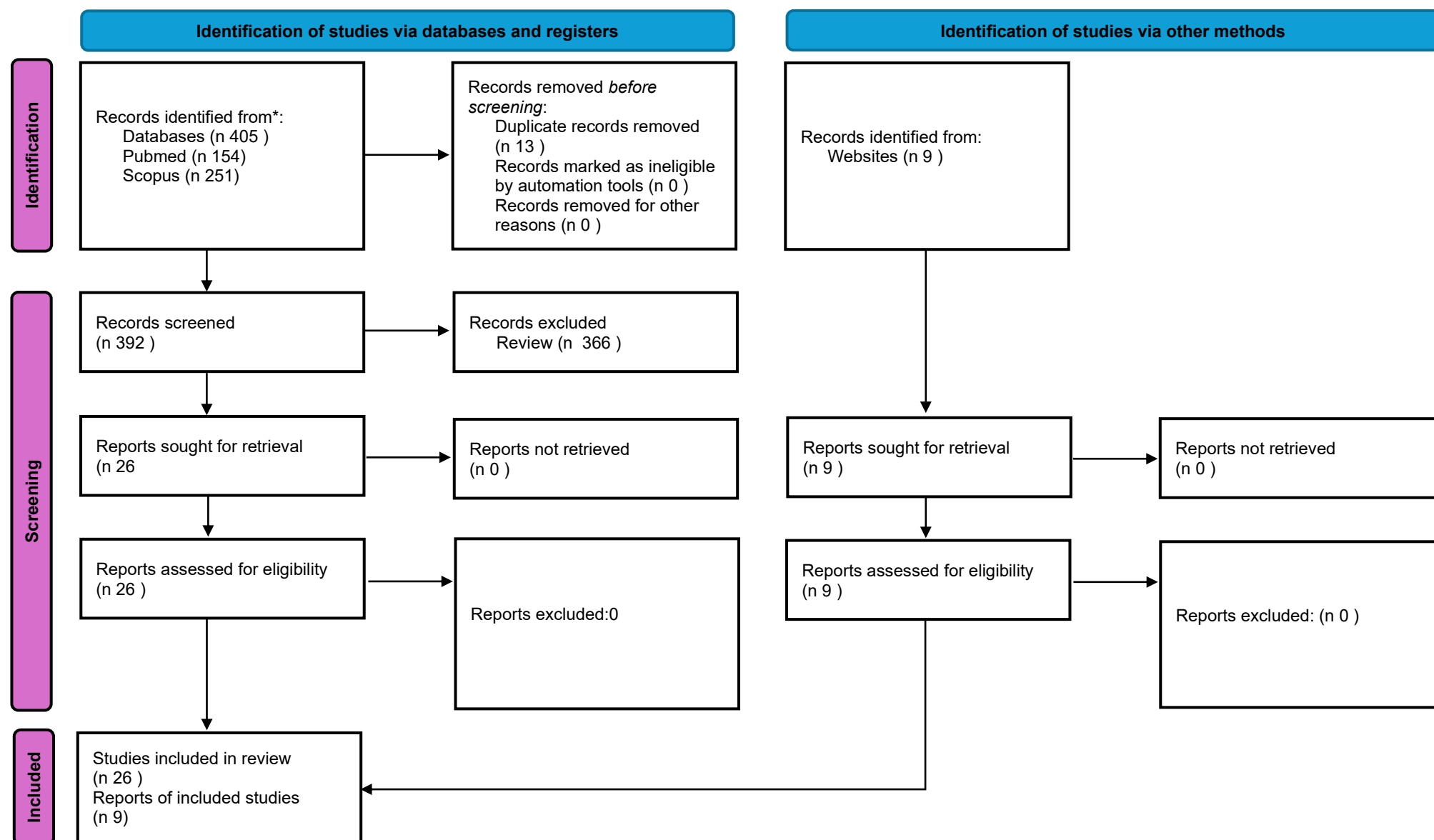


Figure 1 - PRISMA

Chronologically distributed within the designated ten-year temporal window (2016–2026), these 35 included studies exhibit a pronounced density in the post-2019 landscape, reflecting an expanded public health interest in ectoparasitic transmission dynamics following the onset of the COVID-19 pandemic and recent major seismic and flooding crises.

Geographically, the synthesized literature maps out a distinct distribution of research focus, balancing global field reports from Western Asian territories and South Asian disaster sectors with a highly robust analytical concentration on the Italian healthcare framework.

Methodologically, the entire selected corpus comprises non-experimental, observational designs. To ensure analytical clarity and avoid hierarchical classification errors, these studies are classified by both their specific epidemiological architecture—differentiating between retrospective cohorts, cross-sectional designs, and localized outbreak evaluations—and their overarching methodological approach, separating quantitative measurements from qualitative or mixed-methods methodologies.

To provide an overview of the literature, the baseline descriptive profiles of the thirty-five included studies are compiled below. As shown in Table 2, this matrix outlines authors, publication timelines, geographic focus, and methodological configurations

Chronological Mapping and Methodological Profile of the Evaluated Corpus

Title	Author	Year	Country	Study Methodology
Impact of climate change on dermatological conditions related to flooding: update from the International Society of Dermatology Climate Change Committee	Johannes F. Dayrit et al.	2018	Multiple countries (global review)	Descriptive / Qualitative
Public interest in dermatologic symptoms, conditions, treatments, and procedures during the COVID-19 pandemic: Insights from Google Trends	Esen-Salman et al.	2021	USA	Cross-Sectional / Quantitative
Status of Scabies Cases in COVID-19 Pandemic Days	Ahmet Önder Porsuk, Şidem Cerit	2021	Turkey (Kırklareli Province)	Cross-Sectional / Quantitative
Impact of Pandemic in the Frequency of Scabies – Possible Scabies Outbreak Scenario Aftermath COVID-19	Turan and Metin	2021	Turkey	Cross-Sectional / Quantitative
Scabies – An epidemic within a pandemic	Miquel Casals	2021	Spain	Descriptive / Qualitative
Effects of the COVID-19 pandemic on head lice and scabies infestation dynamics: a population-based study in France	Titouan Launay et al.	2022	France	Cohort / Quantitative
Unexpected consequences of SARS-CoV-2 pandemic: scabies infestation (comment letter)	Griffin et al.	2022	UK and Ireland	Case Series / Quantitative

Title	Author	Year	Country	Study Methodology
Decreases in scabies and lice cases among the pediatric and adult populations during COVID-19	Marianne Bonanno, Olivia S. Lee, Christopher Sayed	2022	USA (North Carolina)	Cohort / Quantitative
Challenges of Controlling Vector and Vector-borne Diseases at the Flood Disaster of Khuzestan Province in 2019	Parisa Mahdevar et al.	2022	Iran (Khuzestan Province)	Descriptive / Qualitative
Scabies Outbreak During the COVID-19 Lockdown	P.A. Cerro, A. Navarro-Bielsa, A.M. Palma	2022	Spain (Zaragoza)	Outbreak Evaluation / Quantitative
Scabies revisited in the COVID-19 era	I. Trave et al.	2022	Italy	Case Series / Quantitative
Comparing the Trends of Vector-Borne Diseases (VBDs) before and after the COVID-19 Pandemic and Their Spatial Distribution in Southern Iran	Zahra Gheibi et al.	2023	Iran (Fars Province)	Cross-Sectional / Quantitative
The Scabies Epidemic During the Covid-19 Pandemic	Pınar Etiz, Ali Tanju Altunsu	2023	Türkiye (Adana Province)	Cross-Sectional / Quantitative
Despite the use of ivermectin during the COVID pandemic, scabies keeps playing tricks with us	Juliana Polizel Ocanha-Xavier, José Cândido Caldeira Xavier-Junior	2023	Brazil	Case Series / Quantitative

Title	Author	Year	Country	Study Methodology
The impact of the COVID-19 pandemic on fungal and parasitic skin infections in a Swedish health region without lockdown: Focus on scabies and tinea capitis/tinea barbae	Maria Pissa, Oliver Seifert, Sandra Jerkovic Gulin	2023	Sweden (Jönköping County)	Cohort / Quantitative
COVID-19 pandemic-related decreases in hand, foot, and mouth disease and scabies: A retrospective study	Ania Stolarczyk, Julie Ryan Wolf, Alice Pentland	2024	USA (Rochester area)	Cohort / Quantitative
Trends in Dermatological Diagnoses During Covid-19 Pandemic in Nigeria	C.C. Anaje et al.	2024	Nigeria	Cross-Sectional / Quantitative
Preventing Possible Parasitic Skin Infections After an Earthquake: A Practical Recommendation	Ceyda Tetik Aydogdu et al.	2024	Turkey (Muğla province)	Cross-Sectional / Quantitative
Impact of the COVID-19 pandemic on infectious diseases reporting	Fabio Contarino et al.	2024	Italy (Siracusa)	Cohort / Quantitative
The impact of scabies in tent cities in Kahramanmaras after the Turkish earthquakes: oral pharmacologic treatment efficacy	Muhammed Mustafa Beyoğlu, Mehmet Enes Gökler	2024	Turkey (Kahramanmaraş tent cities)	Cohort / Quantitative
Itchy skin diseases in the emergency department before and after the earthquakes	Bilgehan Demir et al.	2025	Turkey (Malatya province)	Cohort / Quantitative

Title	Author	Year	Country	Study Methodology
Public Interest in Dermatological Issues After the 2023 Türkiye Earthquake: A Comparative Google Trends Analysis	Cansu Altınöz Güney, Huriye Aybüke Koç	2025	Türkiye (11 affected provinces)	Cross-Sectional / Quantitative
Needs and early response towards internally displaced people in Hatay Province in the aftermath of the 2023 earthquake in Turkey	Guenter Froeschl et al.	2025	Turkey (Hatay Province)	Cross-Sectional / Mixed-Methods
Evolving dermatological complaints following the 2023 Turkey and Syria earthquake: insights from a disaster-affected region	Sera Nur Yucesoy, Koray Temiz, Tumay Ak	2025	Turkey (Hassa district, Hatay)	Cross-Sectional / Quantitative
Scabies – A Catastrophe that Befalls Bangladesh amidst Floods	Sakan Binte Imran	2025	Bangladesh	Descriptive / Qualitative
Scabies Outbreak in Hatay Following the Devastating 2023 Turkish Earthquake	Doğramacı et al.	2026	Turkey (Hatay Province)	Outbreak Evaluation / Quantitative

Table 2 Records include

This table provides a systematic categorization of the 26 primary sources included in the final corpus of this scoping review. The listed studies are arranged in ascending chronological order based on their data collection reference period (from 2016 to 2024) to effectively trace the temporal and geographical evolution of the scientific literature concerning scabies infestations during disasters and public health crises. For each included source, the core methodological profile is outlined, distinguishing between the primary research approach (quantitative, qualitative, or mixed-methods) and the specific design macro-typology (cohort studies, cross-sectional surveys, descriptive outbreak evaluations, or case series), thereby establishing a solid structural baseline for the subsequent synthesis of evidence.

Italian Studies

Title	Author	Year	Country	Study Methodology
Impact of the COVID-19 pandemic on infectious disease epidemiology	Facciola A. et al.	2023	Italy (Messina province, Sicily)	Cohort / Quantitative
Resurgence of scabies in Italy: The new life of an old disease	Laganà A. et al.	2024	Italy (Messina province, Sicily)	Cohort / Quantitative
La scabbia in Piemonte. Rapporto 2024 (ed. 2025)	Zottarelli F. et al. (SEREMI)	2024	Italy (Piedmont Region)	Surveillance Report / Quantitative
Post-COVID-19 resurgence of scabies' cases in the Lazio Region, Italy	Spaziante M. et al.	2025	Italy (Lazio Region)	Cohort / Quantitative
Post-COVID-19 resurgence of scabies in Campania, Italy: the hidden burden and challenges in surveillance	Giorgio C.M. et al.	2025	Italy (Campania Region)	Cohort / Quantitative
Scabies increasing incidence in Bologna from 2013 to 2024: a retrospective analysis	Zengarini C. et al.	2025	Italy (Bologna, Emilia-Romagna)	Cohort / Quantitative
Gestione dei casi di scabbia in Regione Lombardia. Linee di indirizzo RL	Regione Lombardia	2025	Italy (Lombardy Region)	Guidelines & Surveillance / Quantitative
Free scabies treatment linked to decline in incidence: time-series analysis from Bologna	Zengarini C. et al.	2026	Italy (Bologna, Emilia-Romagna)	Time-Series / Quantitative
Indagine trasversale sulla prevalenza della scabbia nell' U.L.S.S. 2 Marca Trevigiana	Bonamin M.A. & Krasniqi A.	2026	Italy (ULSS 2 Marca Trevigiana, Veneto)	Cross-Sectional / Quantitative

Table 3 Italian records included

This table (Table 3) outlines the structural characteristics of the 9 specific data sources and institutional documents focused entirely on the Italian territory within the scoping review corpus. Arranged in ascending chronological order according to their publication and release years (ranging from 2023 to 2026), this subset provides a granular, intra-country mapping of the post-pandemic scabies resurgence across various regional healthcare jurisdictions, including Sicily, Lazio, Campania, Emilia-Romagna, Piedmont, Lombardy, and Veneto. The breakdown highlights a diverse array of quantitative research designs and institutional frameworks, spanning retrospective cohort analyses, official regional public health surveillance reports, formal clinical and operational guidelines, advanced time-series policy interventions, and cross-sectional prevalence surveys. By categorizing these distinct sub-national evidence bases, this table serves as the methodological foundation for synthesizing regional variations in ectoparasitic trends, reporting sensitivities, and localized public health containment strategies across the Italian peninsula.

Earthquakes and Scabies

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Doğramacı et al., 2026	Feb 2021–Feb 2023 (pre); Apr 2023–Feb 2025 (post)	Earthquakes (Mw 7.8 / 7.5, 06 Feb 2023)	Turkey (Hatay Province)	Centralized tertiary clinic managing multi-district displaced clusters	General & Displaced population: Pediatric and adult dermatology outpatients	Scabies proportion rose from 4.97% to 13.01% post-event; 2.86-fold higher odds of diagnosis, peaking in children	Interhuman transmission via close contact in camp shelters; Fomite-mediated via shared bedding	Reactive clinical management; operational emphasis on <i>Turkish National Scabies Guidelines</i>	Overcrowded camps, severe water/sanitation deficits, high child dependency, hyper-concentration of IDPs	Destroyed health networks, clean water scarcity, logistical failure of complex topical application	Proportional incidence shifts, post-vs-pre odds ratios, demographic stratification (age, sex, nationality)
Beyoğlu & Gökler, 2024	10 Apr 2023–10 May 2023	Earthquakes (Mw 7.7 / 7.6, 06 Feb 2023)	Turkey (Kahramanmaraş)	Dispersed temporary mass-shelters (tent/container cities)	Vulnerable & Displaced population: 192 clinically diagnosed camp residents (~43k baseline)	Minimum scabies frequency ≥0.54% with extreme symptom burden; rapid clinical resolution post-intervention	Interhuman transmission via skin-to-skin contact; Fomite-mediated via communal bedding configurations	Targeted Mass Drug Administration (MDA): Two-dose oral ivermectin for cases, single-dose for co-sleeping contacts	Adverse camp living conditions, severe water utility deficits, communal sleeping, high population density	Poor feasibility of topical scabicides in tents, incomplete coverage of transient cohorts, screening bias	Estimated cluster frequency, anatomical lesion mapping, symptom severity scores, clinical cure rates
Tetik Aydoğdu et al., 2024	15–24 Feb 2023 (screening); 5-	Earthquakes (Mw 7.7 / 7.6, 06 Feb 2023)	Turkey (Muğla Province)	Centralized institutional evacuation hub	Displaced & Vulnerable population	Baseline prevalence of 10.5%; proactive containment	Interhuman transmission via close	Room-to-room syndromic screening, immediate	Forced displacement, high indoor crowding indices, pre-	High turnover of evacuees, loss to follow-up during	Pre/post-screening prevalence, absolute

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
	month follow-up			(university dormitory)	n: 1,580 relocated earthquake survivors	restricted new cases to 42 over 5 months	contact in high-density shared rooms	isolation of positive rooms, free topical/oral drug allocation	existing upward national scabies trends	longitudinal monitoring	longitudinal incidence, qualitative prevention efficacy
Demir et al., 2025	Apr 2022–Apr 2023 (pre); Apr 2023–Apr 2024 (post)	Earthquakes (Mw 7.8 / 7.5, 06 Feb 2023)	Turkey (Malatya Province)	Emergency Department (ED) and tertiary clinic managing regional clusters	Vulnerable & Refugee population: 3,468 pruritic patients (≥8 years) including significant refugees	Significant post-disaster surge; scabies emerged as the leading diagnosis, concentrated in refugee cohorts	Interhuman transmission via close contact; Shared common source via communal bathrooms	No formal clinical program; authors recommended structural water sanitation and targeted health screening	Congested mass accommodations, damaged utilities, refugee status, stress-induced immune vulnerability	Structural hospital building damage, restricted outpatient access, lack of stable alternative housing	Diagnostic distribution shifts, absolute scabies frequency, correlations with nationality and care setting
Froeschl et al., 2025	16 Feb 2023–06 Apr 2023	Earthquakes (Mw 7.8 / 7.5, 06 Feb 2023)	Turkey (Hatay Province)	Dispersed rural/peri-urban encampments managed by mobile medical teams	Displaced & Vulnerable population: 3,027 primary care consultations among IDPs and hosts	Scabies constituted 9.7% of total consultations and 5.2% among children <5 years, ranking as a primary pathology	Interhuman transmission via close contact in tents; Shared common source via unequipped hosts	On-site point-of-care medication distribution (90% resolution); proposal for systemic oral mass regimens	Mass displacement into tents, total dependence on external aid, collapsed primary healthcare grids	Severe medical supply shortages, operational infeasibility of topicals in fields, poor referral tracking	Consultative diagnostic distribution by age, sex, and origin (Turkish vs. Syrian), ectoparasitic frequency

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Yucesoy et al., 2025	Apr 2023–Jan 2024	Earthquakes (Mw 7.8 / 7.5, 06 Feb 2023)	Turkey (Hassa district, Hatay)	Centralized rural district hospital dermatology clinic	General & Displaced population: 5,103 dermatology outpatients	Scabies accounted for 68.8% of all infectious diagnoses (n=1,450), showing an immediate post-event peak and a winter wave	Interhuman transmission via close contact; Shared common source via shared washing facilities	Routine reactive clinical care matching national guidelines; no systematic field trial implemented	Compromised hygiene infrastructure, overcrowded camp conditions, persistent infrastructure damage	Total lack of pre-disaster localized baseline data, failure to sustain preventative measures over time	Temporal distribution trends across 17 diagnostic groups, relative scabies proportion, seasonal waves
Altınöz Güney & Koç, 2025	06 Feb 2022–03 Feb 2024	Earthquakes (Mw 7.7 / 7.6, 06 Feb 2023)	Türkiye (11 affected provinces)	Regional infodemiological digital tracking landscape	General population (Internet users): Digital population executing queries within disaster zones	Overall dermatological searches decreased, but scabies Relative Search Volume (RSV) surged; Hatay rose to 1st nationally	Not directly measured; proxy indicator of rapid community transmission within overcrowded shelters	Informational paradigm; proposal to use Google Trends to guide post-disaster resource allocation	Overcrowded mass shelters, immediate collapse of hygiene networks, mass population migration	Post-disaster telecommunication disruptions, demographic data bias, difficulty translating RSV to prevalence	Pre- vs. post-earthquake regional variations in scabies RSV, national provincial ranking shifts

Table 4 Earthquakes records

Outbreak context and target populations

As shown in Table 4, in total, seven studies within the evaluated corpus specifically addressed the epidemiological patterns, clinical challenges, and public health containment strategies of scabies infestations in the context of cataclysmic seismic disasters (Altınöz Güney & Koç, 2025; Tetik Aydoğdu et al., 2024; Beyoğlu & Gökler, 2024; Demir et al., 2025; Doğramacı et al., 2026; Froeschl et al., 2025; Yucesoy et al., 2025). This specialized body of evidence comprehensively investigates the correlation between sudden infrastructural collapse, the displacement of civilian populations into hyper-congested temporary shelters, and the parallel acceleration of ectoparasitic transmission chains. Following the devastating earthquakes of 6 February 2023 in Turkey and Syria (Magnitude 7.7 and 7.6), a cluster of hospital- and community-based evaluations characterized emerging dermatological landscapes, focusing intently on infectious dermatoses and parasitic infestations, including scabies. Within this framework, Doğramacı and colleagues (2026) conducted a retrospective cohort study at the Mustafa Kemal University of Hatay to compare patients diagnosed with scabies at the dermatology outpatient clinic during a two-year pre-earthquake baseline (February 2021–February 2023) against an extended post-disaster window (April 2023–February 2025). Also located in the Hatay province, a study at Hassa State Hospital evaluated 5,103 dermatology outpatients between April 2023 and January 2024, charting evolving dermatologic complaints within a district situated directly along the active fault line of the epicenter (Yucesoy et al., 2025). Complementing these insights, a retrospective cohort study at a tertiary university hospital in Malatya analyzed pruritic skin conditions presenting to the emergency department and dermatology clinic, contrasting the year preceding the disaster (April 2022–April 2023) with the immediate post-earthquake year (April 2023–April 2024) (Demir et al., 2025).

In Kahramanmaraş, a cross-sectional study focused on scabies in tent and container cities where 192 patients were treated with oral ivermectin between April and May 2023 (Beyoğlu & Gökler, 2024).

A preventive program in Muğla screened 1,580 earthquake victims hosted in a student dormitory between 15 and 24 February 2023 (Tetik Aydoğdu et al., 2024), while 3,027 consultations collected by mobile medical units in 36 locations in Hatay between 16 February and 6 April 2023 documented primary diagnoses in internally displaced people and host communities (Froeschl et al., 2025).

Finally, a Google Trends study compared public interest in dermatological issues in the 52 weeks before and after the 2023 earthquakes across the 11 affected provinces (Altınöz Güney & Koç, 2025).

Epidemiological trends and key results

In the Hatay university outpatient cohort, scabies represented 4.97% (2,434/48,986) of dermatology visits before the earthquake and 13.01% (5,938/45,655) afterwards, with an odds ratio of 2.86 for scabies diagnosis in the post-earthquake period and a notable increase in paediatric cases (from 21.8% to 32.5%) (Doğramacı et al., 2026). The Hassa State Hospital study found that infections and infestations were the most frequent complaint category across the 10-month period and peaked immediately after the earthquake (38% of complaints in April–June 2023); scabies outbreaks were explicitly described as notable within this group (Yucesoy et al., 2025).

In Malatya, scabies remained the most common itchy-skin diagnosis both before and after the earthquakes, and its frequency increased significantly in the post-earthquake period, particularly among refugees, alongside rises in contact dermatitis, pityriasis rosea and tinea corporis (Demir et al., 2025).

In Kahramanmaraş tent and container cities, the minimum frequency of scabies was $\geq 0.54\%$ of the mass-shelter population; nearly all patients reported pruritus (99.0%) and rash (97.9%), and lesions were widely distributed (Beyoğlu and Gökler, 2024). The Muğla dormitory screening found baseline prevalence values of 10.5% for scabies (167/1,580) and 4.2% for pediculosis capitis (67/1,580), while only 42 new scabies and one new pediculosis case occurred over the following five months among 1,665 residents, reducing point prevalence to 2.8% and 0.06%, respectively (Tetik Aydoğdu et al., 2024).

Mobile teams in Hatay reported that scabies accounted for 9.7% of all primary diagnoses (292/3,021) and 5.2% of consultations in children under five years; in the 5–18-year group, scabies and lice were second and third most common after upper respiratory infections (Froeschl et al., 2025).

The Google Trends study showed that scabies-related search volumes increased significantly after the earthquakes in almost all affected provinces—for example, relative scabies interest rose by 69% in Hatay, 112% in Kahramanmaraş and 144% in

Adıyaman, and Hatay became the top province in Türkiye for scabies searches (Altınöz Güney and Koç, 2025).

Transmission pathways

Across these studies, scabies transmission is consistently associated with overcrowded temporary shelters, shared bedding and clothing, and limited access to water and sanitation after the earthquakes (Doğramacı et al., 2026; Yucesoy et al., 2025; Demir et al., 2025; Beyoğlu and Gökler, 2024; Tetik Aydoğdu et al., 2024; Froeschl et al., 2025).

The Hatay university study links the post-earthquake rise in paediatric cases and concentration of diagnoses in Antakya to conditions such as communal living, disrupted schooling and poor hygiene (Doğramacı et al., 2026). The Hassa State Hospital authors attribute high rates of infections and infestations to hygiene challenges, communal living and psychological stress (Yucesoy et al., 2025).

The Kahramanmaraş tent-city study notes that adverse living conditions in tents and containers—especially inadequate hygiene and lack of clean water—promoted close skin-to-skin contact and hindered proper use of topical scabicides (Beyoğlu and Gökler, 2024).

In Muğla, earthquake survivors living in crowded dormitory rooms with shared facilities were considered at increased risk of person-to-person transmission, in the context of a pre-existing national increase in scabies since the second half of 2019 (Tetik Aydoğdu et al., 2024).

Mobile-team data from Hatay describe internally displaced populations housed in tents and rural shelters with poor sanitation and reliance on external water and food supplies, which the authors link to both respiratory infections and ectoparasitic infestations (Froeschl et al., 2025).

Outbreak control interventions

In Kahramanmaraş, all 192 scabies patients in tent and container cities received oral ivermectin 200 µg/kg on days 1 and 8, while symptomatic co-sleeping contacts received a single dose; additional measures included hygiene advice for clothing and bedding, and active case detection through health tents and home visits (Beyoğlu & Gokler, 2024).

Clinical outcomes were favourable: 82.8% of patients achieved complete response and 15.6% partial response after the first dose, rising to 90.1% complete response after the second dose, with only two non-responders (Beyoğlu and Gökler, 2024).

In Muğla, a multidisciplinary team performed room-to-room screening with dermoscopy over ten days, isolated rooms with at least one positive case for ten days, treated all identified cases and close contacts free of charge (topical permethrin-based regimens and oral ivermectin in selected patients), and provided written instructions to residents and cleaning staff about treatment and laundry handling (Tetik Aydoğdu et al., 2024). The authors report that this intervention was associated with a marked reduction in new scabies and pediculosis cases and interpret this as evidence that early screening, case management and contact tracing can prevent epidemics among relocated earthquake victims (Tetik Aydoğdu et al., 2024).

Mobile units in Hatay offered primary care, including treatment of scabies and lice on site; the authors suggest that oral scabies therapy may be particularly suitable in large displaced populations where topical therapy is difficult to implement due to water shortages and privacy limitations (Froeschl et al., 2025).

Both the Hatay outpatient study and the Hassa hospital study emphasise adherence to national scabies treatment algorithms and guidelines, but note that post-disaster conditions complicate the implementation of measures such as bathing with clean water and using clean clothes and linens (Doğramacı et al., 2026; Yucesoy et al., 2025).

Risk factors, barriers and outcomes investigated

Common risk factors to scabies outbreaks identified by the authors in the context of earthquake aftermath include overcrowded shelters or dormitories, disrupted water supply and sanitation, cold and humid weather, large-scale displacement, and the particular vulnerability of children and refugees (Doğramacı et al., 2026; Demir et al., 2025; Beyoğlu and Gökler, 2024; Tetik Aydoğdu et al., 2024; Froeschl et al., 2025). Barriers to control include damaged hospital infrastructure and missing data immediately after the earthquakes, limited medication and supply availability, difficulty applying topical treatments in crowded tents without adequate water or privacy, highly mobile dormitory populations complicating incidence calculation, and limited specialist referral capacity from mobile teams (Doğramacı et al., 2026; Demir et al., 2025; Beyoğlu and Gökler, 2024; Tetik Aydoğdu et al., 2024; Froeschl et al., 2025).

Outcomes across these earthquake-related studies include changes in scabies incidence and proportion among dermatology or emergency visits, demographic shifts (age, sex, district, nationality) in scabies cases, temporal patterns of infection and infestation complaints over ten months, symptom severity scores and lesion distribution before and after ivermectin therapy, pre- and post-screening prevalence and incidence of scabies and pediculosis in dormitory residents, and the proportion of scabies and lice among all diagnoses in mobile clinics, particularly in children (Doğramacı et al., 2026; Yucesoy et al., 2025; Demir et al., 2025; Beyoğlu and Gökler, 2024; Tetik Aydoğdu et al., 2024; Froeschl et al., 2025). The Google Trends paper adds digital-epidemiology outcomes, showing increased public interest in scabies and other dermatologic issues in earthquake-affected provinces (Altınöz Güney and Koç, 2025).

Floods and Scabies

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Imran, 2025	2024 monsoon season (narrative report)	Severe monsoon flooding	Bangladesh (Cumilla, Feni, Noakhali)	Dispersed temporary field health camps within acute flood zones	Displaced & Vulnerable population : Impoverished flood-affected residents (~3,500 camp outpatients)	Near-epidemic threshold; >75% of evaluated patients (~2,800 absolute cases) exhibited clinical scabies	Interhuman transmission via crowded shared sleeping zones; Fomite-mediated via unwashed, damp linens	Reactive field drug allocation, basic household hygiene counseling, and secondary referrals for severe cases	Extreme structural poverty, total loss of housing, absolute clean water deficits, low health literacy	Practical impossibility of implementing hygiene/laundry protocols in active flood zones; medical supply deficits	Qualitative ectoparasitic burden estimation, syndromic co-existence with waterborne diseases, epidemic warning
Dayrit et al., 2018	Comprehensive review of literature up to 2018	Climate-driven flooding, tsunamis, and hurricanes	Multiple countries (Global review)	Systematic global synthesis of flood-related displacement camps and emergency shelters	Displaced population : Global flood-affected populations relocated to mass evacuation shelters	Scabies identified as a primary driver of post-flood dermatologic morbidity globally (e.g., 2003 Baluchistan flood)	Interhuman transmission via skin-to-skin contact in shelters; Environmental skin damage via prolonged water immersion	Preventive protocols aligned with <i>International Society of Dermatology (ISD)</i> frameworks; clean water provision, PPE	Macro-level climate shifts increasing flood severity, massive population displacement, sanitation collapse	Extensive environmental contamination, logistical delays in restoring sanitation, poor sustainability of parasite control	Taxonomic catalog of post-flood dermatoses, comparative evaluation of international preventive guidelines
Mahdevar et al., 2022	Late 2018–early 2019 flood event (post-event expert review)	Severe river flooding	Iran (Khuzestan Province)	Dispersed flooded rural sectors, emergency camps, and	Displaced & Vulnerable population : Flood-affected villagers,	Ubiquitous post-flood surge; scabies and pediculosis reports escalated	Interhuman transmission via dense camp living arrangements; Fomite-	Active syndromic case detection, localized hygiene training for	Persistent stagnant water pooling, accumulated solid waste,	Complete lack of national disaster-specific public health guidelines,	Structural mapping of post-disaster ectoparasites, operational

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
				migratory pathways	camp residents, nomadic cohorts, and ranchers	across all submerged sectors and active camps	mediated via shared clothing and bedding	camp personnel, waste control, parasite treatment	livestock-camp proximity, collapsed infrastructure	uncoordinated external aid, staff shortages	control efficacy, inter-sectoral coordination gaps

Table 5 Flood records

Outbreak context and target populations

A Bangladeshi physician's narrative study describes dermatologic conditions encountered in temporary health camps serving flood-affected populations in Alkora and Chouddagram (Cumilla), later extended to Sonagazi (Feni) and Noakhali, during severe monsoon floods (Imran, 2025). Over two days, approximately 3,500 patients, mostly from very poor households, were seen at these camps (Imran, 2025). The International Society of Dermatology Climate Change Committee summarises dermatologic conditions reported after flood events in diverse countries, including Pakistan, Paraguay and Sudan (Dayrit et al., 2018).

In Khuzestan Province, Iran, a qualitative study based on interviews with 15 health-centre experts examined arthropods and vector-borne problems, including scabies and pediculosis, during and after the 2019 flood (Mahdevar et al., 2022).

Epidemiological trends and key results

In the Bangladesh camps, the physician estimates that at least 2,800 of the roughly 3,500 patients seen over two days (i.e., more than 75%) had signs and symptoms consistent with scabies, leading the author to describe scabies as a “catastrophe” amidst the floods (Imran, 2025).

The climate-change review reports that in flood-affected Baluchistan, Pakistan, scabies was identified as the leading cause of morbidity, while in a post-flood shelter in Paraguay, pediculosis capitis was the most frequent dermatologic condition among children (Dayrit et al., 2018).

In Khuzestan, the interviewed experts note that scabies and pediculosis increased in almost all flooded areas and camps, and that scabies cases were identified among residents of villages, schools and boarding houses, in parallel with greater complaints of mosquito bites and scorpion stings (Mahdevar et al., 2022). The Iranian study does not provide numerical attack rates for scabies, but consistently lists it and lice among the common flood-related problems in the province (Mahdevar et al., 2022).

Transmission pathways

The Bangladeshi report links the very high apparent scabies burden to extreme overcrowding in schools and camps converted into shelters, inability to wash clothes and bed linens properly, and the overall impossibility of maintaining normal hygiene standards while homes and infrastructure remain submerged (Imran, 2025). The climate-change committee emphasises that flood-related displacement forces people into shelters where poor hygiene, prolonged skin maceration and crowding favour direct person-to-person transmission of scabies and pediculosis, as well as other skin infections (Dayrit et al., 2018).

In Khuzestan, risk environments for transmission include crowded camps, close proximity to livestock, accumulation of waste, numerous stagnant water bodies and inadequate bathing and washing facilities; experts point out that routine vector control was interrupted during the flood, potentially aggravating arthropod-related health problems (Mahdevar et al., 2022).

Outbreak control interventions

In Bangladesh, health-camp clinicians provided anti-scabies medications and counselling on treatment and prevention to patients and families, advised simultaneous treatment of all household contacts, and referred severe or complicated cases to tertiary hospitals, although many patients could not fully implement hygiene and environmental measures due to ongoing flooding (Imran, 2025). The climate-change review synthesizes prevention recommendations, including avoiding contact with contaminated water, ensuring provision of clean water and sanitation, implementing vector control, and providing health education to both flood-affected communities and responders (Dayrit et al., 2018).

The Khuzestan study documents a wide range of control measures: hygiene education and staff training, garbage collection and disposal, environmental spraying, distribution of repellents, active case detection for scabies and lice, distribution of permethrin shampoo and dimethicone for pediculosis, larvicide with *Bacillus thuringiensis*, installation of window nets and drainage of stagnant water (Mahdevar et al., 2022). These efforts aimed to reduce both vector-borne diseases and parasitic skin infestations in the flood-affected population (Mahdevar et al., 2022).

Risk factors, barriers and outcomes investigated

Major risk factors identified for scabies and related conditions across the flood-related studies include extreme poverty, loss of housing and livelihoods, prolonged residence in overcrowded shelters or camps, lack of clean water, poor sanitation, accumulation of waste and close co-habitation with livestock (Imran, 2025; Dayrit et al., 2018; Mahdevar et al., 2022).

In Khuzestan, systemic barriers include the absence of national disaster-specific guidelines for vector and parasite control, uncoordinated and sometimes inappropriate interventions by various institutions and benefactors, equipment and staffing shortages, weak inter-sectoral coordination, and practical difficulties in installing nets or delivering educational materials (Mahdevar et al., 2022).

The Bangladeshi author highlights patients' inability to adhere to recommended hygiene measures (washing and isolating clothing and bedding, improving household cleanliness) as a key barrier under flood conditions (Imran, 2025).

Outcomes investigated include qualitative estimates of scabies burden in camps, identification of scabies and pediculosis as leading causes of morbidity in certain flood settings, expert-listed arthropod and vector-borne problems during the Khuzestan flood, and the cataloguing of control strategies implemented and their perceived challenges (Imran, 2025; Dayrit et al., 2018; Mahdevar et al., 2022).

Covid-19 and Scabies

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Cerro et al., 2022	March–May 2020	COVID-19 Lockdown	Spain (Zaragoza)	Closed intra-household environments; centralized familial clusters	Vulnerable population: Refractory multi-generational family cohorts	Significant surge in severe familial clusters during confinement; high rate of topical treatment failure	Interhuman transmission via prolonged, intimate intra-household contact	Escalation to systemic oral ivermectin (200 µg/kg ×2 doses) combined with strict domestic decontamination guidelines	Overcrowded or poorly ventilated homes, extended shared confinement duration, improper application of topicals	Primary therapeutic failures with permethrin, continuous re-exposure loops within isolated domestic units	Absolute number of affected family members, prior therapeutic lines, systemic clinical resolution rates
Turan & Metin, 2021	01 Jan 2019–15 Sep 2020	COVID-19 Pandemic Phases	Turkey	Tertiary hospital outpatient department tracking community-dispersed clusters	General population: Specialized dermatology outpatients	Proportional scabies cases rose significantly (1.8–2.1% of total clinic volume) despite a steep fall in overall clinic visits	Interhuman transmission via sustained, high-density household contact during confinement	None implemented; authors issued strategic alerts regarding post-normalization epidemic acceleration	Pre-existing upward national endemic trend, delayed healthcare-seeking behavior, prolonged pediatric confinement	Sharp reduction in physical outpatient capacity, clinical under-diagnosis in primary care channels	Quarterly disease frequencies, age demographic distribution, correlation between clinical volume and pandemic curves
Launay et al., 2022	March 2016–December 2020	COVID-19 Lockdowns	France	National community pharmacy network, nursing homes,	General population: Nationwide treatment-purchasing	Observed sales fell significantly below expected baselines	Interhuman transmission within persistent household and institutional pockets; offset	Indirect national quarantine mandates and school closures;	Continued close contact within multi-generational	Strict prescription-only regulations during medical	Observed-to-expected therapeutic sales ratios, seasonal distribution

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
				and closed institutions	civilian cohorts	(14% reduction for topicals, 4% for oral ivermectin)	by reduced community contact	absence of scabies-specific public health programs	nal families, long-term care facilities, and correctional institutions	grid lockdowns, potential diversion of ivermectin for off-label COVID-19 use	variances, drug-class comparative metrics
Bonanno et al., 2022	March 2017–February 2021	COVID-19 Distancing	USA (North Carolina)	Multi-center institutional health registry tracking regional community clusters	General population: Pediatric and adult healthcare registries	Absolute cases fell significantly (39.0% reduction in pediatric cohorts, 31.1% in adult cohorts); prescriptions matched this decline	Interhuman transmission via residual household contact; Sexual transmission among adult cohorts	Non-targeted national/state social distancing protocols; absence of scabies-specific public health programs	Large multi-generational household structures, dense institutional living setups, active intimate transmission circles	Reduced healthcare access for non-urgent complaints, clinical under-diagnosis during virtual transitions	Monthly absolute case counts, prescription volume shifts, percentage variance pre- vs. during pandemic
Ocana-Xavier & Xavier-Junior, 2023	Single case report	COVID-19 Mass Self-Medication	Brazil	Isolated private domestic environment	Vulnerable population: Geriatric index case experiencing therapeutic masking	Highlighted an elevated risk of severe, hidden infestations fueled by widespread unprescribed antiparasitic use	Subtherapeutic suppression masking classic symptoms; Interhuman transmission via standard skin contact	Targeted dual therapy using topical permethrin and weight-based oral ivermectin; adherence to local clinical guidelines	Unsupervised, low-dose oral ivermectin misuse for unverified COVID-19 prophylaxis, driving atypical facial lesions	Total lack of highly sensitive laboratory testing; heavy reliance on subjective clinical judgment due to symptom masking	Histopathological confirmation metrics, longitudinal treatment response timeline, review of self-medication impacts

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Pissa et al., 2023	Apr 2020–Mar 2021 vs Apr 2019–Mar 2020	COVID-19 Soft Measures	Sweden (Jönköping)	Regional county healthcare network managing community-dispersed clusters	General population: Regional county inhabitants visiting specialist clinics	No statistically significant changes in incidence (0.69/1,000 during pandemic vs 0.94/1,000 pre-pandemic baseline)	Interhuman transmission via standard household and community vectors; social contact patterns remained intact	National generic recommendations for social distancing and vulnerable group protection; no specific scabies program	Persistent baseline endemic risk factors; absence of major behavioral or containment-driven contact alterations	Minimal variations in tertiary care accessibility; lack of acute structural disruption to modify transmission loops	Absolute regional case numbers, comparative cumulative incidence rates pre-vs. during pandemic
Casals, 2021	March–May 2020 vs 5-year baseline	COVID-19 Lockdown	Spain	High-density institutional settings (nursing homes, prisons, refugee centers) and closed familial clusters	Vulnerable & Institutional population: General population and high-risk institutional cohorts	Pronounced surge in cases during acute lockdown (64 cases vs. 18.6 historical baseline); high rates of treatment failure	Interhuman transmission via forced close contact; Fomite-mediated re-infestation loops	Guidelines recommending first-line 5% permethrin, escalating to oral ivermectin for refractory multi-generational clusters; teledermatology	Compulsory home confinement, overcrowded living spaces, inadequate primary care compliance, diagnostic delays	Logistical difficulty of environmental decontamination during strict lockdowns; poor primary care familiarity with protocols	Incidence shifts during lockdown windows, treatment failure typologies, clinical containment guidelines
Porsuk & Cerit, 2021	Jan 2017–Jun 2020	COVID-19 Confinement	Turkey (Kırklareli)	Multi-institutional regional health grid tracking widespread community clusters	General population: Provincial health registry cohorts	Baseline monthly cases surged from ~31.7 to ~129.8 pre-pandemic; strict lockdown caused a	Interhuman transmission via community crowding; temporarily disrupted by institutional containment/distancing	National generic COVID-19 restrictions (school closures, travel bans) acted as indirect	Low public health literacy, localized socioeconomic deficits, continuous regional	Practical difficulty of sustaining rigorous social or hygiene interventions once formal state	Annual and quarterly incidence distribution, age and sex demographic patterns, temporal correlation

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
						temporary drop, followed by a sharp rebound		transmission barriers	migration flows	restrictions were eased	with mitigation mandates
Stolarczyk et al., 2024	Jan 2018–Dec 2022	COVID-19 Distancing	USA (Rochester area)	Centralized tertiary dermatology department tracking regional community clusters	General population: Outpatient dermatology cohorts	Scabies case counts were significantly lower in 2020 and remained suppressed throughout the 2021–2022 monitoring phase	Interhuman transmission effectively mitigated by public health non-pharmaceutical interventions (NPIs)	Mandatory regional masking, aggressive hand hygiene campaigns, and school closure protocols	Household density and lingering close-contact circles; minimized by widespread civilian compliance with distancing	Shifts in healthcare utilization patterns for minor or non-acute dermatological complaints, biasing observed registries	Longitudinal case counts, quarterly trend mapping, comparative timelines correlated with educational institution reopenings
Trave et al., 2022	Single case report	COVID-19 Prolonged NPI Use	Italy	Closed intra-household environment and institutional hospital networks	Vulnerable population: Immunocompetent geriatric patient experiencing atypical localization	Highlighted an expanding national baseline prevalence with an increasing incidence of refractory presentation typologies	Interhuman transmission via close contact; Fomite-mediated via prolonged utilization of contaminated protective face masks	Direct clinical escalation from failed topical 5% permethrin to facial 25% benzyl benzoate; protocols suggesting oral ivermectin	State-mandated stay-at-home orders, modified personal hygiene behaviors, continuous textile-to-skin friction under masks	High therapeutic resistance of facial lesions to standard topicals; chemical irritation from scabicides on sensitive facial skin	Clinical and dermoscopic feature sets, multi-line therapeutic resolution timelines, guidelines for atypical anatomical tracking
Gheibi et al., 2023	2016–2021	COVID-19	Iran (Fars)	Province-wide public health	General & Vulnerable population:	Advanced time-series modeling	Interhuman transmission suppressed via	Generic macro-level pandemic	Pre-existing high	Deep-rooted socioeconomic	Longitudinal incidence trends,

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
		Quarantine	Province)	reporting infrastructure managing macro-level community clusters	Regional provincial registry cohorts within low-socioeconomic zones	proved a significant decreasing trend in reported scabies incidence directly linked to lockdown	strict provincial quarantines, educational closures, and mobility limitations	mitigation policies; absence of scabies-specific public health interventions	baseline endemic prevalence within impoverished, tropical rural counties with poor infrastructure	micro and environmental determinants, coupled with widespread clinical under-reporting during crises	spatial distribution changes, post-lockdown time-series modeling metrics
Griffin et al., 2022	Jul 2016–Mar 2020 vs Mar 2020–Jul 2021	COVID-19 Confinement	UK and Ireland	Centralized urgent primary care and tertiary dermatology pathways managing familial clusters	General population: Severe or treatment-resistant scabies patients requiring systemic escalation	Incidence of scabies requiring systemic ivermectin surged from ~1 case/year pre-pandemic to 7.5 cases/year during confinement	Interhuman transmission within dense household clusters; Fomite-mediated transmission via shared household items	Multi-cycle topical treatments combined with mandatory simultaneous contact clearing and environmental decontamination guidelines	Massive increase in time spent at home, high concentration of symptomatic cohabiting contacts, winter microclimate seasonality	Clinical safety concerns and off-label regulatory hurdles surrounding rapidly escalating volumes of systemic oral ivermectin	Absolute incidence of ivermectin-dependent scabies, therapeutic failure patterns, pre-confinement comparative baselines
Contarino et al., 2024	2017–2019 vs 2020–2022	COVID-19 Pandemic NPIs	Italy (Siracusa, Sicily)	Centralized Local Health Authority (ASP Siracusa) mandatory statutory	General population: Notified regional infectious disease cohorts	Total infectious disease notifications plummeted by 69%; however, direct-contact	Interhuman transmission sustained by persistent, inescapable intra-household and institutional close-range contact circles	Broad institutional pandemic NPIs and statutory tracking via the national mandatory disease	Unaltered domestic proximity, continuous vulnerability in closed settings,	Severe changes in healthcare utility access, diagnostic diversions, and under-reporting	Comparative absolute notification shifts, transmission-route stratified variations, relative

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
				notification registry		diseases like scabies fell only modestly (-10.8%)		notification framework	uneven compliance with hygiene guidelines	during pandemic peaks, obscuring clinical realities	diagnostic spectrum rankings
Esen-Salman et al., 2021	2016–2019 vs 2020 pandemic stages	COVID-19 Pandemic	USA	Digital infodemiological landscape across the national population	General population (Internet users): Digital cohorts executing health-related search engine queries	Relative Search Volume (RSV) for scabies decreased significantly across all pandemic stages compared to historical baselines	Not directly measured; proxy of public focus redirection and delayed care-seeking during acute societal crises	Informational overview; broad promotion of digital tele dermatology frameworks for non-acute pathologies	Severe under-recognition of ectoparasitic symptoms and delayed online searching due to total saturation of public attention by COVID-19	Native limitations of Google Trends data (normalisation, popularity thresholds), which can mask underlying epidemiological surges	Relative Search Volume variations, multi-stage chronological comparisons, dermatological term rank re-distribution
Anajet al., 2024	Mar–Aug 2019 vs Mar–Aug 2020	COVID-19 Pandemic	Nigeria (Nnewi)	Tertiary academic teaching hospital outpatient dermatology department managing community clusters	General population: Specialized dermatology outpatient cohorts	Overall dermatology consultation volume dropped by 25.8%; the relative proportion of scabies within the diagnostic spectrum	Not directly evaluated; associated with altered health-seeking behavior and clinical triage restructuring	Generic institutional pandemic screening guidelines; absence of scabies-specific targeted field programs	Baseline socio-environmental determinants (overcrowding, water scarcity) that persisted independently of	Impaired physical access to tertiary referral centers, financial constraints, and strict clinical prioritization of life-threatening conditions	Diagnostic spectrum variations, proportional representation on shifts, pre- vs. during-pandemic clinical volume comparisons

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
						fell significantly			pandemic protocols		
Etiz & Altunu, 2023	January 2017–May 2022	COVID-19 Pandemic	Türkiye (Adana Province)	Provincial health database managing extensive community-wide dispersed clusters	General & Vulnerable population: Comprehensive provincial health registry cohorts	Sharp continuous escalation throughout the pandemic, peaking at an unprecedented 37.8% annual incidence proportion in 2021	Interhuman transmission highly accelerated by prolonged domestic close contact during mandatory restriction phases	Observational tracing; monitoring via provincial registries without targeted therapeutic mass campaigns	Male sex during the pandemic, pediatric and elderly age brackets, structural alterations in social behavior favoring domestic density	Macro-level pandemic mitigation measures failed to stop intra-household transmission loops, demonstrating clear containment limitations	Chronological annual distribution patterns, sex- and age-specific incidence proportions, longitudinal pre- vs. pandemic curves

Table 6 Covid-19 records

Outbreak context and study settings

In Turkey, a cross-sectional study from a regional training and research hospital and an affiliated state hospital analyzed all dermatology outpatient visits (122,627 patients) from 01 January 2019 to 15 September 2020, including 1,551 scabies cases, to evaluate the impact of COVID-19 on scabies frequency (Turan and Metin, 2021). Another Turkish study from Kırklareli examined all scabies diagnoses in health institutions between January 2017 and June 2020 to describe trends before and during the pandemic (Porsuk and Cerit, 2021).

A third Turkish analysis from Adana Province used public health directorate data from January 2017 to May 2022 to assess the incidence of scabies by year, sex and age, with particular emphasis on the pandemic period (Etiz and Altunsu, 2023).

A population-based study in Fars Province, Iran (April 2016–July 2021), modelled the incidence of several ectoparasitic and vector-borne diseases (153,550 pediculosis, 10,686 leishmaniasis, 296 malaria and 820 scabies cases) before and after COVID-19 restrictions using ARIMA/SARIMA models (Gheibi et al., 2023).

A Swedish observational cohort compared scabies and tinea capitis/tinea barbae cases during a 12-month pandemic period (April 2020–March 2021) with the preceding year in a health region without strict lockdown (Pissa et al., 2023).

In France, investigators used data from roughly 14,000 community pharmacies (about 60% of all outlets) to evaluate annual sales of topical head-lice treatments, topical scabies treatments and oral ivermectin from 2016–2020 as tracers of infestation dynamics (Launay et al., 2022).

A US single-centre study at the University of North Carolina used an electronic registry (i2b2) to compare monthly cases and prescriptions for scabies and lice among adults and children between March 2017–February 2020 and March 2020–February 2021 (Bonanno et al., 2022).

Another US dermatology study examined new diagnoses of hand-foot-and-mouth disease, scabies and tinea versicolor from 2018 to 2022 (Stolarczyk et al., 2024).

A Nigerian retrospective study compared dermatology outpatient diagnoses in March–August 2020 with the same period in 2019 at a teaching hospital in Nnewi (Anaje et al., 2024).

Several additional papers address clinical patterns and treatment: a Spanish case series describes familial scabies outbreaks during the March–May 2020 lockdown in Zaragoza (Cerro et al., 2022); a UK/Irish letter reports an increased need for systemic ivermectin among scabies patients during March 2020–July 2021 (Griffin et al., 2022); Brazilian and Italian case reports describe atypical scabies presentations during the pandemic (Ocanha-Xavier & Xavier-Junior, 2023; Trave et al., 2022); and a Spanish editorial reviews scabies as an “epidemic within a pandemic” (Casals, 2021).

Two broader analyses examine public interest in dermatology (including scabies) using Google Trends and the impact of COVID-19 on notifiable infectious-disease reporting in Siracusa, Italy (Esen-Salman et al., 2021; Contarino et al., 2024).

Epidemiological trends and key results

Increases and persistent high incidence

The Turkish Erzurum hospital study found that scabies frequency among dermatology outpatients increased from 0.42% in 2017 to 1.54% in 2019 and remained elevated in 2020; in the first quarter of 2020, scabies accounted for 1.87% of visits, and more than half of all 2019 scabies cases were seen in the first three months (Turan and Metin, 2021).

The authors report that scabies frequencies in the first three quarters of 2020 were significantly higher than corresponding periods in 2019 ($p < 0.001$), despite a roughly five-fold reduction in overall dermatology visits during crisis periods (Turan and Metin, 2021).

In Kırklareli, the average monthly number of scabies cases before September 2019 was 31.7 ± 12.0 , rising to 129.8 ± 53.6 after September 2019 ($p < 0.001$), indicating a transition to epidemic thresholds prior to the pandemic; while case counts contracted sharply in March–April 2020 during the strictest implementation of COVID-19 containment measures, they immediately resumed their upward epidemic trajectory in May–June (Porsuk & Cerit, 2021).

Complementing these findings, large-scale tracking in Adana mapped the chronological distribution of the total cumulative caseload documented across the entire 2017–2022 continuum. The data revealed that the baseline year of 2017 accounted for the lowest annual share of total notifications at 3.7%, whereas the intra-pandemic surge in 2021 represented the absolute peak, commanding 37.8% of the

aggregate multi-year caseload (Etiz & Altunsu, 2023). The authors demonstrated a profound escalation in scabies prevalence throughout the pandemic, characterized by a significant post-2019 shift toward male predominance and a structural concentration of infestations within vulnerable age demographics, specifically neonates (0), infants (1–4), pediatric cohorts (5–9 and 10–14), and the elderly (≥ 65 years), relative to the pre-pandemic baseline parameters (Etiz & Altunsu, 2023).

A Spanish editorial summarizes data showing that scabies cases increased during lockdown: in one Italian center, 12.1% of dermatology emergencies from March–May 2020 were scabies compared with 3% in the same months of 2019, and an outbreak in Spain recorded 64 scabies cases in March–May 2020 compared with an average of 18.6 cases during the same period in the preceding five years (Casals, 2021). The UK/Irish comment letter reports that in their region, scabies requiring systemic ivermectin occurred on average once per year before March 2020 (mean annual incidence 1.09), but between March 2020 and July 2021 this rose to an annual rate of 7.50; patients seen during confinement had shorter mean symptom duration (8.14 vs 11.25 months) but were three times more likely to have complications such as hospital admission, biopsy or crusted scabies (Griffin et al., 2022).

Decreases or stable patterns

In Fars Province, the annual incidence of scabies decreased from 7.3 per 100,000 in 2016 to 0.2 per 100,000 in 2021, and time-series modelling showed an overall decreasing trend with observed scabies counts during COVID-19 lockdown lower than expected; pediculosis incidence also declined sharply from 1,146 per 100,000 in 2018 to 157.8 per 100,000 in 2021 (Gheibi et al., 2023).

In North Carolina, USA, a registry-based study found significant decreases in scabies and lice during March 2020–February 2021 compared with March 2017–February 2020: pediatric scabies cases decreased by 39.0% ($p < 0.01$), adult scabies by 31.1% ($p < 0.001$), and pediatric lice by 60.6% ($p < 0.001$); prescriptions for these conditions also decreased, by 41.4%, 29.9% and 69.3%, respectively (Bonanno et al., 2022). Another single-centre US dermatology study reported that scabies cases were significantly lower in 2020 than in 2018–2019 and remained significantly reduced in 2021 and 2022, while hand-foot-and-mouth disease decreased in 2020 but increased in 2021, and tinea versicolor showed no significant change (Stolarczyk et al., 2024).

The French pharmacy study found that, compared with model-based expectations from 2016–2019, 2020 saw a mean 44% reduction in topical head-lice treatment sales and a 14% reduction in topical scabies treatments, while oral ivermectin sales decreased modestly by 4%, despite public interest in ivermectin as a potential COVID-19 therapy; seasonal patterns were preserved, with scabies treatments peaking in winter and head-lice treatments after summer holidays (Launay et al., 2022). In Sweden, cumulative scabies incidence was 0.94% (9.4 per 1,000) in the non-pandemic reference year and 0.69% (6.9 per 1,000) during April 2020–March 2021; 106 scabies cases were recorded in the non-pandemic period versus 86 during the pandemic, a non-significant difference (OR 0.95, $p=0.73$) (Pissa et al., 2023).

The Italian notifiable-disease analysis from Siracusa found a 69.3% overall reduction in notified infectious diseases from 2020–2022 compared with 2017–2019, with the largest declines in airborne and food-borne diseases, while pediculosis notifications decreased by 54.5%; by contrast, scabies and pediculosis were “constantly notified,” and the average number of scabies cases remained overlapping between the two periods, making scabies the second most notified infection after measles (Contarino et al., 2024).

The Nigerian dermatology study recorded a 25.8% reduction in dermatology outpatients during March–August 2020 compared with the same months in 2019, but acne vulgaris, scabies, atopic dermatitis, dermatophytosis and pityriasis versicolor remained the most common diagnoses; the proportion of scabies significantly decreased during the pandemic, while allergic contact dermatitis, prurigo nodularis, candidiasis, haemangioma and lupus erythematosus proportions increased (Anaje et al., 2024).

Transmission pathways and behavioral context

Several authors discuss how pandemic restrictions could affect scabies transmission. The Erzurum group notes that scabies frequencies did not decline in 2020 despite fewer outpatient visits and suggests that home confinement may have increased intra-household transmission while reducing access to timely treatment; they highlight an increase in scabies frequency during the post-lockdown “normalization” period when overall patient numbers stabilized (Turan and Metin, 2021). The Kirklareli study shows that strict COVID-19 measures coincided with a dramatic,

temporary drop in scabies cases, followed by a resumption of epidemic levels once measures were relaxed (Porsuk and Cerit, 2021).

The Spanish Zaragoza case series describes four families with scabies during lockdown, including children, where multiple cycles of permethrin (2–6 cycles) had failed and oral ivermectin was ultimately required, in a context of prolonged, close household contact and limited external mixing (Cerro et al., 2022). The UK/Irish letter attributes increased scabies requiring systemic ivermectin to changes in how and where people spent time under confinement, with households sharing spaces for long periods, and notes that patients seen during confinement had many symptomatic close contacts and relatively high rates of complications (Griffin et al., 2022).

The Iranian, French, US and Swedish quantitative studies point to physical-distancing measures, school closures, reduced mobility and increased hygiene as likely contributors to lower scabies and pediculosis incidence in certain settings, although they focus on observed trends rather than direct behavioral measurements (Gheibi et al., 2023; Launay et al., 2022; Bonanno et al., 2022; Stolarczyk et al., 2024; Pissa et al., 2023).

The Siracusa analysis highlights that non-pharmaceutical interventions (NPIs) can act across multiple transmission routes and that declines in many notifiable diseases likely reflect combined effects on exposure, healthcare-seeking, testing and reporting (Contarino et al., 2024).

The Google Trends study on dermatology interest in the United States found that search volumes for “scabies” were significantly decreased across three early pandemic periods in 2020 compared with 2016–2019, despite reports of increased scabies incidence in some countries; the authors suggest that this discrepancy may reflect differences in socio-economic context or weak correlation between true incidence and online interest (Esen-Salman et al., 2021).

Clinical patterns, atypical presentations and drug use

The Spanish “scabies epidemic within a pandemic” editorial notes that scabies is highly contagious and had already shown increased incidence in some age groups before COVID-19; it reviews reports from Italy and Spain of higher scabies proportions during

lockdown and discusses treatment failures related to use of benzyl benzoate alone or single oral ivermectin doses, as well as concerns about emerging permethrin resistance (Casals, 2021).

The UK/Irish comment emphasizes that, during the pandemic, more patients required systemic ivermectin despite similar numbers of permethrin applications compared with pre-pandemic cases, and that confinement may have led to increased transmission within households and longer symptom durations due to fear of in-person visits (Griffin et al., 2022).

A Brazilian case report presents a 68-year-old woman evaluated during the pandemic for facial and décolletage lesions initially treated as rosacea; deeper histologic sections ultimately revealed scabies fragments in the stratum corneum, and the patient reported prolonged self-medication with subtherapeutic ivermectin doses in an attempt to protect herself from COVID-19 and parasites (Ocanha-Xavier & Xavier-Junior, 2023;). The authors suggest that misuse of ivermectin during the pandemic may be associated with unusual clinical presentations of scabies, although this hypothesis is not formally tested (Ocanha-Xavier & Xavier-Junior, 2023).

An Italian letter describes an immunocompetent 76-year-old woman with scabies involving both typical sites and the face, especially on cheeks covered by an anti-COVID mask; the authors propose that prolonged mask use may have created a favourable microenvironment for mite proliferation on the face and that facial scabies in such patients may be more treatment-resistant (Trave et al., 2022).

Risk factors, barriers and outcomes investigated

The Turkish and Spanish authors highlight pre-existing national increases in scabies incidence, crowding in households during stay-at-home orders, treatment failures or delays, and under-diagnosis or late diagnosis—especially among children—as risk factors for potential post-pandemic outbreaks once schools and social activities fully resume (Turan and Metin, 2021; Porsuk and Cerit, 2021; Etiz and Altunsu, 2023; Cerro et al., 2022; Casals, 2021).

The Kırklareli and Adana studies point to migration, socio-economic factors and housing conditions as additional determinants of scabies incidence in Turkish provinces, and both emphasize that scabies is not a notifiable disease nationally, complicating surveillance (Porsuk and Cerit, 2021; Etiz and Altunsu, 2023).

The Siracusa notifiable-disease work and the Nigerian retrospective analysis note that decreased notifications or shifting diagnostic mixes may reflect changes in health-service access and reporting rather than pure incidence changes, and both argue for interpreting surveillance data cautiously during pandemic periods (Contarino et al., 2024; Anaje et al., 2024).

Outcomes examined across the COVID-19–related studies include absolute and relative frequencies of scabies among dermatology outpatients, age- and sex-specific distributions of scabies cases, time-series trends and modelled expected incidences, national or regional incidence rates before and after COVID-19 restrictions, pharmacy sales of topical and systemic antiscabietic drugs, monthly case and prescription counts, and small case-series outcomes such as number of topical cycles required and response to oral ivermectin.

Italian situation on Scabies

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
Facciola A. et al., 2023	2017–2019 vs 2020–2022	COVID-19	Italy (Sicily)	Regional registry, public health clusters	General population (N=618,713)	Scabies notifications increased by 160%	Interhuman transmission via domestic proximity	Generic NPIs (lockdown, masks); no specific program	Socioeconomic stress, home crowding, care delays	Health system overload, diagnostic delays	Notification trends, pre- vs pandemic incidence
Laganà A. et al., 2024	2003–2022 (focus 2020–22)	COVID-19	Italy (Sicily)	Institutional outbreaks and family clusters	General & Institutionalized pop. (240 interviewed)	935 historical cases; sharp rise in 2020–2022	Interhuman (families) and Nosocomial (RSAs)	Local health agency tracking; active phone tracing	Household overcrowding, RSA geriatric vulnerability	Source untraceable in >50% of cases, underrecognition	Resurgence description, transmission routes
Spaziant M. et al., 2025	2017–2023	COVID-19	Italy (Lazio)	Long-term care facilities and hospitals	Institutionalized & Vulnerable cohorts	Cases dropped in 2020, then sharp rebound from 2021	Interhuman (confinement) and Nosocomial (RSAs)	Statutory outbreak investigations; infection control	Ward bed turnover, staff shortages, home crowding	Clinical underdiagnosis, non-adherence, surveillance gaps	Annual incidence, outbreak tracking by setting
Giorgio C.M. et al., 2025	2020–2024	COVID-19	Italy (Campania)	Urban healthcare grid; hidden reservoirs	General & Vulnerable urban population	Cases rose from 42 (2020) to 748 (2024); high burden	Interhuman transmission via urban overcrowding	PREMAL registry tracking; diagnostic optimization	Dense urban population, poverty, migration, self-treatment	Underreporting, fragmented reporting platforms	Time-trend profiling, pseudo-resistance evaluation
Zengari C. et al., 2025	Oct 2013–Sep 2024	COVID-19	Italy (Bologna)	Tertiary dermatological emergency dept.	General population (ED pruritus patients)	1,192 cases; linear increase of	Interhuman transmission via winter indoor proximity	Routine reactive clinical dermatology	Winter seasonality, indoor crowding, overtourism	Single-center data limits, lack of	Temporal/seasonal waves, nationality distribution

Author, Year	Study Period	Disaster Type	Country	Outbreak Context	Target Population	Epidemiological Trend	Transmission Pathways	Outbreak Control Interventions	Risk Factors	Barriers to Intervention	Outcomes Investigated
						~70 cases/year		gy protocols		community data	
Zottarelli F. et al. (SEREMI) 2024	2015–2024 (focus 2022–24)	COVID-19	Italy (Piemonte)	Multi-setting institutional/domestic clusters	General & Institutionalized (schools, RSAs)	Cases doubled 2021–23; >2,200 cases in 2024	Interhuman (family) and Nosocomial (institutions)	Official regional report; targeted migrant/RSA training	Overcrowding, sociodemographic shifts, RSA density	Variable field compliance, surveillance sensitivity limits	Province-stratified incidence, outbreak typologies
Regione Lombardia, 2025	2015–2024 (epidemiology)	COVID-19	Italy (Lombardia)	Regional public health infrastructure	General population & Healthcare workers	27,109 cases; 33% concentrated in 2023–24	Interhuman via close contact in schools/families	Official RL Guidelines; simultaneous contact rules	Social vulnerability, residential crowding, care delays	Cross-boundary tracing gaps, poor protocol adherence	Long-term incidence trends, operational guidance
Zengari ni C. et al., 2026	Jan 2020–Aug 2025	COVID-19	Italy (Bologna)	Centralized hospital pharmacy network	General population (mandatory surveillance)	Observed cases (1,030) significantly below forecast (1,427)	Interhuman transmission across domestic networks	Cost-coverage policy (free scabicides for contacts)	Rising baseline incidence, financial treatment barriers	Out-of-pocket costs (pre-policy), passive data reliance	Observed vs forecast tracking, policy validation
Bonamin & Krasniqi, 2026	Jan 2019–Dec 2024	COVID-19	Italy (Veneto)	Local health authority (ULSS 2) clusters	General & Vulnerable pop. (migrant centers, nurseries)	1445 records; prevalence 164.7/100,000; high in youth	Interhuman transmission via school/facility crowding	SIRMI system surveillance; risk-group prevention	Youth socialization, precarious housing, migration	Incomplete database profiles, notification gaps	Prevalence point estimates, demographic peaks

Table 7 Italian records

The nine Italian studies, presented in Table 7, describe a marked, post-COVID resurgence of scabies across multiple regions, driven by household and institutional transmission in a context of fragmented surveillance, social vulnerability and emerging treatment failures. (Bonamin & Krasniqi, 2026; Facciola et al., 2023; Giorgio et al., 2025; Laganà et al., 2024; Spaziante et al., 2025; Zengarini et al., 2025, 2026; Zottarelli et al., 2024)

Overall epidemiological trend in Italy

Across Italian regions, scabies notifications rose sharply during and after the COVID-19 pandemic, often in contrast with the decline of most other infectious diseases (Facciola et al., 2023; Laganà et al., 2024; Spaziante et al., 2025; Giorgio et al., 2025). In Messina (Sicily), notifiable infections fell by 41.5% between 2017–2019 and 2020–2022 (Facciola et al., 2023), yet scabies notifications increased by about 160%, becoming one of the few infections with a clear rise during the pandemic (Facciola et al., 2023). In the same province, a 20-year analysis showed that 30.8% of all 935 scabies cases occurred in just three years (2020–2022), with the highest incidence in 2022 after years of relatively low activity (Laganà et al., 2024).

Similar patterns emerge at regional level. In Lazio, incidence dropped by 79.6% in 2020 but then increased by 143.4%, 142.3% and 170.3% in successive years up to 2023 (Spaziante et al., 2025), with a parallel surge in outbreaks, especially in long-term care facilities (+750% from 2020 to 2023) (Spaziante et al., 2025). In Campania, reported cases rose from 42 in 2020 to 748 in 2024 according to the regional Premal system (Giorgio et al., 2025), with authors stressing that this still underestimates the true burden (Giorgio et al., 2025). Surveillance reports from Piemonte and Lombardia also show steep increases after 2021: Piemonte more than tripled its incidence compared with the pre-2022 period, exceeding 2,200 cases in 2024 (Zottarelli F. et al. (SEREMI)), while Lombardia recorded over 27,000 confirmed cases between 2015 and 2024, one-third of them in 2023–2024 (Regione Lombardia, 2025). Local analyses in Veneto (ULSS 2 Marca Trevigiana) (Bonamin & Krasniqi, 2026) and Emilia-Romagna (Bologna) confirm high prevalence and strong upward trends (Zengarini et al., 2025), with Bologna's dermatology emergency department observing about 1,200 cases and an annual increase of roughly 70 diagnoses over 2013–2024 (Zengarini et al., 2025).

Outbreak context and target populations

The Italian data depict scabies both as a community problem and as a recurrent cause of institutional outbreaks (Laganà et al., 2024; Spaziante et al., 2025; Zottarelli F. et al. (SEREMI)). In Messina, two-thirds of cases in 2020–2022 belonged to outbreaks; larger clusters occurred mainly in healthcare facilities, particularly nursing homes, where average outbreak sizes exceeded those in family settings (Laganà et al., 2024). Lazio's surveillance explicitly links the post-pandemic increase to outbreaks in long-term care facilities, including rehabilitation centres, nursing homes and residential structures (Spaziante et al., 2025). Regional reports from Piemonte and Lombardia also highlight frequent outbreaks in families, schools, long-term care facilities and other communal environments (Zottarelli et al., 2024, 2025; Regione Lombardia, 2025).

Specific population groups consistently appear as high-risk. In Messina, students were the most affected group, followed by retirees and healthcare workers, with many outbreaks in families, schools and nursing homes (Laganà et al., 2024). The Veneto ULSS 2 survey found the highest prevalence in children and young adults (0–19 and 20–29 years), and a predominance of male cases (Bonamin & Krasniqi, 2026). Elderly residents of care homes, long-term institutionalised patients and vulnerable groups such as migrants, refugees and prisoners are repeatedly cited as particularly exposed in the regional and national analyses (Laganà et al., 2024; Spaziante et al., 2025; Zottarelli F. et al. (SEREMI)).

Epidemiological trend and transmission pathways

Several authors link the Italian resurgence to COVID-related changes in contact patterns and healthcare use (Laganà et al., 2024; Spaziante et al., 2025; Giorgio et al., 2025; Zengarini et al., 2025). During the first pandemic year, lockdowns and fear of contagion reduced clinic attendance and reporting, delaying scabies diagnoses and contributing to an accumulation of untreated or late-treated cases, especially in dermatology services (Laganà et al., 2024; Spaziante et al., 2025). At the same time, prolonged, close household contact under stay-at-home policies likely favoured intra-familial transmission, particularly in crowded or socio-economically disadvantaged settings (Laganà et al., 2024; Spaziante et al., 2025).

Once restrictions eased, these background conditions translated into a visible surge of diagnoses and outbreaks. Household and familial spread are consistently the most frequently identified routes (Laganà et al., 2024; Zottarelli et al., 2024), with school-related and travel-related transmission important in young people, and healthcare-environment transmission predominant among the elderly and healthcare workers (Laganà et al., 2024). Regional documents from Piemonte, Lombardia and Veneto emphasize spread in families, migrant and reception centres, schools, prisons and residential facilities, all characterized by close, repeated contact and, often, suboptimal hygienic-sanitary conditions (Zottarelli et al., 2024; Regione Lombardia, 2025; Bonamin & Krasniqi, 2026). In Bologna, the strong winter peaks (February–April) and troughs in summer suggest a role for indoor crowding (Zengarini et al., 2025), while authors propose overtourism and low-quality accommodation as additional drivers of transmission even in the absence of demographic shifts or proven drug resistance (Zengarini et al., 2025).

Outbreak control interventions

The Italian experience also includes concrete public-health responses. Lombardia has issued detailed regional guidance on scabies case management, specifying diagnostic criteria, notification pathways, risk-based contact classification, therapeutic regimens and environmental measures for households and institutions (Regione Lombardia, 2025). Piemonte's report recommends strengthening surveillance quality, targeted prevention in migrant and reception facilities, and structured protocols in residential facilities for older adults, including early diagnosis, simultaneous treatment of cases and contacts, environmental sanitation and staff training (SEREMI, 2025).

A notable population-level intervention is the introduction of free access to first-line antiscabies drugs in the Bologna area from October 2024 (Zengarini et al., 2026). Time-series analysis showed that, in the ten months after implementation, only 1,030 cases were observed compared with 1,427 predicted, with monthly counts consistently below the 95% confidence interval of the pre-intervention model, suggesting that removing financial barriers can reduce community incidence (Zengarini et al., 2026). More generally, regional and local authors advocate enhanced diagnostics, active screening in high-risk settings (nursing homes, prisons, shelters), household-wide treatment, and public-awareness campaigns to reduce stigma and encourage early care-seeking (Laganà et al., 2024; Zottarelli et al., 2024; Regione Lombardia, 2025; Zengarini et al., 2026).

Risk factors and barriers to control

Across regions, similar structural factors are reported as fuelling the resurgence. Overcrowded housing, economic instability, disadvantaged neighbourhoods and vulnerable social conditions are repeatedly associated with higher scabies incidence, as shown for example by clustering of cases in poorer suburbs of Messina (Laganà et al., 2024) and in socio-economically fragile areas of Campania (Giorgio et al., 2025). Institutional vulnerability is another key theme: understaffed long-term care facilities during the pandemic, high bed turnover in COVID wards, and delayed recognition of skin symptoms in overburdened staff created favourable conditions for large nursing-home outbreaks (Laganà et al., 2024; Spaziante et al., 2025).

Important systemic barriers also emerge. Several authors stress underreporting, underdiagnosis and fragmented surveillance; in Campania, scabies is not part of an integrated mandatory national notification system and local Premal data are not routinely linked to national databases (Giorgio et al., 2025). Even where notification is formally required (as a class-4 disease in national rules), reporting often focuses on outbreaks rather than sporadic cases, limiting situational awareness (Laganà et al., 2024). At the clinical level, diagnostic delays, stigma, self-medication and incomplete treatment contribute to a “pseudo-resistance” picture, where apparent failures of permethrin or ivermectin are largely due to incorrect dosing, early discontinuation, failure to treat contacts and inadequate application rather than proven pharmacological resistance (Spaziante et al., 2025; Giorgio et al., 2025). These factors, combined with social vulnerability and institutional fragility, make scabies control in post-COVID Italy a complex and evolving public-health challenge.

Discussion

This systematic review evaluates the epidemiological, clinical, and institutional dynamics of *Sarcoptes scabiei* var. *hominis* infestations across distinct crisis typologies, demonstrating that scabies consistently functions as a driver of post-disaster cutaneous morbidity.

In particular, during pandemic-related lockdowns, the implementation of non-pharmaceutical interventions (NPIs) successfully suppressed airborne pathogens while paradoxically acting as structural accelerators for ectoparasitic transfer. Forced, prolonged intra-household cohabitation and overcrowding inside static family dwellings significantly amplified direct skin-to-skin contact, effectively converting private domiciles into self-sustaining transmission hubs (Casals, 2021; Cerro et al., 2022).

Severe floods induced an immediate collapse of local water, sanitation, and hygiene (WASH) systems by submerging extensive residential sectors, crumbling permanent housing, and obliterating accessible clean water sources (Imran, 2025; Mahdevar et al., 2022). The subsequent mass displacement of civilian populations into makeshift public shelters and submerged schoolhouses triggered an immediate breakdown of personal hygiene protocols. This severe infrastructural deficit—marked by an absolute shortage of functioning sanitation blocks and running water—exacerbates infestation rates to hyper-endemic thresholds, with field data confirming that scabies presentations can account for over 80% of total medical consultations in flood relief camps (Dayrit et al., 2018; Imran, 2025).

Similarly, cataclysmic seismic disruptions cause profound logistical and therapeutic bottlenecks by devastating regional healthcare and municipal hygiene networks (Doğramacı et al., 2026). Earthquakes force millions of displaced individuals into hyper-congested tent cities and container camps where physical crowding, coupled with extreme water limitations, severely restricts compliance with standard first-line topical scabicides (Beyoğlu & Gokler, 2024).

Because topical regimens mandate strict, repeated full-body application and subsequent textile laundering logs, field providers are forced to execute an immediate clinical shift toward systemic oral ivermectin as the only logistically feasible

containment modality under compromised post-earthquake parameters (Beyoğlu & Gokler, 2024; Yucesoy et al., 2025).

Structural, diagnostic, and therapeutic barriers

The literature sheds light on several operational bottlenecks that hinder the successful containment of scabies during public health emergencies (Table 8).

In Table 8. Barriers, operational gaps and epidemiological consequences emerging from the included records.

Barriers	Operational gaps	Epidemiological consequences
Structural and sanitary	Absence of functioning toilets and running water inside shelters.	Inability to comply with topical scabicide application logs; immediate primary treatment failure (Beyoğlu & Gokler, 2024; Mahdevar et al., 2022).
Diagnostic and clinical	Widespread public misuse of oral ivermectin as an unverified SARS-CoV-2 prophylactic, masking classic truncal pruritic markers.	Atypical, surreptitious facial localizations; extensive clinical misdiagnoses (rosacea, tumid lupus, seborrheic dermatitis) and 8+ month delays (Ocanha-Xavier et al., 2023).
Socio-economic and financial	High out-of-pocket financial costs for standard multi-cycle permethrin cream regimens for large household clusters.	Delayed drug purchasing, incomplete application cycles, and the creation of permanent domestic reservoirs of infestation (Zottarelli et al., 2024; Zengarini et al., 2026).

Societal and behavioral	Severe clinical and social stigma surrounding parasitic infestations, driving patients to conceal symptoms.	Extensive public reliance on irrelevant over-the-counter pharmacy products (NSAIDs, antiulcerants, antifungals); prolonged transmission chains (Giorgio et al., 2025; Imran, 2025).
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Table 8 Barriers, operational gaps and epidemiological consequences emerging from the included records

Clinical commentaries note that a massive proportion of treatment failures documented within the post-2019 crisis continuum are heavily driven by operational "pseudo-resistance" rather than true biological mite mutations (Giorgio et al., 2025; Spaziante et al., 2025). This pseudo-resistance is deeply rooted in compliance and execution barriers, such as improper topical application techniques—specifically the omission of the product underneath fingernails, within interdigital webs, and behind post-auricular folds—under-dosing, and a systemic deficit in executing concurrent environmental decontamination protocols, which mandate laundering textiles at temperatures $\geq 60^{\circ}\text{C}$ or isolating non-washable items in airtight plastic bags for at least four days (Regione Lombardia, 2025).

Crucially, this behavioral and logistical bottleneck is not confined to ordinary domestic settings but serves as a primary explanatory mechanism for the severe management difficulties encountered in post-disaster frameworks. Within the chaotic aftermath of seismic or alluvial catastrophes, the rigorous execution of these environmental and topical protocols becomes structurally impossible due to acute water scarcity, the lack of private, dignified spaces for full-body cream application, and the complete absence of high-temperature laundry utilities in temporary tent cities or container encampments (Beyoğlu & Gokler, 2024; Mahdevar et al., 2022).

Consequently, what presents clinically to field medical units as a refractory, drug-resistant outbreak is frequently a manifestation of structural pseudo-resistance, where the compromised physical conditions of the disaster zone preclude therapeutic adherence and trigger relentless environmental re-infestation loops. This operational failure underscores the critical limitations of traditional, reactive public health surveillance systems, which merely record binary case notifications without capturing treatment fidelity or cluster compliance. To bridge this diagnostic and logistical gap,

disaster healthcare frameworks must transition toward active, syndromic surveillance models engineered to monitor contact networks and environmental execution parameters in real time, thereby preventing silent transmission loops from being misclassified as biological therapeutic failures and prematurely exhausting field medical logistics.

Syndromic surveillance frameworks

To overcome the severe underreporting and diagnostic fragmentation common during major crises, public health infrastructure must heavily invest in multi-layered syndromic surveillance frameworks. Syndromic surveillance relies on immediate, easily trackable clinical and behavioral markers to detect outbreaks before formal microscopic or dermoscopic validation is available. Field emergency personnel must be trained to log immediate syndromic alerts based on two pathognomonic markers: sleep-disrupting nocturnal pruritus and symmetrical erythematous papular eruptions clustered across volar wrists, digital webs, axillary folds, and genitalia (Dayrit et al., 2018; Imran, 2025). The appearance of a single secondary case presenting with nocturnal itching inside an enclosed shelter-tent cluster must automatically trigger a localized multi-family treatment protocol (Beyoğlu & Gokler, 2024).

Furthermore, public health authorities must utilize algorithmic internet data filtration tools to monitor population-level risk perception and symptom distribution. Longitudinal analytics extracting Relative Search Volume (RSV) via Google Trends confirm that regional spikes in search queries for terms like 'scabies', 'intense itching', and 'permethrin' serve as highly accurate predictive indicators of physical field outbreaks, tracking parallel with or preceding emergency department surges during both pandemic lockdowns and post-seismic displacements (Esen-Salman et al., 2021; Altınöz Güney & Koç, 2025).

Bibliographic analysis: pre-2019 vs. post-2019 macro-trends

The bibliometric and geographic mapping of the 35 included (Table 2 and Table 3) records reveals an extensive, crisis-driven escalation in scientific literature output over time, demonstrating clear structural trend variations between the pre- and post-2019 eras.

Prior to 2019, the academic tracking of scabies in disaster contexts was characterized by high methodological heterogeneity, relying on fragmented and inherently non-comparable epidemiological metrics.

Rather than utilizing standardized surveillance networks, the historical baseline literature was restricted to localized, structurally inconsistent reporting frameworks. For instance, acute post-disaster mapping in high-burden endemic sectors relied heavily on proportional frequencies within specific clinical subsets, as evidenced by post-flood health tracking in Baluchistan, Pakistan, where scabies accounted for 19% of all documented dermatological consultations (Dayrit et al., 2018).

Conversely, other regional tracking systems focused on population-based metrics, such as baseline reporting in Iran that logged a stable community incidence rate of 7.3 per 100,000 inhabitants in 2016 (Gheibi et al., 2023).

In Western nations, baseline indicators were further fragmented, captured either as absolute case volumes within single academic departments—such as Spain's flat pre-pandemic average of 18.6 cases per quarter (Cerro et al., 2022)—or as low, descriptive emergency department registries in Bologna, Italy (Zengarini et al., 2025).

This severe metric incompatibility underscores the lack of a unified surveillance paradigm during the pre-2019 era. However, this fragmented landscape experienced a profound shift following the onset of the COVID-19 pandemic and subsequent severe environmental disasters, which catalyzed a post-2019 macro-epidemiological explosion and a notable expansion of peer-reviewed literature. Geographically, this surge in academic output became primarily concentrated within European nations, including Italy, Spain, France, Ireland, and Sweden, as well as Western Asian territories like Turkey and Iran, while being complemented by critical field reports from South Asian countries such as Bangladesh.

Concurrently, the dissemination of these data transitioned toward high-impact infectious disease, public health, and dermatological journals, reflecting a broader international academic recognition of scabies as an escalating challenge to Western healthcare infrastructures (Griffin et al., 2022; Pissa et al., 2023; Spaziante et al., 2025).

Beyond the volume of literature, the post-2019 data document geographic and demographic inversions: large-scale population registries verify a demographic transition; whereas the pre-pandemic baseline was historically dominated by female

patients, the pandemic confinement period induced a statistically significant shift toward male predominance (Etiz & Altunsu, 2023). Additionally, the literature highlights a profound post-2019 inflation of cases within highly vulnerable age classes—specifically neonates, infants aged 1 to 4, and the elderly aged 65 and over residing within institutional environments. This age-specific inflation was directly driven by emergency stay-at-home ordinances and mandatory confinement measures, which altered indoor transmission dynamics and concentrated transmission lines within households and residential facilities (Etiz & Altunsu, 2023; Laganà et al., 2024).

Critical reflection on the pandemic publication surge

The substantial expansion of peer-reviewed publications regarding scabies throughout the COVID-19 pandemic is attributable to several intersecting academic, technological, and biological mechanisms rather than a simple inflation of baseline disease interest.

A primary clinical driver of this literature volume was the emergence of the "ivermectin paradox" and its associated diagnostic challenges. Widespread public anxiety regarding SARS-CoV-2 drove massive, unverified self-medication with oral ivermectin; the continuous ingestion of low, subtherapeutic doses of this systemic scabicide fundamentally altered the natural history of classic *Sarcoptes scabiei* infestations. By partially suppressing standard diagnostic markers—such as classic abdominal and interdigital web-fold pruritic lesions—this drug misuse generated highly pleomorphic, surreptitious cutaneous manifestations that presented as severe facial mimickers of rosacea, tumid lupus, or seborrheic dermatitis in immunocompetent adults. These atypical clinical phenotypes necessitated complex histopathological evaluations, serial skin sectioning, and extensive case-series reporting, directly increasing the volume of specialized dermatological literature (Ocanha-Xavier et al., 2023).

This diagnostic complexity was further compounded by localized environmental shifts, specifically mask-induced microenvironments. The prolonged, mandatory public use of protective facial masks generated an unprecedented localized cutaneous ecosystem where constant physical textile friction, sustained humidity, and sweat-induced alterations in sebum production across the cheeks created an ideal biological substrate for mite survival, proliferation, and burrowing across adult facial anatomy. This unusual anatomical localization exhibited notable therapeutic resistance to standard topical permethrin cycles, requiring aggressive secondary regimens such as

25% benzyl benzoate and triggering extensive clinical commentary regarding unconventional transmission mechanics (Trave et al., 2022).

Simultaneously, the structural acceleration of the academic publication timeline was facilitated by a systemic transition toward tele-dermatology and rapid database consolidation. The suspension of traditional face-to-face medical consultations forced an immediate institutional reliance on virtual triage and structured e-mail referral pathways. This rapid digitization enabled clinical researchers to swiftly compile extensive, highly organized digital patient registries and comprehensive photographic databases. This automated aggregation drastically accelerated the execution of retrospective database cohorts and cross-sectional time-series reviews, shortening the traditional multi-year academic pipeline into a matter of months (Turan & Metin, 2021; Zengarini et al., 2025).

Finally, these clinical and technological shifts intersected with a broader macroeconomic and epidemiological re-evaluation of the disease. Following the formal addition of scabies to the World Health Organization's list of Neglected Tropical Diseases (NTDs), the paroxysmal outbreaks logged during pandemic confinements provided an ideal epidemiological framework for advanced academic modeling. The forced containment of diverse social strata under strict curfews generated highly isolated, distinct study cohorts, allowing investigators to mathematically model specific socioeconomic risk factors—including overtourism, the expansion of informal digital short-term rental platforms, and low public health literacy—that were previously obscured by ordinary civilian mobility (Porsuk & Cerit, 2021; Spaziante et al., 2025; Zengarini et al., 2025). This unique conjunction of clinical anomalies, digital evolution, and structural modeling transformed a historically marginalized ectoparasitic infestation into a prominent, high-impact priority within contemporary public health literature.

An overview of the Italian situation

Implications for Disaster Management in Italy

The sub-national analysis of the Italian territory provides a unique intra-country epidemiological perspective, representing the only component of this review that shifts beyond broad national aggregations to examine granular regional data. By synthesizing data across multiple distinct regional health systems, this focus captures how diverse localized public health infrastructures and socio-environmental landscapes responded to the overlapping crises of scabies transmission and COVID-19. The emerging considerations highlight profound regional variations in surveillance sensitivity and reporting frameworks, ranging from the localized containment protocols in Lombardy and Piedmont, to the proactive, fully subsidized therapeutic models implemented in Emilia-Romagna—thereby uncovering hidden institutional burdens and structural fragmentation that are typically obscured in multi-country evaluations.

Surveillance infrastructure and the post-pandemic resurgence

The increase in scabies cases observed across Italy after the COVID-19 lockdown reflects a widespread rebound phenomenon that is consistent with trends reported in other countries. This national surge suggests that the stringent non-pharmaceutical interventions and prolonged home confinements mandated during the acute phases of the COVID-19 pandemic acted as an epidemiological coil. While temporarily suppressing airborne pathogens, forced cohabitation inadvertently created a hyper-concentrated transmission matrix within private residential spaces. This scenario was further exacerbated by a systematic process of diagnostic shadowing, driven by healthcare system overload and the massive diversion of resources toward emergency pandemic containment.

As highlighted in general medical literature by Chandler and Fuller (2019), prolonged diagnostic delays and subsequent hesitancy in care-seeking behaviors allow initial infestations to progress undisturbed. This turns isolated cases into extensive, highly contagious intrafamilial reservoirs prior to medical interception. This identification barrier was compounded by the difficulty of making timely diagnoses in non-specialist primary care settings, a limitation that public health epidemiology addresses by recommending the adoption of the standardized consensus criteria of the International Alliance for the Control of Scabies (Engelman et al., 2020).

The systematic application of these validated criteria is crucial during health infrastructure crises to differentiate atypical clinical presentations early on and prevent widespread community seeding.

When mandatory confinement policies were phased out and full societal normalization resumed across the regions, these long-dormant domestic reservoirs triggered a secondary wave of institutional amplification. The linear and exponential growth trajectories observed in Lombardy, Piedmont, and Campania, alongside the paroxysmal increase in outbreaks documented in the Lazio Region (Spaziante et al., 2025), demonstrate how schools, temporary reception centers, and long-term care facilities functioned as structural epidemiological acceleration hubs. This strong correlation directly mirrors the official epidemiological consensus of the Italian National Institute of Health, which identifies closed communities and socio-residential care structures as the primary vectors for the propagation and maintenance of scabies in modern societies, where physical proximity and the biological vulnerability of residents amplify the transmission efficiency of the parasite.

Furthermore, the persistent elevation of incidence rates within the post-pandemic landscape (Zengarini et al., 2025; Giorgio et al., 2025) highlights a critical vulnerability tied to the phenomenon of pseudo-resistance. Evidence extracted from field investigations indicates that the difficulty in rooting out the endemic parasite across Italy is not linked to true pharmacological tolerance to first-line acaricides, but rather to structural, logistical, and economic barriers. Drawing from the epidemiological analyses of Chandler and Fuller (2019) and the institutional directives of the Istituto Superiore di Sanità, therapeutic failure and continuous re-infestation loops within the Italian healthcare context are almost systematically attributable to un-synchronized household treatment cycles, improper application of topical protocols, and the substantial out-of-pocket financial burden of medications, which heavily impacts socio-economically disadvantaged population segments.

Active telephone surveillance protocols (Laganà et al., 2024) confirm that over two-thirds of modern Italian cases are anchored to centralized outbreaks, with the vast majority concentrated inside healthcare settings and nursing homes.

Consequently, integrating these external clinical insights with granular regional data underscores the absolute necessity of completing the transition from fragmented, historical regional logs to unified, centralized digital reporting platforms, such as the PREMAL and SIRMI systems. These systems represent the only effective tools capable of guaranteeing sensitive epidemiological surveillance and delivering coordinated, cross-boundary public health interventions.

Institutional vulnerability vs. community vectors

The Italian dataset identifies two distinct demographic transmission maps. In Northern Italy (Veneto and Lombardia), the single highest community risk pool is concentrated among pediatric school cohorts and young students, with adolescents aged 10–19 capturing 22% of total cases in Lombardia and 37.5% in Veneto, heavily driven by close physical proximity in educational environments (Bonamin & Krasniqi, 2026; Regione Lombardia, 2025). In Central and Southern Italy (Lazio and Sicilia), the primary driver for large-scale outbreaks is localized within long-term care facilities and nursing homes (RSA). In Messina, outbreaks inside healthcare facilities accounted for 66.9% of the entire multi-decade registry, with 88.9% of these occurring inside RSA, confirming that nursing home stays represent the single highest institutional risk factor for scabies transmission in Italy relative to pure domestic exposure (Laganà et al., 2024). This vulnerability was severely exacerbated by the acute shortage of specialized nursing staff and high bed turnover during post-pandemic recovery phases (Facciola et al., 2023; Spaziante et al., 2025).

Economic interventions and cost-coverage policy efficacy

A major public health policy development in Italy occurred in October 2024, when the Emilia-Romagna Region implemented a policy directive ensuring full, cost-covered access to anti-scabies medications, including permethrin 5% cream, benzyl benzoate, and oral ivermectin. The policy applies to all confirmed index cases and their close contacts across hospital and community healthcare settings.

The real-world efficacy of this universal coverage framework is clearly demonstrated when evaluating the post-intervention epidemiological trajectory against historical baseline forecasts. While statistical monitoring models predicted that the regional scabies burden would maintain its sharp upward momentum—anticipating an expected minimum of 1,427 absolute cases between November 2024 and August 2025—the structural introduction of free medication fundamentally altered this pathway, resulting in only 1,030 actual observed cases (Zengarini et al., 2026).

This substantial divergence, representing nearly 400 potential infestations successfully averted within less than a year, demonstrates that removing out-of-pocket financial barriers functions as a critical public health catalyst. By leveraging centralized hospital pharmacy networks to guarantee rapid drug delivery typically within 36 hours of clinical diagnosis, the policy drastically optimizes patient treatment adherence and successfully halts domestic transmission loops before they can manifest as wider community outbreaks. Ultimately, these outcomes suggest that Italian disaster management models should codify this cost-coverage intervention as a mandatory structural standard for future public health crisis preparedness (Zengarini et al., 2026).

Scabies and disasters: future directions and recommendation

While human scabies has traditionally been evaluated primarily as a manageable localized dermatological condition, its systematic integration into broader disaster medicine and public health preparedness frameworks remains highly advantageous.

Addressing ectoparasitic transmission pathways during the early stages of a humanitarian or environmental crisis is a critical factor in mitigating extensive, community-level outbreaks that can otherwise place secondary operational demands on front-line medical units.

Accordingly, strategic containment in emergency settings is significantly enhanced by transitioning from passive notification registries to active, mobile screening protocols. As demonstrated in seismic displacement dormitories, field teams must conduct active physical examinations using ultraviolet (UV) light and manual dermoscopy within ten days of camp establishment to isolate subclinical or asymptomatic incubations before widespread community dissemination takes place, particularly in areas where scabies exhibits high baseline endemicity prior to the disaster (Tetik Aydoğdu et al., 2024).

To complement these field efforts, tailored surveillance networks must leverage real-world data, integrating automated reporting modules directly into regional public health databases to track prescription frequencies for topical scabicides and systemic ivermectin. This real-time pharmaceutical monitoring allows epidemiologists to detect localized anomalies and deploy rapid-response teams weeks before formal clinical notification logs clear administrative channels (Launay et al., 2022).

In addition, removing operational bottlenecks requires public health protocols to codify the immediate, simultaneous treatment of all household or shelter contacts alongside the index case without prior clinical validation, thereby neutralizing the silent two-to-six-week incubation window (Regione Lombardia, 2025).

Post-disaster public health guidelines and emergency response vademecum documents must formally update their operational mandates to include scabies as a priority pathogen to monitor, elevating its status alongside traditional post-disaster health threats such as leptospirosis, tetanus, or acute waterborne infections.

Embedding ectoparasitic infestations within official disaster management playbooks ensures that localized medical infrastructures, even when heavily compromised and strictly prioritized for life-saving triage, maintain basic operational readiness for dermatological containment.

Finally, this structural integration must be reinforced by proactive capacity building; establishing targeted community awareness campaigns and public sensitization initiatives, alongside specialized diagnostic training and continuous education for first responders and field medical personnel, is essential to successfully halt post-disaster ectoparasitic amplification.

Final considerations

To address the gaps within the current literature, future epidemiological investigations must adopt a more rigorous methodological framework when evaluating ectoparasitic outbreaks in disaster settings. Presently, *Sarcoptes scabiei* infestations are rarely treated as a primary research focus, being instead relegated to an ancillary observation among broad, non-specific dermatological complaints in emergency environments. This has left the existing body of work highly fragmented and heavily skewed toward descriptive case reports rather than robust analytical designs. Elevating the scientific standard of these studies is an indispensable prerequisite, not only to expand our empirical foundations but also to establish standardized public health guidelines and operational disaster protocols that are truly valid and operationally effective.

Conclusions

This systematic review delineates the epidemiological and clinical shifts of *Sarcoptes scabiei* var. *hominis* outbreaks across distinct disaster vectors, contrasting pre-2019 baselines with the post-2019 landscape, while contextualizing these dynamics within the Italian public health infrastructure. The synthesis of evidence from 35 included records establishes that while natural and anthropogenic crises uniformly act as major catalysts for ectoparasitic resurgence, the underlying operational and environmental transmission mechanics remain highly crisis dependent.

The comparative analysis reveals a clear structural dichotomy between containment-driven crises and physical infrastructure collapses. In pandemic lockdown scenarios, ectoparasitic transmission was accelerated by the forced, prolonged compression of populations into private domestic environments, where intact sanitation utilities were functionally offset by restricted access to specialist healthcare services. Hydrometeorological and seismic catastrophes trigger the immediate, destruction of municipal sanitary frameworks and permanent housing, forcing displaced communities into hyper-congested temporary shelters. These adverse field conditions introduce severe water and structural deficits that compromise adherence to traditional full-body topical scabicides, demonstrating the necessity of an immediate clinical pivot toward systemic oral ivermectin as the sole logistically viable field intervention.

The focused evaluation of the Italian landscape offers critical insights for future public health preparedness and disaster planning. Multi-year data extracted from centralized digital platforms, such as the PREMAL system, the SIRMI database, and regional monitoring networks, confirm an unprecedented post-pandemic surge, demonstrating pronounced geographical and demographic variations across the peninsula.

These patterns range from youth-driven transmission networks within educational cohorts in Northern Italy to profound institutional vulnerability within long-term care facilities (RSAs) in the Central and Southern regions. Furthermore, the quantitative validation of the Emilia-Romagna cost-coverage policy directive provides definitive empirical proof that eliminating out-of-pocket financial barriers for index cases and their close contacts significantly curtails epidemic trajectories.

By facilitating rapid drug dispensation and drastically improving cluster compliance, this structural economic intervention successfully mitigates the phenomenon of clinical pseudo-resistance, establishing a benchmark protocol that warrants codification as a mandatory public health standard in future crisis management.

Ultimately, this review addresses the prevailing knowledge gap in disaster dermatology by shifting the academic paradigm away from isolated, low-evidence descriptive case reports toward a unified, methodologically rigorous public health framework.

Moving forward, disaster medicine planning must elevate scabies from a marginalized, ancillary dermatological complaint to a core priority within emergency preparedness agendas. Future operational protocols must structurally integrate specialized surveillance models that blend real-time clinical syndromic markers with innovative infodemiological digital tracking tools, such as internet search volume analytics.

Such proactive frameworks are essential to intercept silent biological incubation windows, optimize resource allocation, and guarantee the rapid containment of ectoparasitic lines before they culminate in widespread community epidemics.

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Appendix

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	3-5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6-7
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	7-8
Search	7	Present the full search strategies for all databases, registers and websites, including any filters and limits	7-9

Section and Topic	Item #	Checklist item	Location where item is reported
strategy		used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	9-11
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	11-13
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	11-13
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	11-13
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	11-13

Section and Topic	Item #	Checklist item	Location where item is reported
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	11-13
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	11-13
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	11-13
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	11-13
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	11-13
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	11-13
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	11-13
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	11-13

Section and Topic	Item #	Checklist item	Location where item is reported
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	11-13
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	12
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	13
Study characteristics	17	Cite each included study and present its characteristics.	15-54
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	13
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	22-54
Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	11-13

Section and Topic	Item #	Checklist item	Location where item is reported
syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	22-54
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	55-66
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	56, 58, 62
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	55-68
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	55-66
	23b	Discuss any limitations of the evidence included in the review.	56-67
	23c	Discuss any limitations of the review processes used.	67
	23d	Discuss implications of the results for practice, policy, and future research.	58, 62-66

Section and Topic	Item #	Checklist item	Location where item is reported
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	6
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	6
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	6
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	11-13
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	11-13

Table 9 PRISMA Check-List