

Original Research Article

HEALTH QUARANTINE AS PILGRIM RISK CONTROL DURING THE 2026 HAJJ EMBARKATION PHASE

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ABSTRACT

Introduction. The Hajj pilgrimage is among the largest *religious mass gatherings* globally, in which the embarkation phase serves as the final health risk control point before pilgrims depart for Saudi Arabia, integrating health examination, *istithaah* assessment, fitness to fly determination, vaccination, environmental sanitation, and catering oversight as a unified safety system. **Method.** This study applied an integrative literature review with descriptive document analysis using two official 1447 H/2026 Hajj embarkation surveillance documents from the Directorate of Surveillance and Health Quarantine, Ministry of Health of the Republic of Indonesia, supplemented by peer-reviewed literature. Analysis combined descriptive statistics, content analysis, narrative synthesis, and cross-document triangulation. **Result & Analysis.** All twenty embarkation units reported through SINKARKES at full compliance, covering over five hundred flight groups and more than two hundred thousand registered pilgrims. Most pilgrims carried comorbid conditions, yet the majority were classified as eligible or eligible with accompaniment under the *istithaah* framework. Illness and hospitalisation were the dominant reasons for deferred and cancelled departures. Vaccination occurred primarily at the region of origin, while environmental sanitation and catering inspections achieved full compliance across all units. **Discussion.** The embarkation phase functions as a structured pre-event risk control mechanism within the *mass gathering health* framework, wherein health examination, aggregate surveillance, vaccination verification, and environmental and food safety oversight collectively constitute a comprehensive instrument of pilgrim safety prior to international departure.

Keywords: *Embarkasi, Health Quarantine, Istithaah, Mass Gathering Health, Hajj Pilgrims*

INTRODUCTION

The Hajj pilgrimage constitutes one of the largest religious mass gatherings in the world, bringing together millions of people from diverse nations within a setting defined by high spatial density, intensive ritual activity, and compressed timelines. In such conditions, pilgrim health cannot be separated from the risks of communicable diseases, non-communicable diseases, physical injuries, fatigue, environmental stressors, and the sustained demand for coordinated health monitoring systems (Parker *et al.*, 2024). Academic literature on Hajj health has predominantly concentrated on vaccination coverage, infectious disease patterns, hospitalisation trends, pilgrim health behaviour, and health system capacity in managing large-scale human mobility (Sweileh, 2022). While these themes remain important, they reflect a persistent tendency to examine pilgrim health through the lens of risks encountered during ritual performance in Saudi Arabia, leaving the pre-departure period comparatively underexplored as a primary unit of integrated analysis.

In the Indonesian context, the embarkation phase occupies a particularly critical position within the Hajj health management system. During this phase, pilgrims enter designated dormitories (*asrama haji*), undergo health verification procedures, reside in communal living arrangements, receive catering services, and are prepared for international air travel to Saudi Arabia. Official surveillance data for the 1447 H/2026 Hajj embarkation recorded 14 embarkation/debarkation points and 6 intermediate embarkation/debarkation points, with 20 embarkation units reporting through SINKARKES, the national health

quarantine information system, at a 100% reporting rate. A total of 528 flight groups (*kloter*) were documented, 204,248 pilgrims were registered into dormitories, 204,010 pilgrims departed for Saudi Arabia, and 199 replacement pilgrims were recorded. These figures establish the embarkation phase as a structured population-level risk control space operating immediately before international mobility commences.

The academic and practical urgency of focusing on this phase is reinforced by evidence on pilgrim disease burden and pre-existing health conditions. Recent findings confirm that Hajj pilgrims carry substantial health risks attributable to respiratory disorders, cardiovascular disease, chronic illness, heat stroke, and limited access to health services during the pilgrimage, making pre-departure preventive measures an essential component of pilgrim safety (Saputra *et al.*, 2025). A longitudinal study of South African pilgrims found that baseline health status and comorbid conditions predicted the risk of illness during and after the Hajj, establishing the necessity of systematic pre-departure health data collection to strengthen prevention and post-return follow-up (Mushi *et al.*, 2021). The 2026 embarkation health surveillance infographic further illustrates this health burden, recording 82,298 pilgrims under 60 years of age and 60,454 pilgrims aged over 60 years with comorbid conditions, 456 deferred departures, 246 cancelled departures, 198,455 pilgrims declared fit to fly, and 487 declared unfit to fly. Simultaneously, food safety and sanitation conditions within embarkation dormitories are inseparable from pilgrim safety, as evidence from catering facility inspections during Hajj has shown that food handler

training, facility compliance, hygiene standards, food storage practices, and professional oversight are pivotal in reducing the risk of foodborne illness (Alnafisah *et al.*, 2023).

Conceptually, this study is grounded in the frameworks of *mass gathering health*, health surveillance, health quarantine, *istithaah* assessment, fitness to fly evaluation, and environmental and food safety as an integrated chain of risk control during the embarkation phase. The *mass gathering health* framework positions the Hajj as an event requiring cross-sectoral planning, early detection, service preparedness, and risk mitigation, given that the density and mobility of pilgrims can accelerate disease transmission and exacerbate chronic health conditions (Al-Tawfiq, Kattan and Memish, 2022). Health surveillance is relevant because syndromic monitoring, health data aggregation, and standardised reporting systems can be used to anticipate potential disease events at large-scale religious gatherings (Taheri *et al.*, 2023). Within the framework of vaccination and global health security, Hajj vaccination programmes serve simultaneously as instruments for preventing communicable disease in individuals and as population protection mechanisms during cross-border mobility (Khan *et al.*, 2025). Environmental sanitation and catering safety can be situated within a waterborne and foodborne disease prevention framework, as studies among Hajj pilgrims have demonstrated that gastrointestinal symptoms remain associated with food and water safety practices during the pilgrimage (Yezli *et al.*, 2021). The Haddon matrix and combined risk model further classify health examination, *istithaah* determination, vaccination, sanitation oversight, and

catering inspection as pre-event prevention instruments targeting the interaction of human factors, environmental conditions, and disease agents across the phases before, during, and after the pilgrimage (Almuzaini *et al.*, 2025).

A review of existing literature reveals a gap that this article directly addresses. Bibliometric analysis of health research on Muslim religious mass gatherings identified dominant themes of pilgrim health behaviour, vaccination, hospitalisation aetiology, and infectious disease epidemiology, while noting that institutional surveillance systems in sending countries remain analytically underdeveloped (Sweileh, 2022). A scoping review of Islamic pilgrimage health mapped findings into the categories of mortality, communicable disease, non-communicable disease, injury, health services, and vaccination, but did not systematically examine pre-departure embarkation surveillance as an integrated risk control mechanism (Wicaksana and Hertanti, 2024). Research on food hygiene and sanitation at the Pondok Gede Hajj Dormitory in Jakarta demonstrated that kitchen inspections, catering guidance, food examinations, and food handler compliance constitute essential components of pilgrim food protection from the pre-embarkation through to the embarkation period, yet such studies remain limited to single sites (Hayati *et al.*, 2024). Studies on catering safety during Hajj in Makkah and Madinah have focused on food service facilities during the pilgrimage rather than on embarkation-phase oversight in the country of origin (Alnafisah *et al.*, 2023). This article addresses these gaps by placing the embarkation phase at the centre of analysis

and integrating official 2026 surveillance data with current scientific literature.

This article aims to describe the implementation of health quarantine and safety measures for Hajj pilgrims during the 2026 embarkation phase across the dimensions of health examination, *istithaah* assessment, fitness to fly determination, vaccination, environmental sanitation, and catering oversight, based on official embarkation surveillance documents. The specific research questions address the principal health examination indicators, the distribution of *istithaah* status and fitness to fly outcomes, the causes of departure deferral and cancellation, the performance outcomes of environmental sanitation and catering surveillance, and the analytical reading of official document findings through the frameworks of *mass gathering health*, health surveillance, health quarantine, and risk management. These questions align with epidemic modelling research that emphasises the value of data and risk simulation as foundations for policy planning at recurrent mass religious events (Alshammari *et al.*, 2025), and with the 2024 Hajj healthcare burden analysis, which highlighted the need for data-driven resource allocation, infection prevention, heat illness management, and targeted interventions for elderly pilgrims and those with chronic disease (Alharbi *et al.*, 2026). The scholarly contribution of this article lies in repositioning the embarkation phase as the primary unit of analysis in Hajj health research, integrating official surveillance data with current literature to establish health quarantine as a comprehensive pre-event instrument of pilgrim safety rather than a routine administrative formality.

METHOD AND ANALYSIS

This study applied an integrative literature review combined with descriptive document analysis. The approach was chosen because the research did not collect primary data through fieldwork, interviews, or questionnaires, but instead drew on official documents as primary secondary data and connected them with peer-reviewed literature to produce a comprehensive analytical reading of the research problem. Integrative reviews are suited to broad and complex topics requiring conceptual synthesis across diverse knowledge sources rather than statistical pooling from homogeneous studies (Sukhera, 2022), while document analysis is recognised as a reliable method for examining policy implementation and health service indicators when data extraction and analysis procedures are applied systematically (Dalglish, Khalid and McMahon, 2021).

The primary data comprised two official documents issued by the Directorate of Surveillance and Health Quarantine, Ministry of Health of the Republic of Indonesia. The first was the *Laporan Pengawasan Embarkasi Jamaah Haji 1447 H/2026 M*, Edition 2 June 2026, containing SINKARKES reporting data across 20 embarkation and debarkation units, covering *kloter* counts, pilgrim registration and departure figures, comorbid conditions, *istithaah* status, vaccination records, deferred and cancelled departures, fitness to fly outcomes, environmental sanitation results, and catering inspection findings. The second was a PDF infographic summarising key embarkation surveillance indicators. Secondary data consisted of peer-reviewed literature on Hajj health, *mass gathering*

health, surveillance, vaccination, food safety, environmental sanitation, and health quarantine, prioritising publications from the preceding five years.

Data collection followed a structured document extraction matrix covering all study dimensions, from pilgrim registration and *istithaah* status through to sanitation and catering outcomes. Literature retrieval used search terms including *Hajj health surveillance*, *mass gathering health*, *health quarantine*, *fit to fly*, *istithaah*, *food safety during Hajj*, and *SINKARKES*. Inclusion criteria for primary data required documents to originate from a relevant health authority, contain aggregate pilgrim and *kloter* indicators, and directly report on the 1447 H/2026 embarkation health surveillance. Inclusion criteria for literature required relevance to Hajj health, *mass gathering*, surveillance, vaccination, food safety, sanitation, or health quarantine, with open-access availability. Documents lacking institutional attribution, individual-level rather than aggregate data, and non-academic popular sources were excluded.

Data analysis combined descriptive statistics, content analysis, narrative synthesis, and document triangulation. Descriptive analysis calculated proportions for key indicators including pilgrim registration, departure, replacement, comorbid conditions, *istithaah* categories, vaccination, deferred and cancelled departures, fitness to fly, sanitation inspection outcomes, and catering compliance. Content analysis grouped findings into the thematic dimensions of health examination, *istithaah*, vaccination, fitness to fly, environmental sanitation, catering services, and health quarantine function. Narrative synthesis connected document findings with the scientific literature on *mass gathering health*,

surveillance, vaccination, food safety, and risk management. Triangulation was conducted by cross-referencing the presentation document and the infographic to confirm consistency across sources. As this study used publicly available aggregate data without individual respondents, no participant consent or personal data collection was required.

RESULTS

Health surveillance for the 1447 H/2026 Hajj embarkation covered 14 embarkation/debarkation points and 6 intermediate embarkation/debarkation points. All 20 embarkation units submitted reports through SINKARKES, yielding a 100% reporting rate across 528 *kloter*. The highest *kloter* counts were recorded at Surabaya (116 *kloter*), Semarang (78), Bandung (68), Soekarno-Hatta (43), and Makassar (42). A total of 204,248 pilgrims were registered into dormitories, 204,010 departed for Saudi Arabia, and 199 replacement pilgrims were recorded. The departure rate relative to dormitory registration was approximately 99.88%, with a recorded difference of 238 pilgrims between those registered and those who departed.

Health examination data revealed that pilgrim composition by age and comorbid status comprised 47,477 pilgrims under 60 years of age without comorbidities, 14,019 pilgrims aged 60 years and above without comorbidities, 82,298 pilgrims under 60 years of age with comorbidities, and 60,454 pilgrims aged 60 years and above with comorbidities. The cumulative total of all four categories was 204,248, consistent with the total number of pilgrims registered into dormitories. Pilgrims with at least one comorbid condition numbered 142,752,

representing approximately 69.89% of total registered pilgrims, while pilgrims without comorbidities numbered 61,496, or approximately 30.11%. Regarding *istithaah* status, 96,834 pilgrims were classified as meeting the requirements, 106,572 as meeting the requirements with accompaniment, 435 as temporarily not meeting the requirements, and 173 as not meeting the requirements. Across the 204,014 pilgrims for whom *istithaah* data were recorded, those classified as eligible or eligible with accompaniment accounted for approximately 99.70% of the total.

The deferred departure indicator recorded 456 pilgrims whose departure was postponed. Documented reasons included illness or hospitalisation (294 cases), pregnancy (5 cases), death (3 cases), and other causes (151 cases), yielding a recorded subtotal of 453 cases against the reported total of 456. Cancelled departures numbered 246 pilgrims, with illness or hospitalisation accounting for 209 cases (approximately 84.96%), pregnancy for 9 cases, death for 3 cases, and other causes for 25 cases. The fitness to fly indicator recorded 198,455 pilgrims as fit to fly and 487 as unfit to fly. Among the 198,942 pilgrims for whom fitness to fly data were recorded, the proportion declared fit was approximately 99.76% and the proportion declared unfit was approximately 0.24%.

On the vaccination indicator, 204,987 pilgrims were vaccinated at their region of origin and 2,226 pilgrims received vaccination at the embarkation dormitory. Combined, these categories yielded a total of 207,213 documented vaccination records, with vaccination at the region of origin accounting for approximately 98.93% and dormitory vaccination for approximately 1.07%. Environmental sanitation inspection results recorded 528

examinations, all of which met established requirements, producing a 100% compliance rate with no non-compliant findings. Catering service inspection results, as reported in the PDF infographic, similarly recorded 100% compliance across 528 inspections for both dormitory sanitation and catering services.

The scientific literature synthesised in this article reflects a range of study designs, including cohort studies, cross-sectional studies, case-control studies, narrative reviews, scoping reviews, systematic reviews, and retrospective analyses based on health service records. A cohort study of the 2021 Hajj examined syndromic surveillance of respiratory tract infections and hand hygiene practices among 510 pilgrims, with 21 of 445 pilgrims who completed follow-up reporting one or more respiratory symptoms (Mahdi *et al.*, 2022). A cross-sectional study of Sudanese pilgrims during the 2025 Hajj recorded 1,130 pilgrims accessing health services, an influenza vaccination coverage rate of 79%, and a lower proportion of influenza-like illness among vaccinated compared to unvaccinated pilgrims (Alshahrani *et al.*, 2025). A retrospective cross-sectional analysis of the 2024 Hajj examined 37,758 adult patient records from outpatient clinics, primary health centres, and hospitals in Mina, Arafat, and Muzdalifah, identifying upper respiratory tract infections as the most frequent diagnosis at 44.6% (Alharbi *et al.*, 2026).

Patterns across the reviewed literature indicate a predominance of themes related to respiratory disease, chronic illness, gastrointestinal disorders, vaccination, and health surveillance needs. A pooled cross-sectional study of Iranian pilgrims from 2013 to 2022 documented variation in

hospitalisation rates, mortality, and health service utilisation by age, sex, and province of origin, with the highest mortality recorded in 2015 and the highest hospitalisation rate in 2019 (Kolivand *et al.*, 2025). A narrative review of religious pilgrimage health identified the Hajj and Arbaeen as the largest Muslim mass pilgrimages and noted consistent associations with respiratory infections, heat-related illness, and crowd-related events (Parker *et al.*, 2024). A study applying the Haddon Matrix and Combined Model to Hajj morbidity grouped determinants into pre-event, during-event, and post-event phases across the categories of human factors, environmental conditions, and disease agents (Almuzaini *et al.*, 2025). A scoping review of Islamic pilgrimage to Makkah identified 36 articles encompassing a total population of 17,075,887 pilgrims and categorised health findings under mortality, communicable disease, non-communicable disease, injury, health services, and vaccination (Wicaksana and Hertanti, 2024).

Within the categories of environmental sanitation, food safety, and waterborne and foodborne disease, the reviewed literature employed cross-sectional and case-control designs. A cross-sectional study of domestic Hajj pilgrims in 2022 involving 1,193 respondents recorded a diarrhoea prevalence of 32.4% and identified statistically significant associations between diarrhoea and handwashing frequency, food source, water source, and food-sharing behaviour (Alrukban *et al.*, 2025). A case-control study conducted during the 2023 Arbaeen pilgrimage involving 100 cases and 100 controls identified associations between diarrhoea and consumption of unhygienic water, inadequate handwashing, ritual food

consumption, and use of public toilets (Azizi *et al.*, 2024). A cross-sectional study on food safety knowledge and practices among 2023 Hajj pilgrims involving 409 respondents found above-average food safety knowledge, below-average food safety practices, and an association between foodborne illness symptoms and both knowledge and practice levels (Msrahi and Turkistani, 2025).

The principal thematic categories derived from document and literature synthesis comprise pilgrim health examination, comorbid conditions, *istithaah* status, vaccination, deferred and cancelled departures, fitness to fly, environmental sanitation, catering services, health surveillance, and health risks at *mass gathering* events. A literature review on antimicrobial resistance among Hajj pilgrims identified respiratory infections, urinary tract infections, skin infections, antimicrobial use, and surveillance as the dominant health categories during the pilgrimage (Haseeb *et al.*, 2023). A systematic review of social norms and risks at *mass gathering* events categorised risks across health, behavioural, environmental, and mental health dimensions in various crowd settings, including religious gatherings (Alhajri, Templeton and Moore, 2023). A narrative review of health care research at religious *mass gatherings* noted that prior studies have predominantly addressed infectious disease risks, weather exposure, physical strain, pre-existing conditions, health awareness, personnel training, and pilgrim risk perception (Almehmadi and Alqahtani, 2023).

DISCUSSION

The primary findings of this study indicate that health quarantine during the

2026 Hajj embarkation phase functioned as an aggregate data-driven risk control mechanism operating through SINKARKES reporting, health examination, *istithaah* assessment, vaccination verification, fitness to fly determination, environmental sanitation inspection, and catering oversight. A 100% reporting rate across 20 embarkation units, 528 *kloter*, 204,248 pilgrims registered into dormitories, 204,010 pilgrims who departed, and 199 replacement pilgrims collectively demonstrate that the embarkation phase possesses a reporting structure capable of providing a population-level reading of departure readiness. The finding that 142,752 pilgrims, approximately 69.89% of the registered total, carried at least one comorbid condition, combined with the result that the majority of pilgrims were classified as eligible or eligible with accompaniment under the *istithaah* framework, indicates that pilgrim safety during the embarkation phase is not solely determined by departure status. Rather, it depends on the capacity of the health quarantine system to identify high-risk pilgrims, assign appropriate deferral or cancellation decisions, confirm fitness to fly, and verify the adequacy of the living environment and food services within embarkation dormitories.

Within the *mass gathering health* framework, these findings position the embarkation phase as a critical pre-event component for preventing health risks before pilgrims enter the denser and more demanding ritual environment of Saudi Arabia. The Hajj carries a distinctive risk profile attributable to cross-national mobility, high spatial density, demographic heterogeneity, comorbid conditions, environmental exposures, and the need for rapid and coordinated health services

(Parker *et al.*, 2024). The placement of health examination, *istithaah* determination, and fitness to fly assessment as primary indicators is consistent with the Haddon Matrix and Combined Model framework, which frames Hajj morbidity as the product of interactions among human factors, environmental conditions, and disease agents across pre-event, during-event, and post-event phases (Almuzaini *et al.*, 2025). Accordingly, decisions to defer or cancel departure and to classify pilgrims as unfit to fly can be read as administrative-clinical controls designed to reduce the probability of serious health events during travel and ritual performance.

The high proportion of pilgrims with comorbid conditions is consistent with the broader literature demonstrating that Hajj pilgrims frequently carry health risks attributable to advanced age, chronic disease, and the physical demands of the pilgrimage. The scoping review of Islamic pilgrimage to Makkah identified communicable disease, non-communicable disease, injury, health services, mortality, and vaccination as the principal health themes (Wicaksana and Hertanti, 2024), while a pooled cross-sectional study of Iranian pilgrims found that hospitalisation and mortality patterns during the Hajj were associated with age, sex, province of origin, and cardiovascular disease, underscoring the relevance of pre-departure data in mapping pilgrim risk profiles before ritual entry (Kolivand *et al.*, 2025). The present findings also align with the 2024 Hajj healthcare burden analysis, which identified upper respiratory tract infections, gastrointestinal disorders, dermatitis, musculoskeletal complaints, and heat exhaustion as dominant diagnosis categories in pilgrim health service utilisation (Alharbi *et al.*, 2026). The

distinction, however, is that this article does not measure morbidity during ritual performance in Saudi Arabia; instead, it positions embarkation health data as an early readiness indicator before pilgrims enter the higher-risk phase of the pilgrimage.

On the dimensions of surveillance and vaccination, the findings suggest that the embarkation reporting system can serve as an important foundation for reading pilgrim health readiness in real time or near real time. A cohort study of the 2021 Hajj demonstrated that syndromic surveillance was capable of detecting respiratory symptoms among pilgrims and associating them with handwashing practices and risk factors such as obesity (Mahdi *et al.*, 2022), while Hajj vaccination literature consistently identifies immunisation as both an individual protection instrument and a global health security mechanism given the cross-border mobility of pilgrims (Khan *et al.*, 2025). In the context of this study, the predominance of vaccination conducted at the region of origin rather than at the embarkation dormitory suggests that the embarkation phase functions primarily as a point of vaccination status verification and completion rather than as the principal site of vaccine administration. This reinforces the embarkation phase as the final validation node linking health preparation at the local level with international departure.

Regarding environmental sanitation and catering services, the reported 100% compliance across all inspections reflects a systematic environmental oversight function within embarkation dormitories. Substantively, catering oversight carries strong preventive relevance, as inspection-based studies of food-serving establishments during the Hajj have

demonstrated that food handler training, professional supervision, facility hygiene, food storage practices, and standards compliance are associated with food safety performance (Alnafisah *et al.*, 2023). Research conducted at the Pondok Gede Hajj Dormitory in Jakarta further confirmed that kitchen inspections, catering guidance, examination of pilgrim-carried food items, and food and beverage quality assessment constitute essential components of food protection from the pre-embarkation through to the embarkation period (Hayati *et al.*, 2024). The catering and sanitation indicators in this study therefore cannot be treated as purely administrative outputs; they represent preventive measures against foodborne and environmentally transmitted disease in a high-density communal setting operating under compressed timelines.

Comparison with prior studies confirms that the present findings are consistent with a body of literature positioning food safety, hand hygiene, and water source as determinants of gastrointestinal disease control at Hajj and other large-scale pilgrimages. A cross-sectional study of domestic Hajj pilgrims in 2022 found a diarrhoea prevalence of 32.4% and statistically significant associations with handwashing frequency, food source, water source, and food-sharing behaviour (Alrukban *et al.*, 2025), while a case-control study at the Arbaeen pilgrimage identified consumption of unhygienic water, inadequate handwashing, ritual food, and public toilet use as diarrhoea risk factors (Azizi *et al.*, 2024). These findings reinforce the analytical position of environmental sanitation and catering oversight within this article as pilgrim safety indicators, particularly given that embarkation dormitories function as communal living

spaces concentrating thousands of pilgrims within a short period immediately before international departure.

The scholarly contribution of this article lies in extending the analytical reading of Hajj health quarantine beyond departure processing to encompass a pre-event risk control system that integrates clinical, administrative, environmental, and food safety data. Literature on Indonesian nurses serving as Hajj health personnel highlights that Hajj health services require professional competence, ethics, therapeutic communication, regulatory literacy, coordination, and strategic resource planning (Sugeng *et al.*, 2024). This article adds the analytical dimension that such coordination can be substantively strengthened through structured reading of embarkation data, particularly when health examination indicators, departure status decisions, and environmental and food safety findings are analysed as an integrated whole. The novelty of the article therefore resides in using official embarkation surveillance documents as primary secondary data and connecting them with *mass gathering health* literature to demonstrate that pilgrim safety is shaped before departure, not solely during ritual performance in Saudi Arabia.

The principal limitations of this study derive from the secondary, aggregate, and two-document nature of the data. Individual-level analysis of relationships among age, comorbid conditions, *istithaah* status, vaccination, deferred departure, cancelled departure, and post-departure health outcomes was not possible within the available data structure. Inferential testing was not applied because the documents did not provide micro-level data at the individual or *kloter* level in a form suitable for statistical analysis. Variation in how the

catering indicator was presented across the two documents also indicates that document-based analyses must attend carefully to the production context, reporting purpose, document version, and the possibility of data updates between versions. Document analysis in health policy research requires that researchers prepare materials, extract data, analyse findings, and present results with sufficient systematic rigour to avoid reading documents outside their institutional and administrative context (Dalglish, Khalid and McMahon, 2021). A further limitation is that the literature review is integrative and narrative in character and is therefore not intended to produce pooled effect estimates as a meta-analysis would.

The practical implications of this study point to the need for strengthened embarkation data governance through cross-document validation, uniform operational definitions, documented data updates, and clear versioning of indicator changes across report editions. For policymakers, SINKARKES data can be developed into a risk monitoring instrument that links health status at the region of origin, embarkation examination findings, fitness to fly decisions, and post-departure health surveillance. For Hajj health practitioners, the indicators of comorbid conditions, *istithaah* with accompaniment, deferred departure, cancelled departure, and unfit to fly status can be used to strengthen pre-departure education, clinical referral pathways, accompaniment readiness, and risk communication to pilgrims. For future research, stronger study designs could be achieved by linking embarkation data with health service records during the Hajj, debarkation data, and post-return follow-up data to assess whether health quarantine decisions at the

embarkation phase are associated with reduced rates of illness, hospitalisation, or medical evacuation.

CONCLUSION AND SUGGESTION

This study demonstrated that health quarantine during the 2026 Hajj embarkation phase operated as a structured pre-event risk control mechanism encompassing health examination, *istithaah* assessment, vaccination verification, fitness to fly determination, environmental sanitation inspection, and catering oversight. The primary data indicated that the majority of pilgrims registered into embarkation dormitories were successfully cleared for departure; however, the substantial proportion of pilgrims carrying comorbid conditions necessitated systematic accompaniment arrangements, clinical monitoring, and precise administrative-clinical decision-making. The findings regarding deferred departures, cancelled departures, and pilgrims classified as unfit to fly affirm that the embarkation phase does not function merely as a transit stage, but as the final health selection point protecting pilgrim safety prior to international travel.

Conceptually, this article contributes to a broader understanding of Hajj health quarantine as an integrated component of pilgrim safety within the *mass gathering* context. Health examination at the individual level, aggregate surveillance through SINKARKES, environmental oversight, and food safety control should be understood as a unified risk management system rather than as separate procedural requirements. By positioning official embarkation surveillance documents as primary secondary data and connecting them with current scientific literature, this

article demonstrates that routinely produced institutional data can serve as a credible foundation for academic analysis of Hajj health system readiness in a descriptive and contextually grounded manner.

The practical implications of these findings underscore the importance of strengthening reporting consistency, cross-document validation, and the systematic use of embarkation data to support timely and accurate pilgrim health decisions. Future research should develop study designs capable of linking individual or *kloter*-level embarkation data with health service utilisation records during the Hajj, debarkation findings, and post-return health follow-up to examine whether embarkation-phase health quarantine decisions are associated with measurable reductions in illness incidence, hospitalisation rates, or medical evacuation events. The development of a surveillance system that connects health data from the region of origin through embarkation, travel, and debarkation phases represents a necessary direction for strengthening the long-term safety of Indonesian Hajj pilgrims.

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