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SYSTEMATIC REVIEW

The impact of the Hajj Pilgrimage on psychological wellbeing and mental health outcomes: a mixed-methods systematic review

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ABSTRACT

Background: The Hajj is one of the world's largest recurrent mass gatherings, bringing millions of pilgrims into a confined setting under extreme heat, overcrowding, and physical exertion. Religiosity is generally protective for mental health, yet negative religious coping can worsen depressive symptoms, and evidence on the psychological consequences of Hajj remains fragmented.

Methods: This mixed-methods systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 statement and was prospectively registered. PubMed, Embase, Scopus, and Web of Science were searched to June 2026. Two reviewers independently screened records, extracted data, and appraised quality using the Mixed Methods Appraisal Tool (MMAT). Given substantial heterogeneity, findings were combined by narrative synthesis rather than meta-analysis, and certainty was formally graded for both evidence strands.

Results: Eleven studies were included. Most reported preserved or improved wellbeing, with gains in meaning in life, collective identity, and intergroup tolerance. This pattern was not uniform: general-health scores diverged across the two studies using the same instrument, the single causal design found reduced wellbeing concentrated among women, and a consistent minority, particularly women, unmarried or older attendees, and those on psychiatric medication, experienced elevated distress, including suicidal ideation in 6.2% of one sample. Certainty was low for quantitative and moderate for qualitative findings.

Conclusion: Hajj participation was compatible with stable or improved psychological wellbeing for most pilgrims, while an identifiable subgroup remained vulnerable under physical and social load. Targeted psychological screening within existing pre-travel and on-site services, alongside prospective cohort research, would strengthen this evidence base.

Keywords: Hajj, mental health, psychological wellbeing, pilgrimage, psychological adaptation.

Introduction

The Hajj is the annual Islamic pilgrimage to Mecca, Kingdom of Saudi Arabia, and is one of the largest recurrent mass gatherings in the world, bringing together millions of pilgrims from more than 180 countries within a confined geographical and temporal setting [1,2]. The pilgrimage trebles the resident population of Mecca and assembles a demographically diverse cohort, many of whom are elderly, of low income or burdened by pre-existing comorbidities, under extreme desert conditions

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and intense congestion [1]. Performing the rites demands sustained physical exertion in temperatures that may exceed 45°C, alongside overcrowding, sleep disruption and prolonged separation from familiar social structures [2,3]. Although the Hajj is widely associated with profound spiritual fulfilment, the convergence of these physical, environmental, and psychosocial stressors makes psychological wellbeing a salient yet underexamined dimension of pilgrim health [3].

The scale of the event is substantial: the 2023 season recorded 1,845,045 pilgrims, approximately 90% of whom arrived from abroad [4]. Saudi health authorities accordingly mobilize extensive infrastructure, including real-time electronic surveillance and thousands of hospital beds, to manage the health needs of this population [5]. Against this backdrop, the global burden of mental disorders is considerable and rising: the number of affected individuals increased by 48.1% between 1990 and 2019 to 970.1 million, with depressive and anxiety disorders together accounting for most mental disorder-related disability-adjusted life-years [6]. Regional data reinforce this burden; a nationwide Iranian survey reported a lifetime prevalence of psychiatric disorders of 10.81%, anxiety disorders being the most common class at 8.35% [7]. A large, comorbidity-laden and psychologically vulnerable pilgrim population within a high-stress environment therefore carries appreciable implications for mental health [1,2].

Health provision for pilgrims has predominantly prioritized communicable disease, heat-related illness, and traumatic injury, supported by mandatory vaccination, vector control, and advanced hospital-based services [5,8]. Within Saudi Arabia more broadly, mental health services have historically been constrained by an over-reliance on inpatient care, an absence of community mental health services, and marked shortages of qualified psychiatrists and allied professionals [9]. Religiosity and spirituality are frequently invoked as protective psychological resources, and higher religious involvement has been associated with greater wellbeing and lower rates of depression and anxiety [8]. Conversely, negative religious coping and spiritual struggle may precede and contribute to the onset of depressive symptoms, indicating that religious experience is not uniformly protective [10].

Despite a mature literature on mass-gathering medicine at the Hajj, evidence on its psychological and mental health consequences remains fragmented and methodologically heterogeneous, comprising disparate quantitative and qualitative investigations that have not been systematically integrated. The dual nature of the pilgrimage, as a source of both spiritual benefit and acute distress, requires an approach capable of capturing measurable outcomes alongside the lived meaning of the journey [3,8]. This mixed-methods systematic review therefore synthesizes and critically appraises the existing quantitative and qualitative evidence concerning the impact of the Hajj pilgrimage on psychological wellbeing and mental health outcomes, with a view to informing future research priorities and the development of culturally appropriate mental health interventions for pilgrims.

Methods

Protocol and registration

This mixed-methods systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [11]. Because no quantitative pooling of effect estimates was undertaken, the narrative synthesis was additionally informed by the Synthesis Without Meta-analysis (SWiM) guideline [12]. The protocol was prospectively registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number CRD420261432784, on June 20, 2026 [13]. No substantive deviations from the registered protocol occurred; minor wording refinements to the search strategy made during piloting did not alter the eligibility criteria.

Eligibility criteria

Eligibility was defined using the PICOS framework. Population: adult Muslim pilgrims (aged ≥ 18 years) who were performing, or had performed, Hajj, irrespective of nationality, sex or baseline health status, including those with pre-existing psychiatric conditions. Exposure: participation in the Hajj pilgrimage, encompassing the full ritual cycle or its core rites. Comparator: within-person pre-Hajj baseline, non-pilgrim or general-population samples, unsuccessful Hajj-visa applicants, or Umrah pilgrims; single-group studies without a comparator were retained for prevalence-based and qualitative objectives only. Outcomes: validated measures of psychological wellbeing and distress (primary), and spiritual wellbeing, post-traumatic stress symptoms, resilience, health-related quality of life, psychiatric-morbidity prevalence, service-utilization indicators, and qualitative accounts of psychological change (additional). Study design: randomized and non-randomized quantitative studies and qualitative studies published in English, with no restriction on publication date.

Information sources and search strategy

PubMed, Embase, Scopus, and Web of Science were searched from inception to the final search date of June 24, 2026, supplemented by Google Scholar and hand-searching of the reference lists of included studies and relevant reviews. Only published, peer-reviewed studies were sought; gray literature was not systematically searched. The search combined controlled vocabulary and free-text terms for three concepts, namely Hajj, psychological and mental-health constructs, and pilgrim populations, joined with Boolean operators, and was piloted before adaptation to each database's syntax. The full search strategy for each of the four databases is provided in Supplementary File 2.

Study selection and data extraction

Retrieved records were imported into a reference-management platform and de-duplicated. Titles and

abstracts were screened independently and in duplicate by two reviewers against the eligibility criteria using the Rayyan screening platform, and potentially eligible studies underwent independent full-text assessment by the same two reviewers. Disagreements at either stage were resolved by discussion, with a third reviewer consulted where consensus could not be reached. A standardized extraction form, piloted on a sample of included studies, captured study identification, setting, design, sample characteristics, timing of outcome assessment relative to Hajj, exposure, comparator, outcome measures, principal findings, and funding or conflict-of-interest information. Data were extracted independently and in duplicate, with discrepancies resolved by discussion or by a third reviewer. Study authors were to be contacted for unclear or missing data, though this was not required.

Risk of bias assessment

Methodological quality was appraised using the Mixed Methods Appraisal Tool (MMAT), 2018 version, which enables concurrent appraisal of qualitative, quantitative, and mixed-methods studies using design-specific criteria alongside five generic screening questions [14]. Each study was rated independently and in duplicate by two reviewers, yielding an overall pattern of risk (low, moderate, or high) rather than a single score, consistent with MMAT guidance. Disagreements were resolved by discussion, with a third reviewer arbitrating unresolved discrepancies.

Data synthesis

Given marked heterogeneity in designs, populations, exposures, and outcome measures, meta-analysis was not undertaken; a convergent, segregated narrative synthesis was performed instead. Studies were grouped and tabulated by design, outcome domain, and timing of assessment relative to Hajj. Qualitative findings were synthesized thematically, and quantitative findings narratively, with variability in the direction and magnitude of effect explored descriptively rather than pooled statistically. The two strands were then integrated to identify convergence and divergence across findings. Certainty of the quantitative evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach [15], and confidence in the qualitative findings was assessed using the Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) approach, considering methodological limitations, coherence, adequacy of data, and relevance [16].

Results

Study selection

The search yielded 142 records across PubMed, Scopus, Embase, and Web of Science. After removal of duplicates, 114 records were screened by title and abstract, of which 90 were excluded. Twenty-four full-text articles were then assessed for eligibility, and 13 were excluded against the pre-specified criteria: six reported no relevant outcome measures, four used an ineligible study design, and three studied an ineligible population. Eleven studies met the inclusion criteria and were included in the review (Figure 1).

Characteristics of included studies

The 11 included studies were conducted in, or drew participants from, Iran, Pakistan, Saudi Arabia, Turkey, the United Kingdom, Morocco, Malaysia, and India. Participants ranged in age from 19 to 83 years and sample sizes from 11 to 1,605 participants. Follow-up ranged from immediate post-return assessment to 18 months of fieldwork, and several studies were cross-sectional with no follow-up.

Four studies were qualitative: a multi-site ethnography [17], an exploratory focus-group study [18], a thematic analysis [19] and a grounded-theory study [20]. Three were cross-sectional quantitative studies [21–23], one was a descriptive epidemiological clinic-based study [24], two used single-group pre–post designs [25,26], and one was a natural experiment using a visa lottery as an instrumental variable [27].

Outcome measurement was heterogeneous. The most commonly used validated instruments were the 28-item General Health Questionnaire (GHQ-28) [25,26], the Mini-International Neuropsychiatric Interview (MINI) [21], and DSM-IV-TR [22] and ICD-10 [24] diagnostic criteria. Additional measures included the Meaning in Life Questionnaire [25], a structured survey comprising 25 thematic indices [27], and a verbally administered seven-point Likert questionnaire assessing latent constructs [23]. The qualitative studies used semi-structured interviews, focus group discussions, and participant observation [17–20]. The absence of a single standardized outcome measure across studies limited direct comparison and precluded statistical pooling. Summary characteristics of the included studies are presented in Table 1, and baseline participant characteristics in Table 2.

Quantitative findings

The two studies using the GHQ-28 reached different conclusions. Bakhtiari et al. [25] reported significant increases in the somatization, anxiety/insomnia, social dysfunction, and depression subscale scores following Hajj (paired *t*-tests, $p < 0.01$), alongside a substantial rise in meaning-in-life scores (mean change 55.69; $t = 13.96$, $p < 0.001$); findings were reported at the aggregate level without subgroup analysis. Fateh et al. [26] found no significant pre- to post-Hajj change in total GHQ-28 score (50.1 before versus 49.5 after; $p = 0.248$), although social dysfunction worsened after the pilgrimage, and regression analyses indicated that age and educational level influenced scores.

The visa-lottery natural experiment provided the strongest causal evidence [27]. Hajj participation significantly increased belief in equality and harmony across ethnic and sectarian groups, improved views of other nationalities, and produced more favorable attitudes toward women (all $p < 0.01$), with larger gains in knowledge and tolerance among pilgrims travelling in smaller parties. Wellbeing outcomes moved in the opposite direction: the rescaled

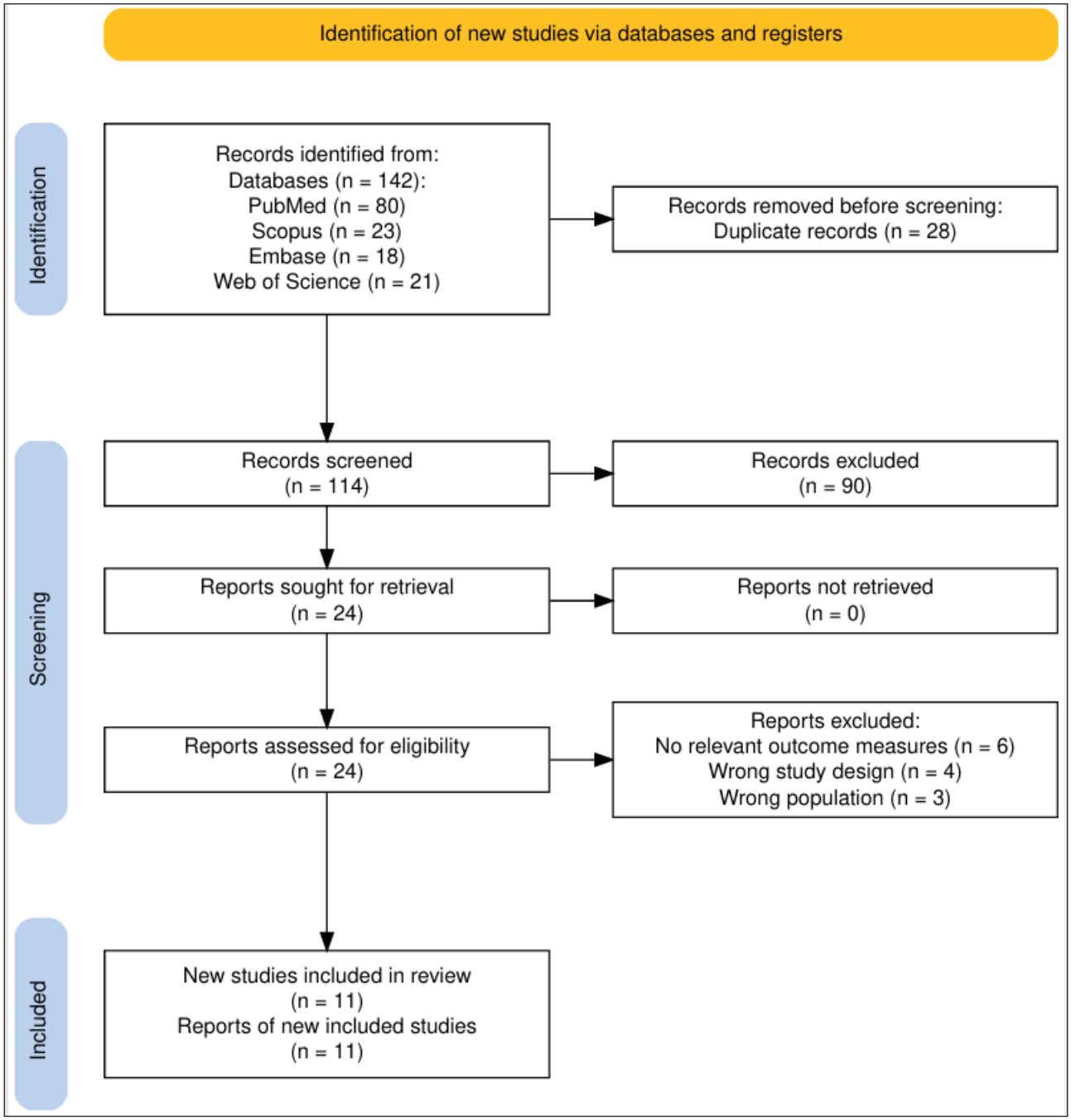

Figure 1. *PRISMA 2020 flow diagram of study identification, screening, and inclusion.*

six-item Kessler psychological distress index (K6), on which a higher score denotes less distress, fell by 0.206 standard deviations ($p < 0.01$), positive feelings fell by 0.109 standard deviations ($p < 0.05$), and self-rated physical health fell by 0.213 standard deviations ($p < 0.01$). These wellbeing effects were concentrated almost entirely among women, with no significant effect among men, whereas overall satisfaction with life and finances was unchanged.

Studies of psychiatric morbidity found that a minority of pilgrims met diagnostic criteria. Alzahrani et al. [21] reported that 7.2% of 513 pilgrims had at least one psychiatric disorder, most commonly depression (2.0%), agoraphobia (1.8%), and psychosis (1.4%); suicidality was identified in 6.2%, with greater vulnerability among women, unmarried individuals, and those taking psychiatric medication. Özen [22] reported high rates of depression (26.5%), anxiety (16.3%), panic disorder (14.0%), and generalized anxiety disorder (12.9%) in a psychiatric outpatient sample, with anxiety more prevalent in women and sleep disturbance more prevalent in men. Khan et al. [24] recorded 182 pilgrims presenting with psychological problems among approximately 136,000 attending the Indian Medical Mission; stress-related presentations were the most common (45.7%), followed by psychosis (9.8%), insomnia (7.3%) and mood disorders (5.6%), and 12% of those affected required admission. The great majority had no previous psychiatric history.

Table 1. *Summary characteristics of the included studies.*

First author [ref]	Country of study	Setting and population	Design	Follow-up duration	Data collection method
Al-Ajarma [17]	Morocco	Moroccan returned pilgrims and non-pilgrims	Ethnography (multi-site, participant observation)	18 months of fieldwork (Jul 2015–Jan 2017)	Participant observation and in-depth interviews
Abd Rahman et al. [18]	Malaysia; data from Pakistan (Lahore)	Pakistani female Hajj pilgrims	Exploratory focus group discussion (FGD)	Retrospective recall	Single FGD with image elicitation (4 Hajj sites) and semi-structured questions
Yalcin and Hopkins [19]	United Kingdom	British Muslims who completed Hajj (2018/2019)	Thematic analysis (grounded-theory oriented)	≤3 months post-Hajj (mostly)	Semi-structured interviews (mean duration ≈ 51 minutes)
Yalcin and Hopkins [20]	United Kingdom	Muslims in Britain who completed Hajj (2018/2019)	Grounded theory (constructivist orientation)	≤3 months post-Hajj (mostly)	Semi-structured interviews
Alzahrani et al. [21]	Saudi Arabia (Makkah)	Multinational Hajj pilgrims during the 2016 Hajj	Cross-sectional prevalence study	None (cross-sectional)	Semi-structured interviews and MINI v6 administered by trained data collectors
Özen [22]	Saudi Arabia (Makkah); Turkish pilgrims	Turkish pilgrims at the Turkish Mecca Hospital psychiatric outpatient clinic, 2008	Cross-sectional descriptive study (outpatient clinic sample)	None (cross-sectional)	Semi-structured form; DSM-IV-TR diagnosis; systematic random sampling
Alnabulsi et al. [23]	Saudi Arabia (Mecca); multinational pilgrims	Pilgrims from 7 language groups and 72 countries, 2012 Hajj	Cross-sectional survey (SEM)	None (cross-sectional, in the moment)	Verbally administered questionnaire (latent constructs, 7-point scales)
Khan et al. [24]	Saudi Arabia (Makkah); Indian pilgrims	Indian Hajj pilgrims (≈ 136,000) attending the Indian Medical Mission, 2016	Descriptive epidemiological study (clinic-referral based)	1–2 months (until departure to India)	Semi-structured clinical interview by a psychiatrist; ICD-10 diagnosis
Bakhtiari et al. [25]	Iran (Tehran)	Sharif University of Technology students (Iranian pilgrims)	Descriptive–correlational, pre/post (single group)	Immediate post-Hajj (no extended follow-up)	Self-administered questionnaires (GHQ-28; Meaning in Life Questionnaire)
Fateh et al. [26]	Iran (Shahroud)	Iranian pilgrims from two caravans, Hajj Tamattu 2011	Longitudinal, pre/post (single group)	≈ 1 month (immediate post-return)	Self-administered GHQ-28 (Persian, validated)
Clingingsmith et al. [27]	Pakistan (Punjab)	Pakistani Sunni Hajj lottery applicants	Natural experiment (visa lottery as instrumental variable)	5–8 months post-Hajj (medium term)	Structured survey (25 thematic indices); qualitative follow-up interviews

GHQ-28 = 28-item General Health Questionnaire; **FGD** = focus group discussion; **MINI** = Mini-International Neuropsychiatric Interview; **DSM-IV-TR** = Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision; **ICD-10** = International Classification of Diseases, 10th revision; **SEM** = structural equation modelling.

Alnabulsi et al. [23] used structural equation modelling to show that crowd identification predicted stronger Muslim identity and more positive attitudes toward outgroups, mediated by perceived cooperation and shared positive emotional experience (both $p < 0.001$).

Qualitative findings

The qualitative studies provided interpretive insight into pilgrims' lived experience, converging on shared religious identity, collective coping, and mutual support. Yalcin and Hopkins [19,20] described how collective identity fosters psychological resilience amid crowding and physical discomfort, with stressful conditions reframed as meaningful religious acts and support enacted between strangers. Abd Rahman et al. [18] identified crowding as a psychosocial stressor that female pilgrims managed through group cohesion and shared purpose. Al-Ajarma's ethnography [17] showed that returned pilgrims negotiate ambivalence and moral striving within their communities, managing perceptions of failure and spiritual progress through community response, humor, and satire.

Convergent synthesis

Integration of the two strands revealed both convergence and divergence. Qualitative accounts of shared identity and collective resilience [17–20] aligned with quantitative evidence that crowd identification predicts stronger identity and more positive intergroup attitudes [23], and with measured gains in tolerance and in meaning in life [25,27]. Both strands also identified environmental and social stressors, including crowding, exertion, and separation from familiar support, as sources of distress [17–20,24].

The strands diverged at the level of symptoms. Qualitative reports of enhanced subjective wellbeing sat alongside quantitative findings of no net change in general mental health [26], deterioration on GHQ-28 subscales [25], and reduced emotional and physical wellbeing among women in the natural experiment [27]. The documented prevalence of depression, anxiety and psychosis [21,22,24] indicates that spiritual fulfilment and psychological vulnerability coexist rather than exclude one another. Taken together, the synthesis suggests that the Hajj reshapes social and attitudinal

Table 2. *Baseline characteristics of participants in the included studies.*

First author [ref]	Sample size (n)	Sex (M/F)	Age	Nationality or origin	First-time vs repeat
Al-Ajarma [17]	14 (10 pilgrims, 4 non-pilgrims)	Mixed	37–68 years (pilgrims)	Moroccan	Mostly experienced or repeat
Abd Rahman et al. [18]	11	All female (11)	30–65 years	Pakistani (Lahore)	Mixed; some first-time, some repeat
Yalcin and Hopkins [19]	33	*M* = 28; *F* = 5	23–66 years	Diverse (British Muslims of varied nationalities)	Mixed (not specified per person)
Yalcin and Hopkins [20]	33	*M* = 28; *F* = 5	23–66 years	Diverse: 7 Pakistani, 7 Turkish, 3 Bangladeshi, 3 Indonesian, 2 Indian, 2 Malawian, 9 others	Mixed (not specified per person)
Alzahrani et al. [21]	513	*M* = 371 (72.3%); *F* = 142 (27.7%)	19–83 years (mean 45.4, SD 12.8)	Multinational (Urdu 23.2%, African 20.1%, Arabic 17.9%, Malay 17.3%, English 9.4%, others)	Previously performed Hajj 12.9%; Umrah 29.4%
Özen [22]	294	*M* = 119 (40.5%); *F* = 175 (59.5%)	19–83 years (mean 53.0, SD 13)	Turkish	Previously performed Hajj 8.5%; Umrah 7.1%
Alnabulsi et al. [23]	1,176 (of 1,194 surveyed)	*M* = 759 (64.5%); *F* = 419 (35.5%)	Modal 40–49 years; 32.3% ≥50	Multinational: Arabic 35%, Malay 13%, Urdu 13%, French 10%, Persian 10%, Turkish 10%, English 9% (72 countries)	First Hajj 68.5%; repeat 31.5%
Khan et al. [24]	182 (of ≈136,000 Indian pilgrims)	*M* = 59.7%; *F* = 40.3%	Mean 46.5 years	Indian	None had performed Hajj before
Bakhtiari et al. [25]	350	*M* = 84 (24%); *F* = 266 (76%)	University students (age NR)	Iranian	NR
Fateh et al. [26]	154 (response rate 54%)	*M* = 72 (47%); *F* = 82 (53%)	23–85 years (mean 53.8)	Iranian	NR
Clingingsmith et al. [27]	1,605 surveyed (134,948 lottery applicants in frame)	≈ 50% female	Mean ≈54.6 years; adult	Pakistani (Punjab, Sunni)	Applicants (mostly first-time intent)

M = male; **F** = female; **SD** = standard deviation; **NR** = not reported.

outcomes more consistently than it shifts symptom-level distress, and that an identifiable subgroup of pilgrims remains vulnerable.

Risk of bias

Most studies showed a low risk of bias in the selection, data collection, and outcome domains. Four studies [17,19,20,27] were rated at consistently low risk across all criteria, indicating high methodological quality. Four studies [18,22,24,26] raised some concerns and were rated at moderate risk, chiefly relating to sampling frame and non-response bias. One study [25] was rated at high risk of bias. Overall, the appraisal placed most included studies at low to moderate risk of bias (Figures 2 and 3).

Discussion

Summary of main findings

This review brought together 11 studies of varied design examining how the Hajj relates to psychological wellbeing and mental health. The studies differed widely in population, exposure definition, outcome measure, and timing, so no meta-analysis was performed and the evidence was combined through a convergent narrative synthesis. The dominant pattern was one of preserved or improved wellbeing at the level of meaning, identity, and intergroup attitudes, supported by qualitative accounts of collective identity and mutual support as sustaining resources. This pattern was not uniform. General-health scores moved in different directions across the two studies using the same instrument, and the single-causal design found reduced emotional and physical wellbeing concentrated among women. A stable minority of pilgrims met criteria for psychiatric disorder, and distress clustered in identifiable groups: women, unmarried pilgrims, older attendees, and those already taking psychiatric medication. Reported suicidality reached 6.2% in one prevalence study. Certainty in the quantitative evidence was low, and confidence in the qualitative findings was moderate.

Comparison with existing literature

The direction of our synthesis fits the wider literature on religion and mental health. Koenig framed religious involvement as a resource that is protective on average without being uniformly so [8], and a meta-analysis of religious and spiritual interventions found reductions in anxiety symptoms relative to controls [28]. The relationship is not benign in every case: negative religious coping, the sense of being abandoned or punished by God, can track with worse depressive outcomes [10]. Our finding that most pilgrims fared well while a subset did not matches that qualified view rather than any simple claim of benefit.

A recent narrative review of the psychological, emotional, and spiritual dimensions of Hajj reached a similar dual conclusion and, like our search, described a sparse evidence base [29]. Our included community sample found that 7.2% of pilgrims met criteria for at least one psychiatric disorder [21]. Clinic-referred series report higher figures, as their sampling frame predicts: hospital work at Makkah documented depressive and

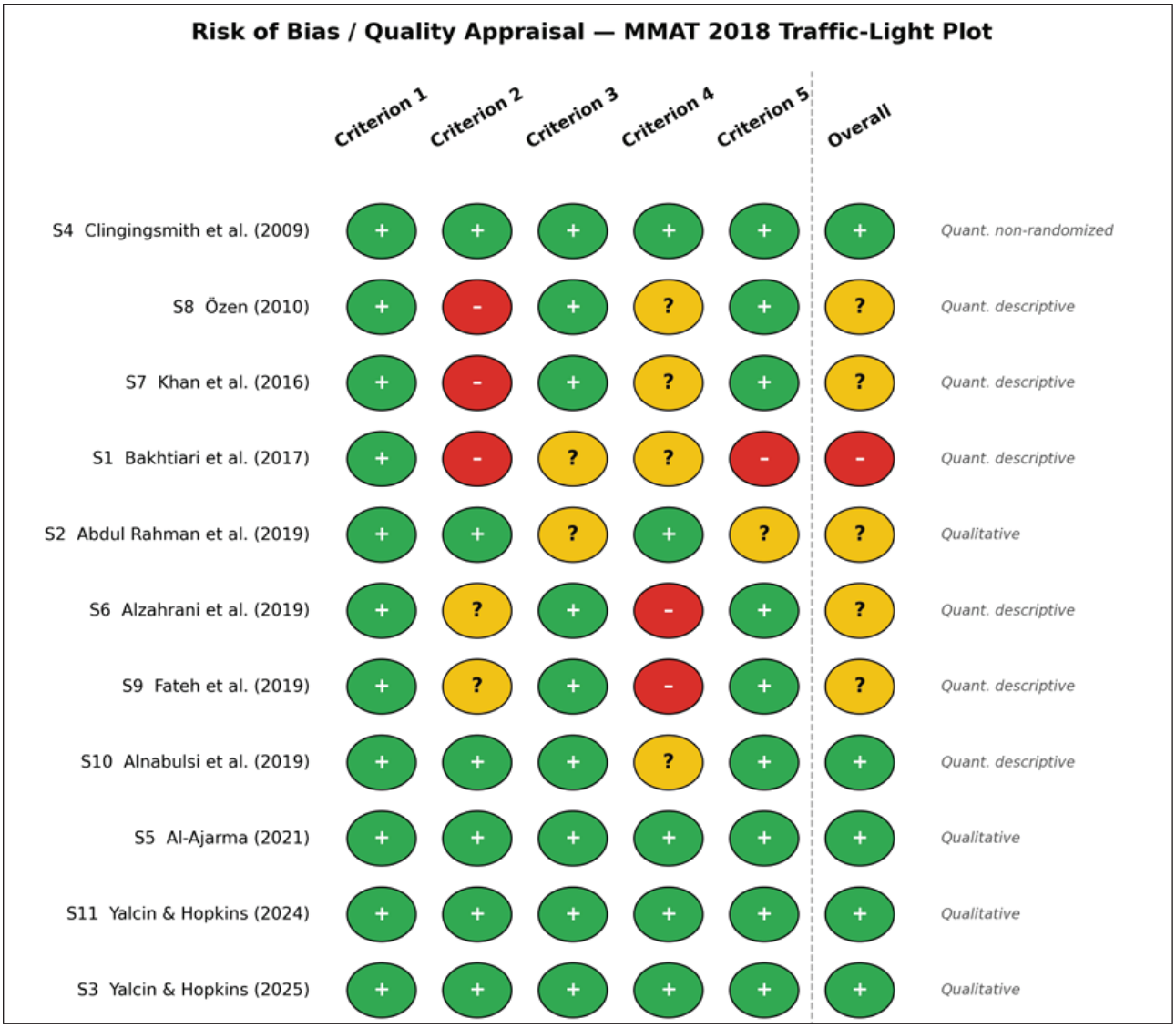

Figure 2. *Traffic-light summary of the risk-of-bias appraisal for each included study.*

psychotic presentations among help-seeking pilgrims [30], and a Turkish outpatient sample recorded high rates of depression and anxiety [22]. These findings are not contradictory, since community prevalence and clinic caseload measure different quantities.

Certainty in the quantitative pool was low according to GRADE, reflecting observational designs and inconsistency [15], and appraisal with the MMAT placed most studies at low to moderate risk of bias [14]. Current Hajj health provision concentrates on communicable disease, heat illness, and injury [1,2], and Saudi mental health services have long been limited by an inpatient focus and workforce shortages [9]; our findings support extending routine provision to psychological screening.

Interpretation and possible mechanisms

Two mechanisms plausibly explain the observed pattern. The first is social identity. Field research at the Hajj shows that shared identification with the crowd turns physical proximity into a source of support, so that density is experienced as safety rather than threat [31]. A structural-equation study of self-change extended this finding, with perceived cooperation and shared positive emotional experience predicting stronger Muslim identity and warmer attitudes toward outgroups [23]. Qualitative work on how pilgrims appraise crowding through identity-related beliefs gave the mechanism an experiential form, with discomfort reframed as a meaningful part of the rite [19]. Where a pilgrim identifies strongly with fellow worshippers, the crowd buffers distress through mutual support [20]; where identification is weak, the same conditions may erode it [31], a pattern echoed across other mass gatherings [24].

The second mechanism is cumulative environmental and physiological load. The rites demand sustained exertion in extreme heat, with crowding, disrupted sleep, and separation from familiar support [1,2]. For most pilgrims, these strains are transient and offset by spiritual meaning, which fits the stability seen in aggregate scores. For vulnerable pilgrims, the same load can precipitate or unmask disorder, and spiritual struggle can convert into depressive symptoms [10]. The concentration of adverse wellbeing effects among women in the causal

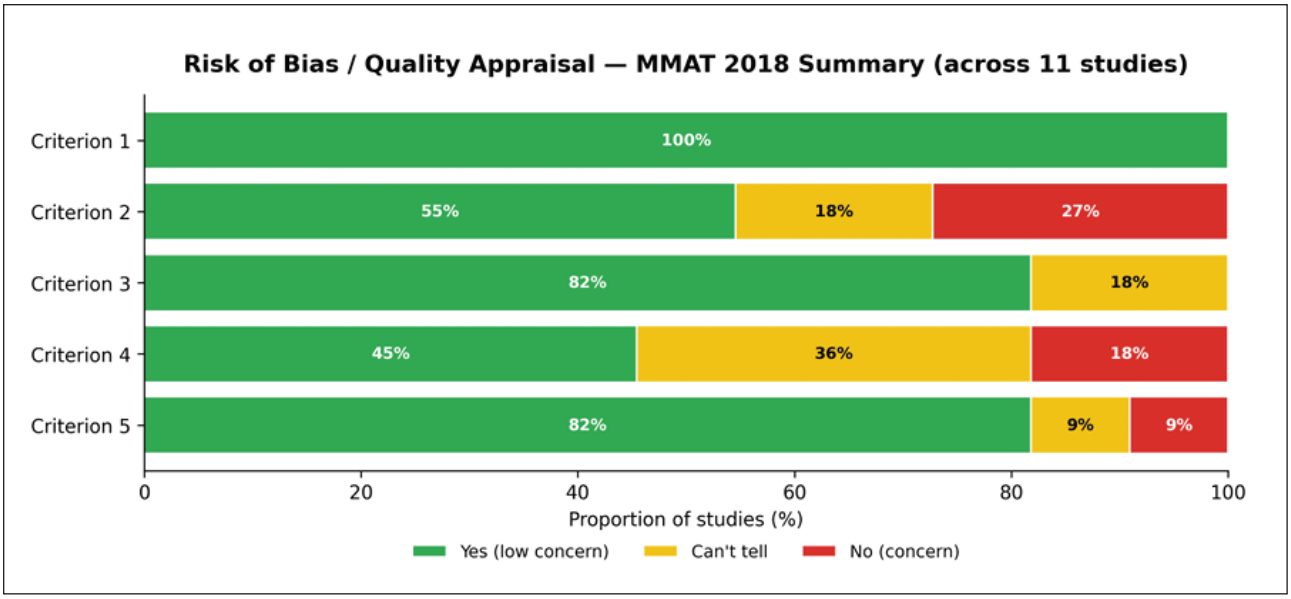

Figure 3. *Aggregate risk-of-bias summary across the included studies.*

study suggests that this load interacts with social position rather than acting uniformly [27]. Against a rising global burden of mental disorder [6], even a small proportion of a nearly two-million-person gathering represents a large absolute number of people in need.

Clinical and research implications

The practical message is not that the Hajj harms mental health, but that a predictable minority of pilgrims arrive vulnerable and deteriorate under load. Pre-travel medical clearance, already required by many national missions, is a natural point at which to screen for active psychiatric illness, recent instability and current psychotropic use, and to plan medication continuity across the journey. On-site psychological first aid and clear referral pathways would meet the help-seeking caseload that clinic studies already record. Screening should be targeted rather than universal, concentrating on the groups this review found to be at higher risk.

The research gap is specific. The field lacks a prospective multinational cohort that enrolls pilgrims before departure, applies a validated instrument such as the five-item World Health Organization Well-Being Index (WHO-5) or the 12-item General Health Questionnaire (GHQ-12) at baseline, immediately after return and at six months, and stratifies by sex, age, first-versus-repeat status, and baseline psychiatric history. Such a design would separate transient reactions from lasting change, quantify who deteriorates and for how long, and test whether identity-based interventions reduce distress. A shared core outcome set would allow future studies to be compared rather than merely counted.

Strengths and limitations

This review followed a prospectively registered protocol, screened, and extracted in duplicate, appraised every study with a design-appropriate tool, and integrated quantitative and qualitative evidence rather than treating either strand alone. Certainty was graded formally for both strands. Its limitations temper the conclusions. The evidence was too heterogeneous to pool, so no summary effect estimate is available, and much of it rested on single-group or cross-sectional designs of low to moderate quality, with one study at high risk of bias. Several included studies were clinic-based, and their caseload cannot be generalized to the wider pilgrim population. Restricting inclusion to English-language, peer-reviewed reports, without a systematic gray-literature search, leaves room for language and publication bias.

Conclusion

For most pilgrims, participation in the Hajj was compatible with stable or improved psychological wellbeing, and the collective identity of the crowd appeared to protect rather than harm. This pattern was not universal: general-health outcomes diverged across the two studies using the same instrument, the single causal design found reduced emotional and physical wellbeing concentrated among women, and a consistent minority of pilgrims, particularly women, older attendees, and those with prior psychiatric treatment, experienced clinically significant distress or disorder. Certainty in the quantitative evidence was low and confidence in the qualitative findings moderate, reflecting observational designs, inconsistency across studies and reliance on English-language peer-reviewed sources, so firm causal conclusions are not warranted. Nonetheless, the convergence of both evidence strands supports embedding targeted psychological screening within existing pre-travel and on-site Hajj health services, concentrated on identifiable at-risk groups rather than applied universally. Prospective, multinational cohort studies using validated instruments and a shared core outcome set, with assessment at baseline, immediately post-pilgrimage and at longer-term follow-up and

stratification by sex, age, and psychiatric history, are needed to strengthen this fragmented evidence base.

Acknowledgment
None.

List of abbreviations

DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision
F	Female
FGD	Focus group discussion
GHQ-12	12-item General Health Questionnaire
GHQ-28	28-item General Health Questionnaire
GRADE	Grading of Recommendations Assessment, Development and Evaluation
GRADE-CERQual	Confidence in the Evidence from Reviews of Qualitative research
ICD-10	International Classification of Diseases, 10th revision
K6	Six-item Kessler psychological distress scale
M	Male
MINI	Mini-International Neuropsychiatric Interview
MMAT	Mixed Methods Appraisal Tool
n	Number of participants
NR	Not reported
PICOS	Population, Intervention/Exposure, Comparator, Outcomes, Study design
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	International Prospective Register of Systematic Reviews
SD	Standard deviation
SEM	Structural equation modelling
SWiM	Synthesis Without Meta-analysis
WHO-5	World Health Organization Five Well-Being Index

Conflict of interests
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Supplementary content (If any) is available online.

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