

Impact of COVID-19 Pandemic on Incidence and Prevalence of Cough and its Types: A Real-world Study

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ABSTRACT

Introduction: Cough is a prominent symptom in both the acute and postinfective phases of coronavirus disease 2019 (COVID-19). This retrospective study examined the prevalence and clinical characteristics of acute cough before, during, and after COVID-19.

Methodology: The anonymized electronic medical records (EMR) data of the pediatric, adult, and elderly patients with cough complaints from 2017 to 2023 was analyzed.

Results: Before, during, and after the pandemic, adults accounted for a higher proportion of the patient population with acute cough than the other two age-groups. Among the specialties, consultant physicians (CPs) and general physicians (GPs) were frequently consulted. When the cough type was analyzed, unspecified cough was the most common before and during COVID-19 in all three age categories, which continued even after the pandemic. The age-wise distribution of the cough prevalence till 2023, with 2020 as the base year, also showed unspecified cough as the most common in all three age-groups. Nonproductive cough was prevalent among adult and pediatric age-groups, while productive cough occurrence was more frequent in the elderly. Upon comparing the prevalence of cough during and after the pandemic, there was an increase in the overall occurrence of cough, with the unspecified cough being the most. In the age-wise comparison of the cough prevalence pre- and post-COVID-19, adult patients had the highest prevalence of all three cough types, followed by elderly patients. Pediatric patients had the lowest cough prevalence.

Conclusion: A significant increase in the incidence of acute cough post-COVID-19 highlights the complex and long-term respiratory consequences of COVID-19. The higher prevalence of unspecified cough suggests the need for cough categorization and adapting efficient documentation to ensure holistic management of cough.

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic, triggered by the novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a profound global health impact since its reported emergence in Wuhan, China.¹ Cough is a prominent symptom in both the acute and postinfective phases of COVID-19. It not only causes distress for patients but also increases the risk of spreading the infection through respiratory droplets.² Additionally, during the pandemic, this symptom often resulted in social stigma and isolation of those affected.³ Multiple global guidelines, including the National Health Service (NHS) guidelines, mandated that any individual exhibiting at least one of the symptoms of COVID-19, including a new continuous cough, should arrange for a swab test and should self-isolate for up to 10 days or until receiving a negative test result.⁴

Several studies have established that cough was one of the most frequent symptoms of COVID-19, affecting 40–80% of patients during the infectious period.^{5,6}

A study from China highlights cough as the most common symptom in nonhospitalized individuals with Omicron SARS-CoV-2 variant infection.⁷ A retrospective study in Saudi Arabia found that 69.8% of children experienced residual cough within 12 months post-COVID-19 infection.⁸ Bhardwaj et al. reported cough as the most common complaint among 55.84% of symptomatic COVID-19 cases.⁹ Similarly, Akaishi and Ishii noted that 24.5% of reverse transcriptase polymerase chain reaction (RT-PCR) positive patients developed cough symptoms within 4–5 days of infection, compared to 8.6% in RT-PCR negative cases, with cough linked to significant fatigability independent of fever or dysosmia.¹⁰ Moreover, the analysis done by Agrawal and Bhardwaj revealed a higher infection risk near a cough cloud of a COVID-19-infected person, with super-spreaders posing a 185% greater risk than average individuals.¹¹

Evidence suggests that many patients experience persistent cough even after fully recovering from COVID-19, regardless of the infection's severity. Lopez-Leon et al., in their meta-analysis, reported that nearly 80% of

COVID-19 survivors had at least one post-COVID-19 symptom, with 19% experiencing a cough (95% CI: 7–34%, $n = 7$ studies).¹² Additionally, various online surveys also indicated that 20–64% of patients continued to have cough 2–6 months after symptom onset, and 2.5–23.3% of patients still reported coughing even after 6 months.^{13,14} Rai et al. have highlighted the challenges of persistent cough post-COVID-19 and focused on how cough sensitivity is responsible for the same. They further mentioned that therapies for post-COVID-19 cough aim at the suppression of cough reflex, but intractable cases may need short-term corticosteroids.¹⁵

Overall, the COVID-19 pandemic has impacted the epidemiology of cough globally, necessitating further research. Present study investigated the incidence and prevalence of different types of coughs and its categorization before, during, and after COVID-19 in Indian patients, to understand the pandemic's influence on respiratory health. This is the first real-world study conducted in India using a large-scale database to understand the impact of COVID-19 on cough epidemiology in India.

METHODOLOGY

Study Design

This retrospective observational study assessed the electronic medical records (EMR) data of Indian pediatric (<18 years), adult patients (≥18 to ≤65 years), and geriatric patients (>65 years of age) with complaints

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of cough to evaluate the impact of COVID-19 on the prevalence and types of coughs. The patients who had complaints mentioned as chronic cough or related terms were excluded from the study.

Data Collection and Variables

Anonymized data of the patients with complaints of cough from 2017 to 2023 was retrieved from the HealthPlix EMR database (<https://healthplix.com/>) for analysis. HealthPlix EMR launched in 2016 and had a significant pool of doctors starting from 2017 who began using the EMR for their daily prescriptions. Hence, the data from 2017 to 2023 was analyzed. The year 2017 may show a lesser number of patients, as only fewer doctors started using the EMR. For the analysis of cough during and after COVID-19, the doctors who had utilized EMR for their practice were kept constant from the year 2020 and were consistently using it until the year 2023. The data entered by them was analyzed for the prevalence and comparison of cough during and after COVID-19.

The data was analyzed to understand the impact of COVID-19 on the prevalence and incidence of cough and its categories in adult, pediatric, and elderly patients and across various specialties [general physicians (GPs): 400, consultant physicians (CPs): 700, pulmonologists: 100, ear, nose, and throat (ENT) specialists: 100, and pediatricians: 110]. The patients were classified into productive and nonproductive cough with the following terms for data analysis: patients with complaints of dry cough, unproductive cough, allergic cough, cough with coryza, cough without expectoration, spasmodic cough, dry cough with rhinitis, cough without sputum, cough without bronchospasm, etc., were tagged in nonproductive cough. Patients with complaints of sputum cough, wet cough, cough with expectoration, fever, running nose, wet cough, purulent cough, cough with mucus, etc., were tagged in productive cough. Nonspecific cough was tagged for patients for whom the type of cough was not mentioned. Time frames specific to India (before, during, and after COVID-19) were considered using Worldometer, which manually analyzes, validates, and aggregates data from thousands of sources in real time and provides global COVID-19 live statistics (https://www.worldometers.info/coronavirus/country/india/#google_vignette).

Ethics Committee (EC) approval for the study was obtained from the Royal Pune Independent Ethics Committee (IEC No. - RIPEC121123, dated November 8, 2023).

Statistical Analysis

Statistical analysis for this study was carried out using Stata version 15.1 SE. Categorical data has been summarized by age-groups and doctor specialty using frequency (*n*) and percentages (%).

RESULTS

Prevalence of Acute Cough before COVID-19 (January 2017 to February 2020)

The EMR of 2,31,085 patients with acute cough were recorded in the database before COVID-19, that is, from January 2017 to February 2020. Of the overall patients, 67.31% were adults, 20.16% were pediatric, and 12.53% were elderly patients. Most patients consulted CPs, followed by GPs, pulmonologists, and ENT specialists. Productive cough was more prevalent among adults and elderly patients, while pediatric patients presented a higher occurrence of nonproductive cough. Unspecified cough was recorded in a substantial proportion of patients across all three age-groups (Table 1).

Prevalence of Acute Cough during COVID-19 (March 2020 to February 2022)

The number of patients with acute cough during COVID-19, from March 2020 to February 2022 in the EMR, was 6,62,629. Adults accounted for 69.38%, and the proportion of pediatric and elderly patients was 19.56 and 11.06%, respectively. The number of patients consulting CPs was the highest, followed by those who consulted GPs. During the pandemic, adults and pediatric patients had a higher incidence of nonproductive cough. Among the elderly patients, nonproductive cough was more prevalent. However, similar to the period before the pandemic, significant proportions of pediatric, adult, and elderly patient populations had their cough type reported as unspecified, where the type of cough was not mentioned (Table 2).

Prevalence of Acute Cough after COVID-19 (March 2022 to November 2023)

Among the 14,35,374 patients with acute cough reported after COVID-19, 60.74% of patients were adults, 29.31% were below 18 years, and 9.95% were above 65 years. A similar pattern of increased patient consultations with CPs and GPs, as seen during the pandemic, was noted during the COVID period. Nonproductive cough was highly common among both adult and pediatric patients, whereas elderly patients frequently

experienced productive cough. The cough type not recorded (unspecified cough) was reported in a considerable patient population (Table 3).

Prevalence and Categorization of Acute Cough with 2020 as the Base Year

Upon analysis of cough prevalence between 2020 and 2023, it was observed that the number of patients with unspecified cough was highest across the years, though it saw a meager decline in 2022. Nonproductive cough was more common than productive cough from 2020 to 2022, whereas in 2023, productive cough incidence was marginally higher than nonproductive cough (Fig. 1).

Prevalence of Cough—Age-wise Distribution with 2020 as the Fixed Base Year

From 2020 to 2023, with 2020 as the fixed base year, it was seen that unspecified cough was the most common in all three age-groups. Nonproductive cough was prevalent in the adult and pediatric age-groups, while productive cough occurrence was more frequent in the elderly.

In pediatric patients, the analysis of the cough data showed a steady increase in all three cough types from 2020 to 2023. The data on adult patients with cough revealed that nonproductive cough was more prevalent than productive cough from 2020 to 2022. However, in 2023, an insignificant decrease in patients with productive cough was noted. The unspecified cough in adult patients saw fluctuations in its occurrence across the years. In elderly patients, the prevalence of productive cough and unspecified cough saw a steady increase from 2020 to 2023, while the nonproductive cough prevalence increased until 2021, which marginally decreased in 2022 and 2023 (Figs 2A to C).

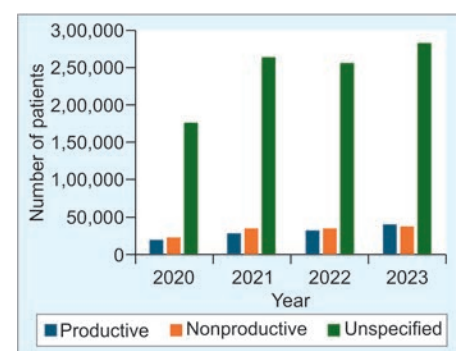
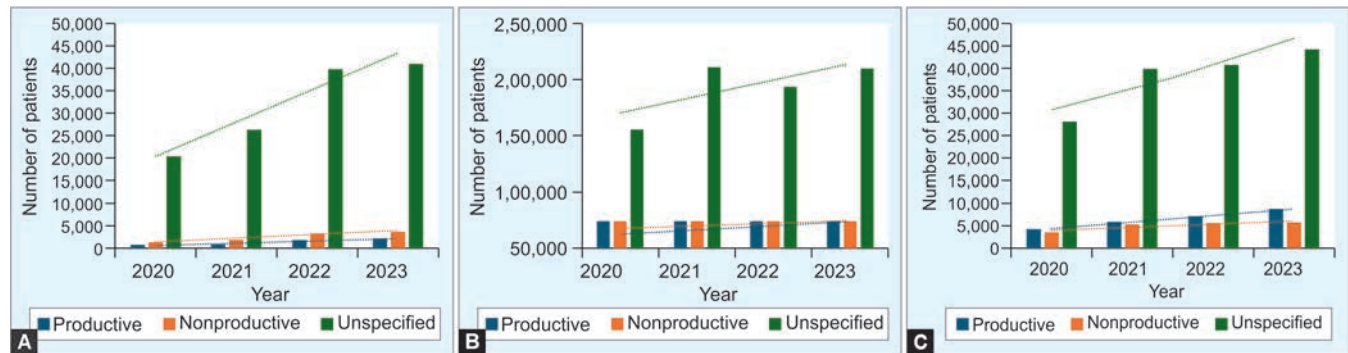


Fig. 1: Prevalence of cough with 2020 as base year



Figs 2A to C: Prevalence of cough—age-wise distribution with 2020 as the base year: (A) Pediatric patients; (B) Adult patients; (C) Elderly patients

Table 1: Summary of prevalence of acute cough before COVID-19 (January 2017 to February 2020)

Category	Age-group	Specialties					Total n (%)
		GPs n (%)	CPs n (%)	Pulmonologists n (%)	ENT specialists n (%)	Pediatricians n (%)	
Patients with complaints mentioned as cough	Overall	46,173	1,50,499	13,550	5,455	15,408	2,31,085
	Pediatric	14,674 (31.78) ^a	13,667 (9.08) ^a	1,679 (12.39) ^a	1,165 (21.36) ^a	15,408 (100.00) ^a	46,593 (20.16) ^a
	Adults	27,955 (60.54) ^b	1,14,098 (75.81) ^b	9,526 (70.30) ^b	3,961 (72.61) ^b		1,55,540 (67.31) ^b
	Elderly	3,544 (7.68) ^c	22,734 (15.11) ^c	2,345 (17.31) ^c	329 (6.03) ^c		28,952 (12.53) ^c
Total patients with productive cough	Pediatric	202 (1.38) [*]	982 (7.19) [*]	157 (9.35) [*]	92 (7.90) [*]	83 (0.54) [*]	1,516 (3.25) [*]
	Adult	2,449 (8.76) [#]	15,549 (13.63) [#]	2,362 (24.8) [#]	457 (11.54) [#]		20,817 (13.38) [#]
	Elderly	570 (2.04) [§]	4,198 (3.68) [§]	754 (7.92) [§]	48 (1.21) [§]		5,570 (3.58) [§]
Total patients with nonproductive cough	Pediatric	288 (4.72) [*]	1,338 (9.79) [*]	208 (12.39) [*]	83 (7.12) [*]	282 (1.83) [*]	2,199 (4.72) [*]
	Adults	2,517 (9.00) [#]	13,018 (11.41) [#]	1,651 (17.33) [#]	478 (12.07) [#]		17,664 (11.36) [#]
	Elderly	215 (0.77) [§]	2,343 (2.05) [§]	375 (3.74) [§]	52 (1.31) [§]		2,985 (1.92) [§]
Total patients with unspecified cough	Pediatric	14,184 (96.66) [*]	11,347 (83.02) [*]	1,314 (78.26) [*]	990 (84.98) [*]	15,043 (97.63) [*]	42,878 (92.03) [*]
	Adults	22,989 (82.24) [#]	85,531 (74.96) [#]	5,513 (57.87) [#]	3,026 (76.39) [#]		117,059 (75.26) [#]
	Elderly	2,759 (9.87) [§]	16,193 (14.19) [§]	1,216 (12.77) [§]	229 (5.78) [§]		20,397 (13.11) [§]

^aOverall pediatric patients with complaints mentioned as cough; ^bOverall adult patients with complaints mentioned as cough; ^cOverall elderly patients with complaints mentioned as cough; ^{*}Percentage of pediatric patients with productive cough, nonproductive, unspecified cough calculated with a as denominator; [#]Percentage of adult patients with productive cough, productive cough, nonproductive, unspecified cough calculated with b as denominator; [§]Percentage of elderly patients with productive cough, productive cough, nonproductive, unspecified cough calculated with c as denominator; n, number of patients; CPs, consultant physicians; GPs, general physicians; ENT, ear, nose, and throat

Comparison of the Prevalence of Cough during and after COVID-19 with Fixed Base Year of 2020

The incidence of unspecified cough was reported the highest during and after COVID-19, with its occurrence frequent in the period after COVID-19, that is, from March 2022 to November 2023. Similarly, both the productive and nonproductive cough were

more prevalent postpandemic than during the pandemic (Fig. 3).

Age-wise Comparison of the Prevalence of Cough during and after COVID-19 with Fixed Base Year of 2020

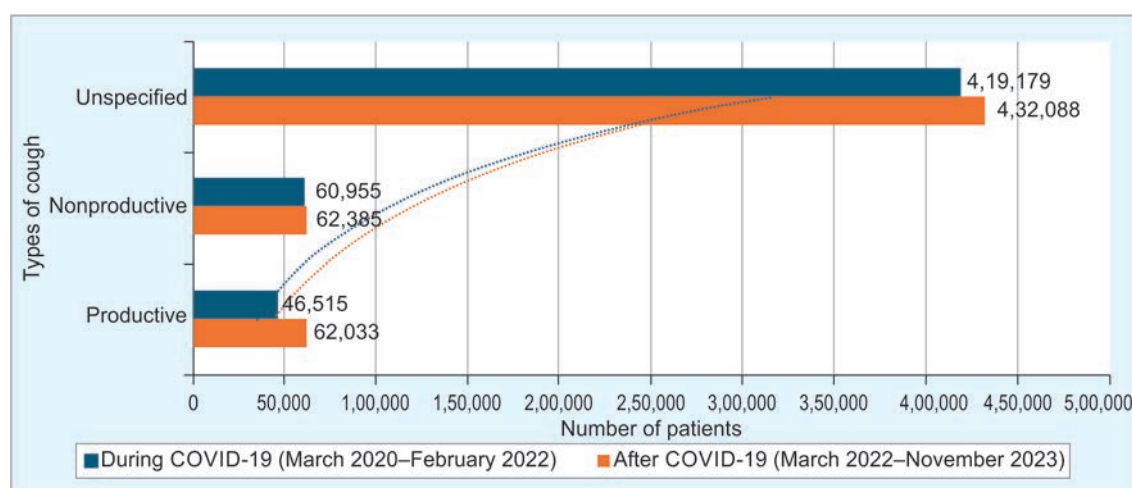
Figure 4 indicates that the overall prevalence of cough among the pediatric, adult,

and elderly age-groups increased post-COVID-19, with adults experiencing the highest occurrence. Upon analyzing the cough categories, it was observed that unspecified cough was more common, and its incidence peaked among the adult patients. While the occurrence of unspecified cough rose postpandemic in pediatric and elderly groups, it decreased

Table 2: Summary of prevalence of acute cough during COVID-19 (March 2020 to February 2022)

Category	Age-group	Specialties					Total n (%)
		GPs n (%)	CPs n (%)	Pulmonologists n (%)	ENT specialists n (%)	Pediatricians n (%)	
Patients with complaints mentioned as cough	Overall	1,79,356	3,75,273	48,470	13,205	46,325	6,62,629
	Pediatric	54,243 (30.24) ^a	24,915 (6.64) ^a	2,473 (5.10) ^a	1,685 (12.76) ^a	46,325 (100.00) ^a	1,29,641 (19.56) ^a
	Adults	1,12,127 (62.52) ^b	2,99,324 (79.76) ^b	37,734 (77.85) ^b	10,549 (79.89) ^b		4,59,734 (69.38) ^b
	Elderly	12,986 (7.24) ^c	51,034 (13.60) ^c	8,263 (17.05) ^c	971 (7.35) ^c		73,254 (11.06) ^c
Total patients with productive cough	Pediatric	898 (1.66) [*]	2,018 (8.10) [*]	305 (12.33) [*]	110 (6.53) [*]	803 (1.73) [*]	4,134 (3.19) [*]
	Adults	6,741 (6.01) [#]	35,489 (11.86) [#]	6,760 (17.91) [#]	883 (8.37) [#]		49,873 (10.85) [#]
	Elderly	1,554 (11.97) [§]	7,673 (15.04) [§]	2,180 (26.38) [§]	110 (11.33) [§]		11,517 (15.72) [§]
Total patients with nonproductive cough	Pediatric	2,862 (5.28) [*]	3,902 (15.66) [*]	392 (15.85) [*]	333 (19.76) [*]	1,993 (4.30) [*]	9,482 (7.31) [*]
	Adults	14,520 (12.95) [#]	52,621 (17.85) [#]	6,368 (16.88) [#]	2,856 (27.07) [#]		76,365 (16.61) [#]
	Elderly	1,541 (11.87) [§]	7,838 (15.36) [§]	1,073 (12.99) [§]	227 (23.38) [§]		10,679 (14.58) [§]
Total patients with unspecified cough	Pediatric	50,483 (93.07) [*]	18,995 (76.24) [*]	1,776 (71.28) [*]	1,242 (73.71) [*]	43,529 (93.96) [*]	1,16,025 (89.50) [*]
	Adults	90,866 (81.04) [#]	2,11,214 (70.56) [#]	24,606 (65.21) [#]	6,810 (64.56) [#]		3,33,496 (72.54) [#]
	Elderly	9,891 (76.17) [§]	35,523 (69.61) [§]	5,010 (60.63) [§]	634 (65.29) [§]		51,058 (69.70) [§]

^aOverall pediatric patients with complaints mentioned as cough; ^bOverall adult patients with complaints mentioned as cough; ^cOverall elderly patients with complaints mentioned as cough; ^{*}Percentage of pediatric patients with productive cough, nonproductive, unspecified cough calculated with a as denominator; [#]Percentage of adult patients with productive cough, productive cough, nonproductive, unspecified cough calculated with b as denominator; [§]Percentage of elderly patients with productive cough productive cough, nonproductive, unspecified cough calculated with c as denominator; n, number of patients; CPs, consultant physicians; GPs, general physicians; ENT, ear, nose, and throat

**Fig. 3:** Comparison of the prevalence of acute cough during and after COVID-19 with a fixed base year of 2020; COVID-19, coronavirus disease 19

among adults. A similar trend was observed in the nonproductive cough scenario. Whereas the productive cough incidence showed a consistent rise post-COVID-19 than during COVID-19 in all three age categories (Fig. 4).

DISCUSSION

This retrospective, first real-world study in an Indian population provided insights into the prevalence and clinical characteristics of acute cough before, during, and after COVID-19.

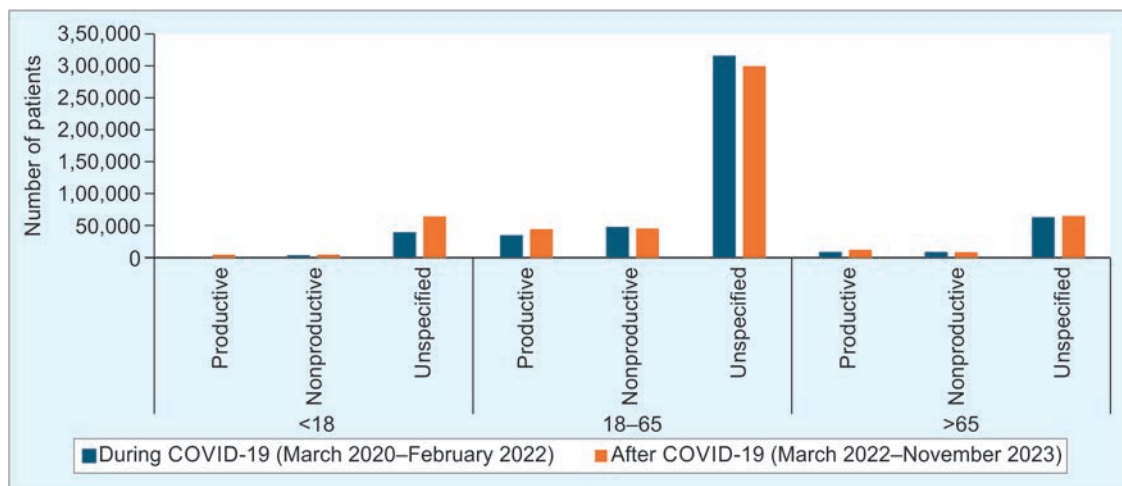
The impact of the pandemic on different age-groups is unique and varying, emphasizing its heterogeneous effects on respiratory health.

Adults show a higher prevalence of acute cough compared to children, who exhibit milder symptoms and lower prevalence

Table 3: Summary of prevalence of cough after COVID-19 (March 2022 to November 2023)

Category	Age-groups	Specialties					Total n (%)
		GPs n (%)	CPs n (%)	Pulmonologists n (%)	ENT specialists n (%)	Pediatricians n (%)	
Patients with complaints mentioned as cough	Overall	5,32,673	6,02,404	1,17,701	35,072	1,47,524	14,35,374
	Pediatric	1,74,898 (32.83) ^a	78,775 (13.08) ^a	12,591 (10.70) ^a	6,958 (19.84) ^a	1,47,524 (100.00) ^a	4,20,746 (29.31) ^a
	Adults	3,18,887 (59.87) ^b	4,43,601 (73.64) ^b	83,885 (71.27) ^b	25,476 (72.64) ^b		8,71,849 (60.74) ^b
	Elderly	38,888 (7.30) ^c	80,028 (13.28) ^c	21,225 (18.03) ^c	2,638 (7.52) ^c		1,42,779 (9.95) ^c
Total patients with productive cough	Pediatric	6,058 (3.46) [*]	6,928 (8.79) [*]	2,209 (17.54) [*]	436 (6.27) [*]	4,231 (2.87) [*]	19,862 (4.72) [*]
	Adults	24,519 (7.69) [#]	62,925 (14.19) [#]	21,014 (25.05) [#]	2,431 (9.54) [#]		1,10,889 (12.72) [#]
	Elderly	4,940 (12.70) [§]	15,378 (19.22) [§]	6,819 (32.13) [§]	280 (10.61) [§]		27,417 (19.20) [§]
Total patients with nonproductive cough	Pediatric	13,217 (7.56) [*]	10,584 (13.44) [*]	2,126 (16.89) [*]	1,491 (21.43) [*]	8,239 (5.58) [*]	35,657 (8.47) [*]
	Adults	44,936 (14.09) [#]	76,218 (17.18) [#]	14,446 (17.22) [#]	6,448 (25.31) [#]		1,42,048 (16.29) [#]
	Elderly	5,036 (12.95) [§]	12,111 (15.13) [§]	3,220 (15.17) [§]	670 (25.40) [§]		21,037 (14.73) [§]
Total patients with unspecified cough	Pediatric	1,55,623 (88.98) [*]	61,263 (77.77) [*]	8,256 (65.57) [*]	5,031 (72.31) [*]	1,35,054 (91.55) [*]	3,65,227 (86.80) [*]
	Adults	2,49,432 (78.22) [#]	3,04,458 (68.63) [#]	48,425 (57.73) [#]	16,597 (65.15) [#]		6,18,912 (70.99) [#]
	Elderly	28,912 (74.35) [§]	52,539 (65.65) [§]	11,186 (52.70) [§]	1,688 (63.99) [§]		94,325 (66.06) [§]

^aOverall pediatric patients with complaints mentioned as cough; ^bOverall adult patients with complaints mentioned as cough; ^cOverall elderly patients with complaints mentioned as cough; ^{*}Percentage of pediatric patients with productive cough, nonproductive, unspecified cough calculated with a as denominator; [#]Percentage of adult patients with productive cough, productive cough, nonproductive, unspecified cough calculated with b as denominator; [§]Percentage of elderly patients with productive cough productive cough, nonproductive, unspecified cough calculated with c as denominator; n, number of patients; CPs, consultant physicians; GPs, general physicians; ENT, ear, nose, and throat


Fig. 4: Age-wise comparison of the prevalence of acute cough during and after COVID-19 with fixed base year of 2020

rates.¹⁶ This trend is seen in elderly patients also, as they exhibit weaker cough responses than adults.¹⁷ Our study corroborated this pattern, revealing a higher prevalence of acute cough in adults during and after COVID-19 compared to pediatric and elderly

patients. This finding aligns with research demonstrating significant differences in the symptomatic presentation of cough across different age-groups.^{18,2} Several factors may contribute to the milder cough manifestations observed in the pediatric

population, including their lower maturity and different distribution of angiotensin-converting enzyme II (ACE II) receptors, which SARS-CoV-2 targets.¹⁹ Frequent respiratory infections in children during winter could elevate antibody levels against

other respiratory viruses, potentially providing cross-protection against SARS-CoV-2.²⁰ Moreover, self-reported symptoms in children can be biased due to their limited ability to express their health status post-COVID-19.¹³ These interwoven aspects highlight the intricate nature of the impact of COVID-19 on respiratory health across varying age-groups.

Dry cough (nonproductive cough) is one of the most common initial symptoms of COVID-19, occurring in approximately 60–70% of symptomatic patients.²¹ This is due to an inflammatory response induced by SARS-CoV-2 in the respiratory sequelae, leading to irritation and a dry cough.^{22,16} A 2020 study from Wuhan, China, found that most COVID-19 patients developed a dry cough 1 day after becoming ill, lasting around 19 days.² Interestingly, an earlier study indicated that the incidence rates of dry and productive cough in long-term COVID-19 patients were equal.²³ This study showed a higher incidence of dry cough than productive cough before, during, and after COVID-19. Additionally, in our studies, unspecified cough was reported in significant proportions in all three time periods in all three age-groups. The higher reported incidences of unspecified cough might be due to the vague and indefinite description of cough by the patients. They often express multiple diagnostic concerns, with only a fraction aligning with the physician's differential diagnoses, hindering effective communication. This, in turn, leads to a lack of clarity in understanding the cough's nature by the healthcare practitioners (HCPs).²⁴ Further, the time constraints in busy clinical settings might have also hindered the HCPs in recording the cough type, leading to less detailed documentation.²⁵

A surge in postinfection symptoms, including persistent cough, has emerged as a notable concern. Our study observed a rise in acute cough prevalence post-COVID-19, resonating with the findings from various investigations, indicating a persistent cough in many patients for weeks to months after the acute phase of infection.¹⁹ Carfi et al. highlighted that approximately 70% of patients had acute cough, decreasing to around 15% after an average of 60 days postacute COVID-19 infection, while D'Cruz et al. reported prolonged coughing in 42.6% of patients up to 6 months later.^{26,27} This collective evidence underscores the enduring impact of COVID-19 on respiratory health, reflecting the complexity of post-COVID cough dynamics. Numerous reports describe persistent post-COVID cough lasting weeks to months after SARS-CoV-2 infection.^{28,29} The neurotropism of the virus heightens the

cough reflex by affecting sensory nerves, prolonging the cough even after the infection resolves. Our results demonstrated a higher prevalence of acute cough after the pandemic than during it. This finding is supported by an 8-month follow-up study showing about one-fifth of COVID-19 patients develop postinfectious cough.⁶ Airway inflammation and viral-induced respiratory damage trigger postinfectious cough, exacerbated by airway hyperresponsiveness and hypersensitivity of the cough reflex.³⁰

The age-wise comparison of acute cough prevalence during and after COVID-19 in our study showed a slight decline in cough prevalence postpandemic among adult patients. Watase et al. reported significant reductions in cough prevalence from the acute COVID-19 to 3, 6, and 12-month follow-up (cough: 52.3% at onset, 8.8% at 3 months, 5.8% at 6 months, and 4.4% at 12 months) in patients aged 18 years.³¹ Notably, this study included inpatients, and the prevalence can vary greatly depending on whether the patient population analyzed consists of inpatients or outpatients. The findings from this retrospective real-world study highlight several important clinical implications for the evaluation and management of cough in the postpandemic period. Given the high prevalence of persistent cough post-COVID-19, HCPs should enhance surveillance and implement long-term follow-up protocols to monitor patients who have recovered from COVID-19, particularly those with respiratory symptoms. Age-specific management strategies are essential, and pediatric considerations should involve careful clinical assessments and reliance on objective measures. The higher incidence of dry cough before, during, and after COVID-19 suggests a need for focused management of this symptom, with an understanding of underlying mechanisms. Likewise, the records of unspecified cough necessitate adherence to proper documentation practices and increase the utility of automated cough detection systems, as suggested by the recommendations of the Association of Physicians of India.³² The study thus emphasizes the critical need for heightened vigilance, comprehensive patient education, and potential revisions to treatment guidelines to effectively address cough in the postpandemic period. Implementing these strategies might enable healthcare providers to manage the persistent respiratory sequelae of COVID-19 more effectively, thereby enhancing patient outcomes and overall quality of life as recommended by the National Institute for Health and Care Excellence (NICE) and Indian Ministry of Health and Family Welfare (MoH&FW) guidelines.^{33,34}

Although this is a retrospective EMR study, the missing data were not studied, and the other environmental, habitual (smoking, etc., in adults), and predisposing factors were not analyzed, which is a limitation of the study. Also, the number of patients reported to have COVID-19 infections was not captured.

CONCLUSION

In conclusion, the findings of this retrospective real-world study revealed a significant increase in the prevalence of acute cough post-COVID-19, reflecting the enduring impact of the viral infection on respiratory health. The higher incidence of nonproductive cough highlights the complex and long-term respiratory consequences of COVID-19. The study further underlines the age-dependent variance in cough manifestations, with adults experiencing higher cough prevalence compared to pediatric patients. Our study adds to the evidence on post-COVID symptoms and highlights the need for comprehensive strategies to understand and manage long-term respiratory effects of COVID-19 across different age-groups in India, alongside various global and Indian guidelines.

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DISCLOSURES

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AUTHOR CONTRIBUTIONS

All authors contributed to the development and review of this research manuscript and confirmed that they have read the journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines. All authors

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