

Response to Reviewers

Quantifying Civilian Vulnerability: A Mixed-Methods Analysis of Gaza Casualties and Famine-Related Deaths (2023–2025)

Dear Editor,

We thank you and the reviewers for the opportunity to revise and resubmit our manuscript, “**Quantifying Civilian Vulnerability: A Mixed-Methods Analysis of Gaza Casualties and Famine-Related Deaths (2023–2025)**”. We are grateful for the reviewers’ thoughtful, detailed, and constructive feedback, which has been invaluable in strengthening our work. The reviewers raised significant methodological and theoretical concerns, which we have addressed comprehensively in this revision.

The core revisions focus on three major areas highlighted by the reviewers: (1) addressing methodological circularity by reframing the study’s scope and claims, (2) enhancing statistical robustness and transparency, and (3) deepening the ethical and theoretical framework. Specifically, we have revised the manuscript to explicitly frame the analysis as an examination of the *institutional documentation system* and its internal coherence, rather than an attempt to establish an independent ground truth. We have added new statistical analyses (bootstrapped confidence intervals, sensitivity analyses using Spearman’s correlation, and explicit analysis of retroactive adjustments) to better account for uncertainty. We have also significantly expanded the discussion of limitations, positionality, and the study’s boundary conditions. All data and code will be made publicly available upon publication to ensure full reproducibility.

We believe these revisions have substantially improved the manuscript’s rigor, clarity, and contribution. Below, we provide a point-by-point response to each reviewer’s comments, detailing the specific changes made.

Response to Reviewers

Reviewer 1

Comment 1: Methodological Circularity: Address overreliance on the same institutions for both data and credibility assessment. Incorporate alternative data sources or explicitly model selection bias. **Response:** We thank the reviewer for this crucial point. We agree that the initial framing risked circular reasoning. In revision, we have fundamentally reframed the study’s aim. We now explicitly state that the analysis treats the institutional data not as a proxy for ground truth, but as the primary record of the documentation practices of the UN-led humanitarian ecosystem itself. We analyze the data’s internal patterns, consistency across sources, and the discursive strategies used to fortify its credibility. This reframing is articulated in the Abstract, Introduction, and Method sections. We have also added the Armed Conflict Location and Event Data (ACLED) project as a cited source for methodological context in the Related Work section, while maintaining our purposive sampling of UN/CPJ sources to maintain a focused analysis of that specific institutional system. The key change is a shift from *validating* the data to *analyzing the system that produces it*.

- **Changes:** Abstract (lines 8-12, 16-18); Introduction, Section 1 (lines 70-75, 85-90); Method,

Section 4.1 (lines 155-160) and Section 4.2 (lines 175-180). We explicitly state: “The research design explicitly recognizes the epistemic challenges... framing the analysis not as an attempt to establish a ground truth but to understand the production, dissemination, and rhetorical fortification of casualty figures within a constrained informational ecosystem” and “This exclusion is a conscious methodological boundary: the study aims to analyze the UN-led humanitarian documentation ecosystem, its internal coherence, and its public-facing credibility strategies.”

Comment 2: Statistical Robustness: Apply multiple imputation or Bayesian methods to account for missing data/underreporting. Include uncertainty intervals in all tables. Justify choice of correlation metrics over time-series models. **Response:** We have significantly enhanced the statistical robustness of our analysis in direct response to this comment.

- **Uncertainty Intervals:** We have added bootstrapped 95% confidence intervals for key descriptive statistics (e.g., mean daily deaths) in Section 5.2 (Results, Temporal Patterns). For example: “Bootstrapped 95% confidence intervals for the mean daily deaths in these periods were: October 2023: [465, 481]; December 2023: [306, 318]; June 2024: [174, 182]; September 2025: [215, 225].”
- **Sensitivity Analysis:** We have added a sensitivity analysis for our correlation calculations, reporting both Pearson and Spearman’s rank correlation coefficients in Section 5.7 and in the Method section 4.4. We state: “Sensitivity analysis using Spearman’s rank correlation yielded substantively similar results ($r = 0.91$ for deaths/injuries, $r = 0.75$ for deaths/malnutrition deaths), confirming the robustness of these associations.”
- **Analysis of Underreporting:** While full multiple imputation or Bayesian modeling of the complete missing data process is beyond the scope of this descriptive/analytical study, we have introduced a novel proxy analysis. We explicitly analyze “retroactive adjustments” as an observable indicator of the verification process and a marker of initial undercounts. This is detailed in the Method (Section 4.4, lines 215-220) and Results (Section 5.2) sections.
- **Justification for Methods:** We have clarified in Section 4.4 that our quantitative analysis is primarily descriptive and associational, identifying patterns within the reported data. We justify the use of correlation and change-point detection as appropriate for exploring relationships and shifts within the time series, while explicitly stating we do not establish causality.

Comment 3: Ethical Framework: Strengthen the ethical analysis beyond procedural IRB compliance to address power dynamics in knowledge production. **Response:** We have substantially expanded the ethical discussion. In the Method section (4.5, Trustworthiness and Ethical Considerations), we now explicitly address the power dynamics and positionality involved in analyzing institutional data from a conflict zone. We discuss the methodological circularity as a feature of the system we study and frame our analysis as an attempt to uncover its internal logic. We also more critically engage with our own positionality as researchers reliant on these secondary sources. Furthermore, in the Discussion (Section 6), we have added a dedicated paragraph on researcher positionality and its implications for interpretation.

- **Changes:** Method, Section 4.5 (lines 240-250): “We explicitly recognize the methodological circularity noted by reviewers... We mitigate this by treating the circularity as a feature of the system under study, not a flaw to be eliminated. Our analysis seeks to uncover the internal logic and consistency of this system.” Discussion, Section 6 (lines 395-405): “Researcher positionality shapes the interpretation of these findings. As analysts working with secondary data... This creates methodological circularity... Commitment to accurate representation of Palestinian experiences necessitates critical engagement with data limitations...”

Comment 4: Theoretical Framing: Reduce jargon and clarify how theoretical concepts directly inform analysis. **Response:** We have streamlined the theoretical language throughout the manuscript, ensuring that concepts like “epistemic injustice,” “mediated witnessing,” and “data trust” are clearly defined upon first use and their operational link to the analysis is explained. For instance, in the Introduction (lines 80-85), we now more succinctly state how these lenses inform our research questions. The qualitative analysis in Section 5.10 directly shows how these concepts are applied to interpret institutional narratives.

- **Changes:** Introduction (lines 80-85, 100-105); Background, Section 3 (lines 125-135); Discussion (lines 380-385, 440-445).

Comment 5: Reproducibility Barriers: Absence of shared data/code and insufficient methodological detail. **Response:** We have taken concrete steps to ensure reproducibility.

- **Data/Code Availability:** We now explicitly state in the Method (Section 4.2, lines 185-190 and Section 4.3, lines 200-205) that the aggregated dataset and analysis code will be made publicly available upon publication in a supplementary repository.
- **Methodological Detail:** We have added specific details: we name the change-point detection algorithm (Pruned Exact Linear Time - PELT method) in Section 4.4, describe the bootstrapping procedure (1000 resamples), and detail the qualitative coding reliability check (Cohen’s kappa of 0.78 from double-coding).

Comment 6: Unsubstantiated Causal Claims: Language implying “systematic targeting” and “structural violence” exceeds what the methodological approach can support. **Response:** We have carefully revised the language throughout the manuscript to temper causal claims. We now use descriptive language to report patterns (e.g., “documented patterns reveal systematic vulnerabilities,” “the high proportion of child fatalities reflects... and indicates particular vulnerability”). The term “structural violence” is now primarily used as a concept drawn from the qualitative discourse of the reporting agencies themselves, not as our independent causal assertion.

- **Changes:** Abstract (line 18); Method, Section 4.5 (line 250); Results, Sections 5.1, 5.3, 5.10; Discussion (lines 410-415). We state in the Method: “We refrain from making strong causal claims about ‘systematic targeting’ based solely on this data; instead, we describe reported patterns and associate them with institutional framings.”

Reviewer 2

Comment 1: Fundamental methodological circularity: Uses institutional reports both as data source and object of study without independent validation. **Response:** We agree with the reviewer that this was a central concern. As detailed in our response to Reviewer 1 (Comment 1), we have reframed the study’s objective. We are no longer attempting to independently validate the data’s accuracy against an inaccessible ground truth. Instead, we are analyzing the institutional documentation system as a social and communicative phenomenon. We examine the coherence of its outputs, the patterns of its reporting (including lags and adjustments), and the discursive strategies it employs to build trust. This reframing directly addresses the circularity by making the system’s operation the core object of inquiry.

- **Changes:** Abstract (lines 8-12); Introduction, Section 1 (lines 70-75); Method, Sections 4.1 and 4.2 (lines 155-165, 175-180). We now state the study “explicitly recognizes the epistemic challenges of working with secondary institutional data in a conflict zone, framing the analysis not as an attempt to establish a ground truth but to understand the production, dissemination, and rhetorical fortification of casualty figures.”

Comment 2: No critical examination of potential political or institutional biases in reporting. **Response:** We have strengthened the critical examination of biases. While a full external audit of biases is not possible without alternative data, we now critically engage with the potential for “institutional capture” in our positionality statement (Method, Section 4.5) and in the Discussion. Furthermore, our analysis of retroactive adjustments and reporting lags (Sections 5.2–5.9) serves as an internal examination of the system’s reliability and consistency over time, which can reveal operational (if not necessarily political) biases in the timing and completeness of reporting.

- **Changes:** Method, Section 4.5 (lines 245-250): “The research acknowledges positionality in analyzing conflict data... We explicitly recognize the methodological circularity...” Discussion (lines 395-400): “As analysts... we acknowledge dependence on the reporting systems we study. This creates methodological circularity...”

Comment 3: Theoretical framework for “data trust” is underdeveloped and applied superficially. **Response:** We have deepened the theoretical development of “data trust.” In the Introduction and Background, we more clearly root it in theories of communicative credibility (Zelizer), epistemic injustice (Fricker), and affective trust in humanitarian communication (Pantti). In the Results (Section 5.10) and Discussion, we explicitly show how this framework is applied to interpret the qualitative findings, identifying specific narrative strategies (e.g., appeals to IHL, transparency about lags) as trust-building performances. We now conceptualize data trust as a “dynamically negotiated construct” and a “performative practice.”

- **Changes:** Abstract (line 20); Introduction (lines 80-85, 100-105); Background, Section 3 (lines 125-130); Results, Section 5.10 (lines 365-375); Discussion (lines 380-385, 440-445).

Comment 4: Statistical analysis lacks sophistication given the complexity of the data. **Response:** We have enhanced the statistical analysis as described in detail in our response to Reviewer 1 (Comment 2). Key additions include:

- Bootstrapped confidence intervals for descriptive statistics.
- Sensitivity analysis using non-parametric (Spearman) correlation.
- Explicit quantitative analysis of retroactive adjustments as a proxy for verification processes.
- Clearer justification for our descriptive and associational approach, acknowledging that we do not perform causal or predictive modeling.

These additions provide a more nuanced and uncertainty-aware presentation of the quantitative findings without overstepping the limitations of the underlying data.

Comment 5: Missing comparative analysis with other conflict contexts to establish generalizability. **Response:** We agree that comparative analysis is valuable for generalizability. However, given the substantial revisions required to address the core methodological and framing issues, and the already significant length of the manuscript, we have chosen to scope this study as a deep, focused case analysis of the Gaza documentation ecosystem. We now explicitly mention this as a limitation and a direction for future work in the Conclusion (Section 7).

- **Changes:** Conclusion, Section 7 (lines 460-465): “Future research should explore cross-cultural understanding of data credibility across different stakeholder groups... Additional studies could examine... A critical next step... is to design studies that can incorporate independent verification mechanisms...”

Comment 6: Implement more sophisticated statistical modeling that accounts for measurement uncertainty. **Response:** Please see our detailed response to Reviewer 1, Comment 2. We have incorporated measures to account for uncertainty (bootstrapping, sensitivity analysis) and have added a dedicated analysis of retroactive adjustments as an indicator of measurement error and correction. We have also added a clear statement in the Limitations (Method, Section 4.6) that we cannot quantify the total scale of underreporting, framing the figures as “minimum verified counts.”

Comment 7: Data/code availability not explicitly addressed. **Response:** Addressed. We now explicitly state in the Method (Sections 4.2 and 4.3) that the aggregated dataset and analysis code will be made publicly available upon publication.

Closing Note

We again express our sincere gratitude to the reviewers for their rigorous and constructive critiques. Their insights have challenged us to refine our theoretical framework, strengthen our methodological rigor, and clarify the scope and contributions of our work. We believe the revised manuscript is significantly improved and hope it now meets the high standards of your journal.

Respectfully submitted,

The Authors