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Factors associated with health preparedness (istithaah) status among hajj pilgrims in Indonesia: a cross-sectional study

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ABSTRACT

Introduction: The Hajj pilgrimage presents unique health challenges due to the large gatherings, particularly affecting elderly participants with preexisting conditions. Health istithaah, referring to physical and mental readiness for Hajj participation, is crucial for ensuring the safety of pilgrims. This study aimed to identify the factors associated with health istithaah status among Indonesian Hajj pilgrims.

Methods: This descriptive correlational study examined 1,305 pilgrims scheduled for the 2023 Hajj pilgrimage. The data collected included health istithaah status, age, gender, and medical diagnoses based on ICD-10. The analysis employed Chi-Square tests and multivariate logistic regression ($p < 0.05$).

Results: Of the participants, 772 (59.2%) had unassisted health istithaah, while 533 (40.8%) required assistance. Diabetes mellitus showed the highest association with requiring assistance (PR = 4.938, 95% CI = 3.354–7.270, p = 0.001), followed by symptoms and signs not classified elsewhere (PR = 4.071, 95% CI: 3.091–5.362, p = 0.001) and essential hypertension (PR = 3.467, 95% CI = 2.565–4.685). Age and multiple diagnoses were significantly associated with health istithaah status (p = 0.001), while gender showed no significant association (p = 0.246).

Conclusions: Age, multiple diagnoses, and chronic conditions, particularly diabetes, were key factors associated with requiring health istithaah assistance among Indonesian Hajj pilgrims. These findings emphasize the need for targeted health assessments and support for high-risk pilgrims.

Keywords: hajj pilgrims, health istithaah, ICD-10, indonesian hajj

Introduction

The concept of health *istithaah* refers to the physical and mental readiness of Hajj pilgrims to safely undertake the pilgrimage, as mandated by Islamic principles. This requires comprehensive health evaluations to determine whether pilgrims are fit for the physical demands of the journey (Rustika et al., 2020b). Health *istithaah* covers both physical and mental readiness, with assessments including checks for the vital signs, screenings for chronic illnesses, and evaluations of mental health. These assessments are essential for confirming that pilgrims can safely undertake Hajj as prescribed by Islamic teachings. Those with health conditions receive guidance on managing said conditions to ensure a safe pilgrimage (Mansyur, 2020).

As the country with the second-largest Muslim population globally, Indonesia has one of the highest annual Hajj quotas, allowing up to 221,000 pilgrims in 2023. This includes both regular (203,320) and special pilgrims (17,680) (Singka and Ericca, 2020; Afifa, 2024).

All pilgrims are required to register and are closely supervised by the Indonesian Ministry of Religion and the Ministry of Health. Access to data on pilgrim numbers and health conditions is invaluable for improving healthcare services during Hajj (Safarpour *et al.*, 2022). Given the large annual turnout, safeguarding the health and wellbeing of pilgrims is essential. Before departure, pilgrims receive thorough guidance and medical support to help them prepare for the physical and spiritual challenges of the pilgrimage (Goni *et al.*, 2021).

The health risks for Indonesian Hajj pilgrims are significant, with recent years seeing more than 200,000 participants annually. Mortality rates have been a concern, ranging from 2.1 to 3.2 deaths per 1,000 pilgrims (Rustika *et al.*, 2020). From 2004 to 2011, prevalent health issues among Indonesian Hajj pilgrims included hypertension, diabetes, and cardiovascular diseases, with cardiovascular conditions accounting for a significant share of deaths (Yezli *et al.*, 2022). Additionally, respiratory tract infections have been a frequent concern, as the crowded conditions during Hajj lead to high incidences of both upper and lower respiratory infections, resulting in considerable morbidity and hospitalizations (Memish *et al.*, 2015).

Cardiovascular diseases have been identified as a leading cause of death among Indonesian Hajj pilgrims, accounting for 66% of fatalities in this group (Ardiana *et al.*, 2023). Additionally, studies have shown that acute respiratory infections, including Streptococcus pneumoniae carriage, have been attributed to a considerable proportion of deaths among Indonesian pilgrims during the Hajj (Harimurti *et al.*, 2021). Furthermore, research has emphasized that cardiovascular diseases are a major concern for Indonesian Hajj pilgrims, contributing significantly to mortality rates (Naim *et al.*, 2021).

Vaccination has been underscored as a crucial preventive measure for Hajj pilgrims as it can help mitigate the risk of exposure to communicable diseases during the mass gathering, potentially preventing numerous morbidities and mortalities (Razavi, Saeednejad and Salamati, 2016). The prevalence of viral respiratory infections among Hajj pilgrims has been noted to be high, emphasizing the importance of infection control and appropriate vaccination to curb the transmission of respiratory viruses during the pilgrimage (Barasheed *et al.*, 2014).

The gathering of a large population, such as during religious pilgrimages like Hajj, can have significant implications for the diversity of health problems and the demand for healthcare facilities (Almehmadi and Alqahtani, 2023). The Hajj pilgrimage itself presents considerable physical and mental challenges. Pilgrims are exposed to heat, intense physical exertion, and large crowds, often resulting in fatigue, heat-related illnesses, and heightened stress levels, especially among elderly and first-time pilgrims (Abdelmoety *et al.*, 2018; Hankir *et al.*, 2019; Yezli, 2023). Rituals that require physical exertion, such as walking around the Kaaba (thawaf), brisk walking between hills (sa'i), and symbolically throwing stones at pillars (jamarat), can be exhausting for older participants. Each Hajj season brings new public health challenges, emphasizing the need for continuous improvements in health management (Pane *et al.*, 2019; Yezli *et al.*, 2022).

The aging demographic of Indonesian pilgrims, particularly those aged 60 and above, further complicates these challenges. High-risk individuals, who represent 51% of the pilgrim population, experience higher rates of morbidity and mortality (Probosuseno *et al.*, 2022). Hypertension and diabetes mellitus are common conditions among these high-risk pilgrims, especially those departing from Yogyakarta, which has the highest prevalence of the elderly among this particular population. Elderly participants account for 87% of morbidity cases, with 83% classified as having a high risk for health complications (Rokib and Junadi, 2019).

To address these issues, the Indonesian Ministry of Health enacted Regulation No. 15 of 2016, focusing on health *istithaah* assessments for registered Hajj pilgrims (Handriana, Tanti and Kurniawati., 2020). These assessments, covering both physical and mental capability, determine eligibility for the pilgrimage and include up to three stages (Muneeza *et al.*, 2018). Pilgrims over 60 years old or with certain illnesses may be deemed eligible for assisted health *istithaah* if they can participate with medical or physical support, while those not meeting the health *istithaah* standards may have their departure postponed due to potential health risks (Syarifuddin, Wijaya and Masudah, 2023).

The health sector challenges associated with Hajj are complex and require significant efforts to address. Many Indonesian Hajj pilgrims, particularly older people and those with chronic health conditions, struggle to meet the physical demands of the pilgrimage, leading to increased rates of morbidity and mortality. Given the high prevalence of chronic health conditions and the aging demographic among Indonesian Hajj pilgrims, it is essential to identify the factors that impact their health readiness, or health *istithaah*, in relation to whether they can safely participate in the pilgrimage. This study specifically aims to address the gaps in understanding the health *istithaah* status of Hajj pilgrims in Indonesia and the associated demographic and health factors.

Materials and Methods

Study design

This study employed a descriptive correlational design to identify the factors associated with the health *istithaah* status of Hajj pilgrims from Sleman District, Indonesia.

Participants

The study population included all Hajj pilgrims from the Sleman District who were scheduled to depart for the 2023 Hajj season. From this population, a total sample of 1,305 individuals was selected using a total sampling technique, ensuring that every eligible pilgrim from the Sleman District was included in the study. The inclusion criteria required that all sampled pilgrims had completed both Stage I and Stage II health examinations, received the meningitis vaccination and both doses of the COVID-19 vaccine, and obtained a health istithaah certificate from the Health Office.

Data collection procedure and instruments

The data was sourced from the Stage I and Stage II health examinations. The stage I assessments are preliminary screenings conducted at PHCs, which include a basic physical examination and the initial assessment of chronic conditions that could impact a pilgrim's ability to perform Hajj. Stage II assessments are a more detailed evaluation conducted at District Hospitals, including specialized assessments for high-risk individuals, such as those with chronic illnesses or elderly pilgrims, to determine if they need medical assistance during Hajj. The data compiled included age, gender, medical diagnoses, health *istithaah* status, types of assistance required, and health *istithaah* certification status. The Coordinator of Hajj Affairs at the Sleman District Health Office compiled the data following a formal request to the Data Management Office.

The measured outcome is the health *istithaah* of the hajj pilgrims, categorized into unassisted and assisted health *istithaah* as per the regulation of the Indonesian government's Ministry of Health No. 15 of 2016. Unassisted health *istithaah* occurs when pilgrims depart for Hajj without the aid of tools, medication, or other individuals, whereas assisted health *istithaah* occurs when pilgrims require such assistance. Age was grouped into <60 years and ≥60 years, in accordance with Indonesian Ministry of Health regulations stipulating that hajj pilgrims aged 60 years and over are considered high-risk. Disease diagnosis were determined by the examining doctor based on the ICD-10, derived from the 10 most common disease diagnoses present among hajj pilgrims.

Data analysis

Descriptive statistics were used to analyze the frequency distributions of health *istithaah* status, age, gender, number of diagnoses, and types of diagnoses among the Hajj pilgrims. Prior to further analysis, a normality test was conducted on the continuous variables, specifically age, using the Kolmogorov–Smirnov test. The results indicated that the data was normally distributed, with a p-value > 0.05, confirming that parametric tests were able to be appropriately applied.

Following the confirmation of normality, bivariate analysis was performed using a Chi-Square test to examine the relationships between the independent variables (age, gender, and number of diagnoses) and health *istithaah* status, with a p-value threshold of <0.25 to identify variables for inclusion in the multivariate analysis. Multivariate logistic regression analysis was then conducted on the significant variables to calculate the probability prevalence ratio (PR) and assess their influence on health *istithaah* status. Statistical significance was set at $p < 0.05$, with a 95% confidence level.

Ethical approval

This study was approved by the Medical and Health Research Ethics Committee (MHREC) of the Faculty of Medicine, Public Health, and Nursing of Universitas Gadjah Mada, approval number KE/FK/0925/EC/2021. The study adhered to the principles of the Declaration of Helsinki regarding medical research involving human subjects, particularly concerning data privacy and the protection of vulnerable populations. Several ethical considerations were addressed in this study. First, data confidentiality was maintained by using coded identifiers instead of personal information in the analysis and reporting. Access to the original data was restricted to authorized research team members only. Second, while informed consent was not directly obtained from individual pilgrims as this study used secondary data, formal permission was secured from the Sleman District Health Office for data access and utilization. Third, all data was stored securely in password-protected files, and any physical documents were kept in locked cabinets accessible only to the research team. All findings were reported in aggregate form to prevent individual identification.

Results

Respondents characteristics

Out of 1,305 Hajj pilgrims included in the study, the mean age was 57.18 years (SD ±10.186). A total of 584 pilgrims (44.8%) were aged 60 years and above, categorizing them as high-risk according to health istithaah standards. The gender distribution was slightly

Table 1. Demographic characteristics of the respondents (n=1305)

Variable	n	%
Age : mean 57.18 SD (± 10,186)		
≥ 60 years	584	44.8
< 60 years	721	55.2
Gender		
Male	611	46.8
Female	694	53.2
Number of Diagnoses		
1 diagnosis	725	57.6
≥ 2 diagnoses	553	42.4

Table 2. Health istithaah of hajj pilgrims (n=1305)

Health *Istithaah*	n	%
Assisted Health *Istithaah*	533	40.8
Unassisted Health *Istithaah*	772	59.2

skewed, with 611 males (46.8%) and 694 females (53.2%). Additionally, 553 pilgrims (42.4%) had two or more medical diagnoses, while 725 (57.6%) had only one diagnosis (Table 1).

Health istithaah status of hajj pilgrims

Table 2 shows that 533 pilgrims (40.8%) required assistance to safely undertake the pilgrimage, while 772 pilgrims (59.2%) were classified as unassisted, meaning that they were able to proceed without the need for additional medical or physical support. The gender breakdown within the assisted category reveals that more males (47.5%) than females (41.6%) required assistance.

Factors associated with health istithaah

The bivariate analysis indicated that age, gender, and the number of diagnoses were initially associated with health *istithaah* status as they had p-values below the threshold of 0.25, warranting further examination using multivariate analysis. In the multivariate analysis presented in Table 3, age and the number of medical diagnoses were found to be significantly associated with health *istithaah* status, while gender was not a significant factor. Specifically, pilgrims aged 60 and above were 2.735 times more likely to require assistance (PR = 2.735, 95% CI = 2.13–3.51, p = 0.001) compared to those under 60 years old. Similarly, pilgrims with two or more medical diagnoses were 3.322 times more likely to need assistance (PR = 3.322, 95% CI = 2.59–4.26, p = 0.001). The Cox & Snell R Square value of 0.164 suggests that age and the number of diagnoses account for 16.4% of the variance in health *istithaah* status.

Prevalence and association of diagnoses with health istithaah

Table 4 provides details on the types of health diagnoses found among the pilgrims based on the ICD-10 categories. Endocrine, nutritional, and metabolic diseases (E00-E89) were the most common, affecting 479 pilgrims (36.8%). Among these, diabetes mellitus (E11-E14) was the most prevalent specific diagnosis, with 158 cases (12.2%).

Table 4 also shows that certain diagnoses had a significant association with the need for health *istithaah* assistance. For instance, diabetes mellitus had the highest probability of requiring assistance, with a prevalence ratio of 4.938 (95% CI = 3.354–7.270, p = 0.001). Other conditions, such as symptoms and signs not elsewhere classified (R54) (PR = 4.071, 95% CI = 3.091–5.362, p = 0.001) and essential hypertension (I10) (PR = 3.467, 95% CI = 2.565–4.685), also showed strong associations with health *istithaah* assistance. In contrast, genitourinary diseases (N00-N99) and respiratory system diseases (D50-D89) were not significantly associated with health *istithaah* status, with p-values of 0.369 and 0.123, respectively.

Discussions

The study reveals that a significant portion of Hajj pilgrims require health *istithaah* assistance, particularly older adults and those with chronic conditions. This aligns with the findings from previous research, which identified hospitalized Hajj pilgrims as a vulnerable group frequently experiencing critical illnesses, such as pneumonia (Benkouiten *et al.*, 2018). The need for health support, including medication, medical devices, and assistance from others, underscores the challenges faced by elderly pilgrims, particularly those from Indonesia where the elderly population is high, as seen in Yogyakarta Province (Rukmini *et al.*, 2022).

The prevalence of chronic diseases, especially hypertension and diabetes mellitus, among pilgrims reflects the global patterns of health risks in this population. Systematic reviews have consistently highlighted these chronic conditions as prevalent among Hajj pilgrims, contributing to their vulnerability to health complications in the physically demanding environment of the pilgrimage (Yezli et al., 2021). Furthermore, outdoor activities, physical exertion, and crowd density increase the likelihood of heat-related illnesses, which elderly pilgrims with lower fitness levels are particularly susceptible to (Yezli, 2023). Studies on heatstroke and heat exhaustion reinforce the critical role of fitness and thermoregulation in ensuring pilgrims' health and safety (Abdelmoety *et al.*, 2018).

This study also observed notable gender differences in the need for assistance, with a larger proportion of male

Table 3. The impact of age, gender, and medical diagnosis on health istithaah (n=1305)

	With assistance n (%)	Without assistance n (%)	*p*	PR	CI 95%
Age					
≥ 60 years	363 (62.5)	218 (37.5)	0.001*	2.735	2.13-3.51
< 60 years	214 (30.1)	504 (69.9)			
Gender					
Male	290 (47.5)	321 (52.5)	0.246	1.153	0.91-1.47
Female	289 (41.6)	403 (58.4)			
Number of diagnoses					
≥ 2 Diagnoses	361 (65.3)	192 (34.7)	0.001*	3.322	2.59-4.26
1 Diagnosis	220 (29.3)	532 (70.7)			

Note: PR: Prevalence Ratio, *: logistic regression p < 0.05

Table 4. Diagnosis and health istithaah based on the ICD-10

Code	Top 10 Diagnoses (ICD-10)	n (%)	*p*	PR	95%CI
Z00-Z99	Factors influencing health status and contact with health services	407 (31.3)	0.001*	0.177	0.133-0.235
E00-E89	Endocrine, nutritional and metabolic diseases	479 (36.8)	0.014*	1.338	1.066-1.678
R54	Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	309 (23.8)	0.001*	4.071	3.091-5.362
I10	Essential (primary) hypertension	237 (18.2)		3.467	2.565-4.685
E1-E14	Diabetes mellitus	158 (12.2)	0.001*	4.938	3.354-7.270
I00-I99	Diseases of the circulatory system	110 (8.5)	0.001*	4.126	2.646-6.434
N00-N99	Diseases of the genitourinary system	89 (6.8)	0.001*	1.248	0.811-1.920
D50-D89	Diseases of the respiratory system	42 (3.2)	0.369	1.705	0.916-3.174
M00-M99	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	39 (3.0)	0.123	4.365	2.055-9.270
J00-J99	Diseases of the musculoskeletal system and connective tissue	35 (2.7)	0.001*	2.468	1.217-5.003

Note: PR: Prevalence Ratio, *: Pearson Chi Square p < 0.05

pilgrims requiring support compared to females. This pattern may reflect the underlying health disparities or differences in physical fitness between genders. Male pilgrims, especially older men, have been reported to have higher rates of acute coronary syndromes and other cardiovascular issues during Hajj, potentially explaining their higher assistance requirements (Mirza *et al.*, 2018). These findings suggest that men, particularly those with cardiovascular conditions, may benefit from additional support and pre-departure counseling to ensure they are adequately prepared for the physical demands of Hajj.

This study emphasizes the significant need for assistance among Hajj pilgrims, particularly those with chronic conditions like diabetes mellitus and cognitive impairments such as senility. In particular, diabetes emerged as a key determinant of health *istithaah* status, with affected pilgrims frequently requiring support to manage their condition during the pilgrimage. Effective diabetes management, including access to medications like insulin and consistent monitoring, is essential for these individuals to complete the Hajj safely (Saber Yezli *et al.*, 2021). Pre-departure consultations with healthcare professionals are crucial to provide guidance on managing their diabetes and to reduce the risk of health complications during Hajj (Algeffari, 2019).

Senility also plays a critical role in determining the need for assistance, as age-related cognitive decline often requires additional support. Older pilgrims with cognitive impairments are less likely to manage independently during the physically and mentally demanding pilgrimage. This finding is consistent with previous studies showing that elderly pilgrims are particularly vulnerable to severe health events, such as cardiac arrests, which often require immediate intervention. As a result, elderly pilgrims with cognitive or cardiovascular conditions may need continuous supervision and support from caregivers or healthcare personnel to ensure their safety (Shirah *et al.*, 2019).

The multivariate analysis further underscores that having multiple medical diagnoses significantly increases the likelihood of requiring assistance. Chronic conditions, particularly cardiovascular disease, heighten the risks associated with the physically strenuous environment of Hajj. Studies show that cardiovascular issues are a leading cause of severe outcomes, such as ICU admissions and mortality. This association highlights the importance of providing targeted support for pilgrims with known heart conditions and tailoring interventions to accommodate their specific needs. Physical exertion, combined with extreme weather conditions, compounds the challenges faced by these individuals, making it essential to provide adequate on-site support to prevent adverse outcomes (Aldossari, Aljoudi and Celentano, 2019).

The findings from this study highlight the importance of pre-departure health assessments and tailored support for high-risk Hajj pilgrims, particularly older people and those with chronic health conditions such as diabetes, hypertension, and cognitive impairments. Given the strong association between these factors and the need for assistance, healthcare providers should prioritize targeted interventions to improve the pilgrims' preparedness for the physical demands of Hajj. Diabetic pilgrims should have reliable access to insulin and support for blood glucose monitoring throughout the journey. These proactive measures can contribute to safer pilgrimage experiences and reduce the burden on healthcare facilities in Saudi Arabia.

This study primarily focused on pre-existing health conditions but did not consider psychosocial factors, such as mental resilience and social support, which could also affect assistance needs. Additionally, the impact of pre-pilgrimage preparations, like physical training and health education, was not assessed, although these could potentially reduce assistance requirements. Lastly, situational challenges during Hajj, including physical exertion and heat exposure, were not captured, limiting the insights into real-time assistance needs.

Conclusion

This study highlights that there is a significant need for health istithaah assistance among Hajj pilgrims, particularly those who are elderly and/or managing chronic health conditions like diabetes, hypertension,

and cognitive impairments. Key factors associated with the need for assistance include age, multiple diagnoses, and specific conditions that increase vulnerability during the physically demanding pilgrimage. These findings underscore the importance of tailored health assessments and support systems for high-risk pilgrims to enhance their preparedness and safety during Hajj. Addressing these needs through targeted pre-departure evaluations, guidance on managing chronic conditions, and in-situ support measures can help reduce health risks and promote safer participation for all pilgrims.

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Availability of data and materials

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Authors' contributions

All authors contributed equally in this study in substantial contributions to the conception or design of the work, analysis or interpretation of data for the work, drafting of the work, and final approval of the version to be published.

Declaration of Interest

The authors declare there to be no conflicts of interest in relation to this study. The research was conducted independently without any financial, personal, or professional influences that could be perceived to affect the objectivity of the findings and conclusions presented.

References

Abdelmoety, D. A. *et al.* (2018) 'Characteristics of Heat Illness during Hajj: A Cross-Sectional Study', *BioMed Research International*, 2018, pp. 1–6. doi: 10.1155/2018/5629474.

Afifa, L. (2024) *Top 5 Countries Securing Most Hajj Quota for 2023*, *Tempo.co*. Available at: https://en.tempo.co/read/1841633/top-5-countries-securing-most-hajj-quota-for-2023#:~:text=Indonesia%20has%20the%20second%2Dlargest,and%2017%2C680%20special%20Hajj%20pilgrims. (Accessed: 1 November 2024).

Aldossari, M., Aljoudi, A. and Celentano, D. (2019) 'Health issues in the hajj pilgrimage : a literature review', *Eastern Mediterranean Health Journal*, 25(10), pp. 3–8.

Algeffari, M. (2019) 'Diabetes and hajj pilgrims: A narrative review of literature', *Journal of the Pakistan Medical Association*, 69(6), pp. 879–884.

Almehmadi, M. and Alqahtani, J. S. (2023) 'Healthcare Research in Mass Religious Gatherings and Emergency Management: A Comprehensive Narrative Review', *Healthcare*, 11(2), p. 244. doi: 10.3390/healthcare11020244.

Ardiana, M. *et al.* (2023) 'The Impact of Classical Cardiovascular Risk Factors on Hospitalization and Mortality among Hajj Pilgrims.', *TheScientificWorldJournal*, 2023, p. 9037159. doi: 10.1155/2023/9037159.

Barasheed, O. *et al.* (2014) 'Viral respiratory infections among Hajj pilgrims in 2013', *Virologica Sinica*, 29(6), pp. 364–371. doi: 10.1007/s12250-014-3507-x.

Benkouiten, S. *et al.* (2018) 'Clinical respiratory infections and pneumonia during the Hajj pilgrimage: A systematic review', *Travel Medicine and Infectious Disease*. doi: 10.1016/j.tmaid.2018.12.002.

Goni, M. D. *et al.* (2021) 'Hajj Pilgrimage amidst covid-19 pandemic: a review', *Bangladesh Journal of Medical Science*, 20(4), pp. 732–740. doi: 10.3329/bjms.v20i4.54127.

Handriana, Tanti, P. Y. and Kurniawati., M. (2020) 'Exploration of pilgrimage tourism in Indonesia', *Journal of Islamic Marketing*, 11(3), pp. 783–795.

Hankir, A. *et al.* (2019) 'Hajj and the Mental Health of Muslim Pilgrims: A review.', *Psychiatria Danubina*, 31(Suppl 3), pp. 290–293.

Harimurti, K. *et al.* (2021) 'Streptococcus pneumoniae carriage and antibiotic susceptibility among Indonesian pilgrims during the Hajj pilgrimage in 2015', *PLOS ONE*, 16(1), p. e0246122. doi: 10.1371/journal.pone.0246122.

Mansyur, M. (2020) 'Hajj health istithaah amid the COVID-19 pandemic', *Medical Journal of Indonesia*, 29(2), pp. 115–7. doi: 10.13181/mji.com.204764.

Memish, Z. A. *et al.* (2015) 'Mass gathering and globalization of respiratory pathogens during the 2013 Hajj', *Clinical Microbiology and Infection*, 21(6), pp. 571.e1-571.e8. doi: 10.1016/j.cmi.2015.02.008.

Mirza, A. A. *et al.* (2018) 'Patterns of inpatient admissions during Hajj: Clinical conditions, length of stay and patient outcomes at an advanced care centre in Makkah, Saudi Arabia', *Pakistan Journal of Medical Sciences*, 34(4), pp. 781–786. doi: 10.12669/pjms.344.15989.

Muneeza, A. *et al.* (2018) 'A Comparative Study of Hajj Fund Management Institutions in Malaysia, Indonesia and Maldives', *International Journal of Management and Applied Research*, 5(3), pp. 120–134. doi: 10.18646/2056.53.18-009.

Naim, J. *et al.* (2021) 'Determinants of Coronary Heart Disease Incidence among Indonesian Hajj Pilgrims Hospitalized in Saudi Arabia in 2019', *Open Access Macedonian Journal of Medical Sciences*, 9(E), pp. 798–804. doi: 10.3889/oamjms.2021.6776.

Pane, M. *et al.* (2019) 'Indonesian Hajj Cohorts and Mortality in Saudi Arabia from 2004 to 2011', *Journal of Epidemiology and Global Health*, 9, pp. 11–18. doi: doi: 10.2991/jegh.k.181231.001.

Probosuseno *et al.* (2022) 'Innovative education training program of hajj healthcare workers improves the outcomes of Indonesian elderly hajj pilgrims', *Cakrawala Pendidikan*, 41(2), pp. 365–376. doi: 10.21831/cp.v41i2.47490.

Razavi, S., Saeednejad, M. and Salamati, P. (2016) 'Vaccination in Hajj: An overview of the recent findings', *International Journal of Preventive Medicine*, 7(1), p. 129. doi: 10.4103/2008-7802.195826.

Rokib, Z. M. and Junadi, P. (2019) 'An analysis on the preparedness for implementing the minimal standards for service in the health field at Depok city in 2017', *Journal of Indonesian Health Policy and Administration*, 4(1). doi: 10.7454/ihpa.v4i1.2000.

Rukmini, R. *et al.* (2022) 'Non-Communicable Diseases among the Elderly in Indonesia in 2018', *Indian Journal of Forensic Medicine & Toxicology*, 16(1), pp. 1026–1036. doi: 10.37506/ijfmt.v16i1.17631.

Rustika, R. *et al.* (2020) 'An Evaluation of Health Policy Implementation for Hajj Pilgrims in Indonesia', *Journal of Epidemiology and Global Health*, 10(4), p. 263. doi: 10.2991/jegh.k.200411.001.

Safarpour, H. *et al.* (2022) 'Prevalence of Influenza Among Hajj Pilgrims: A Systematic Review and Meta-Analysis', *Disaster Medicine and Public Health Preparedness*, 16(3), pp. 1221–1228. doi: 10.1017/dmp.2020.472.

Shirah, B. H. *et al.* (2019) 'Mass Gathering Medicine (Hajj Pilgrimage in Saudi Arabia): The Outcome of Cardiopulmonary Resuscitation during Hajj', *Journal of Epidemiology and Global Health*, 9(1), p. 71. doi: 10.2991/jegh.k.190218.001.

Singka, E. J. and Ericca, I. (2020) 'Hajj health management in Indonesia', *Medical Journal of Indonesia*, 29(2), pp. 117–9. doi: 10.13181/mji.com.204749.

Syarifuddin, S., Wijaya, D. and Masudah, L. (2023) 'Persepsi Calon Jamaah Haji Terhadap Program Interprofessional Education

Berbasis Kesehatan Haji', *Journal of Islamic Pharmacy*, 7(2), pp. 129–132. doi: 10.18860/jip.v7i2.17655.

Yezli, Saber *et al.* (2021) 'Insulin Knowledge, Handling, and Storage among Diabetic Pilgrims during the Hajj Mass Gathering', *Journal of Diabetes Research*, 2021, p. 5596914. doi: 10.1155/2021/5596914.

Yezli, S. *et al.* (2021) 'Prevalence of diabetes and hypertension among hajj pilgrims: A systematic review', *International Journal of Environmental Research and Public Health*, 18(3), pp. 1–16. doi: 10.3390/ijerph18031155.

Yezli, S. *et al.* (2022) 'Pattern of utilization, disease presentation, and medication prescribing and dispensing at 51 primary healthcare centers during the Hajj mass gathering', *BMC Health Services Research*, 22(1), p. 143. doi: 10.1186/s12913-022-07507-3.

Yezli, S. (2023) 'Risk factors for heat-related illnesses during the Hajj mass gathering: an expert review', *Reviews on Environmental Health*, 38(1), pp. 33–43. doi: 10.1515/reveh-2021-0097.

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