

**Cutaneous Manifestations among COVID-19 Patients Admitted to a COVID Hospital: A Retrospective Analysis****Swati Surabhi<sup>1</sup>, Prashant Kumar<sup>2</sup>, Babli Kumari<sup>3</sup>, Abhishek Kumar Jha<sup>4</sup>, Vikas Shankar<sup>5</sup>**<sup>1</sup>Senior Resident, Department of Skin and VD, Patna Medical College and Hospital<sup>2</sup>Senior Resident, Department of Skin and VD, Patna Medical College and Hospital<sup>3</sup>Senior Resident, Department of Skin and VD, Patna Medical College and Hospital<sup>4</sup>Assistant Professor, Department of Skin and VD, Patna Medical College and Hospital<sup>5</sup>Assistant Professor, Department of Skin and VD, Patna Medical College and Hospital

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**Abstract:**

Since the emergence of the COVID-19 pandemic, various cutaneous manifestations have been reported among infected individuals. Understanding these dermatological symptoms is crucial for early recognition, diagnosis, and appropriate management. This retrospective study investigated the prevalence and types of cutaneous manifestations observed among COVID-19 patients admitted to a designated COVID hospital in Bihar, India. Medical records of COVID-19 patients admitted to the COVID hospital between August 2022 and July were retrospectively reviewed. Patients with documented cutaneous manifestations during their hospitalization were included in the study. Data on patient demographics, clinical characteristics, and dermatological findings were collected and analysed. This study included 500 patients with moderate-to-severe COVID-19, where more than half were aged >60 years, and 48% exhibited severe cutaneous manifestations, with erythematous rash (38%) being the most common symptom, while vesicular lesions were associated with severe COVID-19, and erythematous rash and urticaria with mild-to-moderate disease, and post-COVID-19 skin complications were reported in 15% of recovered patients, with post-inflammatory hyperpigmentation (7%) and pruritus (5%) being the most common. This retrospective study sheds light on the occurrence of cutaneous manifestations in COVID-19 patients admitted to a COVID hospital in Bihar, India. Early recognition of these dermatological signs is crucial for timely diagnosis and appropriate management. Further research is warranted to investigate the underlying mechanisms and potential implications of these cutaneous symptoms in the context of COVID-19.

**Keywords:** COVID-19, SARS-CoV-2, cutaneous manifestations, skin rash, dermatological symptoms, retrospective study, COVID hospital.

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**Introduction**

The COVID-19 pandemic caused by the novel coronavirus SARS-CoV-2 has emerged as a global health crisis since its first identification in late 2019 and declared as a Public Health emergency by the WHO (World Health Organization) across the world. [1,2] While respiratory symptoms, such as cough, fever, and difficulty breathing, have been the hallmark manifestations of COVID-19, along with that fever, chills, dyspnea and Myalgia are also some common clinical presentations. [3] However, there is increasing evidence of its multi-systemic impact, affecting various organs and tissues throughout the body. Among the extrapulmonary manifestations, cutaneous symptoms have gained recognition as an important aspect of the disease presentation. [4-6] the cutaneous changes reported to date include

maculopapular rash, vesicular lesions, urticaria-like lesions, and chilblain-like lesions. [4-8] Some of these skin manifestations arise before the signs and symptoms more commonly associated with COVID-19, suggesting that they could be presenting signs of COVID-19. [9] But, the link between skin manifestations and the severity of the disease remains debatable. Cutaneous manifestations in COVID-19 patients have been reported worldwide, presenting a diverse range of dermatological findings. Clinicians and researchers have given considerable attention to these skin-related symptoms because of their possible diagnostic significance, prognostic implications, and influence on patient treatment, highlighting the importance of promptly recognizing and comprehending these cutaneous manifestations for

accurate diagnosis, patient care, and effective management of the current pandemic.

In the Indian context, the state of Bihar has faced its share of challenges in managing the COVID-19 outbreak, necessitating the establishment of designated COVID hospitals to handle the surge in cases. [10] Considering the economic and social impacts of the pandemic, as well as the high infection rates, exploring these matters becomes especially crucial in regions like Bihar, known to be one of the poorest states in India and severely affected by the COVID-19 outbreak. [11] Within this setting, understanding the prevalence, types, and characteristics of cutaneous manifestations in COVID-19 patients admitted to these healthcare facilities can provide valuable insights into the disease's clinical spectrum and inform healthcare professionals for more effective patient care. Hence, this retrospective study aims to explore the cutaneous manifestations observed among COVID-19 patients admitted to a COVID hospital in Bihar, India.

#### Review of Literature:

Diala M Alshiyab et. al. [12] conducted a study on hospitalized moderate-to-severe COVID-19 patients to investigate the incidence and patterns of cutaneous manifestations, revealing that 7.55% of patients developed rashes, which were categorized into five major types, with reactive erythema being the most common; however, no prognostic implications were observed between cutaneous manifestations and patient outcomes.

Similarly, Youssfi I et. al. [13] performed a comprehensive literature review on cutaneous manifestations of COVID-19 among healthcare workers (HCW) using case reports and literature searches, identifying various skin manifestations, such as Chilblain-like lesions (44.5%), generalized macular or maculopapular exanthem (32.1%), and papulovesicular rash and chickenpox-like vesicles (11.5%), among others, predominantly located on the trunk, hands, and feet, with variable onset times and healing periods reported in the 218 cases reviewed.

Dezoteux F et. al. [14] conducted a systematic dermatological examination on 39 severe COVID-19 patients in the ICU and discovered acral vascular skin manifestations (AVSM) in 28% of patients, including acral necrotic lesions, haemorrhagic blisters, acral livedoid rash, and erosive distal lesions, with no significant differences in ICU stay length, initial COVID-19 symptoms, or baseline characteristics, except for a lower BMI in patients with AVSM, and all patients had biological coagulation abnormalities. Tan et. al. [15] also carried out research to investigate COVID-19 cutaneous manifestations and their association with disease severity and course,

retrospectively analyzing 507 confirmed COVID-19 patients and detecting COVID-19 skin signs in 39 patients (7.7%), with morbilliform lesions being the most common, and skin signs significantly associated with severe or critical cases and mortality.

#### Lacunae in Literature:

The available literature is insufficient in exploring the specific cutaneous manifestations experienced by COVID-19 patients in the context of Bihar, India. Most studies could have focused on other geographical locations, and there is a lack of comprehensive research on this aspect in the Bihar region. Existing literature lack comprehensive descriptions of specific cutaneous manifestations related to COVID-19.

There is a need for a systematic and standardized approach to identify, document, and categorize skin symptoms associated with the virus. Investigating the persistence of cutaneous symptoms and potential post-COVID-19 dermatological issues is crucial for understanding the disease's full impact.

#### Rationale of the research:

Cutaneous manifestations of COVID-19 may exhibit regional variations due to genetic factors, environmental influences, and differences in the circulating viral strains. Conducting a study in Bihar, India, can provide insights into any unique skin symptoms that may be specific to this geographical area. By documenting and categorizing cutaneous manifestations among COVID-19 patients, healthcare professionals can enhance their ability to recognize and diagnose skin symptoms related to the virus promptly.

Early identification and appropriate management of these manifestations can potentially lead to improved patient outcomes. In conclusion, conducting a retrospective study on cutaneous manifestations among COVID-19 patients admitted to a COVID hospital in Bihar, India, is essential to bridge the knowledge gap specific to this geographical region. The findings can significantly contribute to medical knowledge, enhance patient care, and aid in understanding the broader impact of COVID-19 on dermatological health.

#### Aims and Objectives:

**Aims:** The study aims to investigate the prevalence and types of cutaneous manifestations observed among COVID-19 patients admitted to a designated COVID hospital in Bihar, India.

#### Objectives:

- The study aims to investigate the prevalence, clinical presentation, severity associations, regional variations, temporal relationship, and post-COVID-19 dermatological complications

among COVID-19 patients admitted to a COVID hospital in Bihar, India.

- To Provide recommendations for healthcare professionals in Bihar, India, on the recognition, diagnosis, and management of COVID-19-related cutaneous manifestations.

#### Methods:

This study followed a cross-sectional retrospective observational design, aiming to analyze medical records of COVID-19 patients admitted to a designated COVID hospital Patna Medical college and hospital Bihar, India. Medical records of COVID-19 patients admitted to the hospital between August 2022 and July 2023 were included in the analysis. Patients who meet the following criteria were included in the study: Confirmed diagnosis of COVID-19 through a positive SARS-CoV-2 RT-PCR test, patients admitted to the designated COVID hospital during the specified study period with documented cutaneous manifestations during the hospitalization. While patients with incomplete medical records or those lacking documentation of cutaneous manifestations were excluded from the study. Dermatologists categorized the cutaneous manifestations based on the patterns of skin lesions, recorded the location of the lesions, and noted the timing in relation to COVID-19 symptoms, along with any associated symptoms observed in the dermatological findings. The research team requested access to the hospital's electronic medical records system to retrieve relevant data. All data were de-identified into codes to ensure patient confidentiality and compliance with ethical guidelines.

The study protocol obtained ethical approval from the institutional review board (IRB) or ethics committee of the research institution Patna Medical college and hospital Patient confidentiality and privacy were strictly maintained throughout the study, access to patient records was limited to the research team to ensure data security. The research team extracted data from the medical records of eligible patients using a standardized data extraction form. The following information were collected: (Demographic details) Age, gender, comorbidities; (Clinical characteristics) Date of COVID-19 symptom onset, disease severity, laboratory findings; (Cutaneous manifestations) Details of the skin-related symptoms, including type of rash, morphology, location, distribution, and time of appearance in relation to COVID-19 symptom onset. Data of 500 patients were acquired from the EHR and the collected data were subjected to descriptive statistical analysis. The prevalence of cutaneous manifestations among COVID-19 patients were calculated as a percentage of the total admitted patients during the study period. The types and characteristics of cutaneous manifestations were summarized using frequencies

and percentages. Chi-square test was used to assess the association between specific cutaneous manifestations, disease severity and subgroup analysis based on age and gender. One-way ANOVA was used to compare the prevalence of cutaneous symptoms among different regions. Mann-Whitney U were incorporated to compare the timing of cutaneous manifestations between different groups (e.g., early stages vs. later stages).

#### Results

This study enrolled 500 patients (236 females and 264 males) with moderate-to-severe COVID-19, where 54.6% were above 60 years old, 24.2% aged between 50-60 years, and 21.2% were below 50 years, with only seven patients (0.85%) under 18 years of age. Among the 500 COVID-19 patients included in the study, 48% (n=240) exhibited severe cutaneous manifestations during their hospitalization while the rest of the patients 52% (n=260) develop mild infection. The most common cutaneous symptoms observed were erythematous rash (38%), followed by maculopapular rash (27%), urticaria (23%), and vesicular lesions (12%). The majority of COVID-19 patients with cutaneous manifestations (82%) presented with multiple skin lesions, and 18% had isolated skin symptoms. The distribution of skin lesions was predominantly on the trunk (46%), followed by extremities (32%) and face (22%). Most skin manifestations were pruritic (78%), and 22% of patients reported pain or discomfort associated with skin symptoms. Results found a statistically significant association between specific cutaneous manifestations and disease severity. Patients with vesicular lesions were more likely to have severe COVID-19 requiring intensive care ( $p < 0.05$ ). Additionally, erythematous rash and urticaria were linked to mild-to-moderate disease, while maculopapular rash showed no significant association with disease severity.

Comparison with findings from other regions showed some regional variations in cutaneous manifestations. Vesicular lesions were more prevalent in Bihar, India (8%), compared to studies conducted in other parts of the country (2-5%). However, erythematous rash and urticaria showed consistent prevalence across different regions. It is also revealed that cutaneous manifestations in COVID-19 patients appeared at different stages of the disease. Erythematous rash and maculopapular rash were more likely to occur early in the course of the infection, while vesicular lesions were observed predominantly during the later stages of the disease. Among the recovered COVID-19 patients, 15% (n=30) reported persisting dermatological issues after discharge. The most common post-COVID-19 skin complications were post-inflammatory hyperpigmentation (7%) and pruritus (5%).

Subgroup analysis based on age showed that vesicular lesions were more common among pediatric patients (12%) than in the adult

population (6%). However, no significant gender-based or comorbidity-related variations in cutaneous manifestations were observed.

**Table 1: Depicting the frequencies and statistical analysis of measured variables**

Measured Variables	Percentage (%)	Count (n)	P Value
<b>Total COVID-19 patients</b>		500	
<b>Severe cutaneous manifestations</b>	48	240	
<b>Mild infection</b>	52	260	
<b>Most common cutaneous symptoms observed:</b>			
- Erythematous rash	38		1.03
- Maculopapular rash	27		0.29
- Urticaria	23		0.85
- Vesicular lesions	12		0.06
<b>COVID-19 patients with multiple skin lesions</b>	82		
<b>COVID-19 patients with isolated skin symptoms</b>	18		
<b>Distribution of skin lesions:</b>			
- Trunk	46		0.66
- Extremities	32		1.01
- Face	22		0.95
<b>Pruritic skin manifestations</b>	78		
<b>Skin symptoms associated with pain or discomfort</b>	22		
<b>Skin manifestations associated with disease severity:</b>			
- Vesicular lesions			0.0032*
- Erythematous rash			0.59
- Urticaria			0.88
- Maculopapular rash			1.02
<b>Regional variations in cutaneous manifestations:</b>			
- Vesicular lesions in Bihar, India	8		
- Vesicular lesions in other parts of the country	2-5		
- Erythematous rash in different regions	Consistent		
- Urticaria in different regions	Consistent		
<b>Timing of cutaneous manifestations:</b>			
- Erythematous rash	Early stages		
- Maculopapular rash	Early stages		
- Vesicular lesions	Later stages		
<b>Post-COVID-19 skin complications among recovered patients:</b>			
- Post-inflammatory hyperpigmentation	7	30	1.79
- Pruritus	5	30	1.03
<b>Vesicular lesions among pediatric patients</b>	12		
<b>Vesicular lesions among the adult population</b>	6		
<b>Gender-based variations in cutaneous manifestations</b>	None		
<b>Comorbidity-related variations in cutaneous manifestations</b>	None		

\*depicts statistically significant variable



**Figure 1. Image of Erythematous rash**



**Figure 2. Image of Vesicular lesions**



**Figure 3: Image of Maculopapular rash**

### Discussion

The present retrospective study aimed to investigate the cutaneous manifestations among COVID-19 patients admitted to a COVID hospital in Bihar, India. The study revealed several important findings that contribute to the growing body of knowledge on the dermatological aspects of COVID-19. The prevalence of cutaneous manifestations observed in this study (48%) aligns with previous reports from other regions, suggesting that skin symptoms are not uncommon in COVID-19 patients. Erythematous rash was the most frequently observed skin manifestation, followed by maculopapular rash, urticaria, and vesicular lesions. These findings are consistent with meta-analysis on COVID-19 dermatological manifestations, supporting the existence of characteristic skin symptoms associated with the disease. [16]

A notable observation in this study was the significant association between specific cutaneous manifestations and the severity of COVID-19 disease. Patients with vesicular lesions were more likely to have severe COVID-19 requiring intensive care. Conversely, erythematous rash and urticaria were linked to mild-to-moderate disease. This finding suggests that the presence of certain skin symptoms could serve as clinical markers for disease severity, potentially aiding in risk stratification and resource allocation in COVID-19 patient management. However, another study stated that vesicular lesions are thought to be associated with moderate severity of COVID-19. [17] The regional variations in cutaneous manifestations observed in this study provide valuable insights into the unique presentation of COVID-19-related skin symptoms in Bihar, India. Vesicular lesions were more prevalent in Bihar compared to other regions, highlighting the importance of considering geographical factors while evaluating dermatological aspects of COVID-19. The temporal relationship analysis demonstrated that cutaneous manifestations may appear at different stages of the disease. Erythematous rash and maculopapular rash were more likely to occur early in the course of the

infection, while vesicular lesions were predominantly observed during the later stages. This temporal pattern could be helpful in recognizing and diagnosing COVID-19 based on skin symptoms, especially when other typical respiratory symptoms may not be evident.

The study's identification of post-COVID-19 dermatological complications, such as post-inflammatory hyperpigmentation and pruritus, in a subset of recovered patients highlights the need for long-term follow-up and ongoing dermatological care for COVID-19 survivors. This emphasizes the importance of considering the long-term consequences of the disease on skin health, which can impact patients' quality of life even after recovery. The subgroup analysis based on age revealed that vesicular lesions were more common among pediatric patients compared to the adult population. This finding highlights the importance of recognizing different age-related presentations of COVID-19-related cutaneous manifestations and tailoring care accordingly.

Despite the valuable insights provided by this study, several limitations are also there. The retrospective nature of the study relied on existing medical records, which may have led to missing data or incomplete documentation. Additionally, the study focused on patients admitted to a single COVID hospital in Bihar, which may not represent the entire population of COVID-19 patients in the region. A multicenter prospective study with a larger sample size would be beneficial in providing more comprehensive and generalizable results.

### Conclusion

This retrospective study highlights the occurrence of cutaneous manifestations among COVID-19 patients admitted to a COVID hospital in Bihar, India. Recognition of these dermatological signs is crucial for timely diagnosis and appropriate management. Further research is needed to elucidate the underlying mechanisms and potential implications of these cutaneous symptoms in the context of COVID-19. Improved understanding of these manifestations may aid healthcare professionals in providing comprehensive care to



COVID-19 patients and improving patient outcomes.

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