

The Public Health Burden and Epidemiology of the Common Cold in India: A Review of Evidence

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Abstract

Review Article

The common cold is a contagious viral infection that affects the upper respiratory tract including the nose, throat, sinuses, and windpipe. The common cold and other acute upper respiratory infections (ARIs) represent one of the largest sources of outpatient illness in India, driven by a combination of high population density, seasonal climate variation, indoor air pollution, and viral diversity. This article reviews available epidemiological data on common cold and ARI prevalence in India, covering national surveys, regional hospital-based studies, viral etiology, risk factors, and healthcare-seeking behavior, drawing on peer-reviewed and government sources.

Keywords: Common cold, Respiratory infections, Population density and Viral etiology.

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1. INTRODUCTION

The common cold caused predominantly by rhinovirus alongside other respiratory viruses is one of the most frequently occurring illnesses in India across all age groups. Because it is usually mild and self-limiting, much of its true burden goes uncaptured by hospital-based surveillance; most of what is known comes from outpatient consultation data, national health surveys, and localized community studies. Nonetheless, the available evidence consistently shows that respiratory infections, including the common cold, account for a disproportionate share of both healthcare visits and self-medication in the country [1,6].

1.1 Virology and Causes

Rhinoviruses belong to the Picornaviridae family small, icosahedral RNA viruses roughly 30nm in diameter. There are over 100 distinct rhinovirus types, a diversity that has made vaccine development extremely difficult. Rhinoviruses replicate optimally at 33–35°C, close to the temperature inside the human nose, which explains why infection is largely confined to the upper respiratory tract rather than the lungs or gut; the virus is also sensitive to stomach acid, preventing gastrointestinal spread.

Beyond rhinovirus, other viruses that can cause cold-like symptoms include coronaviruses, adenoviruses, respiratory syncytial virus (RSV), and parainfluenza viruses. Rhinoviruses cause an estimated 8.9–19% of total acute upper respiratory infections and

4–6.1% of asymptomatic respiratory infections, underscoring both their dominance and the fact that many infections produce no noticeable illness at all.

Notably, research using full-genome analysis has shown that cold symptoms largely result from an overactive immune response to the virus rather than from direct damage caused by the virus itself a finding that has reoriented some treatment research toward modulating immune response rather than attacking the virus directly.

1.2 Transmission

Rhinoviruses spread primarily through respiratory droplets released when an infected person coughs or sneezes, as well as through direct contact with contaminated surfaces. The virus can survive for several hours outside the body, meaning transmission can occur when someone touches a contaminated object and then their nose, eyes, or mouth.

1.3 Symptoms and Course

The symptoms of common cold usually appear in 3 stages (early, active, and late). Children and babies are more prone to common colds as they haven't been exposed to as many viruses as adults. Typical symptoms include sneezing, nasal congestion and drainage, sore throat, coughing, mild headache, watery eyes, and mild body aches; fever is less common in adults than in children. In most healthy people, the acute infection lasts about a week, though residual symptoms such as cough or congestion can persist for two weeks or more. In

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people with asthma, chronic obstructive pulmonary disease (COPD), cystic fibrosis, or weakened immune systems, rhinovirus infection can trigger more serious complications, including asthma exacerbations and, rarely, lower respiratory tract infections.

1.4 Treatment and Management

There is no cure for colds, and they usually go away within 7 to 10 days without turning into anything serious. Over-the-counter (OTC) medications can help to manage symptoms. Pain relievers such as acetaminophen (Tylenol®) and NSAIDs (ibuprofen (Advil®)) aid in relieving fever and headaches. Decongestants like pseudoephedrine (Contac Cold 12 Hour® and Sudafed®) are widely used for symptom relief. Expectorants like Guaifenesin (Mucinex®) may help to thin and loosen mucus.

1.5 Experimental and investigational approaches

Because no antiviral cure exists, research has explored several other angles:

- Interferon therapy: Intranasal interferon-alfa can prevent a substantial share of secondary rhinovirus colds when used prophylactically, but it is not effective once symptoms have developed, and cost and side effects limit its practical use.
- Protease inhibitors (e.g., rupintrivir): Shown in early trials to reduce viral shedding and improve symptom scores, but not to reduce the frequency of colds.
- pH-based approaches: Intranasal citrate/phosphate buffers have reduced viral shedding without meaningfully reducing symptoms.
- Topical barrier sprays (e.g., enzyme-based mouth sprays): Under clinical investigation for both prevention and symptom alleviation, with mixed results so far.

None of these approaches has yet produced a therapy that reliably cures or prevents the common cold, which is why the Centre for Disease Control and Prevention (CDC) continues to emphasize prevention and supportive care over pharmacological treatment.

2. NATIONAL LEVEL PREVALENCE ESTIMATES

2.1 Outpatient burden

The common cold is reported to account for 20–40% of all outpatient consultations in India [1], making it one of the single largest reasons patients seek primary care, alongside other minor ailments such as fever and body aches.

2.2 Government Surveillance Data

According to the National Health Portal of India, 41,996,260 cases and 3,740 deaths related to respiratory infections were recorded across the country in 2018 [2] figures that include the common cold

alongside more severe respiratory illnesses such as influenza and pneumonia. India contributes to 18% of the global population, with severe acute respiratory infection (SARI) as one of the prominent causes of mortality in children >5 years of age [2]. Acute respiratory infections (ARI) accounted for 69% of the total cases of communicable diseases, and this scenario is before the era of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). After the coronavirus disease 2019 (COVID-19) pandemic, the total number of infected numbers rose to millions [2].

2.3 National Family Health Survey (NFHS) Trends - Children under five

India's National Family Health Survey provides the most consistent national-level tracking of ARI symptoms in young children:

- NFHS-3 (2005–06): ARI symptom prevalence in children under five was 5.6% [3].
- NFHS-4 (2015–16): This fell to 2.7%, roughly a 50% decline from the previous round [3].
- NFHS-5 (2019–21): A large-scale analysis of 201,133–222,233 under five children from the NFHS-5 dataset found ARI symptom prevalence of approximately 2.85% (95% CI: 2.78–2.92%), with the highest rates recorded during the winter months and among children living in rural areas [4][5].

This downward trend across successive NFHS rounds is generally attributed to improvements in nutrition, vaccination coverage, household air quality, and healthcare access, though ARI (including the common cold) remains one of the most frequently reported childhood illnesses in the survey.

3. REGIONAL AND SUB-NATIONAL VARIATION

Because ARI and common cold prevalence is sensitive to climate, housing conditions, and air quality, several state and district level studies report considerably higher figures than the national average:

- A community-based study across rural and urban slum areas of Maharashtra found ARI prevalence of 50.4% among under five children in the preceding month, with rural children more affected (54.2%) than urban children (46.7%) [6].
- In Eastern India, hospital-based data have reported ARI symptom prevalence as high as 66.8% among urban children and 62.2% among rural children [7] considerably higher than the national NFHS estimate, reflecting differences in study design (hospital/clinical samples versus household survey self-report) and regional climate.
- District level spatial analysis found that states with high reliance on solid cooking fuel particularly Uttar Pradesh and Bihar reported ARI incidence exceeding 5% of the child

population per square kilometer, with Jharkhand and West Bengal exceeding 2% [5]. These states also showed elevated ambient and household PM_{2.5} levels, in some rural kitchens reaching over 600 µg/m³ against a WHO 24-hour guideline of 25 µg/m³ [5].

4. SEASONALITY

Multiple Indian studies converge on winter as the peak season for common cold and ARI incidence, consistent with global patterns where cooler, drier air favors rhinovirus transmission and survival. NFHS-5-based analysis specifically found ARI symptom prevalence to be highest during winter months across the sampled population of under five children [4].

In Jammu and Kashmir, particularly in Kashmir and other winter regions of Jammu region namely Doda, Bhaderwah, Kishtwar and adjoining areas, rise in cases of common cold and upper respiratory tract infections (URTIs) are reported in winter season [11]. The reason being that the cold season creates ideal conditions for various respiratory viruses such as rhinoviruses, influenza viruses, and certain coronaviruses to spread more easily. Cold and dry air allows these viruses to survive longer in the environment. This makes infections more frequent and more difficult to control. Winter air dries the nasal passages, weakening the mucus barrier that protects against infection. People spend more time indoors with limited ventilation, increasing the chances of transmission. Devices like kangris, traditional bukharis (cold heaters) create enclosed warm spaces that favour viral spread.

5. VIRAL ETIOLOGY IN INDIA

Virological surveillance studies conducted across Indian regions (spanning 1970–2020) show:

- Rhinovirus has the highest regional detection rate among respiratory viruses studied, at approximately 18%, higher than in many other world regions, and is detected year-round [8].
- Influenza A and B show the highest overall prevalence rates among respiratory viruses studied nationally, at roughly 22% and 25%, respectively [8].
- In North India, where winters are colder, influenza and parainfluenza detection rates were found to be around 27% and 14%, respectively higher than in warmer regions, reflecting the role of climate in shaping which viruses dominate seasonally [8].
- A more recent hospital-based pediatric study found human rhinovirus to be the most commonly detected viral pathogen among ARI cases tested (21.05% of positive samples), followed by respiratory syncytial virus [7].

6. AGE AND SEX PATTERNS

- Community based data from Maharashtra found ARI prevalence to be marginally higher in boys

(51.4%) than girls (49.4%) among under five children [6].

- Broader epidemiology-forecast analysis suggests that in India, individuals typically experience the common cold about twice per year, with 40–50% of new cases recorded annually, and that women aged 20–30 tend to report more colds than men of the same age, plausibly linked to closer contact with young children [9].

7. HEALTHCARE SEEKING AND SELF-MEDICATION BEHAVIOR

Because the common cold is generally mild, a large share of cases in India are managed without formal medical consultation. A community based cross-sectional study from Central India found that the common cold was among the most frequent conditions for which people self-medicated, alongside fever, body aches, and cough [10]. Self-medication was reported to be significantly more common among women than men (OR 2.04) and among those with education above the high school level (OR 1.25) [10]. The most common reasons cited were saving time and the perception that the illness was not serious enough to warrant a doctor's visit [10]. Self-medication is an important public health problem, with varied prevalence across the world. The high prevalence of self-medication in India is one of the important factors contributing to the development of antimicrobial resistance. Self-medication without medical guidance can lead to inappropriate, incorrect, or undue therapy, missed diagnosis, delays in appropriate treatment, pathogen resistance, and increased morbidity. The growing trend of self-medication can be attributed to various factors like the urge for self-care, sympathy toward sick family members, inaccessible health services and non-availability of drugs, time and financial constraints, ignorance, misbeliefs, extensive advertisement and availability of drugs in places other than drug shops.

A national analysis using NFHS-5 data on treatment-seeking behavior among 6,198 under-five children with ARI symptoms found notable variation in whether formal healthcare was sought, underscoring persistent gaps in care-seeking for respiratory illness in young children [5].

8. RISK FACTORS IDENTIFIED IN INDIAN STUDIES

Indian epidemiological research has consistently identified the following risk factors for common cold and broader ARI incidence:

- Household air pollution, particularly from solid cooking fuel use, strongly associated with higher ARI rates in states such as Uttar Pradesh and Bihar [5].
- Parental/passive smoking, significantly associated with higher ARI prevalence in children [6].

- Rural residence, associated with higher ARI prevalence than urban residence in most (though not all) studies, likely reflecting differences in indoor air quality, healthcare access, and nutrition [4][6].
- Winter season, consistently linked to peak incidence across regions [4][8].

9. DISCUSSION

Taken together, the data suggest that the common cold in India follows patterns broadly consistent with global epidemiology winter peaks, rhinovirus as a leading cause, and disproportionate impact on children while also being shaped by uniquely Indian factors such as widespread solid fuel cooking, high population density, and substantial rural urban disparities in air quality and healthcare access. National survey estimates (NFHS) suggest a declining trend in ARI symptom prevalence among under five children over the past two decades, but this contrasts with much higher rates reported in localized hospital and community-based studies, a discrepancy likely explained by differences in case definitions, recall periods, and study populations (self-reported household symptoms versus clinically confirmed ARI). The common cold's continued dominance of outpatient consultations (20–40%) [1] and its role as one of the leading reasons for self-medication [10] point to it remaining a significant, if underappreciated, public health and economic burden in India.

10. CONCLUSION

The common cold remains one of the most prevalent illnesses in India, accounting for a large share of outpatient visits and self-medication episodes nationwide. While national survey data point to a long-term decline in acute respiratory infection symptoms among young children, regional studies particularly in states with high indoor air pollution and colder winters continue to report substantially higher burdens. Rhinovirus remains a leading viral cause nationally, with influenza viruses also contributing significantly, particularly in northern India during winter. Addressing household air pollution, improving rural healthcare access, and continued virological surveillance are likely to be important levers for reducing the burden of common cold and related respiratory illness in India.

Conflict of Interest: Author declares that there is no conflict of interest.

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