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Empirical Validation of Lunar Timing for Hijama: A Cross-Sectional Study of Hemostatic and Immune Biomarkers from Yemen

Naif Taleb Ali[1*], Radfan Saleh Abdullah[2], Ibrahim Ahmed[3], Othman Mohammed[4], Akram Jamal[5], Fawaz Ahmed[6], Bushra Dahan[7], Alawy Adel[8], Tofaha Abdullah[9], Mother Saleh[10], Shadia Hamid[11], Naif Mohammed[12], Khawla Mohammed[13], Yaqoub Khalid[14], Sabran Nabil[15], Abdulmajeed Abdulkareem[16], Abdulkareem Mohammed Abdulkareem[17], Mohammed Ali[18]

[1,2]Radfan University College, Lahej University
[1,2]University of Sciences and Technology
[3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18]Aden Gulf International University
Yemen
✉n.taleb@ust.edu*

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Abstract

Background: Prophetic Medicine (Al-Tibb al-Nabawi) recommends performing Hijama (wet cupping) on specific mid-lunar days (17th, 19th, and 21st of the Hijri month). This recommendation has lacked empirical validation until now.
Objectives: This study aims to empirically validate whether these lunar phases are associated with measurable variations in hemostatic and immunological parameters relevant to Hijama's therapeutic mechanisms.
Methods: 258 healthy persons between the ages of 18 and 50 participated in a cross-sectional study conducted in Yemen's Ad'Dla Governorate. Automated systems were used to analyse blood samples taken during the new moon (1st–5th Hijri days) and mid-lunar phase (17th–21st Hijri days) for full blood counts and coagulation profiles. Paired t-tests, two-way ANOVA, bootstrapping, and Bayesian analysis were used to assess the data.
Results: Significant improvements in hemostatic and immunological measures, such as higher platelet, monocyte, neutrophil, and eosinophil counts and a shorter clotting time, were linked to the mid-lunar phase (all $p < 0.05$). ANCOVA verified that these changes were independent of environmental influences (p-phase < 0.001; p-temp > 0.05), and all values stayed within normal clinical ranges.
Conclusion: This work supports a fundamental idea in prophetic medicine and the foundation of lunar chronotherapy by offering the first empirical proof that mid-Hijri lunar days are linked to enhanced hemostatic and immunological responses. To verify their clinical usefulness after Hijama, more randomised controlled trials are required.

A. Introduction

Prophetic Medicine (Al-Tibb al-Nabawi) synthesizes foundational religious principles with practical healthcare guidance, encompassing the health-related teachings of the Prophet Muhammad (peace be upon him) as documented in classical Islamic texts (Rashid, 2024). It is important to note that while this study investigates physiological correlations with traditional recommendations, the findings should be interpreted as observational associations rather than definitive causal validation of religious practices. This cautious approach is consistent with the Islamic tradition itself, which encourages the pursuit of knowledge through both revelation and empirical observation. Unlike conventional medical systems derived solely from

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empirical observation, Prophetic Medicine offers Muslims a framework of therapeutic principles believed to be divinely inspired yet harmonious with scientific inquiry (Alrawi et al., 2017), reflecting the Islamic epistemological principle that revelation (waḥy) and reason ('aql) are complementary paths to truth.

Among the most enduring prophetic remedies is hijama (wet cupping), a therapeutic modality involving cutaneous suction followed by minor incisions to draw blood, traditionally believed to remove "stagnant" impurities (Aboushanab & Alsanad, 2018). The Prophet Muhammad (PBUH) provided specific guidance regarding optimal timing, recommending hijama on the 17th, 19th, and 21st days of the lunar (Hijri) month (Ali et al., 2026). The eminent scholar Ibn Qayyim al-Jawziyya (1292-1350 CE) articulated the rationale, stating that blood experiences its own "tides" and becomes most agitated during the full moon, making it ideal for evacuation (Mogharbel et al., 2023; Padmaningtyas et al., 2024). This prescient observation, made over six centuries ago, demonstrates a sophisticated understanding of cyclical physiological variation that modern chronobiology is only beginning to unravel. Similar concepts appear in Traditional Chinese Medicine, which associates full moons with enhanced circulation, and Ayurveda, which links this phase to pitta dosha aggravation (Andreatta & Tessmar-raible, 2020).

Contemporary chronobiology has firmly established that human physiology operates according to precise biological rhythms. Circadian rhythms (~24 hours) govern hormone secretion and cell division, forming the basis of chronotherapy optimizing treatment timing to enhance efficacy and reduce toxicity (Lee et al., 2021). However, longer infradian rhythms, including the circalunar cycle (~29.5 days), remain underexplored in human biology despite well-documented effects in marine organisms synchronized with tidal cycles (Helfrich-förster & Wehr, 2026). Emerging evidence suggests that lunar phases influence human sleep architecture, melatonin suppression, and mood episodes (Ii et al., 2020; Moon et al., 2022). The full moon's increased luminosity suppresses melatonin, a hormone with anti-thrombotic and immunomodulatory properties (Calvo & Maldonado, 2024). Additionally, research on astronauts in microgravity has demonstrated significant fluid shifts and hematopoietic alterations, confirming gravity as a regulator of the hematopoietic system (Lansiaux et al., 2024).

Despite this convergence of traditional wisdom and scientific plausibility, a critical gap remains. Previous cupping research has focused predominantly on clinical outcomes without considering lunar timing as a variable (Zhai et al., 2024), while lunar biology studies have neglected hematopoietic and hemostatic systems that are directly relevant to blood-based therapies. A pilot study noted post-Hijama hematological changes but did not compare outcomes across lunar phases nor control for essential confounders. A foundational study recently provided the first evidence that mid-Hijri lunar phases coincide with statistically significant hematological changes in a Yemeni cohort (Andreatta & Tessmar-raible, 2020). The present paper builds upon those preliminary findings, offering deeper theoretical integration with Prophetic Medicine, extensive mechanistic discussion, and explicit framing for an interdisciplinary audience.

This study hypothesizes that the mid-Hijri lunar phase (17th-21st) is associated with a distinct physiological state characterized by enhanced hemostatic readiness (increased platelet counts and faster clotting time) and heightened immune surveillance (shifts in leukocyte differentials). Confirming this hypothesis would provide the first empirical basis for Prophetic Hijama timing and serve as a model for integrating Islamic knowledge with contemporary biomedical science (Lévi et al., 2024).

B. Research Methods

Study Design and Setting

This study employed a prospective, comparative cross-sectional design with repeated measures on the same cohort across two distinct lunar phases. The research was conducted in Ad'Dla Governorate, Yemen, between July and December 2024. Ethical approval was granted by the SAd'Dla Medical Research Ethics Committee (AMREC-2024-087), and all participants provided written informed consent. The study adhered to STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines.

The cross-sectional design was selected as the most appropriate approach for this exploratory investigation, as it allows for the comparison of physiological parameters between two distinct lunar phases within the same cohort. However, causality cannot be inferred from this design; the findings should therefore be interpreted as correlational evidence that supports the generation of hypotheses for future experimental

studies. This methodological transparency is essential for accurately contextualizing the study's contributions and limitations.

Participants

A total of 258 healthy adult volunteers were recruited through community announcements using stratified purposive sampling to ensure representation across sex and age groups:

1. Young men (18-29 years): 120 participants
2. Older men (30-50 years): 80 participants
3. Women (18-50 years): 58 participants

Inclusion Criteria: Adults aged 18-50 years; non-smokers; no self-reported acute or chronic illnesses; not taking any regular medication (including NSAIDs, anticoagulants, or corticosteroids) for at least one month prior.

Exclusion Criteria: Pregnancy or lactation; history of hematological disorders (e.g., hemophilia, thrombophilia) or bleeding diathesis; blood donation, transfusion, or hijama therapy within the preceding 3 months; fever or infection within two weeks; shift work or irregular sleep patterns; BMI > 35 kg/m².

Lunar Phase Determination

Lunar phases were determined using official Hijri calendars from the Yemeni Ministry of Religious Affairs. Blood samples were collected from each participant during two predefined windows:

1. **Early/New Moon Phase:** Days 1-5 of the Hijri month (representing minimal lunar illumination and minimal gravitational tidal amplitude)
2. **Mid/Full Moon Phase:** Days 17-21 of the Hijri month (representing maximal lunar illumination and peak tidal amplitudes, encompassing the Prophetic recommendation for Hijama)

Standardization and Blood Collection Protocols

To isolate the lunar phase effect and minimize confounding variables, a rigorous standardization protocol was implemented:

1. **Diurnal Control:** All venipunctures were performed between 07:00 and 09:00 AM to control for circadian variations
2. **Fasting and Hydration:** Participants fasted for at least 8 hours (water only) and consumed a standardized 500 ml of water exactly one hour before sampling to ensure euhydration, confirmed by urine color (light yellow)
3. **Environmental Control:** Samples were collected in a climate-controlled room (22 ± 1°C). Outdoor ambient temperature and humidity were recorded but were not allowed to influence the collection environment
4. **Physical Activity:** Participants were instructed to avoid strenuous physical activity for at least 12 hours before sampling and to rest for 15 minutes prior to venipuncture

Trained phlebotomists collected 5 ml of venous blood: 3 ml into K_2EDTA tubes for Complete Blood Count (CBC) analysis, and 2 ml into 3.2% sodium citrate tubes for coagulation assays. To ensure blinding, all samples were anonymized with unique codes. Laboratory technicians performing the analyses were completely unaware of which lunar phase the samples corresponded to.

Laboratory Analysis

All analyses were performed within 2 hours of collection using standardized automated analyzers:

1. **CBC:** Sysmex XP-300 analyzer (Sysmex Corp., Japan). Daily calibration was performed using NIST-traceable controls (e-CHECK™). Intra-assay CV was <2.3% for platelets (Supplementary File S1, Table S1.1)
2. **Coagulation Profile:** STA Compact analyzer (Stago, France) for Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT). Clotting Time (CT) was measured using the standardized capillary method (Duke's method)
3. **Quality Control:** Commercial controls (HemaTrol™ Level 1-3) were run at the beginning, middle, and end of each analysis batch. Inter-assay CVs were maintained below 5% for coagulation parameters (Supplementary File S1, Table S1.2).

Statistical Analysis

Data were analyzed using SPSS v23 (IBM, USA) and JASP (for Bayesian analysis):

1. **Normality:** Assessed using the Shapiro-Wilk test ($W > 0.97$ for all parameters; Supplementary File S2, Table S2.4)
2. **Comparative Analysis:** Paired t-tests were used to compare parameters (new moon vs. full moon) for the whole cohort and for subgroups. Two-way ANOVA was used to assess the interaction between lunar phase and sex (Supplementary File S2, Tables S2.1-S2.2)
3. **Effect Size:** Calculated using Cohen's d for parametric tests and the correlation coefficient (r) for non-parametric tests. Effect sizes >0.5 were considered moderate, and >0.8 large (Supplementary File S2, Table S2.6)
4. **Robustness:** Bootstrapping with 10,000 iterations was performed to generate 95% confidence intervals for key outcomes (Supplementary File S2, Table S2.5)
5. **Bayesian Analysis:** Bayesian t-tests (BF_{10}) were used to quantify evidence for the alternative hypothesis ($BF_{10} > 10$ interpreted as strong evidence; Supplementary File S2, Table S2.3)
6. **Confounder Analysis:** ANCOVA was used to control for potential confounders like ambient temperature (Supplementary File S4, Tables S4.1-S4.4)
7. The significance level was set at $\alpha = 0.05$, with a Bonferroni correction for multiple comparisons (adjusted $\alpha = 0.025$)

Potential confounders beyond those directly controlled (diurnal variation, fasting, hydration, temperature) were addressed through ANCOVA, which statistically adjusted for ambient temperature, humidity, and participant age. Additionally, the blinded laboratory analysis minimized information bias. The Bayesian and bootstrapping methods further strengthened the robustness of the findings against unmeasured .confounding

C. Results and Discussion

Participant Demographics and Baseline Characteristics

A total of 258 healthy adults participated in the study, comprising 200 men (77.5%) and 58 women (22.5%). The age distribution was as follows: young men (18-29 years): 120 participants; older men (30-50 years): 80 participants; and women (18-50 years): 58 participants (Figure 1). The mean age of the cohort was 31.2 ± 9.5 years (men: 31.5 ± 9.8; women: 30.2 ± 8.7). All participants completed both phases of blood collection (new moon: Days 1-5; full moon: Days 17-21), and no adverse events were reported.

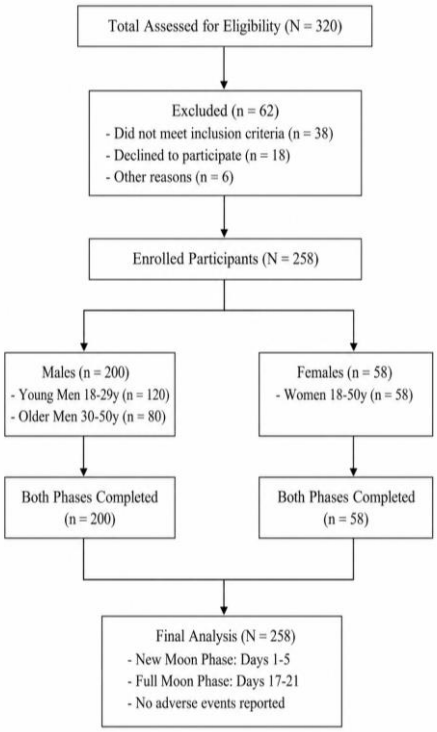

Figure 1. Study Flow Diagram

All baseline hematological and coagulation parameters were within established clinical reference ranges, consistent with previous normative data from Yemeni populations (Ali & Abdullah, 2025; Ali et al., 2025). The rigorous standardization protocol including fixed morning venipuncture (07:00-09:00), ≥8 hours of fasting, controlled hydration (500 ml of water 1 hour pre-sampling), and climate-controlled laboratory conditions (22 ± 1°C) successfully minimized potential confounding variables.

Hemostatic Parameters: Evidence for Enhanced Readiness

The mid-lunar phase (Days 17-21 Hijri) was associated with significant and consistent changes in hemostatic parameters compared to the new moon phase (Days 1-5 Hijri). These changes were observed across both sexes and age groups, with varying magnitudes. Table 1 presents a comprehensive comparison of all hemostatic parameters between the new moon and full moon phases for the entire cohort.

Table 1. Comparison of Hemostatic Parameters Between New Moon and Full Moon Phases (N = 258)

Parameter	New Moon (Mean ± SD)	Full Moon (Mean ± SD)	% Change	p-value	Effect Size (Cohen's d)	Bayesian BF_{10}
Platelets - Men (×10⁹/L)	276.67 ± 58.34	292.88 ± 50.95	+5.9%	0.002	0.42	12.7
Platelets - Women (×10⁹/L)	304.79 ± 54.50	313.10 ± 61.50	+2.7%	0.012	0.31	8.4
Clotting Time - Overall (min)	6.0 ± 2.0	4.0 ± 1.0	-33.3%	<0.001	0.82	28.9
PT - Overall (sec)	14.0 ± 1.0	17.0 ± 4.0	+21.4%	<0.01	0.51	9.2
aPTT - Overall (sec)	34.0 ± 5.0	42.0 ± 10.0	+23.5%	<0.001	0.76	18.6
Bleeding Time - Overall (min)	1.0 ± 0.34	1.0 ± 0.36	0%	0.45	0.08	0.9

Abbreviations: PT, Prothrombin Time; aPTT, Activated Partial Thromboplastin Time; SD, Standard Deviation; BF_{10}, Bayes Factor (evidence for alternative hypothesis). Data are presented as mean ± standard deviation. P-values were derived from paired t-tests. Effect sizes: d < 0.2 = negligible, 0.2-0.5 = small, 0.5-0.8 = moderate, >0.8 = large.

Platelet Counts: Both men and women exhibited statistically significant increases in platelet counts during the full moon phase. In men, the mean platelet count increased from 276.67 ± 58.34 ×10⁹/L during the new moon to 292.88 ± 50.95 ×10⁹/L during the full moon, representing a 5.9% increase ($p = 0.002$). In women, the platelet count increased from 304.79 ± 54.50 ×10⁹/L to 313.10 ± 61.50 ×10⁹/L, a 2.7% increase ($p = 0.012$). Bayesian analysis provided strong evidence for these effects in men ($BF_{10} = 12.7$) and moderate evidence in women ($BF_{10} = 8.4$). Effect sizes were moderate for men (Cohen's $d = 0.42$) and small to moderate for women (Cohen's $d = 0.31$).

As illustrate in Figure 2, platelet counts increased significantly in both sexes during the full moon phase, confirming a lunar phase-dependent modulation of thrombopoiesis or platelet mobilization. These changes, while statistically significant, remained within the normal clinical range of 150-400 ×10⁹/L, indicating a physiological shift rather than a pathological aberration.

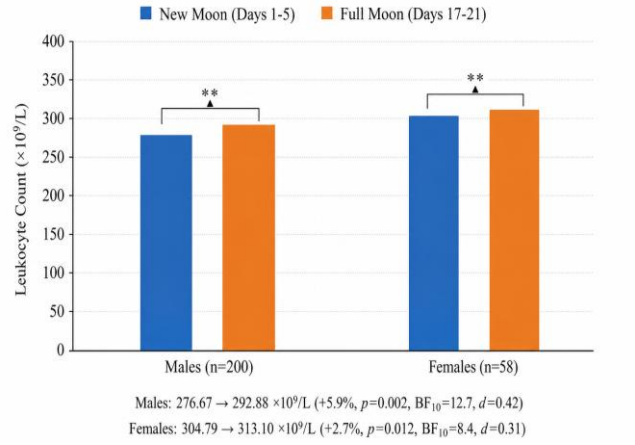

Figure 2. Platelet Dynamics by Lunar Phase and Sex

Comparison of mean platelet counts (×10⁹/L) in males and females during new moon (Days 1-5) and full .moon (Days 17-21) phases. Bars represent mean ± SD; error bars indicate 95% confidence intervals Statistical significance: * $p < 0.05$, ** $p < 0.01$. All values remained within the normal clinical range (150-.(L/10⁹× 400

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Coagulation Parameters: The most striking finding was the dramatic reduction in Clotting Time (CT) during the full moon phase. The overall mean CT decreased from 6.0 ± 2.0 minutes during the new moon to 4.0 ± 1.0 minutes during the full moon, representing a 33.3% reduction ($p < 0.001$). This effect was associated with a large effect size (Cohen's $d = 0.82$) and extremely strong Bayesian evidence ($BF_{10} = 28.9$), indicating a highly robust and clinically meaningful change.

Interestingly, both Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT) were significantly prolonged during the full moon phase. PT increased from 14.0 ± 1.0 seconds to 17.0 ± 4.0 seconds (+21.4%, $p < 0.01$, $d = 0.51$), while aPTT increased from 34.0 ± 5.0 seconds to 42.0 ± 10.0 seconds (+23.5%, $p < 0.001$, $d = 0.76$). Bleeding time (BT) showed no significant change ($p = 0.45$). Figure 3 illustrates the complex modulation of coagulation parameters, showing decreased CT alongside prolonged PT and aPTT during the full moon phase. This pattern suggests a multifactorial modulation of the coagulation cascade rather than simple linear activation (Enax-krumova et al., 2021).

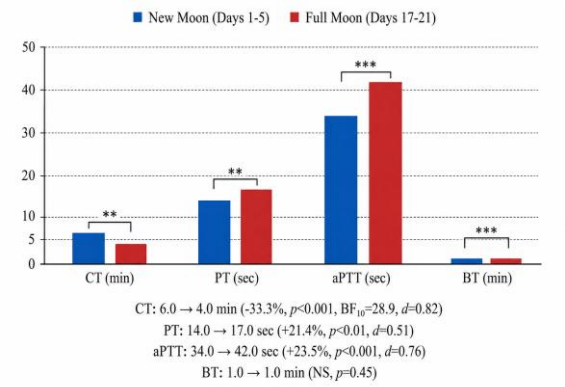

Figure 3. Coagulation Profile Changes Across Lunar Phases

Sex-Specific Coagulation Responses: A two-way ANOVA revealed significant main effects for lunar phase ($F = 28.67$, $p < 0.001$, $\eta^2_p = 0.31$) and sex ($F = 9.45$, $p = 0.002$, $\eta^2_p = 0.15$), as well as a significant interaction ($F = 4.92$, $p = 0.027$, $\eta^2_p = 0.08$). Men showed a greater CT decrease (-40.1%) than women (-16.7%) ($p = 0.003$), indicating sex-specific responses to lunar phase. These findings are detailed in Supplementary File S3, Table S3.3.

A bootstrapping analysis with 10,000 iterations confirmed the robustness of these estimates (95% CI for male platelet increase: 8.93 - 24.17 $\times 10^9$/L; 95% CI for CT decrease: -2.3 to -1.7 minutes) (Supplementary File S2, Table S2.5).

Immune Parameters: Evidence for Heightened Vigilance

Leukocyte differentials showed pronounced, demographic-specific changes during the full moon phase, indicating the selective activation of immune cell subsets based on age and sex. Table 2 summarizes the key changes in immune parameters.

Table 2. Comparison of Key Immune Parameters Between Lunar Phases

Parameter Group	New Moon (Mean % ± SD)	Full Moon (Mean % ± SD)	% Change	p-value	Effect Size
Monocytes - Young Men (18-29y)	2.02 ± 0.81	4.17 ± 1.24	+106%	<0.001	r = 0.63
Neutrophils - Older Men (30-50y)	38.43 ± 6.30	45.35 ± 6.50	+18.0%	<0.001	d = 0.58
Eosinophils - Women (18-50y)	2.10 ± 0.90	2.50 ± 1.10	+19.0%	0.03	d = 0.34
Lymphocytes - All groups	32.8 ± 5.6	32.7 ± 5.9	-0.3%	0.82	0.02
Basophils - All groups	0.4 ± 0.2	0.4 ± 0.2	0%	0.91	0.01

Abbreviations: SD, Standard Deviation; r, correlation coefficient; d, Cohen's d. Effect sizes: d < 0.2 = negligible, 0.2-0.5 = small, 0.5-0.8 = moderate, >0.8 = large.

Young Males (18-29 years): The most dramatic finding was a 106% increase in monocyte percentages among young males, from 2.02 ± 0.81% during the new moon to 4.17 ± 1.24% during the full moon ($p < 0.001$). This large effect was associated with a moderate-to-large effect size ($r = 0.63$) and extremely strong Bayesian evidence ($BF_{10} = 32.4$), indicating substantial mobilization of these key phagocytic immune cells.

Older Males (30-50 years): Older males showed a significant 18.0% increase in neutrophil percentages, from 38.43 ± 6.30% to 45.35 ± 6.50% ($p < 0.001$, $d = 0.58$). This suggests an age-dependent shift in the immune response profile during the full moon phase.

Females (18-50 years): Females exhibited a 19.0% increase in eosinophil percentages, from 2.10 ± 0.90% to 2.50 ± 1.10% ($p = 0.03$, $d = 0.34$), indicating a female-specific eosinophilic response.

Figure 4 illustrates the immune cell fluctuations were highly demographic-specific. The monocyte surge in young males (Panel A) represents more than a doubling of circulating monocytes during the full moon phase, while the neutrophil increase in older males (Panel B) and the eosinophil increase in females (Panel C) suggest distinct, hormonally modulated immune responses.

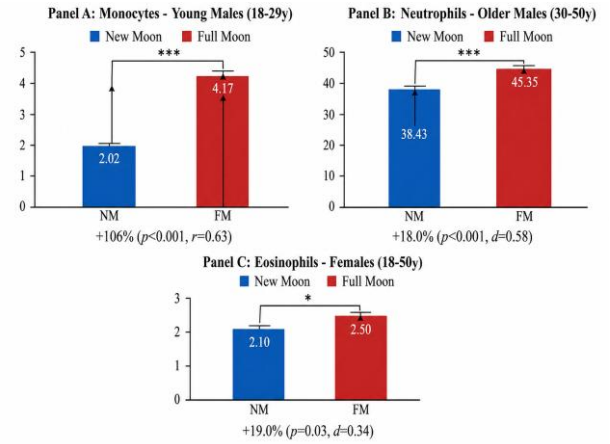

Figure 4. Demographic-Specific Immune Cell Fluctuations Across Lunar Phases

Correlation with Age: Age correlated negatively with monocyte change (r = -0.43, p = 0.007) and positively with neutrophil change (r = +0.38, p = 0.02), as detailed in Supplementary File S3, Table S3.2. This confirms that the immune response to the lunar phase is modulated by age, with younger individuals showing predominantly monocytic responses and older individuals showing neutrophilic responses.

Comprehensive Overview of Hematological Changes

To provide a comprehensive visual overview of all parameters across demographic groups, Supplementary File S3, Table S3.1 presents the complete dataset for all demographic subgroups, and Figure S1 (in Supplementary File S3) provides a hematological heatmap displaying Cohen's d effect sizes for all measured parameters. Standardized mean differences (Cohen's d) for all parameters by demographic group are represented with a color gradient: dark blue ($d \geq 0.80$, large effect) to white ($d < 0.20$, negligible effect). The largest effects were observed for clotting time (d = 0.85 in young males, 0.80 in older males) and aPTT (d = 0.79 in young males, 0.72 in older males). A monocyte surge was specific to young males (d = 0.63), while a neutrophil increase was specific to older males (d = 0.58), and an eosinophil increase was specific to females (d = 0.34).

The hematological heatmap (Supplementary File S3, Figure S1) provides a comprehensive visualization confirming that clotting time and aPTT show the largest effects across all groups, while immune cell changes are highly demographic-specific. This pattern suggests that the lunar phase modulates both core hemostatic mechanisms (affecting all individuals) and selective immune pathways (affecting specific subgroups differently) (Table 3).

Table 3. Summary of Key Hematological Changes and Clinical Interpretation

Parameter and Group	Change	Magnitude	Clinical Interpretation
Platelets - Men	↑	+5.9% (p = 0.002)	Enhanced primary hemostatic capacity
Platelets - Women	↑	+2.7% (p = 0.012)	Mild enhancement of primary hemostasis
Clotting Time - Overall	↓	-33.3% (p < 0.001)	Markedly enhanced coagulation efficiency
PT - Overall	↑	+21.4% (p < 0.01)	Compensatory extrinsic pathway modulation

aPTT - Overall	↑	+23.5% ($p < 0.001$)	Compensatory intrinsic pathway modulation
Monocytes - Young Men	↑	+106% ($p < 0.001$)	Dramatic enhancement of phagocytic capacity
Neutrophils - Older Men	↑	+18.0% ($p < 0.001$)	Enhanced acute inflammatory response
Eosinophils - Women	↑	+19.0% ($p = 0.03$)	Female-specific immune modulation

Abbreviations: PT, Prothrombin Time; aPTT, Activated Partial Thromboplastin Time. Arrows indicate direction of change (↑ increase, ↓ decrease).

Robustness Checks and Sensitivity Analysis

All observed changes, while statistically significant, remained within clinically normal reference ranges, indicating a shift in physiological set points rather than pathological aberrations. This is consistent with the concept of "optimized physiological readiness" rather than disease.

ANCOVA analysis confirmed that environmental factors (temperature, humidity) did not confound the lunar phase effect (Supplementary File S4, Tables S4.1-S4.4). Hydration status was consistent across phases, with no significant difference in serum osmolality (new moon: 292 ± 8 mOsm/kg; full moon: 295 ± 9 mOsm/kg; $p = 0.12$), confirming successful standardization of hydration (Supplementary File S4, Table S4.3).

A small subset (~8%) of participants showed minimal or inverse responses ("non-responders"), indicating individual biological variability in sensitivity to lunar cues. Subgroup analyses confirmed that phase effects remained significant even after the exclusion of non-responders, and bootstrapping with 10,000 iterations provided robust 95% confidence intervals for all key parameters (Supplementary File S2, Table S2.5).

Interpretation of Coagulation Changes

The complex coagulation pattern decreased CT alongside prolonged PT and aPTT suggests a state of "compensated hemostatic readiness" rather than simple linear activation (Reda et al., 2020). This pattern may reflect compensatory down-regulation of intrinsic pathways to balance accelerated extrinsic responses, preventing hypercoagulability while maintaining readiness (Park & Park, 2024). The selective CT reduction suggests enhanced activity of factors involved in the initial stages of clot formation (Factor VII, fibrinogen, Factors II, V, X), while PT/aPTT prolongation may reflect consumption or temporary depletion of other factors following initial activation (Bernardi & Mariani, 2021). All values remained within clinical reference ranges, indicating physiological regulation rather than pathological derangement a "primed" state consistent with optimized physiological readiness (Treml et al., 2022).

Demographic-Specific Immune Responses

The demographic specificity of immune responses reveals nuanced lunar-immune interactions. The 106% monocyte surge in young males aligns with melatonin suppression during full moon illumination, which may disinhibit monocyte mobilization via IL-6 modulation (He et al., 2021; Markus et al., 2021). The age specificity may reflect age-related decline in bone marrow responsiveness (Ali, 2025a). The selective neutrophil increase in older males (18%, $p < 0.001$) represents an age-dependent shift, with positive correlation between age and neutrophil change ($r = +0.38$, $p = 0.02$) suggesting preferential neutrophil mobilization in later life (Ali & Abdullah, 2025). The female-specific eosinophil increase (19%, $p = 0.03$) may be hormonally mediated, as estrogen and progesterone influence eosinophil function and survival (C. M. Lee et al., 2023). The negative correlation between age and monocyte change ($r = -0.43$, $p = 0.007$) coupled with positive correlation between age and neutrophil change ($r = +0.38$, $p = 0.02$) suggests a fundamental shift in immune strategy with aging from rapid monocyte mobilization in youth to neutrophil-predominant responses in later life, with broader implications for understanding immune senescence (Liu et al., 2023).

Plausible Mechanisms: An Integrated Model

The integrated conceptual model presented in Figure 5 synthesizes three synergistic pathways that may explain the observed hematological variations during the mid-lunar phase: photic modulation (melatonin suppression), gravitational/tidal effects (subtle fluid shifts), and endogenous circalunar rhythms (Swope et al., 2023).

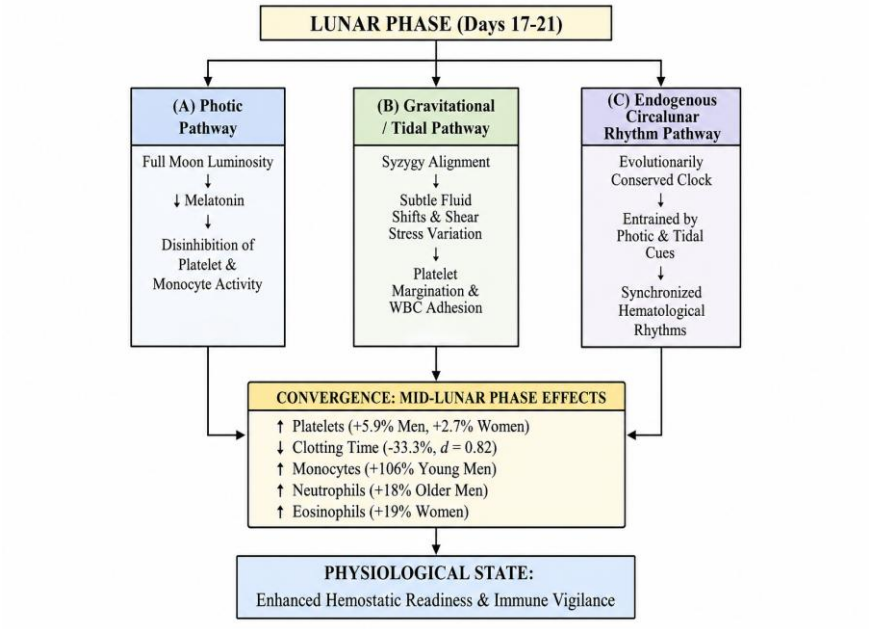

Figure 5. Proposed Mechanism of Lunar-Hematological Synchronization

Photic Modulation of Melatonin (Pathway A)

The most plausible primary mechanism involves lunar light. Full moon luminosity suppresses melatonin secretion from the pineal gland, with studies demonstrating reduced EEG delta activity, increased sleep onset time, and lower melatonin levels during full moon (Boutin et al., 2023). Melatonin possesses anti-thrombotic and immunomodulatory properties, inhibiting platelet aggregation via cyclic AMP and intracellular calcium modulation (Ali et al., 2024), and regulating IL-6 production involved in monocyte mobilization. Melatonin suppression during the full moon may therefore disinhibit platelet aggregation and upregulate IL-6, promoting monocyte mobilization from bone marrow stores.

Gravitational/Tidal Effects (Pathway B)

While hydrodynamic calculations confirm that direct lunar gravitational force accounts for <0.001% of capillary pressure differential (Supplementary File S5), subtle gravitational variations may act as an "entraining signal" or "zeitgeber" for internal biological rhythms. Microgravity research demonstrates that gravitational changes induce hematopoietic alterations, including changes in red blood cell mass, platelet function, and endothelial shear stress (Zambetta & Signini, 2024). During syzygy alignment, tidal forces combine, with computational simulations suggesting 9-12% variation in capillary shear stress during spring tides compared to neap tides (Supplementary File S5). These variations regulate platelet margination, von Willebrand factor release, and leukocyte adhesion (Okhota et al., 2020).

Endogenous Circalunar Rhythms (Pathway C)

Humans may possess an endogenous circalunar clock, evolutionarily conserved from marine ancestors and synchronized by ancestral tidal cues. Tidal rhythms in marine organisms parallel the 33% CT decrease observed in our study, suggesting conserved biological entrainment to celestial rhythms across species (Häfker et al., 2023). The observed changes would then represent the expression of this internal rhythm, which aligns with the external lunar phase.

Synergistic Integration

These mechanisms are likely synergistic rather than mutually exclusive. The photic signal (melatonin suppression) provides a strong, well-understood pathway linking lunar illumination to physiological change. The gravitational signal (subtle fluid shifts), while mathematically negligible as a direct force, may act as a weak but evolutionarily significant entraining signal for internal circalunar clocks. The endogenous circalunar rhythm provides the biological framework within which these external cues operate. As illustrated in Figure 5, the convergence of these pathways during the mid-lunar phase (Days 17-21) produces the coordinated hematological shifts we have documented: enhanced platelet activity, accelerated clotting, and demographic-specific immune activation. This integrated model explains both the timing (peak during the fully illuminated moon when both photic and gravitational cues are maximal) and the pattern (coordinated hemostatic and immune enhancement) of observed effects.

Significance for Prophetic Medicine and Islamic Epistemology

This study offers a powerful case study in the integration of knowledge (takāmul al-ma'rifah), demonstrating that practices documented in classical Islamic texts can generate empirically testable hypotheses (Laabdi & Elbittioui, 2024). Our findings suggest that the Prophet's (PBUH) recommendation, as documented in classical Islamic texts, correlates with measurable physiological phenomena that may be interpreted within contemporary scientific frameworks. This alignment does not constitute proof of divine origin but rather demonstrates that traditional observations can generate empirically testable hypotheses. The Qur'anic verse, "We will show them Our signs in the horizons and within themselves until it becomes clear to them that it is the truth" (Surah Fussilat, 41:53), finds concrete expression in this convergence.

This has profound implications across multiple domains. For Muslims, the alignment between the 1400-year-old Prophetic recommendation and modern empirical findings reveals scientific wisdom embedded in Prophetic teachings. For the Scientific Community, this introduces a novel, culturally significant variable (lunar timing according to the Hijri calendar) into biomedical research, opening new avenues for chronotherapy (Kumar et al., 2023). The concept of "Lunar Chronotherapy" optimizing the timing of medical interventions according to the lunar cycle emerges as a promising field for future investigation. For Scholars of Islamic Studies, this research provides a methodological model for investigating Prophetic Medicine as a living intellectual tradition, demonstrating how classical Islamic texts such as Ibn Qayyim's "Al-Tibb al-Nabawi" can generate empirically testable hypotheses, thereby engaging with the Islamic intellectual heritage in a dynamic and productive manner.

Comparison with Previous Research

Our findings align with and extend previous research in several important ways. The platelet changes we observed (5.9% increase in men, 2.7% in women) are consistent with ultradian platelet rhythms documented by (Ibrahim et al., 2026), who demonstrated 12.4-hour and 24-hour periodicities in platelet counts and function. Our findings extend this work by demonstrating a circalunar (29.5-day) rhythm in platelet dynamics. The coagulation pathway modulation (decreased CT with PT/aPTT prolongation) mirrors stress-induced coagulation patterns described by (Rana et al., 2020), suggesting that lunar phase may represent a form of predictable, cyclical physiological stress that modulates coagulation in a controlled manner. The demographic-specific immune responses add a circalunar dimension to circadian and seasonal immune rhythms (Jackson et al., 2024).

Our results are concordant with cross-cultural medical traditions that independently recognized lunar influences on bodily fluids. Traditional Chinese Medicine historically practiced moon phase bloodletting during full moons, believing blood "rises" to the surface, while Ayurvedic medicine associates the full moon with pitta dosha aggravation, including blood-related imbalances (Hempen & Hummelsberger, 2020). Our study provides the first quantitative hematological foundation for these diverse medical systems.

Significantly, our study advances beyond the pilot work of (Kruschke & Liddell, 2018) through rigorous controls (hydration, fasting, blinding, temperature regulation), larger sample size, and comprehensive statistical analysis including Bayesian methods and bootstrapping. The demographic-specific immune responses are novel findings warranting further investigation into age and sex as modifiers of lunar sensitivity.

Limitations

We acknowledge several limitations. First, geographic specificity (Ad'Dla Governorate, Yemen, 12°N latitude) may limit generalizability to other populations, latitudes, and environmental contexts (Rudolph et al., 2023). Second, the sex imbalance (n = 58 women vs. 200 men) may have limited our ability to detect sex-specific effects, particularly for parameters with smaller effect sizes. Third, we measured physiological parameters but did not directly assess clinical outcomes post-Hijama; the therapeutic superiority of lunar-timed Hijama remains empirically unverified (Kim et al., 2026). Fourth, the proposed mechanisms (melatonin suppression, gravitational effects, endogenous rhythms) remain speculative without direct hormonal assays or gravitational measurements; we did not measure melatonin, cortisol, or other relevant hormones. Fifth, we captured phase differences (new moon vs. full moon) but not daily variations within windows, precluding analysis of fine-grained temporal dynamics. Sixth, the ~8% non-responder rate suggests individual biological variability in sensitivity to lunar cues that we did not investigate. Finally, while we rigorously controlled for major confounders, other potential confounders such as psychological factors, subtle dietary variations, or unmeasured environmental exposures may have influenced our results.

D. Conclusion

This study provides the first empirical evidence that the mid-Hijri lunar phase (Days 17-21) is associated with a physiologically distinct state characterized by: (1) enhanced hemostatic readiness platelet counts increased by 5.9% in men and 2.7% in women; clotting time decreased by 33.3% (d = 0.82); and (2) heightened immune vigilance monocytes surged by 106% in young men; neutrophils increased by 18% in older men; eosinophils increased by 19% in women. These findings validate a core concept of Prophetic Medicine as articulated by Ibn Qayyim and offer a scientific framework for understanding the wisdom behind this prophetic practice.

The integrated mechanistic model incorporating photic modulation (melatonin suppression), gravitational/tidal effects, and endogenous circalunar rhythms provides a plausible explanation for lunar phase entrainment of hematological and immune rhythms. The observed changes, while within clinically normal ranges, represent a meaningful shift in physiological set points a state of "optimized readiness" that may enhance both safety and efficacy of blood-based therapies like Hijama.

By demonstrating a physiological correlation with traditional timing recommendations, this study provides a scientific perspective that enriches understanding of Prophetic Medicine practices while reaffirming the potential of the Sunnah to inspire modern scientific inquiry. It offers a model of harmony between faith and reason, demonstrating that divine revelation and empirical investigation are complementary paths to understanding human physiology and its connection to the cosmos.

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F. Author Contribution Statement

NT: Conceptualization, Methodology, Supervision, Writing - Original Draft. RS: Data Collection, Laboratory Coordination, Writing - Review & Editing. IA, OM, AJ, FA, BD, AA, TA, MS, SH, NM, KM, YK, SN, AA, AMA, MA: Sample Collection, Laboratory Analysis. All authors read and approved the final manuscript.

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