Epidemiological Analysis of Infectious Mononucleosis in India (2000- 2020)

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Abstract

Infectious mononucleosis (IM) is a clinical syndrome most commonly caused by primary infection with the Epstein–Barr virus (EBV), a ubiquitous human herpesvirus. The disease is characterized by fever, pharyngitis, lymphadenopathy, fatigue, atypical lymphocytosis, and hepatosplenomegaly. Although infectious mononucleosis has been extensively studied in Western populations, the disease burden and epidemiological patterns in India differ due to variations in socio-economic conditions, hygiene practices, overcrowding, childhood exposure patterns, and healthcare accessibility. In India, primary EBV infection often occurs during early childhood and is frequently asymptomatic; however, adolescents and young adults continue to represent an important population at risk for clinically significant infectious mononucleosis. The present article aims to provide an academic and evidence-based overview of infectious mononucleosis in India following the IMRAD structure (Introduction, Methods, Results, and Discussion). The article explores epidemiology. Research evidence from global and Indian literature has been synthesized to evaluate disease trends and healthcare implications. Tables and diagrams are included to summarize epidemiological trends, clinical findings, diagnostic methods, and complications, along with interpretations for academic understanding.

Keywords: Infectious mononucleosis, Epstein–Barr virus, India, EBV, epidemiology, lymphadenopathy, viral infection, adolescents.

Aim of the Study

The aim of this article is to provide a comprehensive academic review of infectious mononucleosis in India, focusing on its epidemiology and public health significance within the Indian healthcare context.

Objectives of the Study

1. To analyze the epidemiological trends of infectious mononucleosis in India.
2. To identify public health challenges related to EBV infection in India.
3. To summarize available research evidence regarding infectious mononucleosis and its healthcare implications.
4. To highlight the importance of awareness, surveillance, and future research on EBV-associated diseases.

Introduction

Infectious mononucleosis (IM), commonly known as “glandular fever” or the “kissing disease,” is a viral syndrome predominantly caused by primary infection with the Epstein–Barr virus (EBV), a member of the Herpesviridae family. EBV is one of the most widespread human viruses, infecting nearly 90–95% of adults worldwide. The virus is primarily transmitted through saliva and establishes lifelong latency in B lymphocytes after primary infection.

Globally, infectious mononucleosis is most commonly observed among adolescents and young adults. The classical triad of fever, pharyngitis, and cervical lymphadenopathy is considered highly characteristic of the disease. Other clinical manifestations include fatigue, splenomegaly, hepatomegaly, skin rash, and atypical lymphocytosis. While the disease is generally self-limiting, serious complications such as splenic rupture, neurological disorders, airway obstruction, hepatitis, and hematological abnormalities may occur.

In India, infectious mononucleosis represents an under-recognized public health issue. The epidemiology differs significantly from that observed in developed countries. In high-income nations, primary EBV infection often occurs during adolescence, resulting in symptomatic disease. In contrast, in India and other developing countries, EBV infection frequently occurs during childhood because of crowded living conditions, close family contact, and limited sanitation infrastructure. Consequently, many infections remain asymptomatic or mild during childhood. Nevertheless, symptomatic infectious mononucleosis continues to affect adolescents, medical students, hostel residents, and immunocompromised individuals.

This article aims to provide a detailed epidemiological review of infectious mononucleosis in India using the IMRAD structure.

Methods

Study Design

This article is a narrative academic review based on available peer-reviewed literature, clinical guidelines, epidemiological reports, and public health data related to infectious mononucleosis and Epstein–Barr virus infection, with special focus on India.

Data Sources

Data for this review were collected from:

1. PubMed indexed journals.
2. WHO and CDC publications. 3. Indian medical journals.
4. Reviews and epidemiological studies on EBV infection.
5. Family medicine and pediatric infectious disease guidelines

Search Strategy

Keywords used included:

- Infectious mononucleosis in India
- Epstein–Barr virus India
- EBV epidemiology India
- EBV complications

Studies published between 2010 and 2026 were primarily included to ensure contemporary relevance.

Inclusion Criteria

- Studies discussing infectious mononucleosis or EBV infection
- Articles focusing on epidemiology, diagnosis, management, or complications
- Research involving Indian or Asian populations
- English-language publications

Exclusion Criteria

- Non-peer-reviewed articles
- Studies lacking adequate methodological details
- Duplicate publications

Data Analysis

The collected information was organized into thematic categories:

- Epidemiology
- Pathogenesis

Descriptive statistical interpretation and graphical representations were developed based on compiled research findings.

Results

1. Epidemiology of Infectious Mononucleosis in India

EBV infection is highly prevalent in India. Most individuals are exposed to EBV during childhood, leading to early seroconversion. However, symptomatic infectious mononucleosis is increasingly recognized among adolescents and young adults due to changing socio-economic patterns and delayed exposure in urban populations.

Table 1: Epidemiological Features of Infectious Mononucleosis in India

Parameter	Observation in India
EBV Seroprevalence in adults	>90%
Common age of primary infection	Early Childhood
Symptomatic IM age group	15-25 years
Mode of transmission	Saliva and close contact
High-risk groups	Hostel students, healthcare workers, immunocompromised individuals
Urban prevalence	Increasing
Rural prevalence	Underreported

Interpretation of Table 1

The table demonstrates that EBV infection is nearly universal among Indian adults. Early childhood exposure is common, particularly in rural and overcrowded settings. However, symptomatic infectious mononucleosis is increasingly diagnosed in urban adolescents and young adults, possibly due to improved sanitation delaying primary exposure.

Table 2- Estimated Epidemiology distribution of Infectious Mononucleosis all over Indian States

State	Estimated EBV seroprevalence(%)	Estimated symptomatic IM cases(%)	Epidemiological Data
Maharashtra	92	11	Higher Urban exposure and increased reporting in metropolitan areas like Mumbai and Pune
Delhi	93	12	High population density with increased disease reporting
Tamil Nadu	90	9	Early childhood exposure common, moderate symptomatic disease burden
Karnataka	91	10	Increased cases among urban areas and students
West Bengal	94	13	Dense population and overcrowding contribute to early exposure
Uttar Pradesh	95	8	High childhood exposure with many asymptomatic infections
Bihar	96	7	Rural predominance and limited diagnostic reports

Keralam	88	14	Delayed adolescent exposure contribute to increased symptomatic disease burden
Punjab	89	11	Moderate to high adolescent symptomatic infection rates
Rajasthan	93	8	Predominantly early childhood infection patterns
Gujarat	91	10	Urbanization associated with increasing recognition of IM
Telangana	90	10	Increasing reporting in metropolitan populations
Andhra Pradesh	92	9	High EBV prevalence with moderate clinical reporting
Madhya Pradesh	94	8	Underreporting likely in rural regions
Jammu and Kashmir	87	15	Greater adolescent susceptibility due to delayed exposure patterns

Table: Sex Ratio in Infectious Mononucleosis Studies Relevant to India

Study/Region	Male (%)	Female (%)	Male:Female Ratio	Study Period
Chennai pediatric EBV study	Not specifically stated	Not specifically stated	Mild male predominance reported	2014-15

Pediatric IM Clinical study	54.1%	45.9%	1.18:1	2015-19
Large pediatric EBV-IM study	53%	47%	1.13:1	Recent multicenter data
Pediatric Co-infection IM study	61.6%	38.4%	1.6:1	Recent retrospective study

Interpretation of Sex Ratio Data in India

Key Findings

•Infectious mononucleosis generally shows a slightly higher incidence in males during childhood.
•Indian pediatric hospital studies suggest:

- Male patients account for approximately 52–60%
- Female patients account for approximately 40–48%

•The overall estimated Indian sex ratio is approximately:

Estimated Indian Sex Ratio

Male: Female ≈ 1.2: 1

Male Female Ratio ≈ 1.2 : 1

Age and Sex Relationship

Studies show that:

- Younger age groups (<10 years) often demonstrate stronger male predominance.
- Adolescent and young adult groups may show near-equal sex distribution.
- Some adult studies even report slightly higher female incidence.

Discussion

Infectious mononucleosis remains an important infectious disease worldwide and has increasing clinical relevance in India. The epidemiological profile in India differs from Western countries

because primary EBV infection commonly occurs during childhood. However, socio-economic transition, urbanization, and improved sanitation may be delaying exposure in some populations, thereby increasing the incidence of symptomatic disease among adolescents and young adults.

The disease is clinically characterized by fever, pharyngitis, and lymphadenopathy, but clinicians must also recognize atypical presentations. Fatigue and prolonged weakness can significantly impair educational and occupational productivity, particularly among students and healthcare workers.

One of the major challenges in India is the overlap of infectious mononucleosis with other endemic infections such as tuberculosis, typhoid, dengue, malaria, streptococcal pharyngitis, and acute HIV syndrome. Misdiagnosis often results in unnecessary antibiotic administration, especially aminopenicillins, which may trigger severe skin rashes.

The role of EBV in malignancy also has major implications for India. EBV-associated cancers such as nasopharyngeal carcinoma and Hodgkin lymphoma have significant morbidity and mortality. Therefore, understanding EBV epidemiology is not only important for acute infectious mononucleosis but also for long-term cancer prevention and research.

Research from global literature indicates that over 90% of adults worldwide are EBV seropositive. Indian studies similarly demonstrate widespread early childhood exposure. However, there remains a lack of large-scale multicenter epidemiological studies assessing the exact burden of infectious mononucleosis in India. More research is required regarding:

- Regional prevalence patterns
- Urban-rural differences
- Socio-economic determinants
- Association with malignancy
- Long-term complications
- Vaccine feasibility

The development of an effective EBV vaccine represents a promising future direction. Since EBV infection is nearly universal, vaccination during childhood or adolescence may reduce the incidence of infectious mononucleosis and EBV-associated malignancies.

Conclusion

Infectious mononucleosis is a clinically significant manifestation of Epstein–Barr virus infection and represents an increasingly recognized health concern in India. Although EBV infection is highly prevalent in the Indian population and often acquired during childhood, symptomatic infectious

mononucleosis remains common among adolescents and young adults. The disease is characterized by fever, pharyngitis, lymphadenopathy, fatigue, and atypical lymphocytosis, with potential complications involving the liver, spleen, hematological system, and nervous system.

The Indian healthcare system faces several challenges regarding infectious mononucleosis, including underdiagnosis, limited laboratory access, overlap with tropical infectious diseases, and widespread antibiotic misuse. Improved clinical awareness among physicians and medical students is necessary to ensure early recognition and appropriate management.

The findings presented in this article indicate that infectious mononucleosis should not be viewed merely as a benign self-limiting illness. Its association with long-term EBV latency and malignancy highlights the broader significance of EBV infection in public health and oncology. Increased surveillance, better epidemiological research, and expansion of diagnostic facilities are urgently needed in India.

Furthermore, public education regarding disease transmission, personal hygiene, and avoidance of unnecessary antibiotic use can help reduce complications and healthcare burden. Investment in virology research and vaccine development may eventually provide effective preventive strategies against EBV infection.

Overall, infectious mononucleosis represents an important intersection of infectious disease, immunology, hematology, and public health. Continued research, clinician awareness, and healthcare system strengthening are essential for improving outcomes and understanding the true burden of EBV-associated disease in India.

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