

Rotavirus outbreak in hospital: A lesson learnt

Logapragash Kandasamy, MD, Hairul Izwan Abdul Rahman, MPH, Mohd Adni Fazlil Bin Alias, BEHOH, Nurliyana Najihah Salleh, DEH

Larut, Matang and Selama District Health Office, Taiping, Perak, Malaysia

SUMMARY

This case report presents an outbreak of rotavirus infection in a hospital paediatric ward, with five laboratory-confirmed cases identified among paediatric patients. The sixth case had an epidemiological link with the affected patients. This report highlights the importance of prompt identification, appropriate management, and adherence to infection control measures to prevent the spread of rotavirus in healthcare settings.

INTRODUCTION

Rotavirus is a highly contagious viral infection primarily affecting infants and young children, characterised by severe diarrhoea and vomiting. Rotavirus is common, accounting for 35 to 60% of acute severe diarrhoea in children < 5 years of age in countries without rotavirus vaccine, with the highest attributable percentage in infants.^{1,2} Rotavirus has a case-fatality rate (CFR) of approximately 2.5% among children in developing countries who present to health facilities². This CFR is higher in areas without good access to health care. In 2013, rotavirus caused an estimated 215 000 deaths worldwide³⁻⁵. It imposes a significant burden of disease globally, with substantial morbidity and mortality, particularly in developing nations.⁶ The transmission of rotavirus commonly occurs through the faecal-oral route, and outbreaks can rapidly propagate in settings where individuals, especially young children, are in close proximity.⁷ Although outbreaks in healthcare facilities have been reported, limited literature exists documenting the spread of rotavirus within healthcare staff in paediatric wards.

Studies published during the past 20 years have documented that in Malaysia, the range of the proportion of hospitalisations due to rotavirus-associated acute gastroenteritis was 28 to 43%,⁸ and, in the only community-based rotavirus study in Malaysia, rotavirus was detected in 12% of children seen for acute gastroenteritis.^{9,10} Paediatric wards in healthcare settings play a critical role in managing and treating various illnesses, including rotavirus gastroenteritis, among children. The transmission of rotavirus among healthcare staff in these wards not only pose a risk to the affected staff members but also increases the likelihood of secondary infections among vulnerable patients. Understanding the dynamics of rotavirus spread within healthcare staff is crucial for implementing appropriate preventive measures and controlling outbreaks.

This case report aims to describe a cluster of rotavirus infections among paediatric patients in a paediatric ward and to highlight potential risk factors contributing to its

spread. The report underscores the significance of adherence to infection control practices, including hand hygiene and appropriate personal protective equipment (PPE) usage, to prevent rotavirus transmission within healthcare settings.

To the best of our knowledge, limited published data exists on similar outbreaks involving rotavirus transmission among healthcare staff in paediatric wards. By documenting this case and sharing our findings, we seek to raise awareness regarding the importance of implementing preventive strategies and reinforcing infection control measures to mitigate the spread of rotavirus within healthcare facilities.

CASE REPORT

Larut Matang & Selama District Health Office had received few rotavirus case notifications on 25th July 2022 where four cases were notified from paediatric ward in a hospital. All the cases experienced clinical signs and symptoms of acute gastroenteritis (AGE). On 27th July 2022 at 1715H, we received another rotavirus case notification involving a 5-month child from same ward. On 1st August, another case was notified from the same ward, resulting in a total of six cases of the AGE cluster (Figure 1). Further history taking, noted that the sixth case had no history of recent admission in the ward but the son to the staff nurse who worked in the same ward and had dealt with all the previous five rotavirus positive cases.

A retrospective analysis was conducted to investigate the rotavirus outbreak in the paediatric ward. Data were collected from medical records, laboratory reports and infection control logs. The demographic information, clinical presentation and laboratory confirmation of rotavirus infection was recorded for each case. In addition, the staff nurse's involvement and potential exposure to the infected patients were examined.

Surrounding swab (baby weighing scale) was done on 26th July 2022. Water sampling activities were also carried out on 1st August 2022 from baby room tap water, patient pantry tap water and nurse counter tap water. All water samples were sent to the National Public Health Laboratory Sungai Buloh (MKAK) on 2nd August 2022 for analysis purpose. Active Case Detection (ACD) activities were carried out from 2nd August 2022 onwards involving all patients, caretakers and staffs in the paediatric ward. Caretakers and staffs refused to provide sample as they had been asymptomatic during ACD activities. Further investigation revealed that the mother of the sixth case was a staff nurse who had directly handled the previous five rotavirus cases. She did not reveal to have had symptoms of AGE but recorded as asymptomatic at the time of ACD. Thus, no sample was taken from her for testing.

This article was accepted: 05 July 2023

Corresponding Author: Logapragash Kandasamy

Email: logatechcorporation@yahoo.com

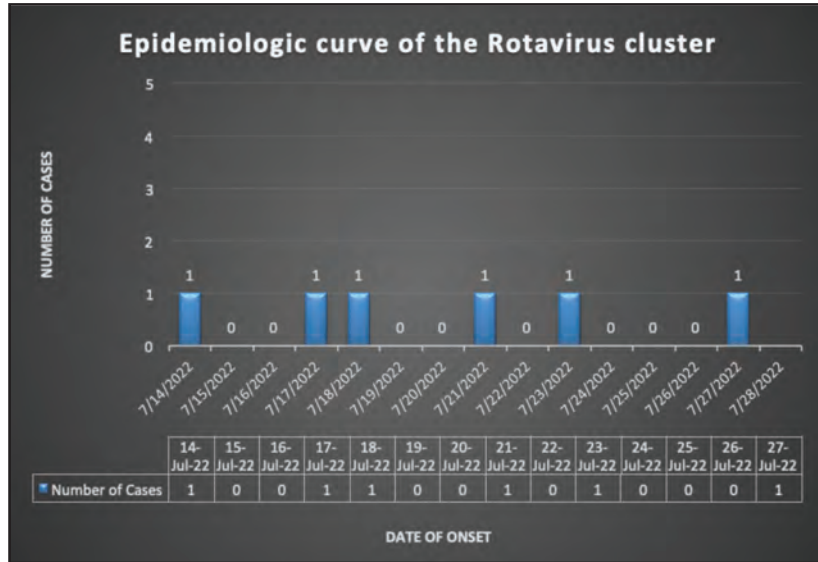


Fig. 1: Epidemiologic curve of the rotavirus cluster

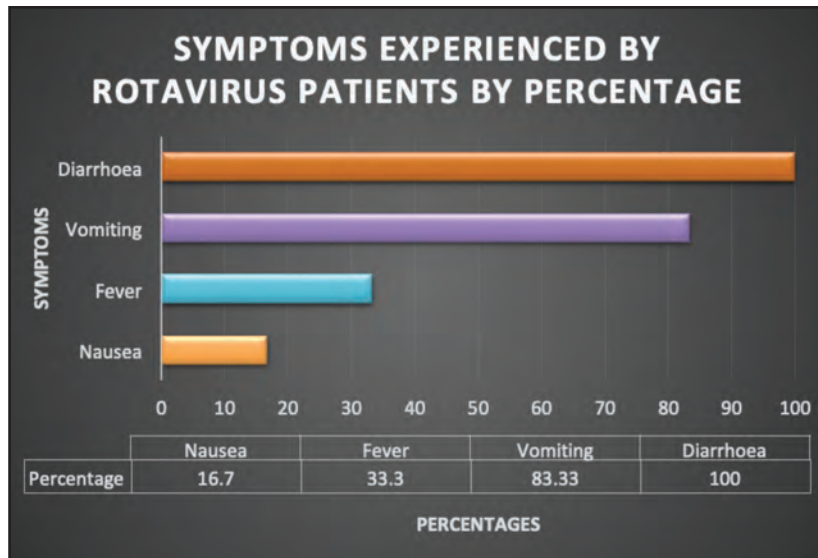


Fig. 2: Symptoms experienced by rotavirus patients by percentage

This paediatric ward consists of three zones, which were red, yellow and green zones. There is a high dependency unit (HDU) situated in the red zone of this ward with maximum capacity of four beds at a time. There was a total of 127 people in this ward at the time of investigation, namely seven doctors, 35 nurses, seven attendants, 39 patients and 39 caretakers.

The symptoms, which were experienced by AGE cases, included diarrhoea (100%), vomiting (83.33%), fever (33.3%) and nausea (16.67%) as shown in Figure 2. Results from water samples (baby room tap water, patient pantry tap water, nurse station tap) were negative (rotavirus A not detected). Result from surrounding swab (baby weighing scale) taken on 26th July 2022 was also negative (rotavirus A not detected).

DISCUSSION

The ACD activity in the ward found that no staff had symptoms of AGE throughout the incubation period. However, a nurse had symptoms of AGE starting from 27th July 2022 but did not seek any treatment and was not screened for rotavirus. The nurse had contacted with five rotavirus cases on rotation basis. Furthermore, this nurse's son started showing symptoms of AGE on 31st July 2022 and was admitted to the same ward and confirmed to be infected with rotavirus on the same day. The sixth case was likely to have been infected by his mother.

The analysis of environmental swab samples (the baby weighing machine, and water samples) did not detect the presence of rotavirus A. It might be due to the hospital regularly carrying out disinfection activities and the water supply is treated water from *Lembaga Air Perak* (LAP).

This cluster incident is probably caused by poor hand washing practice by staffs in the ward concerned. However, no hand swab samples, or other environmental samples were taken. Therefore, the cause of this infection was not identified. According to records, health education and monitoring of hand hygiene skills and practices by all members in the paediatric ward were done periodically. All positive cases had also been isolated to special wards or cubicles to isolate cases from other patients in the ward. All caregivers and staffs were reminded not to share toys among patients. In addition, sanitation and disinfection activities would be monitored by ward supervisors to ensure that they were carried out regularly and according to the schedule. All visitors were also reminded to wash their hands first before visiting patients in the ward.

The spread of rotavirus infections in healthcare facilities, including paediatric wards, poses a significant risk to vulnerable populations, particularly young children. This case report highlights the importance of implementing preventive measures to control the transmission of rotavirus, emphasising the need for rotavirus vaccination among children in Malaysia.¹¹ Rotavirus vaccines have demonstrated efficacy in reducing the incidence and severity of rotavirus gastroenteritis worldwide.^{7,12} However, despite the availability of safe and effective vaccines, rotavirus vaccination coverage in Malaysia remains suboptimal. Increasing vaccine uptake among children is crucial to prevent the spread of rotavirus diseases, not only in the community but also within healthcare facilities.

In healthcare settings, where children may be more susceptible to infections due to underlying conditions or weakened immune systems, the introduction of rotavirus vaccines can help mitigate the risk of outbreaks and protect both patients and healthcare providers. By reducing the number of rotavirus cases among children, the overall burden of disease can be decreased, leading to a decrease in hospital admissions, healthcare costs and the potential for nosocomial transmission.

Hand swab/rectal swab from caretakers/staffs were not sampled to prove the link or cause of the cluster due to the period of asymptomatic and poor cooperation from them.

CONCLUSION

The outbreak of rotavirus infections in the hospital paediatric ward emphasises the need for stringent infection control measures. Early identification of cases, prompt testing, proper isolation precautions and adherence to hand hygiene protocols are vital to prevent the spread of rotavirus in healthcare facilities. Staff education and awareness programs should be implemented to reinforce the importance of disclosing symptoms and following appropriate infection control practices.

The implementation of routine rotavirus vaccination programs in Malaysia should be a priority, targeting all the eligible children. This should include educating healthcare providers, parents and caregivers about the benefits and

safety of rotavirus vaccines, addressing any concerns or misconceptions they may have. By promoting rotavirus vaccination among children, particularly in healthcare settings, Malaysia can significantly reduce the burden of rotavirus infections, minimise the risk of outbreaks and protect the health and well-being of the population.

CONFLICTS OF INTEREST

This research has no conflicts of interests.

ETHICAL CLEARANCE

Ethical clearance has been obtained from NMRR Secretariat. (NMRR ID-22-02692-BYR). Parent's consent were gained for the publication of this case report.

ACKNOWLEDGEMENTS

The authors would like to thank Director-General of Health Malaysia for his permission to publish this article.

REFERENCES

- Mwenda JM, Ntoto KM, Abebe A, Enweronu-Laryea C, Amina I, Mchomvu J, et al. Burden and epidemiology of rotavirus diarrhea in selected African countries: preliminary results from the African Rotavirus Surveillance Network. *J Infect Dis* 2010; 202 Suppl: S5-S11.
- Kotloff KL, Nataro JP, Blackwelder WC, Nasrin D, Farag TH, Panchalingam S, et al. Burden and aetiology of diarrhoeal disease in infants and young children in developing countries (the Global Enteric Multicenter Study, GEMS): a prospective, case-control study. *Lancet* 2013; 382(9888): 209-22.
- Tate JE, Burton AH, Boschi-Pinto C, Parashar UD; World Health Organization-Coordinated Global Rotavirus Surveillance Network. Global, regional, and national estimates of rotavirus mortality in children <5 years of age, 2000–2013. *Clin Infect Dis* 2016; 62 Suppl 2: S96-105.
- Hamborsky J, Kroger A, Wolfe S; Centers for Disease Control and Prevention. Rotavirus. Epidemiology and prevention of vaccine-preventable diseases. 13th Edition. Public Health Foundation; 2015: 353–70.
- Centers for Disease Control and Prevention. Guidelines for prevention and control of nosocomial infections. *MMWR Recommendations and Reports* 2002; 51(RR-10): 1-45.
- Estes MK, Kapikian AZ. Rotaviruses. In: Knipe DM, Howley PM, Cohen JI, et al., Editors. *Fields virology*. 6th Edition. Wolters Kluwer Health/Lippincott Williams & Wilkins; 2013: 1347-401.
- World Health Organization. Rotavirus vaccines: WHO position paper – January 2013. *Wkly Epidemiol Rec* 2013; 88(5): 49–64.
- WHO Vaccine-Preventable Diseases Surveillance Standards, 2018
- Yap KL, Sabil D, Muthu PA. Human rotavirus infection in Malaysia. A hospital-based study of rotavirus in children with acute gastroenteritis. *J Trop Pediatr* 1984; 30: 131-5.
- Yap KL, Yasmin AM, Wong YH, Ooi YE, Tan SC, Jegathesan M, et al. A one year community-based study on the incidence of diarrhoea and rotavirus infection in urban and suburban Malaysian children. *Med J Malaysia* 1992; 47: 303-8.
- Goh CT, Cheah PK, Soo TL, Lee WS. The Epidemiology and Burden of Childhood Rotavirus Infection in a Tertiary Hospital in Sabah, Malaysia. *Med J Malaysia* 2009; 64(2).
- Gray J, Dagan R. Rotavirus vaccines: safety, efficacy and public health impact. *J Intern Med* 2011; 270(3): 206-14.