Review Article

Journal of Emergency and Trauma Nursing
Volume 5 Number 2, July - December 2024

Human Metapneumovirus (HMPV) and the Vital Role of Nurses in Community and Hospital Settings

Rajendra Kumar Sahu[1], Avadhesh Kumar Yadav[2], Apurva Rai[3]

How to cite this article:

Rajendra Kumar Sahu, Avadhesh Kumar Yadav, Apurva Rai. Human Metapneumovirus (HMPV) and the Vital Role of Nurses in Community and Hospital Settings. J of Emer and Trauma Nurs. 2024;5(2):49–52.

Abstract

Human Metapneumovirus (HMPV) is a significant respiratory pathogen responsible for a range of illnesses, from mild cold-like symptoms to severe lower respiratory tract infections, particularly in vulnerable populations such as young children, the elderly, and immunocompromised individuals. This review explores the clinical presentation, epidemiology, and transmission of HMPV, highlighting its seasonal nature and the challenges in controlling its spread. It also emphasizes the crucial role of nurses in both hospital and community settings. In hospitals, nurses are vital in early detection, infection control, supportive care, and patient education. In the community, they contribute to health promotion, early identification of symptoms, and prevention strategies. By providing comprehensive care, managing complications, and educating at-risk populations, nurses play an essential role in reducing the impact of HMPV and improving patient outcomes. This article underscores the importance of nursing interventions in managing HMPV infections and preventing their transmission.

Keywords: Human Metapneumovirus (HMPV), Nursing interventions, RSV, Respiratory infections.

INTRODUCTION

Human Metapneumovirus (HMPV) is an important respiratory microorganism that affects people of all ages. It causes a spectrum of respiratory illnesses, ranging from mild cold-like symptoms to severe respiratory distress. HMPV is part of the Pneumoviridae family, closely related to the Respiratory Syncytial Virus (RSV).[1] It was first identified in 2001 by van den Hoogen *et al.* in respiratory patients from the Netherlands.[2] HMPV is an enveloped negative-sense single-stranded RNA virus, a member of the *Metapneumovirus* genus in the *Pneumovirinae* subfamily within the *Paramyxoviridae* family.[3]

In January 2025, India reported its first case of human metapneumovirus (HMPV) in a 3-month-old female infant from Bengaluru, Karnataka admitted with Bronchopneumonia, and the second case was seen in an 8-month-old male infant who tested positive on January 3, 2025.[4] Shortly after, another case was identified in the same state. As of January 7, 2025, India has confirmed seven

Author's Affiliation: [1]Nursing Officer, [2]Operation Theatre Incharge, [3]Associate Professor, Department of Nursing, Mahamana Pandit Madan Mohan Malviya Cancer Centre, Varanasi, Uttar Pradesh 221005, India

Corresponding Author: Rajendra Kumar Sahu, Nursing Officer, Department of Nursing, Mahamana Pandit Madan Mohan Malviya Cancer Centre, Varanasi, Uttar Pradesh 221005, India.

E-mail: gloriousdhamtari@gmail.com

Received on: 11-01-2025 **Accepted on:** 06-02-2025

Human Metapneumovirus (HMPV), including two cases each in Maharashtra, Karnataka, and Tamil Nadu and one in Gujarat. HMPV is known to cause both upper and lower respiratory tract infections in individuals of all ages. However, young children, the elderly, and individuals with compromised immune systems are at heightened risk for developing severe illness due to the virus.

The Centers for Disease Control and Prevention (CDC) highlights that common symptoms of HMPV include cough, fever, nasal congestion, and shortness of breath. Clinical symptoms of HMPV infection may progress to bronchitis or pneumonia and are similar to other viruses that cause upper and lower respiratory infections. The estimated incubation period is 3 to 6 days (1). The disease spectrum ranged from mild upper respiratory tract disease to severe bronchiolitis and pneumonia[5]. HMPV has garnered attention due to its role in causing lower respiratory tract infections, particularly in vulnerable populations such as young children, the elderly, and immunocompromised individuals.

Clinical Manifestations of HMPV Infections

HMPV infections typically present with symptoms similar to other respiratory viruses, such as cough, fever, nasal congestion, and shortness of breath. In severe cases, it can lead to bronchiolitis, pneumonia, or acute respiratory distress syndrome (ARDS), especially in infants, the elderly, and those with underlying health conditions. In immunocompromised individuals, HMPV can be particularly challenging to manage and may result in prolonged illness or hospitalization[6]. Most HMPV infections occur in the winter and spring months[7], with transmission primarily via respiratory droplets. It is highly contagious and can spread through close contact with infected individuals or contaminated surfaces.

Epidemiology and Transmission

HMPV has a worldwide distribution and is a significant cause of viral respiratory infections, particularly in children and the elderly. The virus is most commonly associated with upper respiratory infections (URI), but in vulnerable populations, it can result in severe lower respiratory tract infections (LRTI). Outbreaks of HMPV occur seasonally, with peak activity typically in the colder months, although the virus can circulate year-round in certain regions.

The primary route of transmission is person-to-person through respiratory droplets, though the virus can also spread by direct contact with contaminated surfaces[8-10]. People infected with HMPV can transmit the virus before showing symptoms, which makes controlling its spread challenging in both hospital and community settings. The HMPV Virus can be Detected by reverse transcriptase-PCR (RT-PCR) assay, which is the most sensitive method for diagnosing HMPV infection.[6]

The Role of Nurses in the Hospital Setting

Nurses play a vital role in the management of HMPV infections in the hospital. Their responsibilities include patient assessment, supportive care, infection control, and family education. The following outlines key areas where nurses contribute significantly to the care of HMPV patients:

1. **Early Detection and Assessment:** Nurses are often the first point of contact for patients and have a critical role in recognizing early symptoms of HMPV infection. They monitor vital signs, assess respiratory function, and track changes in the patient's condition. Nurses are instrumental in identifying signs of respiratory distress, such as tachypnoea, hypoxia, and increased work of breathing, which may require urgent interventions like supplemental oxygen or mechanical ventilation.
2. **Infection Control Measures:** Strict infection control practices are essential to prevent the spread of HMPV, particularly in the hospital environment where the virus can spread rapidly. Nurses enforce measures like wearing personal protective equipment (PPE), practising proper hand hygiene, and ensuring the isolation of patients who are infected. Additionally, nurses educate patients and visitors about hygiene practices and respiratory etiquette to prevent transmission.
3. **Providing Supportive Care:** There is currently no specific antiviral treatment for HMPV, so care is generally supportive. Nurses play a crucial role in managing symptoms, which may include administering fluids to prevent dehydration, providing antipyretics to manage fever, and assisting with respiratory therapies such as nebulization and chest physiotherapy. Nurses may also assist with the management of patients on ventilators or in intensive care units.
4. **Patient and Family Education:** Nurses provide essential education on the nature of the illness, preventive measures, and potential complications. They explain the importance of hand hygiene, cough etiquette, and the need

for vaccination when appropriate. In addition, nurses offer emotional support to families, guiding them through the patient's care and explaining treatment options and prognosis.

5. **Monitoring for Complications:** Nurses are responsible for closely monitoring patients for complications such as secondary bacterial infections, respiratory failure, or pneumonia. If complications arise, nurses collaborate with the multidisciplinary healthcare team to adjust treatment plans, administer antibiotics, or implement advanced interventions.

The Role of Nurses in the Community Setting

Nurses in the community setting have a unique opportunity to impact the prevention and early detection of HMPV infections. Their roles include education, surveillance, and early intervention:

1. **Health Promotion and Education:** Nurses in the community setting educate individuals, families, and communities about the prevention of respiratory infections, including HMPV. This includes promoting practices like regular hand washing, covering coughs, and avoiding close contact with infected individuals. Nurses may also be involved in community health campaigns that emphasize the importance of flu vaccines and the role of hygiene in disease prevention.
2. **Early Detection and Referral:** Community nurses are often the first healthcare providers to identify signs of illness in individuals who may be at risk for HMPV infection. They help in the early recognition of symptoms, especially among high-risk groups such as infants, elderly individuals, and those with chronic diseases. Nurses are critical in referring patients for appropriate testing and care, ensuring timely interventions to prevent complications.
3. **Supporting At-Risk Populations:** Community nurses often work closely with high-risk populations, such as the elderly and those with compromised immune systems, providing them with education on how to protect themselves from HMPV. They also monitor the home environment, ensuring that individuals who are ill are supported in managing symptoms and accessing appropriate medical care if needed.
4. **Preventing the Spread of Infection:** Community nurses help prevent the spread of HMPV by encouraging vaccination, providing information on the importance of staying home when sick and guiding families on how to minimize the risk of transmission within households and the community.

Conclusion

Human Metapneumovirus (HMPV) is a significant cause of respiratory illness, with the potential to lead to severe complications in vulnerable populations. Nurses, both in hospital and community settings, play a critical role in managing, preventing, and educating about HMPV. Their responsibilities range from early detection and assessment to providing supportive care, implementing infection control measures, and educating the public. Nurses' ability to deliver compassionate, evidence-based care is central to mitigating the impact of HMPV and improving health outcomes for those affected by this virus. The expertise and commitment of nurses in managing HMPV infections not only contribute to better patient outcomes but also play an integral role in controlling the spread of this virus in the broader community.

REFERENCES

1. CDC: Centers for Disease Control and Prevention. About Human Metapneumovirus. CDC: Centers for Disease Control and Prevention. [Online] April 11, 2024. [Cited: January 11, 2025.] https://www.cdc.gov/human-metapneumovirus/about/index.html#:~:text=Human%20metapneumovirus%20(HMPV)%20can%20cause%20upper%20and%20lower%20respiratory%20disease,respiratory%20syncytial%20virus%20(RSV)..
2. A newly discovered human pneumovirus isolated from young children with respiratory tract disease. van den Hoogen BG, de Jong JC, Groen J, Kuiken T, de Groot R, Fouchier RA, Osterhaus AD. 6, Jun 2001, Nat Med. , Vol. 7, pp. 719-24. .
3. Genetic diversity between human metapneumovirus subgroups. Biacchesi S, Skiadopoulos MH, Boivin G, Hanson CT, Murphy BR, Collins PL, Buchholz UJ. 1, October 10, 2003, Virology, Vol. 315, pp. 1-9.
4. Mandayam, Nithya. First HMPV Cases in India -Two Bangaluru infant Positive. The Economic Times. [Online] The Economic Times, January 07, 2025. [Cited: January 11, 2025.] https://timesofindia.indiatimes.com/city/bengaluru/8-month-old-baby-tests-positive-for-hmpv-in-bengaluru/articleshow/116982378.cms.
5. First Detection of Human Metapneumovirus in Children with Acute Respiratory Infection in India: a Preliminary Report. Rao BL, Gandhe SS, Pawar SD, Arankalle VAShah SC, Kinikar AA. 12, 2004, Journal of Clinical Microbiology, Vol. 42.

6. Human metapneumovirus in adults. Haas LE, Thijsen SF, van Elden L, Heemstra KA. 1, January 8, 2013, Viruses, Vol. 5, pp. 87-110.
7. Epidemiology of human metapneumovirus. JS., Kahn. 3, July 2006, Clin Microbiol Rev. , Vol. 19, pp. 546-57.
8. An outbreak of human metapneumovirus infection in hospitalized psychiatric adult patients in Taiwan. Tu C.C., Chen L.K., Lee Y.S., Ko C.F., Chen C.M., Yang H.H., Lee J.J. 5, 2009, Scand. J. Infect. Dis., Vol. 41, pp. 363–367.
9. Molecular epidemiological investigation of a nosocomial outbreak of human metapneumovirus infection in a pediatric hemato-oncology patient population. . Kim S, Sung H, Im HJ, Hong SJ, Kim MN. 4, Apr; 2009, J Clin Microbiol. , Vol. 47, pp. 1221–1224.
10. An outbreak of severe respiratory tract infection caused by human metapneumovirus in a residential care facility for elderly in Utrecht, the Netherlands, January to March 2010. . Te Wierik MJ, Nguyen DT, Beersma MF, Thijsen SF, Heemstra KA. 13, March 29, 2012, Euro Surveill., Vol. 17.
11. Human metapneumovirus (hMPV) infection. World Health Organisation. [Online] World Health Organisation, January 10, 2025. [Cited: January 11, 2025.] https://www.who.int/news-room/questions-and-answers/item/human-metapneumovirus-(hmpv)-infection.