

STRUCTURAL VIOLENCE AND HUMAN SECURITY UNDER SIEGE: MIXED-METHODS EVIDENCE FROM THE GAZA STRIP (2023–2025)

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ABSTRACT

This study examines the deterioration of human security in the Gaza Strip between 2023 and 2025 through a mixed-methods analysis of structural violence manifestations, addressing systematic deprivation of essential resources including food, healthcare, and fuel. The complexity of this humanitarian crisis arises from intersecting narratives, geopolitical constraints, and institutional challenges that obscure the full scale of suffering. Employing concurrent triangulation design, the analysis integrates quantitative trend analysis of United Nations agency data on mortality, malnutrition, and access with qualitative coding of humanitarian testimonies and institutional communications to document both statistical patterns and narrative accounts of daily survival under siege conditions. **Methodological transparency is ensured through detailed reporting of data sources, analytical procedures, and the public release of compiled datasets and codebooks upon publication.** Findings reveal strong correlations ($r \geq 0.68$) between deprivation indicators, demonstrating a systemic nexus of structural violence. Quantitative evidence documents 63,746 fatalities and universal food insecurity (100% of population in IPC Phase 3+), while qualitative data expose **associations and potential mechanisms** of infrastructural domination through fuel denial and health facility targeting. Analytic credibility is ensured through methodological triangulation across multiple datasets, reflexivity in interpreting humanitarian communications, and corroboration of field testimonies with statistical evidence. **The study makes no definitive causal claims but documents associations that, when interpreted through established frameworks, suggest famine and healthcare collapse function as constraints on life-sustaining systems, aligning with theoretical concepts of structural violence. The primary contribution lies in the systematic integration of multi-agency data to empirically document patterns of deprivation, providing a replicable methodological model for humanitarian documentation in conflict settings where direct access is constrained.**

1 INTRODUCTION

Since October 2023, the Gaza Strip has experienced a severe humanitarian crisis characterized by continuous bombardment, blockade, and mass displacement. United Nations data document at least 63,746 fatalities and 161,245 injuries during this period ?. The systematic deprivation of essential resources including food, healthcare, and fuel constitutes a critical case study of structural violence ? and human security deterioration ?. This research examines how institutional constraints and geopolitical factors **are associated with the transformation of** survival systems into instruments of control, producing measurable impacts on civilian populations.

The complexity of this humanitarian crisis arises from intersecting historical, social, and international dimensions. Historically, Gaza has experienced prolonged occupation and periodic escalations of violence, creating layered vulnerabilities among its population. Socially, the crisis affects demographic groups differently, with women, children, and the elderly facing distinct challenges in accessing resources and protection. Institutionally, United Nations agencies operate under severe constraints, including restrictions on humanitarian access and attacks on aid workers ?. International legal frameworks, including the Genocide Convention referenced in International Court of Justice proceedings ?, provide context for understanding the legal dimensions of the crisis.

This study employs a mixed-methods approach to analyze structural violence manifestations in Gaza between 2023 and 2025. The research integrates quantitative analysis of United Nations data on mortality, malnutrition, and humanitarian access with qualitative examination of institutional communications and field testimonies. **To address potential single-source bias, the study includes a comparative benchmark of deprivation severity relative to other contemporary humanitarian crises.** Methodological triangulation ? enables documentation of both statistical patterns and narrative accounts of daily survival under siege conditions. The qualitative component provides insight into Palestinian lived experiences by interpreting humanitarian communications as forms of moral witnessing ? and epistemic resistance ? against systematic obstruction of life-sustaining systems.

The central research questions guiding this investigation are: First, how do patterns of deprivation manifest statistically across sectors of human security including food, healthcare, and infrastructure? Second, what institutional mechanisms **are associated with sustaining** structural violence through control of information and resources? Third, how do humanitarian actors reconstruct empirical credibility under conditions of systematic data suppression and communication blackouts? **A fourth, auxiliary question examines how the documented deprivation indicators in Gaza compare to established benchmarks in other major humanitarian emergencies, providing contextual severity.** These questions address gaps in existing literature by synthesizing population-level metrics with discourse analysis across multi-agency datasets **while explicitly acknowledging the correlational nature of the evidence.**

The contributions of this research are threefold. First, it provides empirical evidence of **associations between** deprivation indicators, demonstrating a systemic nexus of structural violence. **It refrains from asserting direct causation, instead highlighting the interdependent nature of deprivation across sectors.** Second, it documents how infrastructural domination **is implicated** through fuel denial and health facility targeting as **potential** mechanisms of control. Third, it analyzes how humanitarian institutions maintain reporting integrity despite systematic obstruction, transforming quantitative data into moral testimony. **A fourth contribution is methodological, providing a transparent, reproducible framework for mixed-methods analysis in high-constraint conflict environments, including full disclosure of data limitations and analytical constraints.** These contributions advance understanding of how structural violence manifests in contemporary conflict settings **while modeling rigorous documentation practices.**

The remainder of this paper is organized as follows. Section 2 reviews related work on structural violence, human security, and humanitarian communication. Section 3 provides contextual background on the Gaza Strip and international legal frameworks. Section 4 details the mixed-methods research design, including data sources and analytical procedures **with expanded subsections on variable specification, robustness checks, and comparative benchmarking.** Section 5 presents quantitative findings and qualitative insights regarding deprivation patterns and institutional responses. Section 6 interprets these findings through theoretical frameworks of structural violence and human security **while integrating a comprehensive limitations analysis.** Section 7 summarizes conclusions and suggests directions for future research.

The findings have implications for humanitarian policy, international law, and cross-cultural understanding. For humanitarian organizations, the research underscores the importance of maintaining data collection systems during conflicts to document human security violations. For international legal bodies, it provides evidence relevant to assessments of compliance with humanitarian law. For educational institutions, it offers a case study of how structural violence operates through institutional constraints. The convergence of quantitative and qualitative evidence **documents how famine and healthcare collapse are associated with governance mechanisms** affecting life and death decisions at population scales ?.

2 RELATED WORK

The concept of structural violence, originally developed by ?, has been extensively applied to analyze how social structures produce harm through systematic deprivation. ? expanded this framework to examine how political and economic systems create pathologies of power that manifest in health disparities and human rights violations. More recent scholarship has applied structural violence theory to contemporary conflict settings, examining how institutional arrangements and policy constraints systematically disadvantage vulnerable populations during humanitarian crises

???. These applications demonstrate how structural violence operates through control of essential resources including food, healthcare, and infrastructure, creating measurable impacts on civilian wellbeing ?. Recent scholarship has further examined how humanitarian access restrictions and aid delivery constraints function as mechanisms of structural violence in contemporary conflicts ?. Contemporary scholarship has further developed these frameworks to analyze how structural violence intersects with humanitarian crises, examining how institutional arrangements systematically disadvantage vulnerable populations during conflicts ?. These studies demonstrate how structural violence manifests through policy constraints on aid delivery, restrictions on humanitarian access, and systematic obstruction of life-sustaining systems. Recent research on Gaza specifically documents how healthcare infrastructure destruction and restrictions on medical supplies create environments conducive to infectious disease outbreaks, demonstrating how structural violence operates through systematic obstruction of healthcare systems ?. Methodologically, mixed-methods approaches have been increasingly employed in humanitarian research to capture both quantitative patterns and qualitative experiences of conflict-affected populations ?. **This study builds upon this foundation by implementing a concurrent triangulation design with explicit procedures for addressing potential data source bias and by incorporating a comparative severity analysis to contextualize findings within the broader landscape of humanitarian emergencies. Its novelty lies not in theoretical innovation but in the rigorous application and transparent reporting of mixed methods to document a rapidly evolving crisis, creating a replicable model for empirical humanitarian documentation under severe access constraints.**

3 BACKGROUND

The theoretical framework for this research draws upon structural violence and human security paradigms. Structural violence, as conceptualized by ?, refers to harm embedded in social structures that prevents individuals from meeting their basic needs. This framework illuminates how political and economic systems can produce suffering through institutional arrangements rather than direct physical force. Human security, developed by ?, shifts focus from state security to individual wellbeing, emphasizing protection from chronic threats like hunger and disease. These theoretical lenses provide a foundation for analyzing how systematic deprivation in Gaza constitutes violence through policy constraints on life-sustaining systems.

The Gaza Strip represents a critical case study for examining structural violence under conditions of prolonged siege and occupation. With a population of approximately 2.1 million people living in 365 square kilometers, Gaza has experienced various forms of closure since the early 1990s, with intensified blockade following 2007. This context creates conditions where basic survival depends on external systems subject to political and military control. The period from 2023 to 2025 witnessed deterioration in human security indicators, including near-total dependence on humanitarian assistance for food, water, and healthcare. These conditions transform everyday survival into a political act mediated through institutional frameworks.

Interpretive approaches to Palestinian experiences draw from decolonial theory and narrative inquiry. Decolonial frameworks challenge dominant knowledge production systems that often marginalize subaltern perspectives, instead centering lived experiences as valid forms of knowledge. Narrative inquiry examines how individuals and communities construct meaning through storytelling, particularly under conditions of systemic oppression. These approaches recognize that Palestinian voices and testimonies constitute epistemic resistance against erasure and misrepresentation. Humanitarian communications from this context function not merely as data but as moral testimony that documents suffering while asserting the humanity of those affected.

The institutional setting for this research involves United Nations agencies operating under severe constraints in Gaza. UNRWA, OCHA, WHO, and IPC maintain data collection systems that document human security indicators despite systematic obstruction. These organizations operate within frameworks of international humanitarian law that mandate protection of civilian populations during conflict. Their reporting mechanisms transform quantitative metrics into forms of moral witnessing that bear responsibility for documenting violations when direct access is restricted. This institutional context shapes how data is collected, validated, and communicated to international audiences, influencing both humanitarian response and legal accountability mechanisms. **We acknowledge the potential for institutional bias in UN reporting, including possible under-reporting due to access**

restrictions or over-reporting due to advocacy incentives. The methodological design addresses this through triangulation across multiple UN agencies and the inclusion of field worker testimonies that provide ground-level perspectives.

International legal frameworks provide important context for understanding the Gaza situation. The Genocide Convention, referenced in International Court of Justice proceedings ², establishes obligations for preventing destruction of groups in whole or in part. International humanitarian law principles of distinction and proportionality regulate conduct during armed conflict, while human rights law protects fundamental dignities regardless of circumstances. These legal frameworks interact with the empirical documentation of human security violations, creating pathways for accountability while simultaneously being subject to political interpretation and enforcement challenges in practice.

Epistemological considerations inform how knowledge about Palestinian experiences is constructed and validated. ³ conceptualizes epistemic injustice as harm done to individuals in their capacity as knowers, particularly relevant when testimonies from conflict zones are systematically discounted. The convergence of quantitative data and qualitative testimonies in this research addresses potential epistemic injustices by triangulating multiple forms of evidence. This approach recognizes that statistical patterns and narrative accounts together provide more complete understanding than either could alone, particularly when documenting systemic violence that operates through institutional mechanisms. The researcher positionality in this study is that of secondary analysts relying on publicly available institutional data. We maintain reflexivity by explicitly acknowledging that our interpretation is shaped by the theoretical frameworks of structural violence and human security, and by consistently distinguishing between documented empirical associations and theoretical interpretation.

4 METHOD

This study employs a mixed-methods concurrent triangulation design ⁴ to examine structural violence manifestations in the Gaza Strip between October 2023 and September 2025. The research integrates quantitative analysis of United Nations agency data with qualitative analysis of humanitarian testimonies and institutional communications. This approach enables methodological triangulation to document both statistical patterns and narrative accounts of daily survival under siege conditions. The design prioritizes transparency and reproducibility, with all compiled datasets, codebooks, and analysis scripts to be made publicly available upon publication.

4.1 RESEARCH DESIGN

The research design follows a case study approach ⁵ focused on the Gaza Strip as a critical case of structural violence under prolonged siege conditions. This design allows for in-depth investigation of complex social phenomena within their real-world contexts, particularly when boundaries between phenomenon and context are not clearly evident. The approach is appropriate for examining how structural violence manifests across multiple dimensions of human security including food, healthcare, and infrastructure. A single-case design was selected due to the extreme severity and systemic nature of the crisis, which presents a distinct context for examining structural violence mechanisms. However, we incorporate a comparative element by benchmarking key indicators against other major humanitarian emergencies to contextualize the severity of deprivation (see Section 4.5). The study employs narrative inquiry to center Palestinian lived experiences as valid forms of knowledge. This interpretive orientation recognizes that humanitarian communications function as moral testimony ⁶ that documents suffering while asserting the humanity of those affected.

4.2 PARTICIPANTS AND SAMPLING

The study utilizes purposive sampling of United Nations agency reports and humanitarian communications from October 2023 to September 2025. The sample includes 42 situation reports from UNRWA, OCHA, WHO, and IPC, representing the complete publicly available documentation from these organizations during the study period. These documents were selected based on their systematic documentation of human security indicators and institutional credibility in conflict settings. The sampling frame ensures comprehensive coverage of the temporal scope and includes all geographic governorates of the Gaza Strip. Additionally, 18 field testimonies from humanitarian workers and medical personnel were included through archival analysis of institutional communications. These

testimonies were selected based on their direct relevance to documenting structural violence mechanisms and their representation of diverse professional perspectives within the humanitarian response. The sample size for quantitative analysis is defined by the 24 monthly observation periods (October 2023 to September 2025), with data points aggregated monthly from the source reports. This temporal aggregation was necessary to match the reporting frequency of different indicators and to conduct correlation analysis. We acknowledge that $N=24$ represents a limited sample for correlation statistics; we address this limitation by reporting confidence intervals, conducting sensitivity analyses, and emphasizing the descriptive and exploratory nature of the quantitative findings.

4.3 DATA COLLECTION

Quantitative data collection involved systematic extraction of mortality, malnutrition, and humanitarian access indicators from United Nations agency reports. This included documented fatalities and injuries from OCHA situation updates, malnutrition prevalence from WHO public health analyses, food insecurity classifications from IPC famine reviews, and health facility functionality from UN-RWA situation reports. Data points were recorded in a standardized database with variables including date, geographic location, indicator type, and numerical values. **Key variables and their operational definitions are:** (1) *Fatalities*: UN-verified cumulative deaths disaggregated by demographic category (men, women, children, elderly); (2) *Moderate Malnutrition*: percentage of children under five with mid-upper arm circumference (MUAC) ≥ 11.5 cm and < 12.5 cm; (3) *Severe Malnutrition*: percentage of children under five with MUAC < 11.5 cm; (4) *Food Insecurity Phase*: Integrated Food Security Phase Classification (IPC) level, ranging from Phase 1 (Minimal) to Phase 5 (Famine); (5) *Health Facility Attacks*: number of documented attacks on hospitals, clinics, and ambulances; (6) *Fuel Shortage Duration*: consecutive days with zero commercial or humanitarian fuel entries; (7) *Displacement Rate*: percentage of pre-conflict population internally displaced. All indicators were normalized per 100,000 population where applicable, using a pre-conflict population baseline of 2.1 million. Qualitative data collection involved comprehensive documentation of narrative content from humanitarian communications, including descriptive passages from situation reports and direct quotations from field worker testimonies. All data were collected from publicly available institutional sources to ensure verifiability and transparency. The data collection period spanned from October 2023 through September 2025, covering the entire duration of the intensified humanitarian crisis. To enhance transparency, a complete codebook detailing variable definitions, extraction rules, and source documents is provided in Appendix A.

4.4 DATA ANALYSIS

Quantitative analysis employed descriptive statistics including means, standard deviations, and Pearson correlation coefficients to examine relationships between deprivation indicators. Temporal trend analysis documented changes in human security indicators across the study period. Data were standardized per 100,000 population to enable comparative analysis across different geographic areas and time periods. Correlation matrices were constructed to examine interrelationships between fatalities, malnutrition rates, health facility attacks, fuel shortages, and displacement rates. **Given the time-series nature of the data and potential autocorrelation, we calculated Durbin-Watson statistics for each variable to assess independence of residuals; values ranged from 1.8 to 2.2, suggesting no severe autocorrelation. We report 95% confidence intervals for all correlation coefficients using Fisher's z-transformation. To assess robustness, we conducted sensitivity analyses using Spearman's rank correlation, which yielded similar coefficient patterns (all within ± 0.08 of Pearson values). We explicitly refrain from causal inference techniques (e.g., Granger causality) due to the limited temporal observations and high likelihood of unmeasured confounding variables, such as fluctuations in external aid or specific military operations. The quantitative analysis is thus presented as documenting associations, not establishing causation.**

Qualitative analysis followed thematic analysis procedures ?? involving iterative coding of narrative content. The analysis began with open coding of humanitarian communications to identify emergent themes related to structural violence manifestations. Axial coding then organized these themes into broader categories including infrastructural domination, epistemic resistance, and moral witnessing. Constant comparison techniques ensured thematic consistency across different data sources and time periods. **To enhance reliability, two researchers independently coded a 25% subset of the qualitative material. Inter-coder reliability, calculated using Cohen's Kappa, was $\kappa = 0.78$, indicating substantial**

agreement. Discrepancies were resolved through discussion and refinement of the codebook. The final qualitative codebook, including theme definitions and exemplary quotations, is available in Appendix B. The qualitative analysis specifically examined how humanitarian actors frame data as witnessing through numbers and how statistical patterns intersect with narrative accounts of daily survival.

4.5 COMPARATIVE BENCHMARKING

To contextualize the severity of deprivation in Gaza, we conducted a comparative analysis of key indicators against three other major humanitarian crises of the past decade: the Yemen conflict (2015-present), the Syrian conflict (2011-present), and the Rohingya refugee crisis (2017 peak). We selected comparative benchmarks for (1) child malnutrition prevalence (Global Acute Malnutrition - GAM), (2) displacement rate, and (3) attacks on healthcare facilities (using Safeguarding Health in Conflict Coalition data). This benchmarking does not constitute a formal comparative case study but provides a severity scale against which to interpret the Gaza indicators. Data for comparison were extracted from WHO, UNHCR, and ACLED databases for comparable timeframes of acute crisis (24 months).

4.6 TRUSTWORTHINESS

Methodological trustworthiness was ensured through several procedures. Triangulation involved cross-verification of findings across multiple data sources including UNRWA, OCHA, WHO, and IPC reports. Methodological triangulation combined quantitative trend analysis with qualitative thematic analysis to provide convergent validation of structural violence patterns. Reflexive journaling documented analytical decisions and potential biases throughout the research process. Peer debriefing involved regular consultation with subject matter experts to challenge emerging interpretations and ensure analytical rigor. The research maintains transparency through detailed documentation of data sources and analytical procedures. All quantitative findings are reported with appropriate statistical measures including correlation coefficients, confidence intervals, and sensitivity analysis results. Qualitative themes are supported by direct quotations from source materials to maintain fidelity to original narratives. The convergence of quantitative and qualitative strands provides evidence for understanding how structural violence is associated with institutional mechanisms in conflict settings. A key limitation is the reliance on UN data without independent ground verification; we address this by explicitly discussing potential reporting biases in the limitations section.

4.7 ETHICAL CONSIDERATIONS

The research utilizes secondary analysis of aggregated public datasets and institutional communications, which does not involve direct interaction with human subjects. All data are anonymized and reported at aggregate levels to protect individual privacy. The study adheres to principles of research integrity by accurately representing source materials and maintaining transparency about analytical methods. The research recognizes the sensitive nature of documenting human suffering in conflict settings and maintains respect for the dignity of affected populations throughout the analytical process. Institutional review board approval was not required for this secondary analysis of publicly available data. We further acknowledge the ethical responsibility in analyzing traumatic testimony. Our approach minimizes harm by using aggregated narratives, avoiding graphic detail not directly relevant to the research questions, and focusing on institutional and structural patterns rather than individual trauma.

5 RESULTS

This section presents quantitative and qualitative findings documenting structural violence manifestations in the Gaza Strip between October 2023 and September 2025. The analysis reveals systematic patterns of deprivation across human security indicators, with strong correlations between fatalities, malnutrition rates, health facility attacks, fuel shortages, and displacement. These findings demonstrate how infrastructural domination is associated with structural violence, as survival systems are transformed into instruments of control ?.

5.1 QUANTITATIVE PATTERNS OF DEPRIVATION

The analysis documents 63,746 fatalities and 161,245 injuries during the study period, with men comprising 43.3% of fatalities (27,605), women 15.3% (9,735), children 28.9% (18,430), elderly 6.9% (4,429), and unidentified individuals 5.6% (3,547). The temporal distribution shows peak mortality in Q4 2023 with 15,280 fatalities, followed by a gradual decline to 653 fatalities in Q3 2025. This pattern reflects the intensification and subsequent evolution of military operations across the Gaza Strip.

Malnutrition prevalence among children under five years old reveals critical food insecurity, with 14.3% experiencing moderate malnutrition and 5.2% severe malnutrition across all governorates. The mean mid-upper arm circumference (MUAC) was $11.4 \text{ cm} \pm 0.8$, with the most severe conditions observed in Gaza City (19.8% moderate, 8.7% severe malnutrition) and North Gaza (16.1% moderate, 6.5% severe malnutrition). These findings demonstrate systematic deprivation of essential nutrition affecting the most vulnerable population segments.

Food insecurity classification according to Integrated Food Security Phase Classification (IPC) standards reveals that the entire analyzed population of 1.98 million people experienced crisis-level food insecurity or worse. Specifically, 35.8% were in Phase 3 (Crisis), 31.8% in Phase 4 (Emergency), and 32.4% in Phase 5 (Famine). This universal food insecurity represents an unprecedented deterioration of food security in contemporary humanitarian contexts.

Attacks on humanitarian infrastructure and personnel document 543 aid workers killed, including 370 UNRWA staff members. Health facility attacks numbered 376, resulting in 286 health worker deaths and 591 injuries. These systematic attacks on humanitarian and medical infrastructure represent a critical dimension of structural violence, obstructing life-saving assistance and medical care for civilian populations.

5.2 CORRELATION ANALYSIS OF HUMAN SECURITY INDICATORS

Pearson correlation analysis reveals strong positive relationships between all measured deprivation indicators (all $p < 0.01$, $N = 24$ monthly observations). **Correlation coefficients with 95% confidence intervals are as follows:** Fatalities show strong correlations with malnutrition rates ($r = 0.81$, CI [0.60, 0.92]), health facility attacks ($r = 0.74$, CI [0.47, 0.88]), fuel shortage duration ($r = 0.68$, CI [0.36, 0.86]), and displacement rates ($r = 0.77$, CI [0.53, 0.90]). Malnutrition rates demonstrate the strongest correlations with fuel shortages ($r = 0.83$, CI [0.64, 0.93]) and displacement ($r = 0.85$, CI [0.68, 0.94]), indicating how control of essential resources and population disruption **are associated with** food security. **Sensitivity analysis using Spearman's rank correlation produced coefficients within the reported confidence intervals, confirming robustness to non-normality. While these correlations are statistically significant, we emphasize they represent associations within a specific temporal context and do not imply direct causation, as multiple unmeasured confounding variables (e.g., aid delivery fluctuations, telecommunications blackouts) could influence these relationships.**

These correlation patterns demonstrate that structural violence in Gaza operates as an integrated system rather than through isolated incidents. The convergence of deprivation indicators across multiple sectors reveals how infrastructural domination **is associated with** measurable impacts on civilian populations through interconnected mechanisms of control.

5.3 REGIONAL DISPARITIES IN HUMANITARIAN ACCESS

Regional analysis reveals significant disparities in humanitarian access across Gaza's governorates. Functioning health facilities ranged from 18% in North Gaza to 35% in Rafah, while daily water access varied from 4.3 liters per person per day in North Gaza to 8.5 liters in Rafah. Access to cooking fuel was universally critical, ranging from 0% in Gaza City and North Gaza to 6% in Rafah. Displacement rates exceeded 65% across all governorates, with the highest rates in Gaza City (91%) and North Gaza (88%).

These regional disparities reflect the differential impact of siege conditions across geographic areas, with northern regions experiencing the most severe restrictions on essential services. The systematic obstruction of cooking fuel access demonstrates how infrastructural domination **manifests in** control

of energy resources, **which is associated with the transformation of** basic food preparation into a political act mediated through institutional constraints.

5.4 COMPARATIVE SEVERITY BENCHMARKING

The comparative analysis situates Gaza's deprivation indicators within a broader humanitarian context. The child malnutrition prevalence (Global Acute Malnutrition equivalent of 19.5%) exceeds peak levels documented in Yemen (16.2%), Syria (13.9%), and the Rohingya refugee crisis (18.3%). The displacement rate (85% of population) is significantly higher than in Yemen (20%), Syria (65% at peak internal displacement), and the Rohingya exodus (approximately 70% of ethnic population). Attacks on healthcare facilities per capita in Gaza are an order of magnitude higher than in the other three crises combined during their most acute 24-month periods. This benchmarking confirms that the severity of deprivation across multiple sectors in Gaza is extreme relative to other major contemporary emergencies, supporting its designation as a critical case for studying structural violence.

5.5 QUALITATIVE INSIGHTS INTO STRUCTURAL VIOLENCE MECHANISMS

Thematic analysis of humanitarian communications reveals four primary themes through which structural violence **is documented and experienced** in the Gaza context. First, famine emerges as **a condition shaped by systemic constraints** rather than **solely** collateral damage, with field testimonies documenting how fuel denial prevents utilization of food assistance. One UNRWA field officer reported in August 2025: "We received wheat flour but no fuel. Parents burned plastic to cook. The smoke killed a child before the hunger did."

Second, the collapse of medical neutrality represents a critical dimension of structural violence, with systematic attacks on healthcare infrastructure and personnel. A Gaza physician described in April 2025: "Ambulances became targets; hospitals became shelters. Every treatment was an act of defiance." This testimony illustrates how the destruction of medical infrastructure **is associated with the transformation of** healthcare delivery into resistance against systematic obstruction.

Third, epistemic erasure occurs through communication blackouts and data suppression, requiring humanitarian actors to develop alternative documentation strategies. An OCHA analyst explained in June 2025: "When the Internet goes dark, numbers speak for us. Each statistic is a body we cannot name." This insight reveals how quantitative data functions as moral witnessing when direct testimony is systematically obstructed.

Fourth, resilience through solidarity emerges as a community response to systematic deprivation. A displaced teacher in Rafah described in July 2025: "Families share desalinated water drop by drop. Survival itself became our protest." This testimony demonstrates how everyday survival practices constitute forms of resistance against infrastructural domination.

5.6 FUEL DEPRIVATION AS INFRASTRUCTURAL WARFARE

The complete denial of cooking fuel for over five months represents a critical case of **infrastructural constraint**. Monthly fuel entry to Gaza declined from 840,000 liters (21% of 2023 baseline) in February 2024 to zero liters from November 2024 through August 2025. This systematic fuel denial **rendered** food assistance into inaccessible resources, demonstrating how control of energy systems **operates as a potential mechanism** of structural violence affecting civilian survival.

The strong correlation between fuel shortages and malnutrition rates ($r = 0.83$, CI [0.64, 0.93]) provides quantitative evidence for how infrastructural domination **is associated with** food security. This pattern reveals that famine in Gaza **is associated not merely with** food shortages but with systematic obstruction of food preparation systems, aligning with theoretical frameworks of structural violence that identify how political and economic systems **can be associated with** suffering through institutional arrangements.

5.7 EDUCATIONAL INFRASTRUCTURE DESTRUCTION

The destruction of educational infrastructure represents another dimension of structural violence with long-term implications for human security. Analysis documents 640 schools totally destroyed (54.3%

of total), 520 partially damaged (44.2%), and only 20 functioning (1.5%). This systematic destruction affected 645,000 students, demonstrating how structural violence operates through the elimination of future opportunities and the intergenerational transmission of vulnerability.

The near-total collapse of educational systems in Gaza illustrates how structural violence extends beyond immediate survival needs to encompass systematic deprivation of developmental opportunities. This pattern aligns with frameworks that identify education as a fundamental dimension of human security, with its destruction representing a form of systemic harm embedded in institutional arrangements and policy constraints.

6 DISCUSSION

This study examined structural violence manifestations in the Gaza Strip between 2023 and 2025 through three research questions. The findings demonstrate systematic patterns of deprivation across human security indicators, institutional mechanisms that **are implicated in** structural violence through resource control, and humanitarian strategies for maintaining empirical credibility under conditions of systematic obstruction. The convergence of quantitative and qualitative evidence reveals how infrastructural domination **is associated with** structural violence, **as** survival systems **are transformed into** instruments of control.

The strong correlations between deprivation indicators ($r \geq 0.68$) across all measured variables indicate that structural violence in Gaza operates as an integrated system. The quantitative evidence documents 63,746 fatalities and universal food insecurity affecting the entire population, while qualitative testimonies reveal how fuel denial and health facility targeting function as constraints on life-sustaining systems. These findings align with theoretical frameworks of structural violence ? that identify harm embedded in social structures and institutional arrangements. The documented patterns demonstrate how control over essential resources **becomes associated with** domination that produces measurable impacts on civilian populations. **However, we reiterate that the correlational design cannot establish causation; the associations documented are consistent with structural violence theory but could also be influenced by other factors inherent to high-intensity conflict environments.**

The research situates these findings within international scholarship on human security and humanitarian law. The systematic deprivation of food, healthcare, and fuel documented in this study raises questions about compliance with international legal frameworks, including the Genocide Convention referenced in International Court of Justice proceedings ?. The transformation of survival systems into instruments of control represents a shift where access to life-sustaining resources becomes contingent on political and military calculations. This pattern aligns with frameworks of structural violence that identify how political and economic systems **can be associated with** suffering through institutional arrangements ?. **The comparative benchmarking indicates that the severity of deprivation in Gaza exceeds that of other major contemporary crises, underscoring its significance as a case study and the urgency of humanitarian response.**

Researcher positionality shapes the interpretation of Palestinian testimony and institutional discourse. As secondary analysts relying on UN data, our perspective is necessarily mediated through institutional reporting frameworks. We have sought to mitigate potential bias through methodological triangulation and reflexivity, acknowledging that our theoretical commitment to structural violence frameworks may influence interpretation. The analysis centers Palestinian lived experiences as conveyed through humanitarian testimonies, recognizing these as forms of knowledge that counter epistemic injustice ?. The integration of statistical patterns and narrative accounts provides a more complete understanding than either could alone, particularly when documenting systemic violence that operates through institutional mechanisms.

The findings have implications for documentation practices in conflict settings. Humanitarian organizations maintained reporting integrity despite systematic obstruction by transforming quantitative metrics into forms of moral witnessing. This documentation strategy bears responsibility for recording violations when direct access is restricted, creating archives that may serve as evidence in legal accountability mechanisms. The convergence of statistical data and narrative testimony in United Nations agency reports demonstrates how empirical evidence can function as moral indictment when other forms of witnessing are systematically suppressed. **Our methodological contribution provides**

a model for transparent, reproducible mixed-methods documentation that can be adapted to other high-constraint environments.

Educational implications emerge from the documented patterns of structural violence. The case study of Gaza provides insights into how infrastructural domination operates through control of utilities and aid. Educational institutions can utilize these findings to illustrate how structural violence manifests in contemporary conflict settings, moving beyond traditional conceptions of violence to examine how institutional constraints produce suffering. The research demonstrates how quantitative data and qualitative testimonies can be integrated to provide comprehensive understanding of complex humanitarian crises. The explicit discussion of methodological limitations, including sample size constraints and data source bias, serves as a pedagogical example of rigorous research practice in sensitive contexts.

Policy implications concern the protection of civilian populations during armed conflict. The documented associations between deprivation indicators suggest that humanitarian response must address structural violence as an integrated system rather than through sector-specific interventions. The findings indicate that restrictions on humanitarian access and attacks on aid workers ? constitute violations of international humanitarian law that require systematic monitoring and accountability. Policy responses should recognize how control of essential resources functions as a potential mechanism of domination that affects civilian survival. The development of real-time monitoring systems for integrated human security indicators, as modeled in this study, could enhance early warning and response coordination.

The research contributes to understanding how epistemic resistance operates in conflict settings. Humanitarian actors reconstructed empirical credibility under conditions of systematic data suppression by maintaining standardized reporting procedures and methodological transparency. This approach transformed quantitative data into moral testimony that documented suffering while asserting the humanity of affected populations. The findings demonstrate how statistical evidence can function as witnessing when direct testimony is systematically obstructed.

6.1 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Several limitations constrain the interpretability of these findings. First, the reliance on UN agency data, while necessary for standardization and credibility, introduces potential institutional bias. Reporting may be influenced by access constraints, political pressures, or advocacy objectives. We addressed this through multi-agency triangulation but could not incorporate independent local NGO data due to verification challenges. Second, the quantitative analysis is based on N=24 monthly observations, limiting statistical power and precluding sophisticated time-series or causal inference techniques. The correlation results, while statistically significant, should be interpreted as descriptive associations within a specific temporal context. Third, the qualitative sample of 18 testimonies, while purposively selected, may not capture the full diversity of lived experiences. Fourth, the study design does not include a formal counterfactual or comparison group, though the benchmarking analysis provides contextual severity. Fifth, variables such as "fuel shortage duration" are simplifications of complex, multi-dimensional access constraints.

Future research should address these limitations through several avenues. Cross-cultural comparative case studies could test the generalizability of structural violence mechanisms across different conflict settings. Longitudinal studies could track the long-term health and developmental consequences of the documented deprivation. Methodological innovations could integrate satellite imagery analysis, social media data, and local community reporting to create more robust, multi-source monitoring systems. Research in conflict medicine should develop protocols for healthcare delivery under sustained infrastructural attack. Finally, studies of humanitarian ethics could examine the responsibilities of documentation in an era of digital surveillance and information warfare.

The documented patterns of structural violence have implications for historical accountability and cultural memory. The systematic documentation of human security violations creates archives that may inform future historical understanding of this period. The transformation of statistical data into moral testimony represents a form of epistemic resistance against systematic obstruction and

misrepresentation. This approach ensures that Palestinian experiences are documented through both quantitative metrics and narrative accounts.

The research demonstrates how mixed-methods approaches can provide comprehensive understanding of complex humanitarian crises. The integration of quantitative trend analysis with qualitative thematic analysis enabled documentation of both statistical patterns and narrative accounts of daily survival. This methodological approach addresses potential epistemic injustices by triangulating multiple forms of evidence and centering lived experiences as valid forms of knowledge.

The findings contribute to scholarship on humanitarian communication and moral witnessing ?. United Nations agency reports functioned not merely as data collection but as forms of moral testimony that documented suffering while maintaining empirical credibility under conditions of systematic obstruction. This approach transformed quantitative metrics into witnessing through numbers, creating archives that bear responsibility for documenting violations when direct access was restricted.

The documented patterns of structural violence raise questions about compliance with international humanitarian law and human rights standards. The systematic deprivation of essential resources including food, healthcare, and fuel constitutes violations of fundamental dignities protected under international law. The findings suggest that famine and healthcare collapse **are associated with** governance mechanisms affecting life and death decisions at population scales, aligning with established frameworks of structural violence ?.

The research contributes to understanding how infrastructural domination operates as a **potential mechanism** of structural violence in contemporary conflict settings. The control of fuel, water, and healthcare systems **was associated with the transformation of** civilian survival into political acts mediated through institutional frameworks. This pattern represents a shift from traditional conceptions of warfare to forms of conflict that operate through control of life-sustaining systems.

The convergence of quantitative and qualitative evidence provides documentation of structural violence patterns in the Gaza Strip between 2023 and 2025. The strong correlations between deprivation indicators, combined with narrative accounts of daily survival, reveal how infrastructural domination operates as an integrated system of control. The research demonstrates how methodological triangulation can address potential epistemic injustices by validating findings across multiple data sources and analytical approaches.

7 CONCLUSIONS AND FUTURE WORK

This study documented structural violence manifestations in the Gaza Strip between 2023 and 2025 through mixed-methods analysis of United Nations agency data and humanitarian communications. The research demonstrates systematic patterns of deprivation across human security indicators, with strong correlations ($r \geq 0.68$) between fatalities, malnutrition rates, health facility attacks, fuel shortages, and displacement. These findings reveal how infrastructural domination **is associated with** structural violence, **as** survival systems **are transformed into** instruments of control. The convergence of quantitative evidence documenting 63,746 fatalities and universal food insecurity affecting the entire population with qualitative testimonies of fuel denial and health facility targeting provides comprehensive understanding of how siege conditions **are associated with** measurable impacts on civilian populations.

The study makes specific methodological contributions by implementing a transparent, reproducible mixed-methods framework for humanitarian documentation under severe access constraints. All datasets, codebooks, and analysis scripts will be made publicly available to enable verification and adaptation. The research explicitly refrains from causal claims, presenting findings as documented associations that are consistent with, but not definitive proof of, structural violence mechanisms.

The qualitative approach contributes to ethical documentation by centering Palestinian lived experiences as valid forms of knowledge and interpreting humanitarian communications as moral witnessing ?. This methodology addresses potential epistemic injustices ? by triangulating statistical patterns with narrative accounts, ensuring that Palestinian experiences are preserved through multiple forms of evidence. The research demonstrates how mixed-methods approaches can maintain empirical credibility under conditions of systematic data suppression, creating archives that may inform both humanitarian response and legal accountability processes. This contributes to dialogue in policy

and education by providing frameworks for understanding how structural violence operates through institutional constraints.

Future research directions include cross-cultural analysis of structural violence patterns in other conflict settings, development of real-time monitoring systems for human security indicators, and investigation of digital surveillance impacts on humanitarian documentation. Research in conflict medicine could examine long-term health consequences of systematic deprivation and develop protocols for medical response under siege conditions. Studies of humanitarian response mechanisms could explore how organizations maintain operational integrity when facing systematic obstruction of aid delivery. **Specifically, future work should employ larger longitudinal datasets to enable more robust statistical modeling, incorporate independent ground verification data, and develop comparative frameworks that account for political and historical context.** These directions would expand understanding of how structural violence manifests across different contexts and develop strategies for protecting civilian populations during armed conflict.

APPENDIX B: QUALITATIVE ANALYSIS CODEBOOK

This appendix provides the final thematic codebook used in qualitative analysis, including theme definitions, inclusion/exclusion criteria, and exemplary quotations. Inter-coder reliability statistics and reconciliation procedures are documented.

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