



Health Challenges of the Elderly During the Arbaeen Pilgrimage: A Review of Physical, Psychological, Hygienic, Sociocultural and Managerial Dimensions

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Abstract

Context: The Arbaeen pilgrimage is one of the largest religious mass gatherings in the world, attracting millions of participants annually, including a significant number of elderly individuals. While their participation reflects deep spiritual commitment, it also exposes them to a wide range of health risks due to physical exertion, environmental stressors, and limited access to age-appropriate services. Understanding these challenges is essential for improving health outcomes and ensuring safe participation.

Evidence Acquisition: This study employed a narrative review methodology. Scientific literature published between 2010 and 2025 was retrieved from databases including PubMed, Scopus, Google Scholar, Scientific Information Database (SID), and Magiran. Keywords such as “elderly”, “Arbaeen pilgrimage”, “health in mass gatherings”, and “geriatric care” were used. After screening and applying inclusion criteria, 42 relevant studies were selected and analyzed across five thematic domains: Physical, psychological, hygienic, managerial, and sociocultural.

Results: Findings revealed that elderly pilgrims face multifaceted health challenges. Physically, they experience fatigue, chronic disease exacerbation, and injury risks. Psychologically, anxiety, cognitive decline, and sleep disruption are prevalent. Hygienic and nutritional issues include poor sanitation, dehydration, and inadequate dietary options. Managerial challenges involve insufficient infrastructure, emergency response gaps, and lack of trained volunteers. Sociocultural barriers such as language differences and limited social support further compound vulnerability.

Conclusions: Elderly participation in the Arbaeen pilgrimage, while spiritually meaningful, requires targeted health interventions. Multilevel strategies – including infrastructure improvements, preventive care, volunteer training, and international coordination – are essential to safeguard their well-being. Addressing these challenges is both a public health priority and a humanitarian obligation.

Keywords: Elderly Health, Arbaeen Pilgrimage, Mass Gatherings, Geriatric Care, Public Health

1. Context

Aging is a natural and inevitable stage of human life, accompanied by extensive changes across physical, psychological, social, and cognitive domains (1). As individuals grow older, the functionality of various bodily systems declines, motor abilities diminish, and the likelihood of developing chronic conditions such as diabetes, hypertension, cardiovascular, respiratory, and musculoskeletal diseases increases. Alongside these

physiological changes, elderly individuals may also face psychological challenges such as anxiety, depression, memory loss, and feelings of isolation (2). These factors collectively render older adults one of the most vulnerable populations in special circumstances, including mass gatherings and religious events (3).

Among such events, the Arbaeen pilgrimage stands out as one of the largest religious gatherings in the world, annually attracting millions of pilgrims from

various countries to Karbala, Iraq (4). Rooted in Shia Islamic tradition, this pilgrimage symbolizes devotion, sacrifice, solidarity, and loyalty to the ideals of Imam Hussain (AS) (5). Pilgrims often walk long distances — sometimes exceeding 80 kilometers — under challenging environmental conditions, including extreme weather, crowded pathways, and limited access to facilities (6). The participation of elderly individuals in this pilgrimage, despite physical and psychological limitations, reflects deep religious conviction, spiritual motivation, and a desire for active engagement in sacred rituals (7).

However, the involvement of older adults in the Arbaeen pilgrimage presents serious health challenges (8). Long walking distances, adverse environmental conditions, inadequate hygiene and medical services, and the absence of tailored support systems can jeopardize their physical and mental well-being (9). Moreover, the lack of comprehensive planning, infrastructural weaknesses, and insufficient training for volunteers and caregivers further increase their vulnerability (10). In such a context, a systematic and scientific examination of the health challenges faced by elderly pilgrims during Arbaeen becomes an urgent necessity (11).

Studying this issue is not only important from a public health perspective but also holds ethical, cultural, and social significance. Addressing the needs of elderly participants in religious ceremonies reflects societal maturity and respect for human dignity. Furthermore, enhancing the health and safety of this group can improve their spiritual experience, reduce medical burdens, and contribute to better management of large-scale events. Therefore, this review article aims to explore the multifaceted health challenges of elderly individuals during the Arbaeen pilgrimage by analyzing existing literature and offering practical recommendations to improve their conditions.

2. Evidence Acquisition

This study was conducted using a narrative review approach. Scientific sources were retrieved from reputable databases, including PubMed, Scopus, Google Scholar, the Scientific Information Database (SID), and Magiran, covering the time span from 2010 to 2025. The search strategy employed keywords such as “elderly”, “geriatric health”, “Arbaeen pilgrimage”, “religious mass gatherings”, “pilgrim hygiene”, and “travel health care”. Boolean operators (AND, OR) were used to refine the search and ensure comprehensive coverage.

After initial screening, 42 relevant articles were selected for in-depth analysis. These included qualitative

and quantitative studies, field reports, and previous review articles. Inclusion criteria focused on studies that addressed health-related challenges of elderly individuals in mass gatherings, particularly religious pilgrimages. Exclusion criteria involved articles unrelated to aging populations or those lacking empirical data.

The selected studies were categorized based on thematic relevance to physical health, psychological well-being, hygiene and nutrition, and logistical or managerial aspects. Data extraction was performed manually, and findings were synthesized narratively to identify recurring patterns, gaps in knowledge, and practical implications for improving elderly care during the Arbaeen pilgrimage.

3. Results

The review of 42 scholarly articles, field reports, and prior reviews revealed a complex and multifaceted landscape of health challenges faced by elderly pilgrims during the Arbaeen pilgrimage. These challenges span across five major domains: Physical and physiological, psychological and cognitive, hygienic and nutritional, managerial and infrastructural, and sociocultural and communicative. Each domain is explored below with detailed subcategories and contextual insights (Figure 1).

3.1. Physical and Physiological Challenges

3.1.1. Musculoskeletal Limitations

Age-related degeneration of joints, muscles, and connective tissues significantly impairs mobility (12). Elderly pilgrims often report joint stiffness, lower back pain, and reduced walking endurance. Studies show that prolonged walking exacerbates osteoarthritis symptoms, especially in the knees and hips (13).

3.1.2. Cardiovascular and Respiratory Vulnerabilities

The physical exertion required during the pilgrimage can strain the cardiovascular system. Elderly individuals with pre-existing conditions such as arrhythmia, congestive heart failure, or chronic obstructive pulmonary disease (COPD) are at increased risk of cardiac events (8). Exposure to dust and pollutants along the route can trigger asthma attacks and respiratory distress (14).

3.1.3. Neurological and Balance Disorders

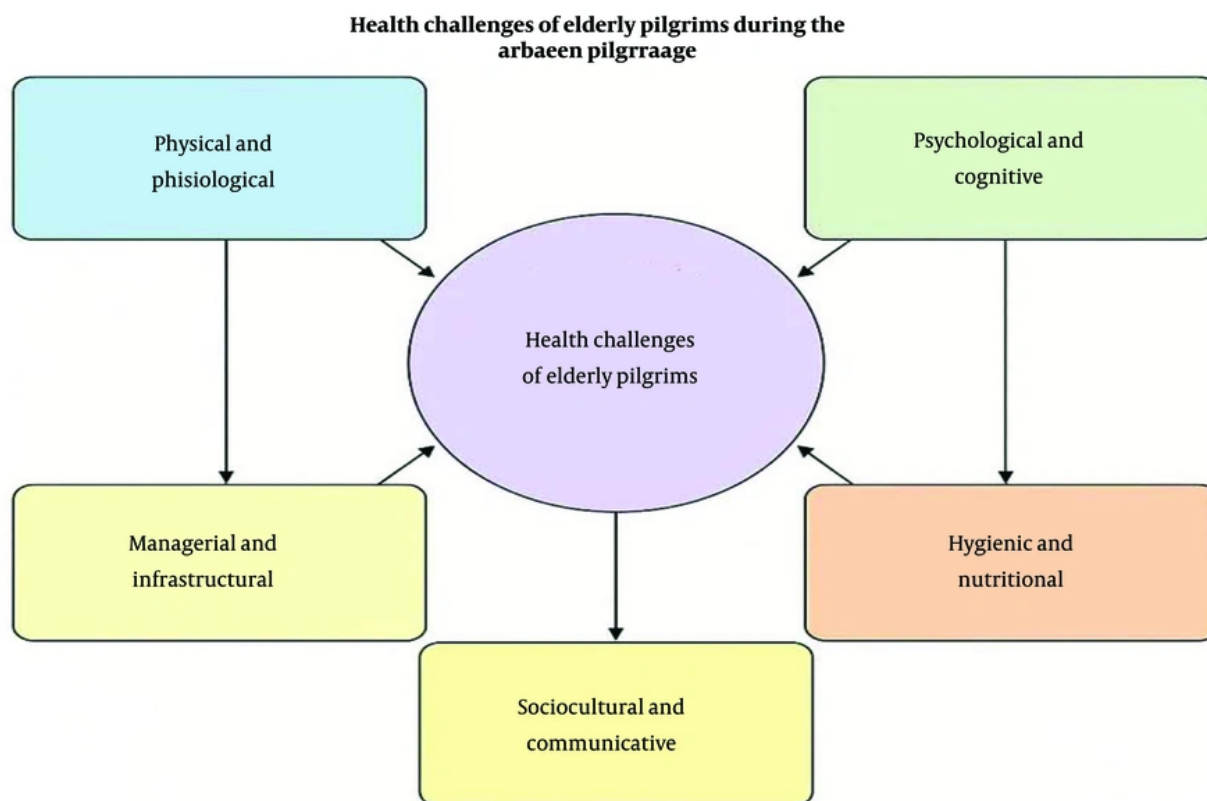


Figure 1. Health challenges of the elderly during the Arbaeen pilgrimage

Age-related decline in proprioception and vestibular function contributes to poor balance and increased fall risk (15). Pilgrims with Parkinson's disease or peripheral neuropathy face heightened difficulty navigating uneven terrain, especially in crowded areas (12).

3.1.4. Heat Stress and Thermoregulation

Older adults have a diminished ability to regulate body temperature (16). In high-temperature environments, they are more susceptible to heat exhaustion, dehydration, and heatstroke (6). Conversely, nighttime cold can lead to hypothermia, particularly in those with poor circulation or low body mass (17, 18).

3.1.5. Medication Adherence and Accessibility

Interruptions in medication schedules due to travel logistics, lack of refrigeration (for insulin or biologics), and language barriers in pharmacies can lead to uncontrolled symptoms (1). Some pilgrims report

skipping doses or rationing medications due to fear of running out (7, 19).

3.2. Psychological and Cognitive Challenges

3.2.1. Anxiety and Emotional Distress

The unpredictability of the journey, fear of separation from companions, and concern over physical limitations contribute to heightened anxiety (20). Elderly pilgrims may experience panic attacks, irritability, or emotional withdrawal, especially in unfamiliar environments (21).

3.2.2. Depression and Mood Disorders

Feelings of isolation, fatigue, and perceived burden on others can lead to depressive symptoms. The lack of mental health support services along the route exacerbates this issue (22). Some pilgrims report a

decline in motivation or spiritual engagement due to emotional exhaustion (23).

3.2.3. Cognitive Impairments and Disorientation

Pilgrims with mild cognitive impairment (MCI), Alzheimer's disease, or vascular dementia may struggle with orientation, memory recall, and decision-making. These impairments increase the risk of getting lost, misinterpreting instructions, or failing to recognize danger (24).

3.2.4. Sleep Disruption and Circadian Misalignment

Irregular sleep schedules, noise pollution, and overcrowded sleeping areas contribute to insomnia and circadian rhythm disturbances. Sleep deprivation can impair judgment, worsen mood, and increase susceptibility to illness (25).

3.2.5. Psychological Resilience and Coping Mechanisms

Elderly individuals traveling alone or without family may experience loneliness and social isolation (26). Lack of peer support groups or designated gathering spaces for seniors reduces opportunities for meaningful interaction and emotional comfort (27).

3.3. Hygienic and Nutritional Challenges

3.3.1. Sanitation and Personal Hygiene

Limited access to clean, accessible toilets and washing facilities poses a major challenge. Elderly individuals with mobility impairments or incontinence require specialized hygiene accommodations, which are often unavailable (28). Poor sanitation increases the risk of urinary tract infections, skin rashes, and gastrointestinal illnesses (29).

3.3.2. Infection Control and Communicable Diseases

Crowded conditions, shared sleeping quarters, and communal food distribution heighten the risk of infectious disease transmission (30). Elderly pilgrims are particularly vulnerable to influenza, norovirus, and respiratory infections due to weakened immune systems (13).

3.3.3. Nutritional Deficiencies and Dietary Incompatibility

Meals provided by volunteer-run camps (mawakib) may lack nutritional balance or fail to meet dietary restrictions (31). High-sodium, high-fat, or spicy foods can aggravate hypertension, diabetes, and acid reflux.

Lack of fiber and hydration may lead to constipation and fatigue (27).

3.3.4. Hydration and Electrolyte Imbalance

Dehydration is a common issue due to heat exposure, physical exertion, and limited water availability. Electrolyte imbalances can cause muscle cramps, dizziness, and cardiac arrhythmias (8). Some pilgrims avoid drinking water to reduce bathroom visits, further compounding the problem (28).

3.3.5. Preventive Health Services and Screening

There is a notable absence of preventive care such as blood pressure monitoring, glucose checks, and nutritional counseling (8). Mobile clinics, where available, are often overwhelmed and lack geriatric-specific protocols (32).

3.4. Managerial and Infrastructural Challenges

3.4.1. Route Design and Accessibility

Pilgrimage routes are not optimized for elderly mobility. The lack of ramps, handrails, shaded rest areas, and tactile signage makes navigation difficult. Uneven pavement and long walking distances without rest stations increase fatigue and injury risk (31).

3.4.2. Emergency Response and Medical Evacuation

In case of medical emergencies, response times are often delayed due to traffic congestion, poor communication, and limited ambulance availability (29). Elderly pilgrims may face long waits for care or be forced to discontinue their journey (1).

3.4.3. Volunteer Training and Geriatric Awareness

Many volunteers lack training in elderly care, first aid, or communication with cognitively impaired individuals (5). This gap leads to mismanagement, neglect, or unintentional harm. There is a need for structured training programs and multilingual health guides (33).

3.4.4. Coordination Between Health Authorities

The multinational nature of the pilgrimage demands cross-border coordination (28). However, disparities in healthcare systems, data sharing, and emergency protocols hinder unified service delivery. Elderly pilgrims from abroad may face bureaucratic delays or lack insurance coverage (32).

3.4.5. Infrastructure for Assistive Devices

Wheelchair accessibility is limited, and there are few charging stations for mobility aids (14). Pilgrims using walkers or canes often struggle with terrain and crowd flow. Lack of storage or repair services for assistive devices adds to the burden (34).

3.5. Sociocultural and Communicative Challenges

3.5.1. Cultural Perceptions of Aging

While Islamic culture emphasizes respect for the elderly, practical accommodations are often lacking (10). Elderly pilgrims may feel marginalized or overlooked in logistical planning. Cultural taboos around dependency or asking for help may prevent them from voicing their needs (34).

3.5.2. Language Barriers and Information Access

Non-Arabic-speaking pilgrims face difficulties understanding signage, medical instructions, or announcements. This barrier can lead to miscommunication, medication errors, or missed opportunities for assistance (32).

3.5.3. Social Inclusion and Peer Support

Elderly individuals traveling alone or without family may experience loneliness and social isolation. Lack of peer support groups or designated gathering spaces for seniors reduces opportunities for meaningful interaction and emotional comfort (33).

3.5.4. Religious Motivation vs. Physical Limitation

Many elderly pilgrims are driven by deep spiritual conviction, which may lead them to ignore physical warning signs or medical advice. This tension between faith and frailty requires sensitive, culturally informed health messaging (35).

4. Conclusions

This systematic review of health challenges faced by elderly pilgrims during the Arbaeen pilgrimage reveals a complex and multilayered set of physical, psychological, hygienic, managerial, and sociocultural issues. Long walking distances, harsh environmental conditions, limited access to medical and sanitary services, infrastructural shortcomings, and insufficient volunteer training all contribute to elevated health risks for older adults. In addition, cognitive impairments, anxiety, dependency, sleep deprivation, and inadequate

nutrition further compromise their mental and social well-being.

The findings indicate that many of these challenges are preventable or manageable – provided that there is comprehensive planning, inter-agency coordination, and culturally sensitive attention to the specific needs of elderly participants. While their participation is often driven by profound spiritual and religious motivation, this should not overshadow the physical and psychological realities they face. Respecting the dignity of older adults must go beyond cultural rhetoric and be reflected in the design of walking routes, medical services, nutrition, transportation, and volunteer education.

Ultimately, addressing the health needs of elderly pilgrims in mass religious gatherings such as Arbaeen is not only a humanitarian and ethical imperative but also a public health priority. It contributes to crisis preparedness, enhances the quality of the spiritual experience, and promotes inclusive participation. By highlighting these challenges and offering a comprehensive overview of the current landscape, this review lays the groundwork for developing practical solutions to improve the safety and well-being of elderly individuals in future pilgrimages.

Footnotes

Authors' Contribution: M. N. conceptualized the study. A. M. and M. N. supervised data collection. A. M. and S. G. developed the database search strategy. A. M. analyzed the data and drafted the first version of the manuscript. M. N. and S. G. reviewed and edited the manuscript. All authors read, revised, and approved the final version of the manuscript.

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References

1. Moulaei K, Bastaminejad S, Haghdoost A. Health challenges and facilitators of arbaeen pilgrimage: a scoping review. *BMC Public Health*. 2024;**24**(1):132. [PubMed ID: 38195530]. [PubMed Central ID: PMC10777642]. <https://doi.org/10.1186/s12889-024-17640-9>.
2. Mohammadinia L, Abadi ESN. Barriers and Challenges for Healthcare Professionals in the Context of the Arbaeen Pilgrimage. *Mass*

- Gathering Medical Journal. 2025;2(2).
3. Hajian M, Mohaghegh S. Factors Influencing the health of participants in religious mass gathering ceremonies in Iraq: a systematic review. *Trauma Monthly*. 2023;28(1):694-714.
 4. Movahed A, Moazzeni M, Kian B. Spiritual Experience at the Arbaeen Pilgrimage: The Case of Iranian Pilgrims. *Int J Religious Tourism Pilgrimage*. 2024;11(6):9.
 5. Rasouli M. Evaluation of Capabilities and facilities of Najaf to Karbala Road with Emphasis on Hosseini's Arbaeen. *Interdisciplinary Studies in Society, Law, and Politics*. 2023;2(4):77-91.
 6. Kolivand P, Moslehi S, Marzban A, Bastami M, Sayadi H. Investigating the Risk Perception of Arbaeen Pilgrims Regarding Heat Stroke. *Trauma Monthly*. 2025;30(1):1346-52. <https://doi.org/10.30491/tm.2024.468507.1750>.
 7. Karampourian A, Ghomian Z, Khorasani-Zavareh D. Exploring challenges of health system preparedness for communicable diseases in Arbaeen mass gathering: a qualitative study. *F1000Res*. 2018;7:1448. [PubMed ID: 30473777]. [PubMed Central ID: PMC6234742]. <https://doi.org/10.12688/f1000research.15290.1>.
 8. Peyravi M, Ahmadi Marzaleh M, Najafi H. An overview of health-related challenges in a mass gathering. *Trauma Monthly*. 2020;25(2):78-82. <https://doi.org/10.30491/tm.2020.213574.1022>.
 9. Al-Ansari F, Al Ansari M, Hill-Cawthorne GA, Abdulzahra MS, Al-Ansari MB, Al-Ansari B, et al. Arbaeen public health concerns: A pilot cross-sectional survey. *Travel Med Infect Dis*. 2020;35:101546. [PubMed ID: 31838209]. <https://doi.org/10.1016/j.tmaid.2019.101546>.
 10. Marzban A, Bastami MT, Moslehi S, Kolivand P. Environmental and Social Factors Influencing Heat Exhaustion Among Arbaeen Pilgrims: A Narrative Review. *Mass Gather Med J*. 2025;2(2).
 11. Azizi H, Davtalab Esmaeili E, Naghili B, Ghanbarzadeh Javid S, Sarbazi E, Abbasi F. Risk factors for diarrheal diseases among pilgrims during Arbaeen mass gathering: a case-control study. *BMC Infect Dis*. 2024;24(1):1063. [PubMed ID: 39333896]. [PubMed Central ID: PMC11437897]. <https://doi.org/10.1186/s12879-024-09962-1>.
 12. Tavan A, Tafti AD, Nekoie-Moghadam M, Ehrampoush M, Vafaei Nasab MR, Tavangar H, et al. Risks threatening the health of people participating in mass gatherings: A systematic review. *J Educ Health Promot*. 2019;8:209. [PubMed ID: 31807599]. [PubMed Central ID: PMC6852309]. https://doi.org/10.4103/jehp.jehp_214_19.
 13. Memish ZA, Steffen R, White P, Dar O, Azhar EI, Sharma A, et al. Mass gatherings medicine: public health issues arising from mass gathering religious and sporting events. *Lancet*. 2019;393(10185):2073-84. [PubMed ID: 31106753]. [PubMed Central ID: PMC7159069]. [https://doi.org/10.1016/S0140-6736\(19\)30501-X](https://doi.org/10.1016/S0140-6736(19)30501-X).
 14. Singh I, Zumla A. Ensuring the safety and health of older people at mass gathering events. *BMJ*. 2025;390:r1650. [PubMed ID: 40769524]. <https://doi.org/10.1136/bmj.r1650>.
 15. Karami M, Doosti-Irani A, Ardalan A, Gohari-Ensaf F, Berangi Z, Massad E, et al. Public Health Threats in Mass Gatherings: A Systematic Review. *Disaster Med Public Health Prep*. 2019;13(5-6):1035-46. [PubMed ID: 31250774]. <https://doi.org/10.1017/dmp.2018.161>.
 16. Mehrvarz S, Bagheri MJ, Manoochehry S, Einollahi B, Ganjeh M, Doroudi T, et al. Evaluation of trauma management in injured Iranian Hajj pilgrims in 2015 Mina stampede. *Iran Red Crescent Med J*. 2021;23(3):6.
 17. Marzban A. Innovative Technologies in Preventing and Managing Heat Exhaustion During Large Religious Gatherings. *Mass Gather Med J*. 2025;2(2).
 18. Salehi SZ. Heatstroke During Arbaeen Walking and Its Prevention: A Review Study. *Mass Gather Med J*. 2024;1(2).
 19. Felkai P. Medical Problems of Way of St. James Pilgrimage. *J Relig Health*. 2019;58(2):566-71. [PubMed ID: 30604326]. <https://doi.org/10.1007/s10943-018-00744-z>.
 20. Hopkins N, Reicher S. The psychology of health and well-being in mass gatherings: A review and a research agenda. *J Epidemiol Glob Health*. 2016;6(2):49-57. [PubMed ID: 26164280]. [PubMed Central ID: PMC7320437]. <https://doi.org/10.1016/j.jegh.2015.06.001>.
 21. Yezli S, Khan AA. The Jeddah tool. A health risk assessment framework for mass gatherings. *Saudi Med J*. 2020;41(2):121-2. [PubMed ID: 32020143]. [PubMed Central ID: PMC7841630]. <https://doi.org/10.15537/smj.2020.2.24875>.
 22. Marzban A, Movahedi A, Miri SMR. Psychological Well-Being of Participants in Mass Gatherings: Stress, Anxiety. *Mass Gather Med J*. 2025;2(2).
 23. Joseph JK, Babu N, Dev KA, Pradeepkumar AP. Identification of potential health risks in mass gatherings: A study from Sabarimala pilgrimage, Kerala, India. *Int J Disaster Risk Reduct*. 2016;17:95-9. <https://doi.org/10.1016/j.ijdrr.2016.04.008>.
 24. Kolivand P, Saberian P, Saffari H, Doroudi T, Marashi A, Behzadifar M, et al. Patterns of diabetes mellitus by age, sex, and province among Iranian Hajj pilgrims and health care delivery during 2012-2022: A retrospective study of 469,581 participants. *PLoS One*. 2024;19(10):e0311399. [PubMed ID: 39378202]. [PubMed Central ID: PMC11460693]. <https://doi.org/10.1371/journal.pone.0311399>.
 25. Khogeer Z, Alnifae R, Alyamani S, Alharbi K, Hanbaza S, Mashhor A, et al. Acute Complications of Diabetes Among Pilgrims During Hajj 2017: A Brief Report. *Diabetes Ther*. 2020;11(3):747-51. [PubMed ID: 32036541]. [PubMed Central ID: PMC7048894]. <https://doi.org/10.1007/s13300-020-00774-5>.
 26. Ahmed QA, Memish ZA. From the "Madding Crowd" to mass gatherings-religion, sport, culture and public health. *Travel Med Infect Dis*. 2019;28:91-7. [PubMed ID: 29879514]. [PubMed Central ID: PMC7110704]. <https://doi.org/10.1016/j.tmaid.2018.06.001>.
 27. Hopkins N, Reicher S. Mass Gatherings, Health, and Well-Being: From Risk Mitigation to Health Promotion. *Social Issues Policy Rev*. 2020;15(1):114-45. <https://doi.org/10.1111/sipr.12071>.
 28. Tavan A, Tafti AD, Nekoie-Moghadam M, Ehrampoush M, Nasab MRV, Tavangar H. Public health risks threatening health of people participating in mass gatherings: A qualitative study. *Indian J Public Health*. 2020;64(3):242-7. [PubMed ID: 32985424]. https://doi.org/10.4103/ijph.IJPH_305_19.
 29. Vortmann M, Balsari S, Holman SR, Greenough PG. Water, Sanitation, and Hygiene at the World's Largest Mass Gathering. *Curr Infect Dis Rep*. 2015;17(2):461. [PubMed ID: 25783442]. <https://doi.org/10.1007/s11908-015-0461-1>.
 30. Abubakar I, Gautret P, Brunette GW, Blumberg L, Johnson D, Poumerol G, et al. Global perspectives for prevention of infectious diseases associated with mass gatherings. *Lancet Infect Dis*. 2012;12(1):66-74. [PubMed ID: 22192131]. [https://doi.org/10.1016/S1473-3099\(11\)70246-8](https://doi.org/10.1016/S1473-3099(11)70246-8).
 31. Delir Haghighi P, Burstein F, Zaslavsky A, Arbon P. Development and evaluation of ontology for intelligent decision support in medical emergency management for mass gatherings. *Decision Support Systems*. 2013;54(2):1192-204. <https://doi.org/10.1016/j.dss.2012.11.013>.
 32. Tobaiqy M, Alhasan AH, Shams MM, Amer SA, MacLure K, Alcantan MF, et al. Assessment of Preventative Measures Practice among Umrah Pilgrims in Saudi Arabia, 1440H-2019. *Int J Environ Res Public Health*. 2020;18(1). [PubMed ID: 33396376]. [PubMed Central ID: PMC7796344]. <https://doi.org/10.3390/ijerph18010257>.
 33. Soltani A, Aram M, Alaeddini F, Marzaleh MA. Challenges of health services during Arbaeen Pilgrimage in 2019. *Diabetes*. 2021;3(1.9):0.067.
 34. Mushi A, Yassin Y, Khan A, Alotaibi B, Parker S, Mahomed O, et al. A Longitudinal Study Regarding the Health Profile of the 2017 South African Hajj Pilgrims. *Int J Environ Res Public Health*. 2021;18(7).

- [PubMed ID: [33807142](#)]. [PubMed Central ID: [PMC8036399](#)]. <https://doi.org/10.3390/ijerph18073607>.
35. Lin HH, Lin TY, Hsu CW, Chen CH, Li QY, Wu PH. Moderating Effects of Religious Tourism Activities on Environmental Risk, Leisure Satisfaction, Physical and Mental Health and Well-Being among the Elderly in the Context of COVID-19. *Int J Environ Res Public Health*. 2022;**19**(21). [PubMed ID: [36361295](#)]. [PubMed Central ID: [PMC9658456](#)]. <https://doi.org/10.3390/ijerph192114419>.