

Risk of Respiratory Tract Infection Transmission in The Hajj Organizing Committee at the Surabaya Pilgrimage Quarantine

Isna Rohmatul Umah^{1*}, Christyaji Indradmojo¹, Full Name²

¹. Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Maulana Malik Ibrahim, Malang

email: isnarohmatulumah@gmail.com

ABSTRACT

Acute Respiratory Tract Infections (RTIs) are among the most common illnesses occurring during the Hajj pilgrimage, particularly in crowded environments such as during the debarkation phase. Transmission occurs through droplets or airborne and can affect not only pilgrims but also Hajj organizing committee members (PPIH) who interact directly with them. The risk of infection is high due to close contact, high population density, and inconsistent use of personal protective equipment. This study aims to describe the occurrence of RTIs among PPIH members at the Surabaya Debarkation and identify preventive measures to minimize the risk of transmission. This descriptive observational case study involved hajj organizing committee members who presented with respiratory complaints at the Hajj Dormitory Clinic in Sukolilo, Surabaya, during June 12–July 12, 2025. Examinations included temperature measurement using a thermogun, assessment of vital signs, and interviews regarding respiratory symptoms such as cough, cold, and fever. A total of 20 respondents were reported with RTI symptoms, most of whom were aged 30–40 years (45%) and worked in logistics (30%) or reception (25%). Most respondents experienced symptoms for 1–2 days (50%), indicating mild and self-limiting infections. The main risk factors for RTIs transmission among committee include overcrowding, poor ventilation, and direct contact without adequate protection. Preventive measures should include complete vaccination (influenza, COVID-19, and pneumococcal for high-risk individuals), proper personal protective equipment use (medical/N95 masks, gloves, face shields), hand hygiene, cough etiquette, regular disinfection, and health screening before and after duty.

Key words: Acute Respiratory Tract Infections, Hajj Organizing Committee, preventive



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INTRODUCTION

Acute Respiratory Tract Infections (RTIs) are among the most common health issues affecting pilgrims during the Hajj pilgrimage, where high population density facilitates rapid disease transmission. RTIs primarily spread through respiratory droplets and airborne aerosols, which are emitted when infected individuals cough, sneeze, or talk (Springer, 2021). Droplet transmission occurs over short distances (<2 m) as larger particles (>5 µm) quickly settle on surfaces, while airborne transmission involves smaller particles (<5 µm) that can remain suspended in the air for extended periods, travel longer distances, and reach the lower respiratory tract—especially in crowded settings with poor ventilation. Environmental factors such as humidity, temperature, and airflow significantly affect particle persistence and dispersion.

Common RTI symptoms include cough, cold, fever, and shortness of breath, particularly among individuals with comorbidities or compromised immunity (Mahdi, 2021). Despite strict health protocols implemented during the COVID-19 pandemic—including mask use, hand hygiene, and vaccination—cohort and survey studies revealed that pilgrims continued to experience respiratory symptoms (Assessment of Knowledge, 2019). For instance, a 2021 surveillance study reported that 4.7% of 510 pilgrims exhibited at least one RTI symptom, such as cough or sore throat (Mahdi, 2021), indicating that even comprehensive preventive measures cannot completely eliminate infection risk in large gatherings.

Healthcare workers and the Hajj Organizing Committee (PPIH) are also at elevated risk due to frequent contact with symptomatic pilgrims, particularly during arrival and debarkation phases. A post-Hajj survey in 2021 found that, despite widespread COVID-19 vaccination, many pilgrims still presented RTI symptoms after returning home (Mahdi HA, 2022). The PPIH plays a critical role in health screening at debarkation, identifying symptoms such as cough, cold, and fever, ensuring the availability of basic medical facilities at Hajj dormitories, and managing pilgrim flow to reduce transmission. However, environmental challenges, including overcrowding, suboptimal ventilation, and inconsistent use of personal protective equipment, further heighten infection risk.

Moreover, research indicates that healthcare workers serving pilgrims experience higher rates of respiratory illness compared to those not directly involved in Hajj activities. A cohort study from the 2015 Hajj season found that 29.3% of healthcare workers developed respiratory symptoms during or after Hajj, and 14.7% tested positive for rhinovirus, compared with only 3.4% among the non-exposed control group (Yezli, 2019). This evidence highlights the substantially increased risk of infection among Hajj health personnel and underscores the importance of enhanced infection control, adequate preventive measures, and personal protective equipment for all staff engaged in Hajj operations.

METHODS

This observational case study was conducted to assess cases of respiratory tract infections (RTIs) among members of the Hajj organizing committee who presented with respiratory symptoms at the Hajj Dormitory Clinic in Surabaya. The study took place between June 12 and July 12, 2025, aligning with the arrival period of returning pilgrims at the Sukolilo Hajj Dormitory, Surabaya. During this time, committee members who were involved in various operational tasks including health services, logistics, administration, and security were evaluated when they reported symptoms suggestive of RTI. Each participant underwent a clinical examination, including temperature measurement using a thermogun and vital sign assessment (pulse rate, blood pressure, and respiratory rate). The predominant clinical complaints identified among the subjects were fever, cough, and nasal congestion or cold, which are consistent with typical manifestations of upper respiratory tract infections.

RESULT AND DISCUSSION

During the debarkation period, a total of 20 members of the Hajj Organizing Committee (PPIH) sought medical attention at the Hajj Dormitory Clinic in Sukolilo, Surabaya, presenting with respiratory complaints such as fever, cough, and cold. Each respondent was subsequently categorized based on their occupation, age group, and duration of symptoms to better understand the distribution and possible risk factors associated with the onset of respiratory illness.

No	Characteristics	Respondent (n = 20)
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		Frequency	%
1.	Respondents' Age		
	20 – 30 years	5	25%
	30 – 40 years	8	40%
	40 – 50 years	7	35%
2.	Occupation		
	Security	4	20%
	Administration	3	15%
	Logistics	6	30%
	Medical staff	2	10%
	Reception	5	25%
3.	Lama gejala		
	1- 2 days	10	50%
	2– 3 days	7	35%
	>3 days	3	15%

The table illustrates that the majority of respondents were in the 30–40-year age group (45%), followed by those aged 40–50 years (35%) and 20–30 years (25%). This distribution indicates that most participants were within the productive working-age range, typically associated with high physical activity levels and frequent field exposure. Individuals in this age group are often responsible for operational and supervisory duties, which may involve extensive interaction with pilgrims and fellow staff members, thereby increasing their risk of exposure to respiratory infections.

When classified by occupation, the largest proportion of respondents (30%) were from the logistics division, followed by reception staff (25%), security officers (20%), administrative personnel (15%), and healthcare staff (10%). This occupational distribution highlights an important finding: the risk of respiratory tract infection (RTI) transmission during the Hajj is not limited to healthcare workers, but also significantly affects non-medical staff. These non-medical roles often require frequent face-to-face interaction with pilgrims, handling baggage, documents, or crowd control, which facilitates close contact and possible droplet transmission. This suggests that infection control measures should be implemented comprehensively across all divisions, not only within medical teams.

In terms of symptom duration, the majority of respondents (50%) reported experiencing symptoms for 1–2 days, followed by 35% who reported symptoms lasting 2–3 days, and only 15% who experienced symptoms for more than 3 days. This pattern suggests that most cases were mild, self-limiting respiratory infections, likely caused by common viral agents such as rhinoviruses or other nonspecific upper respiratory pathogens. The Hajj pilgrimage is one of the world's largest mass gatherings, attended by more than two million pilgrims annually. The risk of respiratory virus transmission is very high due to overcrowding in areas such as the Tawaf and pilgrims' accommodations (Benkouiten, 2019).

This study reported 20 cases of PPIH members presenting with RTIs symptoms, most of which were short in duration (1–2 days). These findings align with cohort surveillance data from the 2021 Hajj, which reported that 4.7% of pilgrims experienced at least one respiratory symptom (e.g., cough or sore throat) in the week following the Hajj rituals, with most cases being mild and self-limiting



(Mahdi HA, 2022). Non-medical staff (logistics, reception, and security) showed a higher prevalence of symptoms than medical staff. This aligns with previous literature suggesting that not only healthcare workers but all personnel with direct interaction with pilgrims are at high risk of respiratory infections, particularly when infection prevention measures are inconsistently implemented (Mahdi HA, 2022).

During the debarkation phase, the logistics and reception divisions play essential roles in managing arrivals, handling equipment, and distributing supplies. However, this phase also carries a high risk of RTI transmission (Kemenkes RI, 2023). Major risk factors include overcrowding in dormitory and waiting areas, direct contact during luggage handling and meal distribution, poor ventilation in storage areas, and inconsistent personal protective equipment use.

Preventive strategies should include full vaccination (meningitis, influenza, COVID-19, and pneumococcal for high-risk individuals), pre-duty health screening, infection prevention training, PPE use (masks, gloves, face shields), and regular disinfection of workspaces (World Health Organization, 2023). During duty, staff should wear medical or N95 masks, wash hands or use alcohol-based sanitizers after contact with pilgrims or belongings, and practice cough etiquette (CDC, 2023).

Post-duty measures include proper personal protective equipment removal, personal hygiene (showering and changing clothes), and self-health monitoring for 14 days after service. Staff with respiratory symptoms should promptly report to the Hajj medical team or nearest health facility. Adequate rest, proper nutrition, and hydration are also essential to maintain immunity (WHO, 2023).

CONCLUSION

The Hajj Organizing Committee (PPIH), particularly those in logistics and reception, faces a high risk of Acute Respiratory Tract Infection (RTI) due to frequent direct contact with pilgrims, overcrowded environments, and high mobility during the debarkation process. Comprehensive prevention efforts—including vaccination, consistent use of PPE such as medical or N95 masks, physical distancing, good ventilation, and routine health monitoring—are crucial to minimize infection risk. Health education and intersectoral coordination among PPIH, the Ministry of Health, and the Port Health Office (KKP) are key to maintaining the health and safety of both pilgrims and staff during the repatriation phase.

REFERENCES

- Assessment of Knowledge, Attitude and Practice towards Prevention of Respiratory Tract Infections among Hajj and Umrah Pilgrims from Malaysia in 2018 (2019) International Journal of Environmental Research and Public Health, 16(22), p. 4569.
- Centers for Disease Control and Prevention (CDC) (2023) Guidelines for the Prevention of Respiratory Infections during Mass Gatherings. Atlanta: U.S. Department of Health and Human Services.
- Kementerian Kesehatan Republik Indonesia (2024) Pedoman Kesehatan Penyelenggaraan Ibadah Haji dan Umrah Tahun 2024. Jakarta: Direktorat Jenderal Pencegahan dan Pengendalian Penyakit.
- Mahdi, H.A., Qashqari, F.S., Hariri, S.H., Bamerdah, S., Altayyar, S.A., Almalki, H.M. et al. (2022) 'Low prevalence of syndromic respiratory tract infections among returning Hajj pilgrims amidst the COVID-19 pandemic: A post-Hajj survey', Tropical Medicine and Infectious Disease, 7(8), p. 182. doi:10.3390/tropicalmed7080182.

Mahdi, H.A., Rashid, H., Qashqari, F.S., Hariri, S.H., Marglani, O.A., Barasheed, O. et al. (2022)



‘Syndromic surveillance of respiratory-tract infections and hand hygiene practice among pilgrims attending Hajj in 2021: A cohort study’, BMC Infectious Diseases, 22(1), p. 578. doi:10.1186/s12879-022-07559-0.

Springer Environmental Science and Pollution Research. (2023). Aerosol behavior and airborne transmission in indoor environments. <https://link.springer.com/article/10.1007/s10311-023-01579-1>

World Health Organization (WHO) (2023) Public Health for Mass Gatherings: Key Considerations. Geneva: World Health Organization.

Yezli, S., Alotaibi, B., Al-Abdely, H., Balkhy, H.H., Yassin, Y. et all. (2019) ‘Acquisition of respiratory and gastrointestinal pathogens among health care workers during the 2015 Hajj season’, American Journal of Infection Control, 47(9), pp. 1071–1076. doi:10.1016/j.ajic.2019.02.033