POLICY BRIEF

The Impact of Conflict on Child Health Outcomes: Micro-level evidence from Nigeria

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October 2023 / No.792

Abstract

Globally, the prevalence of conflicts has taken different dimensions due to exposure to different forms of conflict. Also, extant studies have linked conflict with health outcomes. However, comprehensive information on different conflict types remaining a major challenge faced by existing studies. Thus, this study provides a comprehensive analysis of the impact of conflicts on child well-being in Nigeria. To achieve the goal, it classified the conflicts into three categories: aggregate, insurgency/terrorism, and herdsmen/farmers' conflict. Furthermore, robust data are used by exploring four DHS waves (2003, 2008,

2013, and 2018) and integrating three conflict data sets using the MELTT technique. We present three steps of analysis for conflicts and child well-being based on this robust information. The impact of aggregate conflicts on child health outcomes, mechanisms, and across different groups was first investigated. Second, the impact of insurgency/terrorism on child health outcomes, mechanisms, and across different groups was examined. Third, the impact of herdsmen/farmers' conflict on child health outcomes, mechanisms, and across various groups was investigated. The result of a difference-in-difference approach suggest that proximity and exposure to different types of conflict worsened child health outcomes (infant mortality, height-for-age z-score, weight-for-age z-score and weight-for-heigh z-score). Also, vaccination, hospital visitation, and mother's education are significantly affected by conflict types. Proximity and exposure to different conflict types forced people to migrate to less conflict-affected areas.

Introduction

The significance of child well-being in the world is well recognized in the various targets and indicators of the United Nations' Sustainable Development Goals. Both developed and developing countries place a premium on their children's well-being because of the importance of human and social capital production in the future. As a result, child well-being remains an important indicator of progress in any country or region. According to UNICEF (2007), child wellbeing encompasses children's health, safety, material security, education, and socializing, as well as the love and values instilled in those children by their families and the societal environment. It also includes the fundamental characteristics that ensure a good quality of life for children, such as their growth, development, happiness, and satisfaction (Helseth, and Haralstad, 2014). Given the concept's complexities, this study focuses solely on the child health components of wellbeing.

Several regions, including Europe, Northern America, Latin America, and the Caribbean, have made substantial progress in child health outcomes when compared to regions such as Sub-Saharan Africa (see UN IGME report, 2019). Nigeria has one of the worst child health outcomes in the Sub-Saharan African region. For example, in 2018, the country's under-five mortality rate was 100 (deaths per 1000 live births), compared to the sub-Saharan African average of 76 (deaths per 1000 births). Indeed, Nigeria was among the conflict-prone African nations that had under-five mortality rates of more than 100 (deaths per 1000 births) between 2008 and 2018. These countries included the Central African Republic, Guinea, Sierra Leone, Somalia, and Chad. As a result of limited access to adequate health care services, improving child well-being in the country remains a significant challenge. Access to health care services is dependent on availability, accessibility, accommodation, affordability, and acceptability (Penchansky and Thomas, 1981; Campbell, Roland, and Beutow, 2000),

all of which are often undermined by the presence of conflicts[1]. As a result, there is a growing concern in Nigeria about the stifling influence of conflicts on development outcomes such as child well-being.

Furthermore, the impact of conflict has terrible health consequences for the vulnerable, particularly children. For example, between 2000 and 2008, about one-third of developing countries experienced civil war or other forms of violence (Minoiu and Shemyakina, 2014). Hostilities have no direct impact on child well-being because children are non-combatants in conflicts. Exposure to conflicts, on the other hand, may have an indirect and detrimental impact on their well-being. More specifically, early-life experiences are known to have long-term and long-lasting consequences on health, education, and socioeconomic outcomes (Maccini and Yang, 2008). In essence, many essential drivers of child well-being (such as household income, access to health care, supply chain, and a tranquil environment, among others) may be impacted (Chi, Patience, Urdal, and Sundby, 2015; David et al., 2017).

According to Wagner et al. (2019), the extent to which armed conflicts affect child mortality is largely unknown beyond specific conflicts. Furthermore, Kinney et al. (2010) emphasized that high child mortality in conflict-prone countries is mainly due to underdevelopment caused by conflicts, rather than the direct influence of

1 According to ICRC (2008), armed conflicts can be classified as international armed conflicts (conflicts between two states that involves the intervention of armed forces) and non-international conflicts (the occurrence of conflicts in the territory of a 'high contracting party' between its armed forces and rebellious armed forces or organized armed group with vibrant command exercising a form of control over a part of its territory to perform and-execute military operations effectively and implement this Protocol). Another definition of armed conflicts is given by the Armed Conflict Location and Event Data (ACLED) report which comprehensively measured armed conflicts as the death resulting from political violence, civil and communal conflicts, violence against civilians, rioting and protesting and militia interactions (see Raleigh et al., 2014). According to Uppsala Conflict Data Program (UCDP), armed conflict is a contested incompatibility that requires government action through the use of armed force by the military forces of two parties where one party is the government of the state which resulted in at least 25 battle-related deaths each year. On the other hand, the Global Terrorism Database (GTD) defines terrorist attacks as: the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation. These are three main conceptual definitions for armed conflict. In this study, we preferentially adopt an armed conflict definition in the context of ACLED and UCDP essentially because they cover different aspects of armed conflicts experienced in African countries. ACLED and UCDP definitions are merged with GTD to provide a more detailed analysis of conflicts in Nigeria. Therefore, we specifically conceptualized conflict as any forms of political violence, civil and communal clashes, violence against civilians, militia interactions, and rioting and protest as well as use of violence means by non-state actor to achieve self-fulfilling goals via force or deterrence.

conflicts on child mortality. According to recent statistics, Nigeria is one of the world's deadliest countries in terms of terrorism and armed conflicts. Specifically, using the UCPD dataset, Hoeffler (2021) classified armed conflicts into three types and rated Nigeria first, third, and fifth in one-sided violence, state-based armed conflict, and non-state conflict, among high-fatality countries around the world. The study also ranked Nigeria third in terms of terrorist events, trailing only Iraq and Afghanistan. Moreover, the number of fatalities in armed conflicts increased from 497 in 1997 to 5,147 in 2019. (ACLED, 2019).

Furthermore, conflicts generate security issues in the country because most household members experience one form of conflict on a regular basis. Between 2010 and 2017, 49% of households in the North-East had at least one conflict episode. During the same period, 25% of households in the North-Central experienced conflict, while 22% of households in the South-South have been directly affected by conflicts (NBS and World Bank, 2018). This demonstrates the spread of armed conflicts in Nigeria, which may raise the likelihood of wasting either at birth before 1 year or 5 years. Furthermore, Nigeria has a youthful population of about 31 million children under the age of five, who are the most affected age group in conflict areas, becoming homeless and forced to live in Internally Displaced Persons (IDP) camps (UNICEF, 2018). This group also had the highest mortality rate in IDP camps due to common causes such as cholera, severe malnutrition, and malaria. Nigeria has the highest rate of child mortality due to pneumonia (162,000 deaths in 2018; 443 deaths per day or 18 deaths every hour). The cause of mortality can be ascribed to hunger and indoor pollution caused by the use of solid fuels (UNICEF, 2019). The risk factors for infectious disease fatality are enhanced during complex emergencies, which are often caused by conflicts (Connolly, et al., 2004).

Conflicts have an impact on people's livelihoods, particularly in conflict areas, as well as the entire country. Nigeria, for example, was among the countries with the highest overall expected conflict risk index in 2019, as well as increased risk in socioeconomic vulnerability, inequality, and food security (World Risk Report, 2020). Nigeria's conflicts have remained unabated. As the Boko Haram menace grows in the Northeast, the Northwest and Northcentral continue to experience growing threats in the form of banditry violence and herdsmen-farmer conflicts, respectively, raising serious concerns for national security and having far-reaching consequences for the people. After prolonged conflicts in Nigeria, the crisis in the affected areas remains one of the most severe, with a total of 7.9 million people (more than one in every two people) in crisis-hit states need humanitarian assistance in 2020 (United Nations Office for the Coordination of Humanitarian Affairs-OCHA, 2020). Consequently, one-fourth of the affected population is under the age of five, and one-fourth of conflict-affected households lack access to economic opportunities due to the destruction of social and economic infrastructure, as well as private enterprises. Due to conflict, there are certain restrictions on movement in conflicted areas, markets, and economic

activities. Furthermore, of the 4.7 million people suffering from severe problems related to physical and mental well-being, 58 percent are children, while 53 percent of the whole population lacks access to basic living conditions due to conflicts (United Nations Office for the Coordination of Humanitarian Affairs-OCHA, 2020).

Hence, existing studies on Africa have examined the relationships between shocks and a myriad of outcomes. Some studies have examined the micro-effects of aid on health outcomes (see Wayoro and Ndikumana, 2020; Kotsadam et al., 2018; Odokonyero et al., 2018; and others), while others have investigated the micro-effects of armed conflict on health outcomes (see Wayoro and Ndikumana, 2020; Kotsadam et al., 2018; Odokonyero et al (Kotsadam and Ostby, 2019; Ostby et al., 2018; Ekhator and Asfaw, 2018; Chukwuma and Ekhator-Mobayode, 2019; Wayaro, 2017; Nwokolo, 2015; Plumper and Neumayer, 2006 and among others). Some studies on Nigeria, in particular, have sought to provide explanations for the impact of armed conflicts on health outcomes in Nigeria at the micro-level (Howell et al., 2020; Dunn, 2018; Ekhator and Asfaw, 2018; Chukwuma and Ekhator-Mobayode, 2019; Nwokolo, 2015). These studies are focused on the negative impact of the Boko Haram insurgency. The growth and spread of various types of armed conflict in the country, however, suggests that these studies are insufficient for policy prescription for all of the country's federating units (states). While the Boko Haram insurgency is critical to child well-being in the country's northeast, other pockets of rising violent conflicts such as farmer-herdsmen conflict, political, religious crises, and communal conflicts are also critical to child well-being in other parts of the country.

Thus, by focusing on the local effects of armed conflicts on child well-being, our study adds to the rapidly developing literature. Evidence suggests that the country's conflict dimensions extend beyond the Boko Haram insurgency. Armed conflict actors, as opposed to terrorism, constitute a more serious challenge to the government (Blattman and Miguel, 2010; Hoeffler, 2012). Thus, to present a more complete picture of conflicts in Nigeria, this study attempts to integrate conflict datasets (ACLED, UCDP-GED, and GTD) using the Matching Event Data by Location, Time, and Type (MELTT) approach recently developed by Dannay et al. (2019). This approach distinguishes our study from previous studies on Nigeria, which only focused on a single dataset. To analyze conflict events more broadly, integrating datasets could lead to a more comprehensive measurement of a subnational pattern of violence than relying on a single data set (Dannay et al., 2019). Data integration is an important approach to resolving all issues in empirical conflict measurement. Furthermore, in comparison to armed conflicts, the number of terrorist/insurgency events is very low (Hoeffler, 2021). Dunn (2018) observes that Bokoharam is not the only source of violence in Nigeria's northeast and that there may be other unobserved dynamics influencing the findings of his analysis. Thus, focusing just on terrorism/insurgency as a conflict is a potentially significant omission. The MELTT approach enables us to give thorough and robust evidence of the impact of various conflict dimensions on child well-being in Nigeria.

Following the integration of conflict data, the study explores the geo-matching of household data surveys with the new conflict data for a 15km buffer zone to assess the well-being of a child born near conflict areas.

It is evident from the aforementioned narrative that Nigeria continues to struggle with subpar child health outcomes. Furthermore, exposure to conflicts worsens the issue, putting the realization of Sustainable Development Goal 3 by 2030 in jeopardy. While recent studies have focused on only two DHS surveys—2008 and 2013—to explore this relationship, the availability of four waves and our focus on these—including the most recent survey, 2018—allows for a more thorough assessment of the patterns in the influence of conflicts on child health outcomes. The most recent surveys accurately reflect the country's growing intensity of conflicts. Furthermore, over-reliance on inadequate conflict information necessitates revisiting this link in order to improve understanding of how conflict affects child health outcomes and thus contribute to the literature. The mechanisms by which armed conflicts harm child health outcomes are investigated. Maternal education, employment, earnings, hospital visitation, vaccination, and migration are all important factors in child health outcomes. The comprehensive analysis provides solid evidence for policymaking involving all federating units in the country. Hence, the study answers the following pertinent questions:

i. What effect do conflicts have on child health outcomes?

ii. What are the mechanisms by which conflicts impair the child health outcomes?

Data source

Three datasets on conflicts are integrated to provide a more comprehensive understanding of the dynamic effect of conflicts on child well-being. Existing studies, such as Ekhator and Asfaw (2018), Chukwuma and Ekhator-Mobayode (2019), Kotsadam and Ostby (2019), and Dunn (2018), have only investigated one dataset (either ACLED or UCDP-GED or GTD). Many studies, however (for example, Findley and Young, 2012; Fortna, 2013; Polo and Gleditsch, 2016), have investigated data integration to provide a comprehensive analysis of conflicts. Because the datasets reinforce each other, this approach provides useful information regarding the interrelationships among conflicts. Despite the progress, the approach is hampered by incompatible data formats, a restrictive process, and a tedious and manual approach (Donnay et al., 2019). As a result, Donnay et al. (2019) developed an automated protocol called Matching Event Data by Location, Time, and Type (MELLT) to improve data quality and yield reliable results. The approach enables information on the same event across different datasets to be harmonized. As a result, this study used this approach to address the problem of missing data in a single conflict dataset. Understanding the various dimensions of Nigeria's ongoing conflicts is essential to this study, which a single data set cannot provide.

Three data sets on conflict events were used. First, the Armed Conflict Location and Event Data (ACLED) project focuses on collecting, analyzing, and mapping disaggregated conflict data. ACLED categorizes all documented conflicts in over 150 countries by the dates and locations of the conflicts. It gathers real-time information on the locations, dates, actors, fatalities, and reported political violence, as well as events that occur during civil wars and periods of instability, and also regime breakdown and protest events. Second, from 1970 to the present, the Global Terrorism Database (GTD) provides detailed information on terrorist attacks worldwide. The database gathers information on the attacks' timing, location, and perpetrators. Third, the Georeferenced Event Dataset (GED) from the Uppsala Conflict Data Program (UCDP) shows a contested incompatibility that requires government action through the use of armed force by the military forces of two parties where one of the parties is the government of the state which resulted in at least 25 battle-related deaths each year. These data sets contain information about Nigerian conflicts, although they are coded differently and have time lags. We determined the spatiotemporal blocking (spatial fuzziness-radius in kilometers and temporal fuzziness-time unit in a day) and conflict event attributes are captured taxonomy thus allowing us to apply MELTT to the three data sets for the periods (2003, 2008, 2013, and 2018).

To account for potential coding ambiguity and false identification of matched entries across the data sets, the study employed a radius of 5km for spatial fuzziness and 1 day for temporal fuzziness. In addition, we developed two taxonomies that consolidate variables from the three data sets. The first taxonomy focuses on mapping a certain conflict event type to any other conflict event across data sets. The second taxonomy captures geo-precision in the three data sets in terms of exact state, local government, and town. Table 1 shows the result of the matching approach. The table shows that just 2.2 and 1.4 percent of the entries match across the data sets in 2003 and 2008, respectively. In addition, the percentage of entries matching across data sets increased to 12.4 and 3.8 percent in 2013 and 2018, respectively. In comparison to a single data set, the new data set contains more information on conflict events in Nigeria.

Table 1: MELTT Summary Output

Data Object Names: GTD, UCDP, and ACLED				
Spatial Window: 5km				
Temporal Window: 1 Day(s)				
No. of Taxonomies: 1				
Taxonomy Names: event type				
	2003	**2008**	**2013**	**2018**
Total No. of Input Observations	272	290	1722	3219
No. of Unique Obs. (after deduplication)	266	286	1508	3098
No. of Unique Matches	5	4	180	118
No. of Duplicates Removed	6	4	214	121

In addition, the new dataset is being used to assess the localized consequences of conflict on child well-being. It now has adequate information on several types of conflict, such as political violence, religious violence, insurgency, and farmer/herdsmen violence, among others. Furthermore, we classified the conflict data set into three categories. The first data set captures information on conflict areas (whether it is political violence or insurgency, farmer/herder clashes, or religious/communal violence). The second set of data focuses solely on the insurgency caused by BokoHaram/Islamic State in West Africa Province-ISWAP attacks. The third data set only includes farmer/herdsmen conflict. As a result, Figures 1-3 depict the relationship between the three types of data and DHS distribution.

We match the DHS data with the new conflict data set (in various forms) and the location of live-born children under 12 months in households within 5km, 15km, 25km, and 45km radius. Figure 1 (see appendix) depicts the distribution of DHS clusters and conflict events across the period under consideration at different buffer zones. The red, black, blue, and yellow dots on the maps indicate the presence of conflicts (in any form) in the DHS clustering area (plus dots) and the absence of conflicts. A brief look at the map reveals that pockets of conflict began to spread from the southern part of the country in 2003 and 2008. More so, the post-2009 emergency of insurgency, farmer/herdsmen violence, and other conflicts paint a devastating image of conflict intensity across the country.

In Figure 2, we also isolated insurgency from the broader conflict. In 2003, two dots were located around the Yobe and Borno areas demonstrating the origin of BokoHaram before they became prominent only after 2009. Furthermore, there is no map for 2008 that suggests that there are no insurgency activities throughout that period. Figures from 2013 and 2018 reveal a significant concentration of insurgency in the northern part of the country. In addition, when separated from the total conflict data, Figure 3 provides more detailed information about the farmer/herdsmen conflict. In 2003 and 2008, we can clearly see that there are only a few pockets of this conflict. From 2013 to 2018, the conflict became more complex as it spread across the country. The figure depicts the evolution and spread of conflicts across the country, as well as the distribution of DHS clusters among conflict and non-conflict areas, based on the foregoing. This demonstrates the complexities of the conflicts and how their influence on child well-being in Nigeria cannot be disregarded.

DHS

The study used four waves of Demographic Health Surveys (DHS) conducted in Nigeria over four years to achieve our objectives. The variables relating to child health outcomes and its characteristics, as well as the demographic information of mothers, are obtained from DHS. The NDHS is a nationally representative cross-sectional household survey that provides information on the population and health of Nigerian households. Individual interviews are conducted with men and women aged 15 to 49. The datasets considered in this study are from 2003, 2008, 2013, and

2018 Children Recode (KR). The KR code file has a record for every child between 0-59 months old for each woman interviewed. The data contains information on the time of death for each child, child weight, height, vaccinations, and age of each child if the child is of multiple births. In addition, the survey instrument gathers data on sexual and reproductive health, nutrition, family, ethnicity, education, household assets, and other demographic factors. Traditionally, the surveys cover several thousand respondents across the country, representing urban and rural areas as well as provinces/states. The KR code files for the years used; 2003, 2008, 2013, and 2018 NDHS, respectively, comprise 6,029, 28,647, 31,482, and 33,924 observations. The observations of children from the 2003 and 2008 KR provide data for 'pre-2009,' i.e., before the commencement of the insurgency/terrorism. While observations of children from 2013 and 2018 KR provide information for the 'post-2009' period, which is regarded to be during the insurgency/terrorism. The geographic DHS data, which is separate from the main dataset, contains detailed information on the locations of each sample cluster, as well as geographical coordinates for each surveyed location, allowing us to match with conflict datasets.

In Figures 1-3, we present the trends of the health outcomes (height-for-age z-scores, weight-for-age z-scores, and weight-for-height z-scores) for conflicted-affected and non-conflict-affected children. Before 2009 (pre-conflict period), the children born in conflict-affected areas have high height-for-age z-scores, weight-for-age z-scores and weight-for-height z-scores compared to children born in non-conflict-affected areas. However, the height-for-age z-scores, weight-for-age z-scores, and weight-for-height z-scores of the children born in conflicted-affected areas decline over time after 2009. This may suggest that the effect of conflicts results in stunting, underweight, and wasting as conflicts persist due to food deprivation. Hence, the trends of indicators are similar in pre-2009 but diverge in post-2009 which fulfils the assumption of a common trend.

Figure 1: Height-for-age Z-scores and exposure to conflict

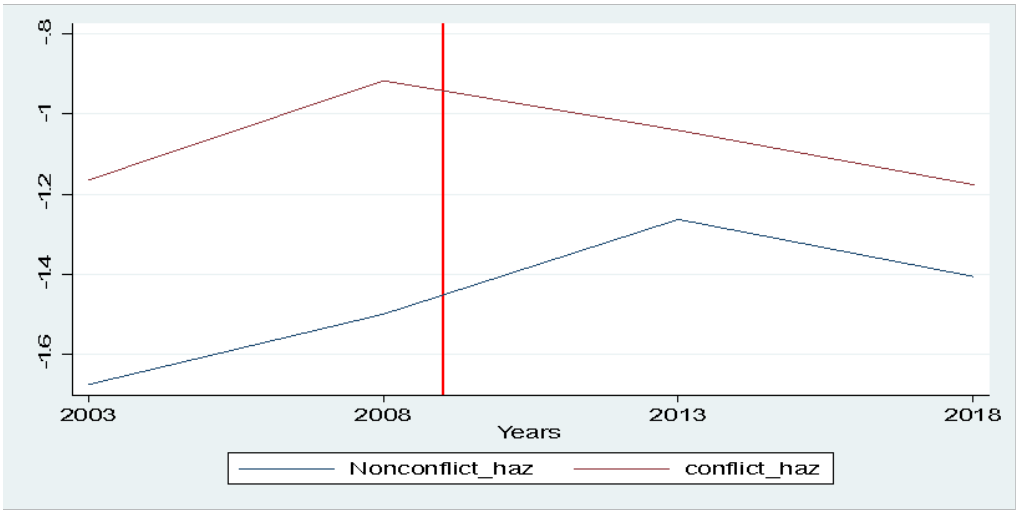
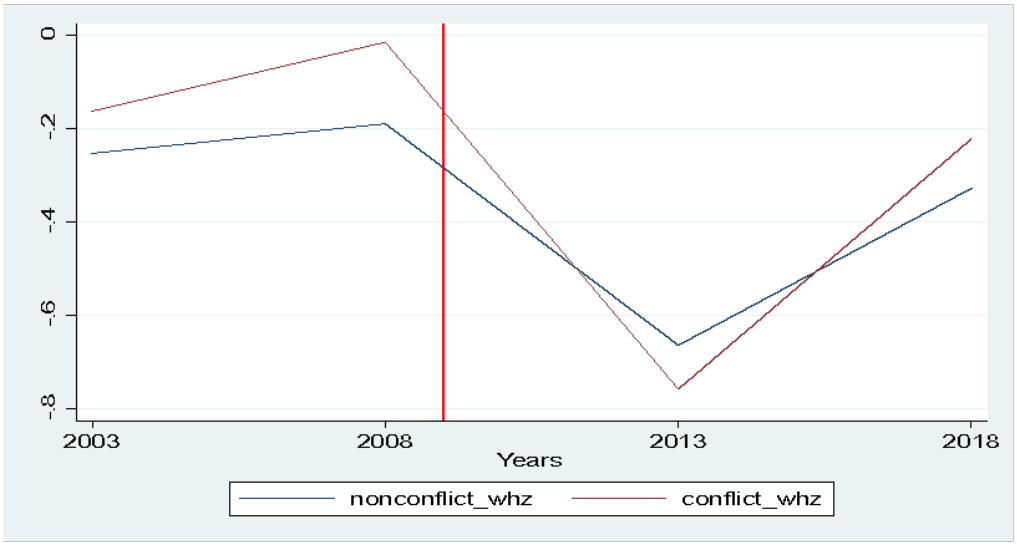


Figure 2: Weight-for-age Z-scores and exposure to conflict

Figure 3: Weight-for-height Z-scores and exposure to conflict



Conclusions

Without a doubt, Nigeria continues to face challenges in improving child health outcomes. This is worsened further by the severity and prevalence of different conflicts in many parts of the country. Furthermore, available evidence suggests that previous studies were preoccupied with insurgency. As a result, the study provides extensive evidence on the consequences of aggregate conflicts, insurgency, and herdsmen/farmers conflict on child well-being (using different child health outcomes - infant mortality, stunting, wasting and underweight and mechanisms- vaccination, hospital

visitation, earnings, employment, and education). Furthermore, the study employs different sensitivity analyses to determine the differential impacts of these conflict types on child health outcomes. Specifically, it explores three conflict data sets (ACLED, UCDP-GED, and GTD), in contrast to previous studies that used a single conflict data set. The MELTT protocol developed by Donnay et al. (2019) is used to merge these data sets. Furthermore, the study explores four DHS waves (2003, 2008, 2013, and 2018). The combination of robust data sets allows us to investigate different dimensions of conflict and their implications for child outcomes. The study employs a difference-in-differences approach to achieve our objective.

The findings clearly show that proximity to conflict areas within a 15-km radius (aggregate) in Nigeria significantly worsens infant mortality, wasting, and underweight. Similar findings were found when the country was dichotomized into North and South. However, the consequence of conflicts on health outcomes is weighty in the North. Furthermore, we found that exposing children to insurgency had a detrimental effect on some health outcomes. Children, as non-combatants in conflicts, are impacted indirectly and severely by the consequences of conflict. This poses a significant challenge to Nigeria's future human capital production. More so, the effect of the herdsmen/farmers conflict is telling. Additionally, there is strong evidence for a significant decline in the number of vaccinated children, hospital visitation, mother's earnings, employment, and educational attainment for children and mothers living within a 15-km radius of a conflict. The conflicts also forced mothers in affected areas to move to non-conflict affected areas. Similarly, exposure to herdsmen/farmers' conflict has a large and detrimental effect on these mechanisms. More so, exposure to insurgency affects only vaccination, earnings, and employment. Hence, the prevalence of conflict types hinders access to vaccination and worsens the livelihood of mothers which most likely affects the child's health. This may also result in high child mortality. The consequence of conflicts is enormous as essential services are cut off thus putting the children in danger. In terms of socioeconomic activities, proximity and exposure to conflicts result in economic loss due to disruption of productive activities, which affects the mother's earnings and employment. More specifically, a mother's educational aspirations are likely to be jeopardized as a result of conflict-related insecurity.

From the foregoing, a number of relatable policy issues ensue. First, the government needs to take proactive measures towards addressing the prevalence of conflicts across the country. Specifically, the protection of children (under-5 children) from exposure to conflict is essential. Given the complexity of conflict, it is important to devise a means to evacuate vulnerable mothers from conflict. By this, the government can protect the future production of quality human capital. Since evidence has shown how a child’s health is affected across different parts of the country, developing a national framework in collaboration with states may be a way forward. Second, designing interventions and programs to

improve child health outcomes in the conflict areas in the country should focus on conflict-affected areas. Although resource allocation may differ, interventions and programs should be holistic due to overwhelming evidence that conflicts in the country are not confined to the north-eastern region. Third, the interventions and programs should be targeted towards increasing access to vaccination, hospital visitation, and also restoring productive activities for mothers to regain their economic strength.

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