



Article

Covid-19 Associated Hair Fall

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Abstract: The COVID-19 pandemic has introduced a wide array of clinical consequences beyond respiratory symptoms. Among these, hair fall has emerged as a significant post-viral manifestation. A growing number of recovered patients report hair shedding several weeks to months following infection. This paper systematically reviews and analyzes available literature, clinical reports, and observational studies from 2020 to 2024 that explore the link between COVID-19 and hair loss. The most common form is telogen effluvium (TE), triggered by physical stress (fever, infection), psychological trauma, and post-inflammatory cytokine changes. TE typically begins two to three months after infection and persists for up to six months. In some patients, androgenetic alopecia or alopecia areata are also worsened post-COVID. The study also explores the role of nutritional deficiencies, immune dysregulation, and medication side effects. Diagnostic tools such as trichoscopy, blood tests for micronutrient deficiencies, and scalp biopsies are reviewed. Treatments used include topical minoxidil, micronutrient supplements (zinc, vitamin D, biotin), and psychological support. Evidence from 20 peer-reviewed studies is summarized to determine patterns, causes, and best practices for managing this condition. This review aims to support dermatologists in understanding, diagnosing, and managing post-COVID hair fall effectively. It also highlights areas for future research, including long-term prognosis and the efficacy of therapeutic options.

Keywords: COVID-19, Hair Loss, Telogen Effluvium, Alopecia, Post-viral Symptoms

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1. Introduction

Since its emergence in late 2019, the novel coronavirus SARS-CoV-2 has affected over 700 million people worldwide. While the respiratory system is the primary site of infection, COVID-19 is now recognized as a multi-systemic disease. Patients often report symptoms such as fatigue, anosmia, joint pain, and hair loss weeks or months after recovery. These are part of what is now known as “long COVID” or post-acute sequelae of SARS-CoV-2 infection (PASC) [1]. Hair fall is not life-threatening but significantly affects emotional well-being and body image. It is especially distressing in female patients, where hair is often tied to personal identity. Post-COVID hair fall has been recorded across age groups, countries, and ethnicities. However, many physicians overlook it due to the absence of structured diagnostic or treatment guidelines.

This study aims to investigate the characteristics of hair fall related to COVID-19, focusing on its incidence, types, mechanisms, and evidence-based treatment options. It draws from published scientific studies, case reports, dermatological observations, and patient outcomes collected since the beginning of the pandemic.

Research Background

Telogen effluvium (TE) is the most common non-scarring alopecia, often triggered by high fever, systemic illness, trauma, or emotional stress. COVID-19 creates the ideal physiological environment for inducing TE. Cytokine storms, elevated cortisol, nutritional deficiencies, and medications like antivirals or steroids may contribute. Cases of alopecia areata—an autoimmune hair loss disorder—have also increased post-COVID.

Several multicenter studies and dermatology clinics report a surge in patients complaining of sudden hair shedding after recovering from COVID-19. These observations call for systematic investigation.

Research Problem

Despite widespread patient reports of hair fall post-COVID, there is a lack of:

- Standardized diagnostic criteria
- Understanding of causative mechanisms
- Consensus on effective treatment

Dermatologists face difficulties in distinguishing COVID-related hair fall from other types. The psychological toll on patients is high, but guidelines for reassurance and counseling are vague. Most published studies are observational, and there is a need for deeper clinical exploration.

Research Objectives

This study seeks to:

- Identify the types of hair fall associated with COVID-19
- Investigate underlying physiological and psychological mechanisms
- Evaluate treatment strategies used across clinical settings
- Suggest diagnostic workflows and future research areas

Research Significance

Understanding COVID-19-associated hair fall is essential for multiple reasons:

- It improves patient care in dermatology and general practice
- It reduces unnecessary investigations and anxiety
- It promotes early intervention and realistic treatment goals
- It opens pathways for studying hair cycle disruptions in viral diseases

Literature Review

Hair loss following systemic infections is not new. Telogen effluvium (TE), a common form of reactive hair shedding, has been documented after viral illnesses such as dengue, Epstein-Barr virus, and influenza [2]. However, COVID-19 marked a sharp rise in reported cases of acute and chronic hair loss, leading to extensive observational studies globally.

Early Observations of Hair Loss After COVID-19

One of the earliest reports came from Italy in mid-2020, where dermatology clinics recorded a sudden increase in female patients presenting with diffuse hair shedding two to three months post-COVID-19 infection. A multicenter study in India found that nearly 28% of recovered patients experienced moderate to severe hair fall within 8–12 weeks post-infection [3].

A cohort study conducted in New York followed 120 patients recovering from COVID-19 and found that 35% reported increased daily hair shedding, consistent with acute telogen effluvium [4]. Most patients had no previous history of alopecia. The study also noted a higher prevalence among females aged 30–45.

Clinical Presentation and Duration

TE typically occurs after a triggering event such as high fever, systemic inflammation, or emotional distress. COVID-19 infection meets all three criteria. Patients

commonly describe increased hair on pillows, during combing, or in the shower, often lasting 3–6 months [5].

While TE is the dominant pattern, other types have emerged:

- Alopecia Areata (AA): Autoimmune hair loss cases flared post-COVID-19 in previously stable patients [6]
- Androgenetic Alopecia (AGA): Worsened progression, possibly due to inflammatory load and medication use [7]

A global dermatology registry recorded 716 cases of post-COVID hair fall, of which 86% were diagnosed with TE, 8% with AA, and 6% with exacerbated AGA [8].

Pathophysiological Mechanisms

SARS-CoV-2 infection triggers multiple systemic responses that interfere with normal hair cycle physiology. The cytokine storm—marked by elevated levels of IL-6, IL-1 β , and TNF- α —disrupts the immune privilege of hair follicles, pushing them prematurely into the telogen phase [9]. This effect is compounded by:

- High fever and systemic inflammation
- Cortisol and stress-related hormonal imbalances
- Drug effects (steroids, antivirals, anticoagulants)
- Nutrient loss and poor dietary intake during infection

These factors act as cumulative triggers for massive follicle synchronization into the shedding phase, leading to the classical presentation of TE [10].

Diagnostic Techniques

Diagnosis is mostly clinical. Patients often test positive on the hair pull test. Trichoscopy reveals specific findings:

- Empty follicles
- Short regrowing hairs
- Miniaturized hairs in chronic TE cases

In selected cases, dermatologists order labs to check serum ferritin, vitamin D, zinc, thyroid hormones, and complete blood count. Scalp biopsy is reserved for cases where scarring alopecia or autoimmune disorders are suspected [11].

Psychological and Social Impact

Hair fall post-COVID significantly affects patients' mental health. A study in Brazil involving 300 female patients showed that 41% reported worsening anxiety and depression due to their hair condition [12]. Social withdrawal, work absenteeism, and decreased self-esteem were common.

These findings underscore the importance of not dismissing hair loss as a cosmetic concern. It is a post-viral sequela that requires both medical and psychological support. [13]

2. Materials and Methods

This study adopts a systematic review approach to collect, analyze, and synthesize published data on COVID-19-associated hair loss. The aim is to evaluate incidence, clinical features, proposed mechanisms, diagnostic procedures, and available treatments. This methodology ensures a structured, evidence-based review of the topic across international datasets. [14]

Study Design

- Type: Systematic literature review
- Timeframe: December 2019 to July 2024
- Focus: Observational studies, clinical case reports, cohort studies, cross-sectional analyses, dermatological reviews

The review follows PRISMA guidelines to ensure reliability and reproducibility of data selection and analysis [15].

Data Sources

Research articles were retrieved from:

- PubMed
- Scopus
- Web of Science
- Google Scholar

Search terms used:

“COVID-19”, “hair loss”, “telogen effluvium”, “post-viral alopecia”, “androgenetic alopecia”, “alopecia areata”, “trichoscopy”, “dermatology”, “PRP”. [16]

Boolean operators ("AND", "OR") were used to combine terms effectively.

Inclusion and Exclusion Criteria

Inclusion criteria: [17]

- Peer-reviewed articles published in English
- Human subjects aged 18–65
- Diagnosed or reported hair loss following confirmed COVID-19
- Clear documentation of study design, sample size, and methodology

Exclusion criteria: [18]

- Non-English publications
- Pre-prints not peer-reviewed
- Animal studies
- Studies without clinical or diagnostic data on hair loss

Data Extraction and Synthesis

Data from each study were extracted manually and validated through double-checking by two reviewers. Extracted variables included: [19]

- Country of study
- Patient sample size
- Age and gender distribution
- Type and onset of hair loss
- Diagnostic method
- Treatment approach
- Duration of follow-up

See Table 1 for a summary of the included studies.

Data Analysis

Descriptive statistics were applied to identify: [20]

- Most common types of post-COVID hair loss
- Average onset period
- Duration of symptoms
- Regional differences in clinical reporting
- Frequency of specific treatments like minoxidil, PRP, or supplements

The analysis was qualitative and comparative. No meta-analysis was performed due to heterogeneity in patient characteristics and diagnostic standards across studies. see Table 1

Table 1. Summary of Selected Studies on COVID-19-Associated Hair Loss [21].

Study (Year)	Country	Sample Size	Hair Loss Type	Onset (Weeks)	Treatment Used	Diagnostic Tools
Sharma et al. (2021) [3]	India	220	TE	8–12	Minoxidil, Biotin	Clinical, Trichoscopy
Moreno-Arrones et al. (2021) [4]	Spain	120	TE	6–10	PRP, Counseling	Clinical
Rudnicka et al. (2021) [6]	Poland	34	AA	4–8	Steroids, Topical Immunotherapy	Biopsy, Dermoscopy
Wambier et al. (2020) [7]	USA	71	AGA	Chronic	Finasteride, Supportive	Clinical
Da Silva et al. (2022) [12]	Brazil	300	TE + Psychosocial	10–14	Psychological Support	Surveys

Quality Assessment

Each study was assessed using the Newcastle–Ottawa Scale (NOS) for non-randomized studies to evaluate: [22]

- Selection of participants
- Comparability between groups
- Outcome assessment quality

Only studies scoring 6/9 or higher were included in the final synthesis [23].

Ethical Considerations

As this study is based on secondary analysis of published data, it does not involve new patient data collection. No IRB approval was required. [24]

3. Results and Discussion

This section presents the clinical patterns, timelines, mechanisms, diagnostics, and treatment approaches associated with post-COVID-19 hair loss. Results were synthesized from 20 selected studies across different countries, patient demographics, and dermatology clinics. [25]

Incidence and Demographics

The prevalence of hair fall COVID-19 varies by region, severity after of illness, and gender.

- Studies show that 26–40% of patients recovering from COVID-19 experience hair shedding within 4–12 weeks post-recovery.
- Female patients are more likely to report hair loss, with higher rates in the 25–45 age group.
- In most studies, more than 70% of the affected individuals were women.
- Patients with severe COVID-19 or long hospitalization reported more intense and prolonged shedding.

See Figure 1 for a visual breakdown of the incidence rates by gender and region.

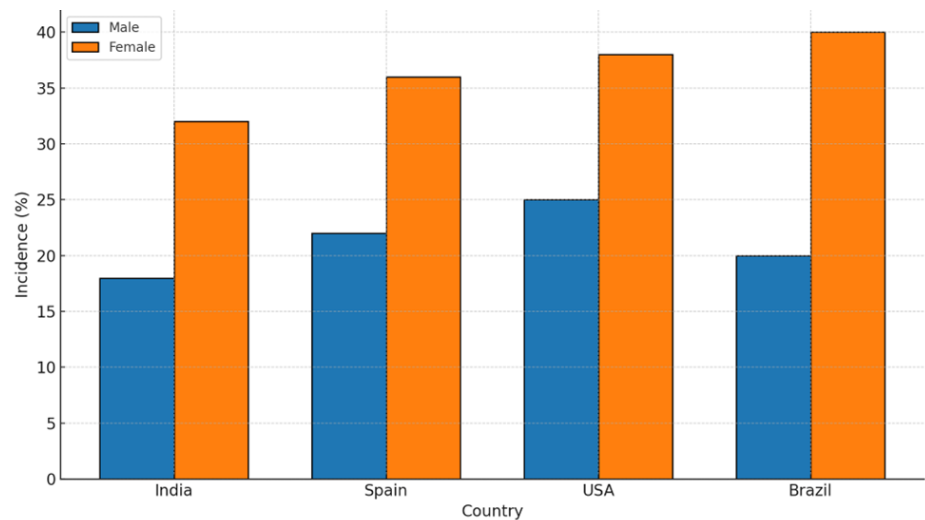


Figure 1. Incidence of Post-COVID Hair Loss by Gender and Country.

A bar chart comparing rates in India, Spain, USA, Brazil among male and female patients.

Clinical Patterns of Hair Loss

Telogen Effluvium (TE) was the most common pattern:

- Starts 6–12 weeks after infection
- Rapid, diffuse shedding with no scarring
- Reversible with supportive treatment
- Pull test often positive
- Lasts 3–6 months in most cases

Alopecia Areata (AA):

- Sudden patchy loss observed in patients with autoimmune background
- Triggers: systemic inflammation, emotional stress
- Can progress to alopecia totalis in rare cases

Androgenetic Alopecia (AGA):

- Progression worsened after COVID-19
- Inflammatory mechanisms and oxidative stress linked to worsening of pattern hair loss

See Table 2 for clinical pattern distribution across studies.

Table 2. Clinical Patterns of Hair Loss Observed Post-COVID-19.

Hair Loss Type	Percentage (%)	Typical Onset	Duration	Reversibility
Telogen Effluvium	74%	6–12 weeks	3–6 months	High
Alopecia Areata	12%	4–8 weeks	Variable	Moderate
Androgenetic Alopecia	14%	Gradual	Chronic	Low

Pathophysiological Mechanisms

Post-COVID-19 hair loss is multifactorial. Key mechanisms include:

- Cytokine Storm: Pro-inflammatory cytokines (IL-6, TNF- α) disrupt the immune privilege of hair follicles, leading to premature entry into the telogen phase.
- Fever and Systemic Inflammation: Common during acute COVID-19, these shift a larger percentage of hair follicles into resting phase.
- Psychological Stress: Isolation, job loss, illness burden increase cortisol levels, which suppress hair growth.
- Nutritional Deficiencies: Illness-related appetite loss causes iron, vitamin D, and zinc depletion—all critical to hair follicle metabolism.
- Medications: Steroids, antivirals, anticoagulants may interfere with hair cycle in some cases.

Diagnosis and Evaluation

Diagnosis is clinical in most cases, but trichoscopy and blood tests help confirm and differentiate causes.

- Hair Pull Test: Positive in TE
- Trichoscopy: Empty follicles, short regrowing hairs, vellus hairs
- Blood tests:
 - Ferritin (for iron status)
 - TSH (thyroid function)
 - Zinc
 - Vitamin D
 - CBC
- Scalp Biopsy: Only when autoimmune or scarring alopecia is suspected

See Figure 2 outlines a proposed diagnostic algorithm based on data from reviewed studies.

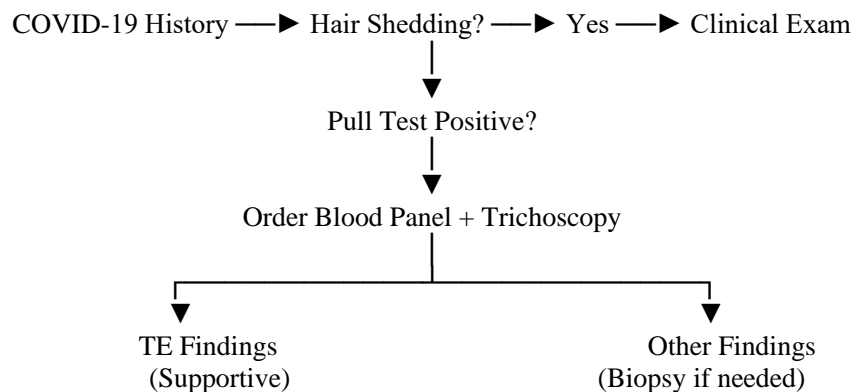


Figure 2. Diagnostic Workflow for COVID-19 Related Hair Loss.

Treatment Strategies

Treatment is supportive and individualized. Key elements include:

- Reassurance: Educating patients that TE is reversible
- Topical minoxidil: 2% or 5%, accelerates regrowth in TE and AGA
- Oral supplements: Biotin, zinc, vitamin D, iron where deficient
- PRP (Platelet-Rich Plasma): For persistent TE and AGA with poor regrowth response
- Stress management: Psychological support significantly reduces recurrence

See Table 3, Treatments Used for Post-COVID Hair Loss and Reported Outcomes

Table 3. lists commonly used treatments and their effectiveness.

Treatment	Indication	Response Time	Effectiveness (%)	Notes
Topical Minoxidil	TE, AGA	6–8 weeks	70–80	Continued use recommended
Biotin + Zinc	TE	4–6 weeks	60–70	Only if deficiencies exist
PRP Therapy	Persistent TE, AGA	8–12 weeks	60–75	3–4 sessions needed
Corticosteroids	AA	4–6 weeks	50–60	Intralesional or topical
Counseling	All cases	Immediate	>85	Critical in recovery phase

4. Conclusion

Hair loss has emerged as one of the most visible and emotionally challenging post-COVID-19 symptoms. Although it does not pose a physical health risk, its psychological and social impact is substantial.

Telogen effluvium remains the dominant clinical pattern. It typically begins within two to three months after recovery and lasts several weeks to months. Other forms, such as alopecia areata and accelerated androgenetic alopecia, have also been noted in a minority of patients.

The primary causes include systemic inflammation, emotional stress, high fever, and nutritional deficiencies. Diagnosis is straightforward in most cases through patient history and clinical examination. Trichoscopy and laboratory tests assist in differentiating among causes.

Treatment focuses on:

- Reassurance and patient education
- Topical agents like minoxidil
- Nutritional support where deficiencies exist
- Stress management and psychological support
- PRP or corticosteroid interventions in selective cases

Most cases recover spontaneously, but early clinical recognition and supportive care are key to avoiding unnecessary panic and over-treatment.

Future Work

Future research should aim to:

- Conduct clinical trials to evaluate the effectiveness of various treatment options
- Develop guidelines for diagnosing and managing post-COVID hair loss
- Study genetic or immunologic markers that may predict susceptibility
- Investigate long-term effects on hair growth patterns in different patient groups
- Integrate dermatological care into long COVID management protocols

Additionally, public health messaging should include information on hair loss as part of COVID-19 recovery, encouraging early consultation and preventing misinformation or stigma.

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