Extended Abstract:

Armed Conflict and Early Childbearing: A Spatiotemporal Analysis of Conflict Exposure and Adolescent Fertility in Nigeria, 1997-2024

Introduction and Research Problem

Armed conflict is known to severely disrupt demographic processes, affecting mortality, migration, and fertility (Brunborg & Urdal, 2005; Thayer, . In the past three decades, Nigeria has faced ongoing armed conflicts that have altered adolescent development and reproductive decisions. Since 2009, the Boko Haram insurgency in the Northeast has caused over 350,000 deaths and displaced more than 2.5 million people. Meanwhile, farmer-herder clashes in the Middle Belt and banditry in the Northwest have escalated violence and mass displacement.

These conflicts have profoundly affected adolescent fertility mainly by disrupting protective systems and resources. Targeted closure of over 1,400 schools in Northeast Nigeria by 2018 reduced educational opportunities and removed a known barrier against early childbearing (Abdulrahim et al., 2023; Oyekan et al., 2023). Damage to healthcare facilities constrained access to reproductive health services, increasing early pregnancy risk (Marlow et al., 2022; Tyndall et al., 2020). Economic hardship pushed families toward early marriage of daughters, further raising adolescent fertility (Svallfors, 2024). Displacement and fragmentation of communities undermined structures that typically regulate marriage timing. During adolescence (ages 12-19), when key life preferences are established, conflict exposure may accelerate transitions to adulthood through these specific pathways: educational loss heightens early childbearing risk; displacement weakens parental oversight and heightens risk of sexual violence; and economic shocks encourage early marriage as households attempt to cope.

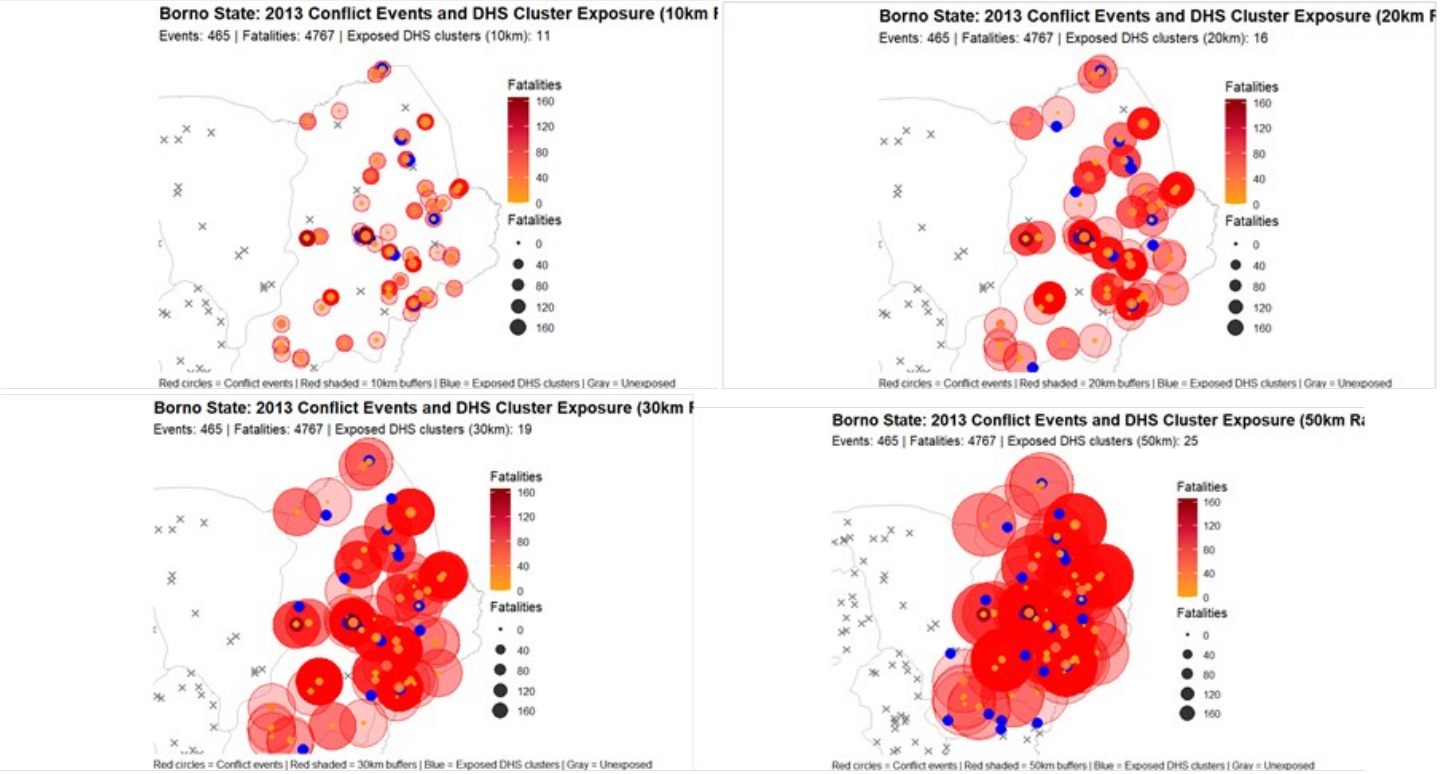
Despite increased research in conflict demography in sub-Saharan Africa, adolescent fertility is less explored than maternal health. Studies show conflict reduces healthcare use (Amberg et al., 2023; Chukwuma & Ekhator-Mobayode, 2019), increases child malnutrition (Makinde et al., 2023) and mortality (Goli et al., 2022; Wagner et al., 2018), and influences adult fertility through crisis and insurance effects (Rotondi et al 2022). Yet, how conflict shapes adolescent fertility timing remains unclear. Adolescents face unique vulnerabilities like educational disruption and limited autonomy. Methodological issues also limit research rigor, as studies employ inconsistent conflict exposure measurements such as spatial buffers, fatality thresholds, and temporal windows, hence reflecting a lack of consensus on best practices and data challenges, including the GPS displacement of DHS clusters. These choices alter who is considered 'exposed' and may bias the effects and hinder comparisons across studies.

This study examines two questions: (1) How does exposure to armed conflict before and during adolescence (ages 12–19) affect the timing of first birth and early childbearing among young women in Nigeria? (2) What specific mechanisms mediate the impact of conflict on adolescent fertility outcomes, such as educational disruption, restricted health services, altered marriage practices, displacement, and economic pressure? We address these questions by developing a conflict exposure index through a systematic review (detailed in appendix A), improving measurement across spatial, temporal, and intensity dimensions.

Data Sources

We used two datasets: the Armed Conflict Location and Event Data (ACLED), which provides geolocation, conflict types and time of events across Nigeria from 1997 to 2024, and the Nigeria Demographic and Health Surveys (DHS), covering five waves from 2003 to 2024. We extracted all violent events from ACLED battles, explosions, violence against civilians, and riots with at least one fatality documenting over 72,000 events for our 1997-2024 study window. Secondly, DHS data provides birth histories for women aged 15-19 and includes outcomes like age at first birth, early childbearing (before age 18), current pregnancy, and fertility preferences. DHS cluster locations enable spatial linkage with conflict data. Our sample includes about 8,500 adolescent women across survey waves.

Figure 1: DHS Cluster Exposure to Conflict at Varying Buffer Radii: Borno State, 2013



Preliminary Spatial Analysis

Figure 1 shows our preliminary spatial analysis for Borno State in 2013, comparing DHS cluster exposure using four buffer radii: 10km, 20km, 30km, and 50km. Of the 465 conflict events and 4,767 fatalities in Borno in 2013, exposure rates shift with buffer choice: 11 out of 20 clusters (55%) are exposed at 10km; 16 out of 20 (80%) at 20km; 19 out of 20 (95%) at 30km; and all 20 (100%) at 50km.

This analysis also verifies that exposure classification using fixed buffers changes sample composition and can misrepresent exposure patterns (Tapsoba, 2023). Instead, our multidimensional exposure index utilizes spatial decay functions to weight conflict events based on their distance from clusters. This means a conflict 5km away counts more than one 25km away, and the index also considers

fatality counts and the cumulative burden over time. This captures exposure as a continuum, not just a binary classification.

Analytical Strategy/Method

We utilize multilevel models to capitalize on the spatial and temporal structure of our data and investigate adolescent fertility outcomes within and across DHS clusters. Repeated surveys (2003, 2008, 2013, 2018, 2024) and birth histories allow us to construct fertility and conflict exposure timelines before, during, and after conflict escalations.

Our multilevel logistic regression models use early childbearing (defined as birth before age 19) as a binary outcome, with women nested within DHS clusters and periods. Cluster fixed effects adjust for time-invariant characteristics, enabling within-cluster outcome comparisons before, during, and after conflict periods. This approach uses local changes in violence to identify effects. Individual controls cover age, education, household wealth, religion, ethnicity, and household head traits. We test different versions of the conflict exposure index (spatial decay, intensity, cumulative burden) and nonlinear effects.

We also use discrete-time survival analysis to model age at first birth, treating each person-year between 11 and 19 as one observation. Conflict exposure is time-varying and measured with our multidimensional index, considering both current violence (at age t) and past exposure. This allows us to test whether conflict during early adolescence (11-14) versus late adolescence (15-19) has different impacts on fertility, and if these effects persist beyond the conflict periods. A key advantage of our approach is comparing fertility in the same clusters before, during, and after conflict. For example, in clusters affected by Boko Haram, we examine baseline fertility prior to 2009, changes during the insurgency's peak (2009-2015), and potential recovery or ongoing effects thereafter. This variation strengthens causal inference by accounting for fixed cluster factors that confound cross-sectional comparisons.

Expected Findings

Drawing on existing literature and preliminary spatial analysis, we anticipate three key findings. First, our preliminary analysis (Figure 1) reveals a critical methodological insight: binary exposure classification using fixed buffer zones produces dramatically different prevalence estimates, ranging from 55% of clusters at 10km to 100% at 50km in Borno State alone. This demonstrates that conventional approaches may systematically misclassify exposure status, highlighting the necessity of our multidimensional exposure index, which incorporates spatial decay rather than arbitrary thresholds. Second, we expect educational disruption to emerge as the dominant pathway linking conflict exposure to early childbearing. When violence closes schools or makes attendance unsafe, adolescent girls transition rapidly into marriage and motherhood, particularly during early adolescence (ages 12-15) when educational interruption triggers cascading effects on life trajectories. This mechanism may vary significantly by conflict intensity and proximity, with girls in high exposure clusters experiencing more severe and prolonged educational disruptions. Third, we anticipate substantial variation in conflict effects by violence type and geographic context. This is because violence directly targeting civilians, which mostly includes community attacks, abductions, and sexual violence, will likely show stronger associations with adolescent fertility than battles between armed groups or explosions, as such violence causes immediate displacement and breakdown of protective social structures. As such, we expect to see such effects to be most

pronounced in Nigeria's Northeast, where the Boko Haram insurgency has sustained high intensity violence since 2009, compared to more sporadic conflicts in other regions.

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Appendix

Table 1: Summary of reviewed studies using Georeferenced Conflict Event Data

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
1.	Svallfors et al. (2024)	Nigeria	To explore the association between conflict exposure and attitudes toward contraception, safe abortion, early marriage, and childbearing.	Cross-sectional study using WVS and UCDP-GED; linear probability models		State-level only (no spatial radius possible due to sample size)	Explored different temporal durations (five years, three years, one year, and six months preceding the survey interview).	Increased support for safe abortion and contraception, but also perceived benefits of early marriage	Crude exposure measure, makes it unable to apply more fine-grained measures of exposure to conflict
2.	Rotondi et al. (2021)	Nigeria	To test whether households exposed to Boko Haram terrorism adjust fertility as an adaptive strategy	Panel data analysis using GHS-Panel and ACLED; difference-in-differences and IV models	At least one (1) fatality	Conflict leading to fatalities within 5 km of household (used 10km as robustness check)	One (1) year prior to survey	Increased fertility rate as adaptive strategy	5km buffer too small to account for DHS GPS displacement
3.	Thiede et al. (2020)	25 Sub-Saharan Africa	To analyse the demographic consequences of conflict exposure on fertility goals and outcomes	Regression analysis of DHS and ACLED data	NO fatality threshold - uses event PRESENCE (binary), not casualty INTENSITY	Binary indicator of violent conflict events within 10 km radius (used 50km and 100km for robustness checks	36 months prior to the DHS survey	Modest reduction in preferred family size and recent fertility	Uses binary exposure (any event yes/no) with NO fatality threshold - captures all violent events regardless of death toll.
4. 19.	Sharma (2024)	Sri Lanka	To assess differential fertility effects of conflict among ethnic groups	Difference-in-differences using census data and UCDP data	UCDP threshold: 25 deaths/year for conflict	No spatial buffer - uses entire districts	1992-2009 (entire war period)	Tamil fertility increased than Sinhalese during conflict	District-level aggregation (no spatial buffer like 5-10km radius); binary treatment loses

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
									spatial precision in measuring conflict exposure
5. 20.	Torrisi (2020)	Azerbaijan	To explore how Nagorno-Karabakh conflict shaped timing of births	Discrete-time logit models using 2006 AZ-DHS and UCDP-GED	None specified; uses conflict events with ≥1 casualty from UCDP-GED	No spatial buffer radius used District-level exposure classification (administrative boundaries, not distance buffers) Note: Author explicitly states couldn't use spatial buffers due to lack of georeferenced cluster data in DHS	1992-2006 analysis period; 1992-1994 peak conflict; 7-month birth interval buffer	Conflict exposure increased second-birth risks (insurance effect)	no georeferenced data prevents spatial analysis; small sample limits subgroup analysis; excludes some conflict territories
6.	Mhamed Ben Salah, Kritika Saxena	Sub-Saharan Africa	assesses the impact of violent conflicts on learning outcomes (proficiency in reading and mathematics) of sixth-grade pupils	Cross-sectional district-cohort panel using PASEC 2014 standardized test scores and ACLED conflict data (1997-2013). OLS regression with region and year-of-birth fixed effects	No specific threshold; uses both conflict event counts and total fatalities as exposure measures	District level (second-level administrative division); robustness checks with 5km and 10km spatial buffers around conflict locations	Conflicts experienced since birth until 2013/14 school year. Also analyzes three periods: before birth, early childhood (birth to first grade), and during school years	Violent conflict exposure reduces proficiency, primarily through infrastructure damage; early childhood exposure has largest effect. No differential impact by gender/SES on learning, but girls' attendance declines.	No exact school locations or pupil residence data; district-level matching may miss within-district variation
7.	Felix Amberg, et	35 countries	To examine the	Geospatially matched	At least 1 conflict-	50 km from survey	Year before:	Nearby conflict	50 km radius is

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	al (2023)	in sub-Saharan Africa	relationship between exposure to armed conflict and coverage of four maternal and child health service indicators along the continuum of care	DHS data (104 surveys, 1990-2020) with UCDP Georeferenced Events Dataset (1989-2020). Linear probability models with ADM2, birth-year, and country-month fixed effects	related death	cluster	start of pregnancy (antenatal care), birth (facility delivery, vaccination), or interview (treatment of childhood illnesses)	reduced facility-based delivery, timely vaccination, and treatment of childhood illnesses.	excessively wide and may dilute true effects by including unexposed populations, while also capturing spurious associations from distant conflicts. May also assume uniform conflict impact across large geographic area ignoring local heterogeneity
8.	Chukwuma & Ekhator-Mobayode (2019)	Nigeria	To examine the impact of the Boko Haram Insurgency (BHI) on maternal health care utilization (antenatal care visits, facility deliv	Spatially matched 52,675 birth records from 2008 and 2013 Nigeria DHS with ACLED conflict data (2009-2013). Difference-in-differences with linear probability models; controls for time-varying determinants and fixed effects for state, month/year of interview	At least 1 conflict-related death per event (ACLED definition); defines BH conflict area as clusters with at least 5 attacks within catchment area (robustness checks vary from 1-10 attacks)	Any boko haram attack within 3km, 5km and 10km of a DHS cluster Three catchment areas: 3000m, 5000m, and 10,000m from DHS cluster. Robustness checks vary radius from 1000m to 10,000m and number of attacks	Before 2009 (pre-BHI) vs after 2009 (during BHI). Births in 2009 excluded from main analysis to avoid misclassification . Conflict events: 2009-2013	Boko haram insurgency reduced any antenatal care, antenatal visits, facility delivery, and skilled attendance at 3000m catchment. Effects decay with distance; persist to 10,000m for antenatal care only. Effects extend beyond Northeast	The DHS displacement (urban: 2km, rural: 5km) may severely compromise the 3000m catchment. Also, the 5km for rural displacement has already exceeded the catchment radius and may potentially lead to misclassifying entire conflict

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
								region.	exposure status and causing substantial bias.
9.	Makinde et al (2023)	Nigeria	To examine the association between different measures of childhood experiences of armed conflicts and nutritional health outcomes (stunting, underweight, wasting) of children aged 36-59 months	Cross-sectional: 2018 Nigeria DHS linked with Uppsala Conflict Data Program Geo-Referenced Events Dataset (UCDP GED, 1989-2017). Multilevel multivariable binary logistic regression.	25+ fatalities per conflict event	10km radius around household cluster (not accounting for DHS displacement error)	Any conflict since child's birth until interview (2013-2018); secondary analysis restricted to conflicts within last year preceding survey. All measures age-normalized (monthly average since birth)	Increased conflict frequency associated with higher odds of stunting (AOR=2.52) and underweight (AOR=2.33), not wasting. Intensity (fatalities) weakly associated with stunting and underweight.	25-fatality threshold excludes frequent low-intensity conflicts that may cause cumulative harm
10.	Kotsadam & Østby (2019),	Sub-Saharan Africa (30 countries, 1989-2013)	To test whether local exposure to armed conflict impacts maternal mortality at the micro-level, using individual sister-level data rather than aggregate maternal mortality ratios	Individual-level longitudinal analysis combining geo-coded UCDP GED conflict data with geo-referenced DHS "sisterhood method" data. Sister fixed-effects models comparing each sister to herself before/after conflict.	UCDP GED: Conflicts where dyads/actors crossed 25 deaths threshold in any year; individual events require ≥1 direct death	50 km radius (main specification); robustness checks with 25 km radius		Each additional logged conflict event increases maternal mortality by ~10% (8.5 deaths per 100,000 living women). Strongest effects for women aged 20-35 (14% increase). Contemporaneous effects	50 km radius is excessively wide and may dilute true effects by including unexposed populations, while also capturing spurious associations from distant conflicts. May also assume uniform conflict impact across

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
								dominate; no persistence beyond 1 year. Larger effects in rural vs urban areas (as expected).	large geographic area ignoring local heterogeneity. Secondly.
11.	Østby et al. (2018)	Sub-Saharan Africa (31 countries)	To examine how local exposure to organized violence affects whether women give birth in a health facility using micro-level, quasi-experimental approach	Mother fixed-effects analysis (comparing each mother to herself before/after conflict exposure). Combined geo-coded UCDP GED violent events data with georeferenced DHS survey data.	UCDP GED: Dyads that crossed 25 deaths threshold in any year; individual events require ≥1 direct death.	50 km radius (main specification); robustness checks with 25 km and 100 km radii	6 months prior to individual birth date (main specification); robustness checks with 3-month and 9-month windows. Period: 1989-2014	Geographical and temporal proximity to organized violence significantly reduces institutional births.	50km radius excessively wide—dilutes true effects by including unexposed populations while capturing spurious associations from distant conflicts; assumes uniform conflict impact across large area ignoring substantial local heterogeneity
12.	Felix Amberg et al 2025	Burkina Faso	To examine the impact of nearby armed conflict on access to six essential maternal and child health services	Longitudinal study with facility fixed-effects negative binomial regression models. Linked monthly facility-specific HMIS service counts with UCDP GED conflict events.	Events where armed force was used by organized actor against another organized actor or civilians, resulting in ≥1 direct death at specific location/date.	25 km radius (main specification; represents distance walkable in 1 day)	Conflict events within 6 months prior to birth date/health service access (contemporaneous exposure in month of service). Also tested 3-month and 9-month	Any nearby conflict significantly reduced incidence of all services except caesarean sections (non-significant)	Effects represent contemporaneous/6-month exposure only; may miss longer-term impacts beyond 12 months or spatial spillovers beyond 25km

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
							windows as robustness checks. Period: 2013-2021 (escalation from 2018/2019 onwards)		buffer
13.	Howell et al. (2020)	Nigeria	To examine the effect of civil conflicts on infant and young child acute malnutrition (wasting) in children under age 5, accounting for conflict severity (deaths and duration) and proximity	Cross-sectional: 2013 Nigeria DHS linked with Social Conflict Analysis Database (SCAD). Logistic regression predicting wasting.	Deaths/days weighted inversely by distance (e.g., death at 1km = weight of 1; death at 2km = weight of 0.5)	10km radius for urban children; 25km radius for rural children.	12 months (1 year) preceding the interview date	Strong association between conflict proximity and acute malnutrition (wasting). Urban children: 5% higher odds of wasting per unit increase in conflict death index (OR=1.05) or conflict duration	Arbitrary differential buffers (10km urban/25km rural) without theoretical justification
14.	Wagner et al. (2019)	35 African countries	To examine effects of armed conflict on: (1) mortality among women of childbearing age (15-49 years), and (2) orphanhood among children <15 years, accounting for conflict intensity and duration	Cross-sectional: DHS sibling survival module (women) and household census (orphans) linked with UCDP GED conflict data (1989-2017). Cluster-area fixed-effects regression.	≥1 death per conflict event (UCDP definition: "use of armed force by organised actor resulting in at least one direct death")	50 km radius around DHS cluster centroid. Robustness check: 51-100 km buffer	Women: Calendar year of observation (contemporaneous); also examined lagged effects 1-3 years post-conflict. Children: Average annual exposure from birth until survey date	Women's mortality increased by 112 deaths/100,000 person-years (21% increase) on average; 202% increase at highest conflict decile (>826 deaths). Effects persist 1-3 years post-	

S/N	Article Details (Author(s), Year)	Geographic scope	Objectives	Data Source / Methodology	Fatality threshold	Radius/Buffer (Exposure Measure)	Temporal Window	Key findings	Limitation
								conflict.	
15.	Wagner et al. (2018)	35 African countries	To examine effects of armed conflict on infant mortality (<1 year, primary outcome) and child mortality (<5 years, secondary)	Cross-sectional: DHS child survival data linked with UCDP GED conflict data (1989-2015).	≥1 death per conflict event (UCDP definition: "use of armed force by organised actor resulting in at least one direct death")	Primary: 50 km radius around DHS cluster centroid. Extended analysis: 51-100 km buffer (significant effects), 101-250 km buffer (no significant effects)	Primary: Calendar year of birth (contemporaneous exposure during first year of life for infants). Extended analysis: lagged effects up to 10 years before birth; effects persist up to 8 years post-conflict. For children <5 years: exposure during years 0-1 and 1-2 of life	Infant mortality increased 5.2 deaths/1000 births (7.7% increase) for any conflict within 50km.	50km to extended 250km radius is too wide in certain context and may capture many households with minimal true exposure hence creating false positive classification and measurement error
16.	Tapsoba (2023)	Ivory Coast (2002-2011 civil conflict) and Uganda (2002-2005 Lord's Resistance Army conflict in Northern Uganda)	To develop a kernel density estimation approach to measure violence risk beyond incidence of conflict events, and evaluate the impact of violence risk on infant mortality	Difference-in-Differences design. Conflict data: UCDP-GED and ACLED (georeferenced events). Health data: DHS 2011-2012 (Ivory Coast, n=4,944 female children); DHS 2006, 2011, 2016 (Uganda, n=4,868 female children). Adaptive kernel density estimation to model	No fixed threshold. Main specification uses event location/timing only. Robustness checks weight events by fatalities	No fixed radius/buffer. Uses data-driven adaptive kernel density estimation with Gaussian kernels. Optimal smoothing parameters: Ivory Coast hs=34.3km (spatial bandwidth); Uganda hs=22.5km (spatial bandwidth).	In utero and first year of life (from conception to first birthday, approximately 21 months total window)	One standard deviation increase in violence risk increases infant mortality by 1 percentage point (Ivory Coast) and 0.8 percentage points (Uganda).	While the kernel density approach captures risk beyond direct violence exposure, it has key limitation: No clear geographic boundary - without fixed buffers, it's

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				violence as space-time stochastic process					unclear how far "exposure" extends,
17.	Vilier, L. & Groot, W. (2025)	Northern Nigeria (North West, North Central, and North East regions, including areas affected by Boko Haram insurgency from 2009 onwards)	To investigate the impact of conflict exposure on women's unmet need for family planning and reproductive autonomy (contraceptive decision-making, ability to ask partner to use condom, and ability to refuse sex)	Repeated cross-sectional: Nigeria DHS 2008, 2013, 2018 linked with Armed Conflict Location and Events Database (ACLED). Difference-in-Differences (DiD) with kernel-based Propensity Score Matching. Sample: varies by outcome	Minimum 8 fatal conflict incidents (≥1 fatality per incident) within specified radius over exposure period (average ≥2 incidents per year)	15 km radius (larger than typical studies to account for DHS geo-coordinate displacement: rural clusters displaced up to 5 km, urban clusters up to 2 km). Robustness checks conducted with 10 km, 25 km, and 50 km radii	4 years preceding each survey wave. Pre-conflict baseline: 2008; Post-conflict periods: 2013 (assessing 2009-2013 exposure) and 2018 (assessing 2014-2018 exposure). Robustness checks with 2-year and 8-year exposure windows	Conflict exposure 2009-2013 associated with 4.8 percentage point reduction in unmet family planning needs.	Dichotomous classification (exposed/not exposed) does not capture conflict intensity gradients, cumulative exposure, or dose-response relationships
18.	Jawad M et al (2021)	Global: 193 countries across all continents, 1990-2017 (Palestine and Israel excluded due to data assignment issues)	To quantify indirect mortality impacts of armed conflict in civilian populations globally and explore differential effects by armed conflict characteristics (intensity, actor type) and population groups (age, sex, cause-specific mortality)	Panel regression with country fixed effects using Uppsala Conflict Data Program (UCDP) Georeferenced Event Dataset v19.1 and Global Burden of Disease (GBD) study 2017.	UCDP definition: ≥25 battle-related deaths per calendar year defines conflict presence.	None - country-level analysis. Entire country classified as conflict-exposed or not based on presence of ≥25 battle deaths anywhere within national borders. No geographic buffering or distance-based exposure assignment.	Main models: conflict variable lagged 1 year to capture indirect deaths in year following conflict. Extended lag analyses: 2-10 years post-conflict to account for varying disease progressions.	Wars associated with 81.5 per 100,000 increases in age-standardized all-cause civilian mortality	Unlike radius-based studies, assigns all conflicts to entire country regardless of actual location, potentially misclassifying unexposed populations in large countries with localized conflicts
19.	Ojeleke et al. (2022)	Nigeria (Northern	To explore the impact of	Cross-sectional study using three waves of	At least one (1) fatality	Conflict cluster defined as within 5-	Analyzed three 5-year periods	Residing within conflict cluster	Binary exposure measure

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		Nigeria: Northeast and Northwest)	protracted armed conflicts on healthcare utilization, measured by maternal care (antenatal visits, facility childbirth) and child immunization	NDHS (2008, 2013, 2018) spatially merged with ACLED data. DID (Difference-in-Differences) analysis		10 km radius of conflict event(s) with at least one fatality	(2004-2008, 2009-2013, 2014-2018) corresponding to each NDHS wave.	significantly reduces odds of achieving minimum antenatal visits	(conflict/non-conflict cluster) may not fully capture intensity/severity of exposure