



Literature Review: Prevalence and Management of Impetigo in Children

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Abstract

*Impetigo is a highly contagious superficial bacterial skin infection that commonly affects children. Its high incidence worldwide, limited epidemiological data in Indonesia, evolving treatment options, and increasing antibiotic resistance highlight the importance of studying its prevalence and management. This study aimed to determine the risk factors, prevalence, and management of impetigo in children based on recent scientific literature. A literature review was conducted by searching PubMed, Google Scholar, ScienceDirect, ResearchGate, and ProQuest. Articles published between 2021 and 2026 were selected according to inclusion and exclusion criteria and analyzed descriptively. Fifteen eligible articles were included. Impetigo most frequently occurred among children aged 2–5 years through school age. Prevalence varied across regions and was higher in areas characterized by population density, poor sanitation, and a high incidence of scabies. Commonly reported risk factors included age, poor hygiene, overcrowding, and comorbid skin diseases. Management was adjusted according to disease severity. Topical antibiotics, including mupirocin, fusidic acid, retapamulin, and ozenoxacin, were used for mild and localized cases, whereas systemic antibiotics, such as cephalexin, dicloxacillin, amoxicillin-clavulanate, or clindamycin, were used for extensive or severe cases and suspected Methicillin-resistant *Staphylococcus aureus* (MRSA) infections. Increasing resistance to several topical antibiotics remains a concern when selecting therapy. Impetigo remains common among children, with regional variations in prevalence. Management based on lesion extent, clinical condition, and antibiotic resistance patterns is essential to improve treatment success and prevent complications and transmission. This study may serve as a reference for healthcare professionals in preventing and managing childhood impetigo.*

Introduction

The skin is the largest organ covering the human body and serves as the first line of defense against various pathogenic microorganisms in the surrounding environment. In children, especially toddlers, the skin's barrier function is not fully developed, making them more susceptible to skin infections than adults. One of the most common bacterial skin infections in children is impetigo (Menaldi et al., 2016; Rahma & Lane, 2022; Paul, 2024; Ricciardo et al., 2025; Kortekaas Krohn et al., 2024; Ward et al., 2026).

Impetigo is a highly contagious, superficial bacterial infection of the epidermis that is most often found in children (Galli et al., 2022; Avena-Woods, 2024; Glennon et al., 2025). This

disease is generally caused by *Staphylococcus aureus* and *Streptococcus pyogenes*. Impetigo can appear on various parts of the body, especially the face and extremities, and is easily spread through direct or indirect contact with an infected person (Menaldi et al., 2016; Nardi & Schaefer, 2023).

Globally, impetigo is one of the skin diseases that most commonly affects children, particularly in tropical and hot-humid climates with high population densities and limited access to sanitation (Barbieri et al., 2022; Challenge, 2025; Madnani, 2023; Sakib, 2026). The highest prevalence is reported in the Oceania region, particularly among children in remote areas and vulnerable populations, with prevalence rates reaching over 40%. Meanwhile, the prevalence in Asia and Africa ranges from 7–8%, although the actual figure is estimated to be higher because many cases go unreported and children do not receive formal health care (Bowen et al., 2015).

Data on the prevalence of impetigo in children in Indonesia is still limited and comes primarily from hospital studies. Research at the Dermatology and Venereology Polyclinic of Prof. Dr. R.D. Kandou General Hospital in Manado found 53 cases of pediatric pyoderma in 2012, with impetigo being the most common type of pyoderma, at 58.5%. Follow-up research from 2013–2015 also showed that of the 114 cases of pediatric pyoderma, crusted impetigo remained the most common diagnosis, particularly in the 1–4 year age group. These findings indicate that impetigo remains one of the most common bacterial skin infections in children in Indonesia.

The management of impetigo continues to evolve and requires regular updates. Laboratory surveillance in Belgium covering data from 2013–2023 reported an increase in mupirocin resistance of *Staphylococcus aureus* from 0.5–1.5% to 1.7–5.6%, with more than 5% of isolates in the pediatric population from 2022–2023 being resistant to mupirocin and almost always cross-resistant to fusidic acid (Yin et al., 2024). Furthermore, the emergence of newer topical therapy options such as ozenoxacin, whose efficacy and safety in pediatric and adult populations have been evaluated through recent meta-analyses of randomized clinical trials, adds to the management options that healthcare professionals, including primary care physicians, need to understand (Tuesta et al., 2025; Travers et al., 2023; Zhang et al., 2025; Goh et al., 2024; Taylor et al., 2022; Wilhelm et al., 2025).

In Indonesia, most epidemiological data on impetigo comes from hospital studies or regional reports with limited population coverage and therefore cannot fully describe the condition. Furthermore, developments in impetigo therapy continue as new recommendations regarding the use of topical and systemic antibiotics emerge, but this information remains scattered across scientific publications. To date, studies specifically summarizing and analyzing the prevalence and management of impetigo in children based on current literature are limited. Therefore, a literature review is needed that can provide a comprehensive overview of the prevalence and management of impetigo in children as a basis for developing more effective prevention and management strategies.

Methods

Research Methods and Types

This research is a literature review using a descriptive-analytical approach that systematically analyzes previous research findings. Primary studies are represented by individual studies, while the literature review includes secondary research. This approach combines quantitative and qualitative methods, including cross-sectional, cohort, case-control, quasi-experimental, randomized controlled trials (RCTs), systematic reviews, meta-analyses, and descriptive population studies.

The data used are primary and secondary data obtained from online literature, such as scientific journals, theses, textbooks, and ebooks. Searches were conducted through PubMed, Google

Scholar, ScienceDirect, Scopus, ResearchGate, ProQuest, and manual searches of Indonesian journals published between 2021 and 2026, using Indonesian or English.

Place and Time of Research

This research was conducted online by searching scientific literature through several electronic databases, including PubMed, Google Scholar, ScienceDirect, Scopus, ResearchGate, and ProQuest. These databases were selected to obtain relevant scientific articles from a broad range of national and international publications related to the research topic. The literature search and article selection process was conducted between April and May 2026. During this period, potentially relevant articles were identified, screened, and selected according to the predetermined inclusion and exclusion criteria. All stages of data collection were performed electronically without direct fieldwork or participant involvement.

Inclusion and Exclusion Criteria

Articles included in this literature review must meet several inclusion criteria: be written in English or Indonesian, discuss the prevalence and/or management of impetigo in children, and involve research subjects aged 0–18 years. Articles must be published in national or international peer-reviewed journals. Eligible research types include cross-sectional studies, cohort studies, case-control studies, case reports, clinical trials, systematic reviews, or meta-analyses relevant to the research objectives.

Articles were excluded from the literature review if they were duplicate articles found in more than one database, were only available in abstract form without full text, did not specifically discuss impetigo, or were not fully accessible after the search process was carried out.

Variable Identification

The independent variables in this study are factors suspected to be related to the prevalence and management of impetigo in children. Based on the results of the literature synthesis, the independent variables analyzed included the child's age, gender, and the presence of comorbid skin conditions. Meanwhile, the dependent variables in this study were the prevalence of impetigo in children and the form of impetigo management provided to the pediatric population.

Table 1. Operational Definition

No.	Variable Name	Operational Definition	Measuring instrument	How to Measure	Measuring Scaler	Objective Criteria
1.	Impetigo	superficial bacterial infection of the epidermis caused by <i>Staphylococcus aureus</i> and/or <i>Streptococcus pyogenes</i> . Characterized by lesions in the form of vesicles, pustules, bullae, erosions or crusts,	Data extraction sheet based on reviewed articles	Identifying the diagnosis of impetigo as reported in research articles that met the inclusion criteria	Nominal	Impetigo: diagnosis based on clinical criteria or diagnosis reported in research articles.
2.	Bullous Impetigo	A form of impetigo characterized by thin-walled, flaccid bullae that	Data extraction sheet based on reviewed articles	Identifying cases reported as bullous impetigo in	Nominal	Yes: the article reports a diagnosis of bullous

		rupture easily and leave erosions with a scaly crust..		research articles		impetigo. No: it is not bullous impetigo.
3.	Impetigo Crustosa	A form of impetigo characterized by lesions in the form of vesicles or pustules that burst to form a golden yellow crust (honey-colored crust).	Data extraction sheet based on reviewed articles	Identifying cases reported as crusted/non-bullous impetigo in research articles	Nominal	Yes: the article reports a diagnosis of crusted/non-bullous impetigo. No: not crusted/non-bullous impetigo..
4.	Prevalence of Impetigo in Children	Percentage of impetigo cases in children reported in studies	Observation sheet, medical record	Recording prevalence figures from articles	Ratio	Presented as a percentage (%)
5.	Impetigo Management in Children	Therapeutic efforts used to treat impetigo in children	Observation sheet, medical record	Identify the type of therapy reported in the article	Nominal	Topical therapy/ Systemic therapy/ Combination of topical and systemic
6.	Age	Age groups of children reported in the article	Medical records	Age data identification	Ordinal	Infant (0–<1 year), Toddler (1–<5 years), Child (5–12 years), Teenager (13–18 years)
7.	Sex	Gender of child subjects experiencing impetigo	Medical records	Data recording from articles	Nominal	Male/Female
8.	Topical Therapy	Use of topical antibiotics for the treatment of impetigo in children	Medical records	Data recording from articles	Nominal	Mupirocin, Fusidic Acid, Retapamulin, Ozenoxacin
9.	Systemic Therapy	Use of oral or parenteral antibiotics in pediatric impetigo	Medical records	Data recording from articles	Nominal	Amoxicillin-clavulanate, Cephalexin,

						Erythromycin, Clindamycin, others
10.	Accompanying Skin Diseases	Other skin diseases reported along with impetigo in children	Questionnaire	Identification of the research results reviewed	Nominal	Yes/No

Data collection technique

Data collection was conducted through a systematic literature search of relevant scientific sources, with a focus on the prevalence and management of impetigo in children. Data sources used included Google Scholar, PubMed, ScienceDirect, ResearchGate, and ProQuest.

The literature search used a combination of keywords designed based on the main research concepts, both in Indonesian and English. Examples of keywords used include: "Impetigo in children," "Prevalence and management of impetigo," "Prevalence of impetigo in pediatrics," "Treatment for impetigo," and "Incidence and prevalence of impetigo in children."

The literature selection process was carried out systematically and in stages, including: (1) Initial Identification (Title and Keyword Screening) – Articles resulting from the initial search were reviewed based on their titles and keywords to assess their general relevance to the research topic; (2) Abstract Review: Articles with relevant titles were reviewed through their abstracts to ensure alignment with the research focus and the completeness of the data presented; (3) Full-Text Review, Articles that pass the abstract stage are read comprehensively to assess the methodology, clarity of results, relevance of content, and suitability to the inclusion criteria; (4) Final Selection, Only articles that meet all inclusion criteria and are not covered by the exclusion criteria are selected for further analysis.

Data Processing and Analysis

The collected data were analyzed using descriptive analysis within the literature review framework. This analytical method was applied to systematically organize, summarize, and describe the main characteristics of the studies included in the review without conducting an in-depth interpretation of cause-and-effect relationships. The analysis focused on extracting and presenting essential information from each study, including the year of publication, study title, research design, factors or variables examined, main findings, and the strengths and weaknesses of the study. The extracted information was then compared across the selected studies to identify similarities, differences, recurring patterns, and the distribution of research findings. Particular attention was given to how the studies addressed the reviewed topic and how their methodological characteristics influenced the findings reported. The strengths and weaknesses of each study were also described to provide a balanced understanding of the available evidence. Through this process, descriptive analysis provided a structured overview of the existing literature, allowing readers to understand the general characteristics, context, scope, and patterns of the research included in the review. This approach also helped present the available evidence clearly and systematically while remaining consistent with the descriptive purpose of the literature review.

Research Flow

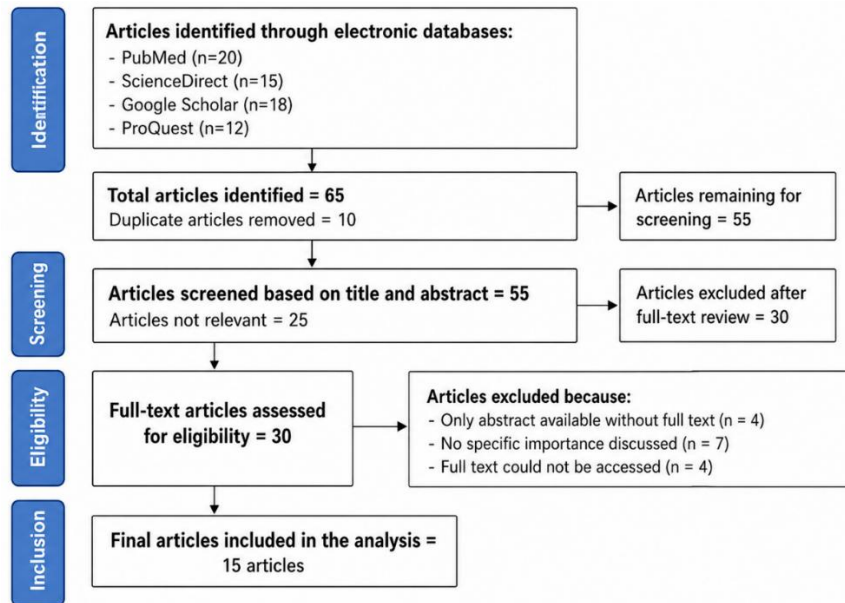


Figure 1. PRISMA Flowchart of the Study Selection Process

Result and Discussion

This research used a literature review method. From the screening process, 10 relevant articles were obtained, which were then used as reference sources. Each article was thoroughly reviewed using descriptive analysis methods.

Table 2. Summary of Previous Research on Impetigo

No	Researcher (Year)	Research Title	Research Design	Main Results	Analysis
1.	Barbieri et al (2022)	Non-bullous Impetigo: Incidence, Prevalence, and Treatment in the Pediatric Primary Care Setting in Italy	Observational retrospective cohort	A total of 15,136 episodes of NBI were observed in 225,979 children. The overall incidence rate was 9.53 per 1,000 persons/year. The highest incidence occurred in the 1–4 year age group (13.2 per 1,000 persons/year). There was a significant decrease in the incidence of NBI from 13 per 1,000 persons/year in 2004 to 7.46 per 1,000 persons/year in 2018 ($p < 0.0001$). Most patients received antibiotic therapy, with systemic antibiotics	Strengths: Very large sample size (225,979 children). Uses real-world data from primary care over 14 years. Evaluates not only incidence and prevalence, but also clinically relevant antibiotic treatment patterns. Weaknesses: The diagnosis of NBI is not always confirmed by microbiological examination. Data do not account for socioeconomic factors, hygiene, or environmental conditions that

				being used more frequently than topical antibiotics.	may influence impetigo incidence.
2.	Aleidet al (2024)	Prevalence and Socio-Demographic and Hygiene Factors Influencing Impetigo in Saudi Arabian Children: A Cross-Sectional Investigation	analytical observational with cross-sectional design	Of the 1,200 respondents, 5.2% reported that their child had been diagnosed with impetigo. There was a significant association between poor personal hygiene and the incidence of impetigo ($p < 0.001$). Children who had experienced impetigo had lower hygiene scores than children without impetigo. Sociodemographic factors significantly associated with impetigo were the child's gender, parental education level, employment status, and geographic location..	Strengths: Large sample size (1,200 respondents). Involves various regions in Saudi Arabia, providing a fairly representative national picture. Simultaneously assesses sociodemographic and hygiene factors, thus identifying modifiable risk factors. Weaknesses: Data were obtained through questionnaires and parental reports, thus subject to recall and reporting bias.
3.	Latifah et al (2023)	Profile of Primary Pyoderma Patients at the Dermatology and Venereology Polyclinic of Ulin Regional Hospital, Banjarmasin, 2019–2021	descriptive observational	Of the total 75 cases of primary pyoderma, it was found: Bullous impetigo was the second most common clinical manifestation with 15 cases (20%). Crusted impetigo (non-bullous) with 8 cases (10.7%). Both types of impetigo combined, there were 23 cases of impetigo (30.7%), making impetigo one of the most common forms of primary pyoderma. The largest age group in all cases of primary	Strengths: Provides limited local Indonesian epidemiological data on primary pyoderma. It presents detailed distribution of each type of pyoderma, including bullous and crusted impetigo. Weaknesses: This descriptive study cannot establish a causal relationship between impetigo and its occurrence. Bacterial cultures were not

				pyoderma was 0–5 years (24%), The majority of patients received topical antibiotic therapy as many as 67 patients (37.6%), namely mupirocin 27 patients (36%) and systemic 59 patients (33.2%), namely erythromycin 29 patients (38.7%).	performed. Impetigo data were not analyzed separately by age, sex, or specific therapy. The study was conducted at only one referral hospital, making the results difficult to generalize to the entire Indonesian population.
4.	Dimawan et al (2022)	Pediatric Viral and Bacterial Skin Infection Profile	observasional deskriptif dengan desain cross-sectional	Crusted impetigo is the most common bacterial skin infection, accounting for 32 cases (29.9% of all bacterial infections). Most cases of bacterial infection are found in the 2–12 age group. Bacterial skin infections are more common in boys than girls.	Strengths: Involved a relatively large number of medical records (1,427 patients). It demonstrated that impetigo is the most common bacterial diagnosis, making it relevant for research on the prevalence of impetigo in children. Weaknesses: The study was conducted in only one hospital, so the generalizability of the results to the Indonesian population as a whole is limited. It did not provide detailed information on treatment patterns and clinical outcomes specific to impetigo patients..
5.	Matthews et al (2021)	Prevalence of Scabies and Impetigo in School-Age Children in Timor-Leste	Cross-sectional	The prevalence of impetigo is higher in rural areas than in semi-urban areas. In Ermera, the prevalence was 14.9%, while in	Strengths: Assesses the epidemiological relationship between scabies and impetigo, which is highly

				Manufahi it was 18.0%, compared to 8.7% in Dili. Most cases of impetigo were considered very mild (93.1%), with fewer than five lesions. Children with scabies had approximately twice the risk of impetigo compared to children without scabies..	relevant for prevention programs. It includes both urban and rural areas, providing a more comprehensive epidemiological picture. Weaknesses: It does not evaluate therapy patterns, antibiotic types, or impetigo treatment outcomes. The study was conducted only on children attending school and may not be representative of the entire Timor-Leste child population..
6.	Nardi et al (2023)	Impetigo	Narrative Review	Impetigo is most commonly found in children aged 2–5 years. Impetigo is divided into non-bullous ($\pm 70\%$ of cases) and bullous ($\pm 30\%$ of cases). Topical antibiotics are the first-line therapy for localized and mild cases of impetigo, especially mupirocin, retapamulin, and ozenoxacin. Systemic antibiotics are given in cases with extensive lesions, multiple lesions, the presence of large bullae, involvement of multiple body areas, or when topical therapy is not possible. These include amoxicillin-	Strengths: Presents an overview of impetigo, from epidemiology to therapy. Includes updates on current topical and systemic therapy options. Weaknesses: This is not a primary study and therefore does not yield new prevalence or incidence data. Some therapy recommendations may vary depending on local antibiotic resistance patterns in each country. It does not specifically address the epidemiology of impetigo in

				clavulanate, dicloxacillin, and cephalixin.	Indonesian or developing country populations.
7.	Auliya et al (2024)	Clinical Manifestations and Distribution of Treatment for Pyoderma at a Tertiary Hospital in Surabaya, Indonesia	Retrospective descriptive	Of the 407 pyoderma patients, there were 78 cases of impetigo (19.2%). Impetigo cases were most commonly found in children aged 0-5 years with 47 patients (60.2%) and 6-11 years with 21 patients (26.9%). Clinical manifestations of impetigo were dominated by macules (48.7%), pustules (24.3%), and bullae (12.8%) as primary lesions. The most common secondary lesions were erosions (69.2%) and crusts (51.2%). In the impetigo group, 60 patients (76.9%) received systemic antibiotics. And for topical antibiotics with 30 patients (38.5%). The study did not detail the specific types of antibiotics used in each case of impetigo, but confirmed that antibiotics were the primary therapeutic modality.	Strengths: Provides local Indonesian data on the clinical profile of pyoderma, which is still limited. It uses a relatively large sample size (407 patients). It presents detailed clinical manifestations of impetigo based on primary and secondary lesion types. It provides a clear picture of antibiotic use patterns in clinical practice at a tertiary referral hospital. Weaknesses: A total of 272 patients were excluded due to incomplete data. It does not evaluate treatment success, recurrence, or antibiotic resistance. It was conducted at a single referral hospital, so the generalizability of the results to the broader Indonesian population is limited.
8.	Rainer et al (2024)	Prevalence and Associated Risk Factors of Scabies and Impetigo: A Cross-Sectional Study in Tutume District, Botswana	analytical observational with cross-sectional design	The prevalence of impetigo was 10.2% in the study population. Impetigo was found more frequently in children who also had scabies, indicating a	Strengths: Provides the most recent epidemiological data on impetigo in Sub-Saharan Africa, a region where data are still limited. It not

				significant association between the two diseases. Factors associated with increased impetigo incidence include high residential density, low socioeconomic status, and poor hygiene practices. Most impetigo cases were found in the elementary school age group, which is a group with high social interaction and physical contact.	only measures prevalence but also identifies risk factors associated with impetigo. It demonstrates a strong association between scabies and impetigo, making it relevant for integrated prevention strategies. Weaknesses: It does not evaluate treatment patterns, antibiotic resistance, or patient outcomes. As the study was conducted in a single district, the results may not be representative of the entire Botswana population.
9.	Aprillia et al (2025)	Treatment Strategies: A Systematic Review of The Advancements of Topical Antibiotics for Impetigo	Systematic Review	Ozenoxacin has demonstrated excellent efficacy, resulting in faster clinical cure and bacterial eradication compared to some conventional topical therapies. Increasing resistance to mupirocin and fusidic acid poses a significant challenge in current impetigo management. Topical antibiotics remain first-line therapy for localized impetigo with limited lesions. For extensive or severe cases of impetigo, systemic antibiotics are still	Strengths: Discusses the latest developments in impetigo therapy, particularly new-generation topical antibiotics such as ozenoxacin. It simultaneously examines antibiotic efficacy, safety, and resistance, making it highly relevant to discussions of impetigo management. Weaknesses: Not all studies have consistent designs and outcomes, limiting direct comparisons

				required as part of standard therapy.	between therapies. Most data comes from developed countries, so its applicability in developing countries must be considered based on local resistance patterns.
10.	Gahlawat, et al (2021)	Emerging Treatment Strategies for Impetigo in Endemic and Nonendemic Settings: A Systematic Review	Systematic Review	Most of the studies analyzed focused on non-bullous impetigo. In non-endemic countries, ozenoxacin 1% cream has the strongest evidence of effectiveness compared to retapamulin and newer topical minocycline formulations. In endemic areas, systemic therapies such as oral co-trimoxazole and intramuscular benzathine benzylpenicillin G have shown equivalent effectiveness in severe impetigo..	Strengths: Compares therapeutic strategies in endemic and non-endemic areas, a topic rarely discussed in previous reviews. Highlights new therapies, such as ozenoxacin, which are highly relevant to the development of modern impetigo management. Weaknesses: Only 10 studies met the criteria, so the evidence is limited. Some studies have varying risk of bias. Most studies are from specific countries. Data on long-term antibiotic resistance is limited.
11.	Altaho et al (2025)	Pediatric Bullous Impetigo: A Case Report and Literature Review	Case report	A 2-year-old girl with bullous impetigo presented with flaccid bullae, superficial erosions, and honey-colored crusts on her right leg. Treatment included intravenous cefazolin, topical fusidic acid, and emollients during	Advantages: Explains the management process systematically. Outlines the rationale for selecting systemic and topical antibiotics based on the patient's clinical condition. Provides

				her hospital stay. Following improvement, therapy was continued with oral cephalixin for one week, along with topical fusidic acid and emollients. The patient showed gradual improvement with reduced pain, pruritus, erythema, and crusts, and ultimately healed without complications. A rapid clinical diagnosis can avoid unnecessary testing and allow for early initiation of appropriate antibiotics.	documentation of lesion progression before and after therapy. Disadvantages: There is no comparison group, so the effectiveness of the therapy regimen cannot be compared with other antibiotic options.
12.	Pramana et al (2025)	Case Report: Crustose Impetigo with Secondary Infection in a 25-day-old Infant	Case report	25 day old baby girl with a diagnosis of crustous impetigo accompanied by secondary infection which presents with thick yellow crusts in the areas around the mouth, nose, ears, neck and groin. Management includes 0.9% NaCl compresses for 10-15 minutes 2-3 times per day to help remove crusts, 2% fusidic acid ointment twice a day on skin lesions, eye ointment with a combination of polymyxin B sulfate, neomycin and gramicidin in the area around the eyes, baby diaper cream in the groin area, as well as the systemic antibiotic cefotaxime intravenously 200	Advantages: Provides a clinical rationale for the use of intravenous antibiotics in neonates, particularly because the patient's condition is not yet optimally responsive to oral therapy. Disadvantages: This is a single case report, so the level of evidence is low and cannot be generalized. There is inconsistency in antibiotic prescription between the Case Presentation (intravenous cefotaxime) and Discussion (cefixime) sections.

				mg three times a day. given paracetamol if body temperature is >37.5°C. After 5 days of treatment, the lesions dried up, the crusts disappeared, the fever disappeared, and no new lesions appeared.	
13.	Saraswati et al (2025)	Case Report of Vesiculobullous Impetigo	Case Report	A 1 year 7 month old girl presented with complaints of fluid-filled blisters (vesicles and bullae) on the face, body, and extremities that then burst, forming erosions and crusts. Management was carried out in combination, including systemic antibiotics amoxicillin-clavulanic acid syrup, topical antibiotics gentamicin cream 0.1%, and antihistamines. Evaluation after one week showed clinical improvement characterized by drying of the lesions, reduced erythema, no new bullae, and a good healing process without complications.	Kelebihan: Menyertakan tindak lanjut (follow-up) sehingga efektivitas terapi dapat dievaluasi. (4) Memberikan edukasi pencegahan penularan dan perawatan kulit sebagai bagian penting dari penatalaksanaan. Kekurangan: Merupakan laporan satu kasus sehingga tingkat evidensinya rendah dan tidak dapat digeneralisasikan.
14	Pratama et al (2023)	Profile of Skin Diseases in Pediatric Patients Treated at the Dermatology and Venereology Polyclinic of the West Nusa Tenggara Provincial	Descriptive Retrospective	There were 475 pediatric patients, consisting of 448 new patients and 27 old patients. Patients were predominantly male (59.4%) and in the age group >10–18 years (50.1%). The	Strengths: Using 3.5 years of medical record data, it provides a fairly representative epidemiological picture at the provincial referral hospital.

		Hospital for the Period January 2020–June 2023		most common skin disease was infectious dermatology (60.6%). In the bacterial infection group, crusted impetigo was the most common diagnosis with 15 cases (26.3%), followed by bullous impetigo with 6 cases (10.5%). Skin infections remain a major problem in the pediatric population seeking treatment at the NTB Provincial Hospital, with impetigo being the most frequently found bacterial infection.	Weaknesses: The study is only descriptive in nature, so it does not analyze risk factors or relationships between variables. It does not report management, antibiotic type, dosage, or patient clinical outcomes, making it less suitable for discussing the effectiveness of therapy.
15.	Bishnoi et al (2021)	Atypical Manifestations of Cutaneous Staphylococcal Infection in Infants – Generalized Bullous Impetigo and Asymmetrical Peripheral Gangrene	Case Report	This study reports two infants with atypical manifestations of Staphylococcus aureus skin infections. The first case involved an 8-month-old infant with generalized bullous impetigo, characterized by vesicopustules, flaccid pus-filled bullae, extensive erosions, and crusting over most of the body. Gram stain revealed clustered Gram-positive cocci, and pus culture isolated coagulase-positive Staphylococcus aureus. The patient received intravenous clindamycin 20 mg/kg body weight every 8 hours based on sensitivity	Strengths: Presents two cases with very rare manifestations, broadening clinical understanding of the spectrum of bullous impetigo in infants. Diagnosis is supported by bacterial culture and antibiotic sensitivity testing, allowing for rational therapy selection. Describes the clinical response to intravenous antibiotics, providing an overview of management in severe cases. Weaknesses: Consisting of only two case reports, the

				testing and recovered completely. The second case involved a 1-year-old male infant with bullae on the hands and feet that progressed to asymmetric peripheral gangrene. Pus culture also revealed coagulase-positive <i>Staphylococcus aureus</i> . Treatment included a combination of intravenous ceftriaxone 100 mg/kg/day and intravenous clindamycin 30 mg/kg/day based on culture and sensitivity testing results. The patient showed clinical improvement after treatment, despite having undergone a finger amputation due to gangrene prior to referral.	evidence base is low and cannot be generalized. Does not compare the effectiveness of antibiotic regimens with other treatment options.
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Prevalence of Impetigo in Children

Based on a review of various studies, impetigo remains one of the most common bacterial skin infections found in the pediatric population. Research by Bowen et al. indicates that impetigo remains a public health problem that is still prevalent in developing countries, with a global prevalence of approximately 12.3% in children. It is estimated that more than 162 million children worldwide experience impetigo at any given time, particularly in tropical and subtropical climates. These findings indicate that impetigo remains a skin disease that poses a significant health burden in the pediatric age group (Bowen et al., 2015; Vitale et al., 2023).

Research by Barbieri et al. in Italy indicates that non-bullous impetigo is more common in young children, particularly those aged 1–4 years. The study also reported that most cases of impetigo were diagnosed in primary healthcare settings, indicating that this disease is a major reason for children to visit healthcare facilities. These findings align with the theory that preschool-aged children are at higher risk of developing impetigo due to their immature immune systems and high frequency of physical contact with their surroundings (Barbieri et al., 2022).

Research by Matthews et al. in Timor-Leste found an impetigo prevalence of 14.9% in the Ermera region and 18.0% in the Manufahi region, while the prevalence in the urban area of Dili was only 8.7%. These results indicate that the incidence of impetigo tends to be higher in rural areas than in urban areas. This difference is likely influenced by differences in sanitation

conditions, access to health services, community education levels, and residential density between regions. Furthermore, most cases of impetigo were classified as mild, with fewer than five lesions (Matthews et al., 2021).

Similar findings were also reported by Rainer et al. in Botswana, who found an impetigo prevalence of 10.2%. This study indicated that high residential density, low socioeconomic conditions, and poor hygiene practices were factors associated with an increased incidence of impetigo. Elementary school-aged children are the group most likely to experience impetigo due to their high social activity and physical contact between individuals (Rainer et al., 2024).

The link between scabies and impetigo has also been found in several studies. Matthews et al. reported that children with scabies had almost twice the risk of impetigo compared to children without scabies. These results are supported by research by Rainer et al., which showed a significant association between the two diseases. This can be explained by the fact that scabies lesions disrupt skin integrity, facilitating the colonization and invasion of impetigo-causing bacteria, particularly *Staphylococcus aureus* and *Streptococcus pyogenes* (Matthews et al., 2021; Rainer et al., 2024).

Data from Indonesia shows results that are not much different. Research by Dimawan et al. found that impetigo crustosa is the most common bacterial skin infection found in children, namely 32 cases or around 29.9% of all recorded bacterial skin infections. Most cases are found in the 2–12 year age group and occur more often in boys than girls. These results indicate that impetigo is still an important skin health problem in the child population in Indonesia (Dimawan et al., 2022).

Research by Auliya et al. in Surabaya also showed that of 407 pyoderma patients there were 78 cases of impetigo (19.2%). Most cases were found in the 0–5 year age group, namely 60.2%, followed by the 6–11 year age group at 26.9%. These results strengthen the finding that young children are the group most vulnerable to experiencing impetigo (Auliya et al., 2024).

These findings are also strengthened by research by Pratama et al. in West Nusa Tenggara Province Hospital which shows that infectious diseases are still the largest group of skin diseases in children, namely 60.6%. In the bacterial infection group, crustous impetigo was the most frequently diagnosed diagnosis (26.3%), followed by bullous impetigo (10.5%). Although this study did not specifically evaluate risk factors or management, the results show that impetigo is still one of the most frequently encountered bacterial skin infections in hospital-level health services in Indonesia (Pratama et al., 2023). These findings strengthen the research results of Dimawan et al. and Auliya et al. that impetigo is still an important skin health problem in the child population in Indonesia (Auliya et al., 2024; Dimawan et al., 2022).

Overall, the results of various studies show that the prevalence of impetigo in children is still quite high, especially in developing countries and tropical regions. The factors of young age, poor hygiene, residential density, low socio-economic conditions, and the presence of other skin diseases such as scabies play an important role in increasing the risk of impetigo in children (Aleid et al., 2024).

Impetigo Management in Children

Impetigo management aims to accelerate lesion healing, reduce the risk of transmission, prevent complications, and minimize the development of antibiotic resistance. Based on the reviewed literature, impetigo therapy in children can be divided into topical and systemic therapies, the use of which is tailored to the extent of the lesion, the severity of the disease, and the patient's condition (Pramana & Sutawan, 2025).

According to Nardi and Schaefer, topical antibiotics are the first-line therapy for localized impetigo with a limited number of lesions. Recommended topical antibiotics include mupirocin, retapamulin, and ozenoxacin. The use of topical antibiotics has several advantages,

including fewer systemic side effects and the ability to achieve high drug concentrations directly at the site of infection (Nardi & Schaefer, 2023).

Recent developments in impetigo therapy indicate the increasing use of ozenoxacin as a new-generation topical antibiotic. According to Aprillia et al., ozenoxacin has excellent effectiveness, with faster clinical cure rates and bacterial eradication compared to several conventional topical therapies. Furthermore, ozenoxacin also demonstrated a good safety profile in the pediatric population.(24)(25) These results align with research by Tuesta et al., which demonstrated that the use of 1% ozenoxacin was effective in increasing the success of impetigo therapy in both children and adults. Another advantage of ozenoxacin is its activity against several bacterial strains that have shown resistance to other antibiotics (Tuesta et al., 2025).

Nevertheless, antibiotic resistance remains a challenge in impetigo management. Aprillia et al. reported increasing resistance to mupirocin and fusidic acid, which are currently widely used as topical therapies. These findings are supported by research by Yin et al., which reported the emergence of mupirocin-resistant *Staphylococcus aureus* strains in several European countries. This situation highlights the importance of rational antibiotic use to prevent future increases in bacterial resistance (Yin et al., 2024; Aprillia & Wicaksono, 2025).

In cases of impetigo that are extensive, multiple, accompanied by large bullae, or involve multiple areas of the body, systemic therapy is recommended. According to Nardi and Schaefer, frequently used systemic antibiotics include amoxicillin-clavulanate, dicloxacillin, and cephalexin (Nardi & Schaefer, 2023). Nearly similar results were also reported by Saraswati et al. in a case of vesiculobullous impetigo in a child aged one year and seven months. The patient received a combination of oral amoxicillin-clavulanic acid and topical gentamicin, along with antihistamines, and education on skin hygiene and infection prevention. Evaluation after one week showed that the lesions had dried, the erythema had decreased, and no new bullae had formed (Ola et al., 2026).

Evidence for the use of systemic therapy in more severe cases of impetigo is also provided by several recent case reports. Altaho et al. reported a two-year-old girl with bullous impetigo who received intravenous cefazolin, topical fusidic acid, and emollients during her hospitalization. After the clinical condition improves, therapy is continued with oral cephalexin for one week accompanied by the use of topical fusidic acid so that gradual improvement occurs in the form of reduced pain, pruritus, erythema and crusting until the patient recovers without complications (Altaho & AlQusaimi, 2025).

Similar management was also reported by Pramana et al. in a case of crusted impetigo with secondary infection in a 25-day-old infant. In addition to intravenous cefotaxime administration, comprehensive therapy included 0.9% NaCl compresses to help loosen crusts, 2% fusidic acid application, a combination antibiotic eye ointment, and other supportive therapies. After five days of treatment, all lesions showed clinical improvement with no new lesions appearing. These results indicate that in neonates, impetigo therapy focuses not only on bacterial eradication with systemic antibiotics but also requires adequate local care to accelerate skin healing and prevent complications (Pramana & Sutawan, 2025).

In Indonesia, a study by Auliya et al. showed that 76.9% of impetigo patients received systemic antibiotic therapy and 38.5% received topical therapy. These results indicate that systemic antibiotics remain a frequently used treatment option in daily clinical practice, especially in cases presenting to referral hospitals with higher severity (Auliya et al., 2024).

A study by Latifah et al. also showed that mupirocin was the most commonly used topical antibiotic, while erythromycin was the most frequently prescribed systemic antibiotic in cases of pediatric pyoderma. These findings align with the recommendations of various clinical

guidelines that prioritize topical antibiotics for mild cases and systemic antibiotics for more severe or extensive cases (Latifah et al., 2023).

In more severe cases, antibiotic use based on culture and sensitivity test results is crucial. Bishnoi et al. reported two infants with atypical manifestations of *Staphylococcus aureus* infection, namely generalized bullous impetigo and asymmetric peripheral gangrene. The first patient received intravenous clindamycin based on sensitivity test results and recovered completely, while the second patient was treated with a combination of intravenous ceftriaxone and clindamycin after cultures showed coagulase-positive *Staphylococcus aureus*. This study confirms that in severe or complicated impetigo, culture and sensitivity testing play a crucial role in determining the most effective antibiotic, thereby increasing the success of therapy.(8)

In addition to pharmacological therapy, education regarding personal and environmental hygiene also plays a crucial role in preventing recurrence and transmission of impetigo. Menaldi et al. explain that maintaining skin hygiene, washing hands regularly, avoiding sharing personal items, and treating concomitant skin conditions such as scabies are important steps in controlling impetigo (Menaldi et al., 2016).

Research Gap

Based on the literature review, most previous studies have focused solely on the prevalence or management of impetigo. Furthermore, data on the prevalence of impetigo in children in Indonesia is still limited and largely comes from hospital studies with limited coverage. Research on therapy patterns, treatment outcomes, and antibiotic resistance in children is also limited. Therefore, this literature review was conducted to synthesize the latest scientific evidence on the prevalence and management of impetigo in children to provide a more comprehensive picture of the disease.

Conclusion

Based on a literature review of the prevalence and management of impetigo in children, obtained from various national and international articles, it can be concluded that impetigo remains a common bacterial skin infection in children and is a significant health problem, particularly in developing countries and tropical climates. The prevalence of impetigo in children varies across regions, with several factors contributing to the increased incidence including age, gender, poor personal hygiene, environmental conditions, and the presence of comorbidities that damage the skin barrier. Based on all research findings, antibiotic selection is strongly influenced by several factors, including disease severity, patient age, lesion extent, and the presence of complications. In cases with limited lesions, topical antibiotics such as mupirocin, fusidic acid, and gentamicin are generally sufficient. However, cases with more extensive lesions, as well as neonatal patients, generally require systemic antibiotics such as cefotaxime, cefazolin, cephalexin, amoxicillin-clavulanic acid, ceftriaxone, and clindamycin. These differences in regimens indicate that impetigo management must be tailored to each patient's clinical condition, local bacterial resistance patterns, and antibiotic availability at healthcare facilities to ensure optimal therapy results. Appropriate management, coupled with preventive measures and health education, plays a crucial role in reducing the incidence of impetigo and preventing complications and recurrence in children.

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