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The Long-Term Effects of Civil Conflict on Psychological Well-being

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ABSTRACT *A growing literature shows that exposure to civil conflict could have long-term effects on psychological well-being in adulthood. This paper examines the long-term effects of exposure to the Nigerian civil war on the psychological well-being of heads of household using a difference-in-differences approach. We find that exposure to the civil war is associated with an increase in depressive score or symptoms in later life. We also find gender and locational differences in the effects of the civil war on depressive symptoms. The findings of this paper reveal that illness, household income, ownership of formal accounts, access to electricity, and unemployment, are some of the potential mechanisms through which exposure to conflict could affect depressive symptoms in later life. The findings of this paper support the hypothesis that exposure to shocks such as conflict could have deleterious consequences on well-being in later life.*

KEYWORDS: long-term; civil conflict; psychological; well-being

1. Introduction

Over the years, the incidence of conflict has been on the increase globally. Since World War II, almost one-third of all countries have experienced a civil war, and the prevalence of armed conflict has been on the rise (Gleditsch, Wallensteen, Eriksson, Sollenberg, & Strand, 2002). For example, in sub-Saharan Africa, nearly three-fourths of countries in the region have experienced a civil war (Gleditsch et al., 2002). The implications of conflicts have often been associated with loss of lives, deterioration of physical and human capital, erosion of institutional capacity, and retarded economic growth (Akbulut-Yuksel and Yuksel, 2017). Moreover, exposure to wars or armed conflicts during infancy or in utero may have repercussions on health outcomes of the populations that may extend beyond the short run into the long-run or adulthood (Akbulut-Yuksel, 2014, 2017; Akresh, Bhalotra, Leone, & Osili, 2012a; Akresh,

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Lucchetti, & Thirumurthy, 2012b; Brown, 2018; Minoiu & Shemyakina, 2014; World Bank, 2011).

In light of the above, this paper examines the effects of exposure to the Nigerian Civil War on psychological well-being in adulthood. The Nigerian Civil War, also known as the Biafran War, which occurred between July 6, 1967, and January 15, 1970, provides a compelling and quasi-experimental setting to investigate the deleterious effects of exposure to the war on psychological well-being. The Civil War crystallised from hostilities, ethnic tensions and rioting in the northern part of the country that targeted mostly the Igbos (an ethnic group in the south-eastern part of Nigeria), and eventually the Igbos fled to the eastern part of the country, where they seceded as Biafra (Okonjo-Iweala, 2012). The war was restricted to the south-eastern region of Nigeria, and it was between the Federal Government of Nigeria and the seceded South-Eastern region (which comprises the Igbos and some other minority ethnic groups). There was large-scale devastation during the conflict, and it was reported that between 1 and 3 million deaths occurred (Ajefu & Casale, 2021, 2025; Akresh et al., 2012b; Simpson, 2014).

The contributions of this paper are twofold. First, this paper examines an under-researched aspect of the Nigerian Civil War, which is the long-run effect of the war on psychological well-being in the context of sub-Saharan Africa. Due to paucity of survey data on mental health, there has been limited evidence in the context of sub-Saharan Africa on the nexus between early-life exposure to civil conflict and mental health or psychological well-being in adulthood. Second, this paper explores the potential pathways or mechanisms through which early-life exposure to the Nigerian civil war affects psychological well-being in adulthood. The psychological consequences that result from exposure to civil war could stem from the following mechanisms. Evidence has shown that direct exposure to armed conflicts can result in injury and trauma, but the indirect or 'hidden' effects of conflicts on health outcomes may be pernicious and surface in later life or adulthood (Ghobarah, Huth, & Russett, 2003; Palmer, Nguyen, Mitra, Mont, & Groce, 2019; Ugalde, Patricia, & Anthony, 1999).[1] Furthermore, deprivations in nutrition, education, and medical care during critical periods of child development can lead to long-run effects in health and well-being (Cunha & Heckman, 2007). This point is relevant to the Nigerian Civil War, which was associated with prolonged periods of nutritional shock and reduced access to medical care and education (Akresh et al., 2012a, 2012b).

A few studies have shown that health shocks in utero and infancy are predictive of long-run socio-economic outcomes and life expectancy such as earnings, health, and well-being (Almond, Currie, & Duque, 2018; Almond, Edlund, Li, & Zhang, 2007; Bhalotra, Karlsson, & Nilsson, 2017; Bhalotra & Venkataramani, 2013; La Mattina & Shemyakina, 2017; Palmer et al., 2019; Saing & Kazianga, 2020). Broadly speaking, the contributions of this paper are at the intersection of two main strands of literature. First, the paper adds to the literature that examines the effects of exposure to shocks (such as climate change, natural disasters, and famine, among others) on mental health or psychological well-being (Adhvaryu, Fenske, Kala, & Nyshadham, 2024; Adhvaryu, Fenske, & Nyshadham, 2019; Ajefu & Sonne, 2022; Li & Sunder, 2021; Palmer et al., 2019; Pasha, Rockmore, Tan, & Thamarapani, 2023; Singhal, 2019). For example, Pasha et al. (2023) examine the effects of early life exposure to above average levels of rainfall on adult mental health, and the results reveals that postnatal positive rainfall shocks increase the likelihood of depression. Moreover, Adhvaryu et al. (2024) use data on 19 African countries to examine the effect of in utero exposure to temperature shocks on depressive symptoms in adulthood, and the findings show that temperature shocks are associated with depressive symptoms.

Second, this paper is closely related to the literature that examines the effects of violent conflicts on socio-economic outcomes such as education, health, subjective survival probabilities, trust, labour supply, earnings, and household consumption (Akbulut-Yuksel, 2014; Akresh et al., 2012a; Arpino, Conzo, & Salustri, 2022; Islam, Ouch, Smyth, & Wang, 2017; Saing & Kazianga, 2020). This literature speaks to the potential mechanisms or pathways through which violent conflicts are related to psychological well-being of individuals.

The findings of our analysis reveal that exposure to the Nigerian Civil War is associated with an increase in the depressive score (proxied as a decline in psychological well-being) in adulthood. We also find gender and locational differences in the effects of the civil war on depressive symptoms of the head of households. We identify outcomes such as illness, unemployment, household income, electricity access, and ownership of formal accounts, as some of the potential mechanisms through which exposure to shocks such as civil war affect depressive symptoms in adulthood. We conduct placebo analysis, in which, we drop the war exposed states and randomly assign states in the northern and western regions as war-exposed States. In the placebo analysis, we find no association between war-exposed cohorts and the psychological well-being of the heads of households.

The relevance of this study is underscored in the growing evidence of the global economic costs of conflict. For example, between 2012 and 2017, it was estimated that the global economic costs of conflict increased from $12.62 trillion to $14.76 trillion, with many of the conflict-torn countries trapped in a perpetual cycle of violence (Institute for Economics & Peace, 2018; World Bank, 2011; World Humanitarian Data & Trends, 2017). Further, the economic losses associated with mental health disorders, which could result from exposure to early life shocks, in low-income countries are significantly high. For example, it has been estimated that depression generates losses of about 55.5 million disability-adjusted life-years in low-and-middle-income countries (Mathers, Fat, & Boerma, 2008).

The remainder of this paper proceeds as follows: Section 2 provides background to the Nigerian Civil War. Section 3 provides the theoretical framework to the paper. Section 4 discusses the data sources and identification strategy. Section 5 presents the results of the study, mechanisms, and heterogeneity of effects. Finally, Section 6 concludes the paper.

2. Background to the Nigerian civil war

Prior to gaining independence, Nigeria comprised three regions: Northern, Western, and Eastern. Each of these regions was dominated by a distinct ethnic group - the Hausas in the Northern region, the Yorubas in Western region, and the Igbos in the Eastern region. After Nigeria gained independence from Britain in 1960, it instituted a parliamentary democracy, with a bicameral legislature, a prime minister, and a president who carried out ceremonial functions. That era, known as the First Republic, lasted from 1960 to 1966. The period between 1960 and 1966 was largely characterized by ethnic tensions, poor governance, and corruption (Bamiduro, 1983; Okonjo-Iweala, 2012).

The remote and immediate causes of the civil war were due to military coup and counter-coup, hostilities, ethnic tensions and rioting in the northern part of the country that targeted mostly the Igbos, which eventually led to the Igbos fleeing to the eastern part of the country, where they seceded from the Nigerian Federation as Biafra (Akresh et al., 2012a, 2012b; Okonjo-Iweala, 2012). The Civil War began on July 6, 1967, shortly after the South-Eastern region declared the Biafra Republic as an independent State on May 30, 1967. The Federal Government resisted the move to establish the Biafra Republic, hence the act of secession was declared illegal (Akresh, Bhalotra, Leone, & Osili, 2023). The actions by the South-Eastern region and the Federal Government culminated in full-blown civil war that lasted for 30 months (the war ended on January 15, 1970). The war was restricted to the South-Eastern region (eastern region during the war).

The Federal Government deployed significant military might in addition to a strict blockade of the landlocked territory (movement of people or essential commodities were restricted), as responses against the actualization of the secession move of the South-Eastern region. It was estimated that the Civil War led to the death of between 1 and 3 million people, mostly from malnutrition and devastation associated with the war. It has been referred to as one of the worst human disasters in Africa (Ajefu & Casale, 2021; Akresh et al., 2012b; Simpson, 2014).

3. Theoretical framework

There are plausible pathways through early life exposure to civil conflict affects health outcomes, such as mental health in later life. A number of studies have shown that exposure to adverse shocks or negative events such as civil war, droughts and famine during in utero or childhood could affect an individual's welfare or well-being in adulthood. More specifically, in utero exposure to negative shocks could have long-term consequences on educational attainment, labour market outcomes, physical and mental health (Almond & Currie, 2011; Barker, 1990; Dunn, 2007; Ravelli, Stein, & Susser, 1976). These studies stress the significance of the conditions and the nine months in utero as critical factors for a child's future health trajectories and development (Almond et al., 2018; Barker, 1990)[2].

Moreover, the fetal origins hypothesis suggests that conditions in utero such as intrauterine environment, e.g. lack of nutrition 'program' the fetus in certain ways with a particular metabolic attribute, which can be associated with heart disease in the future (Barker, 1995). For example, Hoek, Brown, and Susser (1998) show that those exposed to the Dutch hunger of 1944 in utero showed an increase in schizophrenia compared to those not exposed to the famine. Additionally, this hypothesis argues that the effects of prenatal exposure to adverse shocks may be persistent. The mechanism through which in utero exposure to adverse shock affect later-life outcomes is known as 'fetal programming'. Hence, during civil conflict, famine or nutrition deprivation is a potential mechanism of transmission through which long-term health or well-being could be affect due to the exposure to civil conflict (Almond et al., 2007, 2018; Chen & Zhou, 2007; Stein, Susser, Saenger, & Marolla, 1975).

Considering adverse events such as civil conflicts and epidemics, evidence shows that in utero or childhood exposure to civil war is not only associated with poor nutrition but also diseases in the environment of the affected population. For women who are pregnant during war, they are likely to have children that experience reduced educational attainment, which could lead to reduced income and socioeconomic status, and accelerated disability rate in adulthood (Almond, 2006; Almond, Chay, & Lee, 2005). These outcomes could be the links through which exposure to civil war affects psychological well-being.

Another channel through which early life exposure to conflict affects psychological well-being stems from the likelihood of growing up amid conflict being associated with health conditions such as stroke, cardiovascular disease, diabetes, and low self-rated health (Akbulut-Yuksel, 2017; Kesternich, Siflinger, Smith, & Winter, 2014; Lindeboom & Ewijk, 2015). Lastly, exposure to civil conflict can be associated with displacement or social dislocation, institutional and infrastructural breakdowns, with consequences on physical, cognitive, and psychological outcomes, and an increase in risk of poor health outcomes in adulthood (Kitagawa & Hauser, 1973; Link & Phelan, 1995; Shemyakina, 2011). See Figure 1 for a description of the channels through which early life exposure to civil conflict affect psychological well-being in adulthood.

4. Data sources and empirical strategy

4.1. Data source

We use the 2015/16 (third wave) of the Nigerian General Household Surveys (NGHS) in our analysis. The NGHS is a nationally representative survey that is designed by the National Bureau of Statistics (NBS) of Nigeria as part of the Living Standards Measurement Study surveys (LSMS). The surveys cover all the 36 states in Nigeria and the Federal Capital Territory (FCT) of Abuja. The 2015/16 NGHS provides information on individuals, households, and community characteristics, such as age (date of birth), gender, marital status, education attainment, health status, labour market participation, family size, and household's state and region of residence, attitude of heads of household or other senior members in the household, household food and non-food expenditures, among others. It is imperative to note that only the 2015/16 wave of the NGHS provides information on psychological well-being or mental health

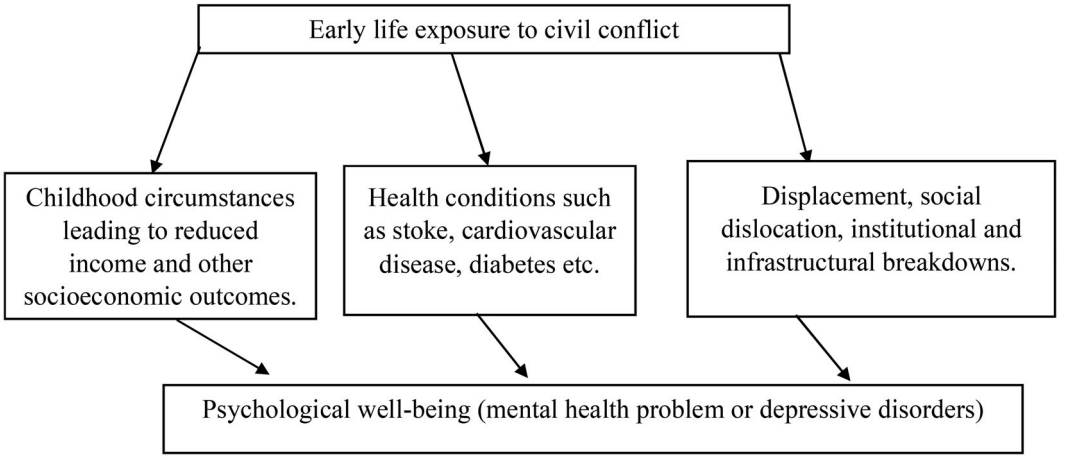

Figure 1. Pathways through which civil war affects psychological well-being.
Source: Authors' analysis.

status of household's head or senior members in the household. Hence, the reason for using only the third wave (2015/16) of NGHS in our analysis.

4.1.1. Exposure to the civil war (treatment variables). Due to the limitations associated with geographical variation in conflict intensity, this paper explores ethnic groups in the Biafran region (Igbos ethnic group) as well as other minority ethnic groups close to the region. Although the 2015/16 General Household Survey (GHS) does not provide information on ethnicity, we were able to identify ethnic groups based on information on Local Government Areas (LGAs) of the respondents provided by the GHS. Following Akresh et al. (2012a; 2021), we identify the war-exposed ethnic groups as Igbo, Ekoi, Adoni, Adun, Annang, Ibibio, and Efik. The Igbos are found in the South-east region, using the information from the GHS on the geopolitical zones of the respondents, we identified this ethnic group as a dummy variable if a respondent is from South-east region of the country. In addition, we identified Efik ethnic group (Akpabuyo LGA), Annang ethnic group (Ikot Ekene, Abak, Etim Ekpo, Essien Udim, Ika, and Oruk Anam LGAs), Ekoi ethnic group (Ogoja, Etung, and Obubra LGAs), and Ibibio ethnic group (Uyo, Ibiono Ibom, Uruan, Nsit Ubium, Nsit Atai, and Ikot Abasi LGAs). However, we are unable to include Adoni and Adun in our analysis because the GHS does not capture respondents from the LGAs of these ethnic groups (Adoni and Adun)[3]. See Figure 2 for the map of Nigeria indicating war-exposed ethnic groups.

Further, we restrict the sample to individuals with birth years between January 1951 and October 1974, which covers those born before and after the civil war. This sample includes individuals that were exposed to the war during infancy or in utero (treatment) as well as those who were up to four years old when the war ended. We restrict the control group to four years after the war to limit the possibility of confounding events which increases with window size. In other words, using control groups beyond four years could lead to bias in the estimates due to confounding of other factors than the Civil War (Akresh et al., 2012a, 2023).

4.1.2. Measures of psychological well-being. We use reported information on the attitude of head of households or other senior members in the household to construct incidences of depressive symptoms or mental health outcome. The 2015/16 NGHS obtained this information using a version of the Center for Epidemiological Studies-Depression or CES-D-10 tool (Andresen, Malmgren, Carter, & Patrick, 1994). The CES-D-10 questionnaire was administered to household heads or other senior members in the household during the interview to collect information for the 2015/16 Nigerian General Household Survey.

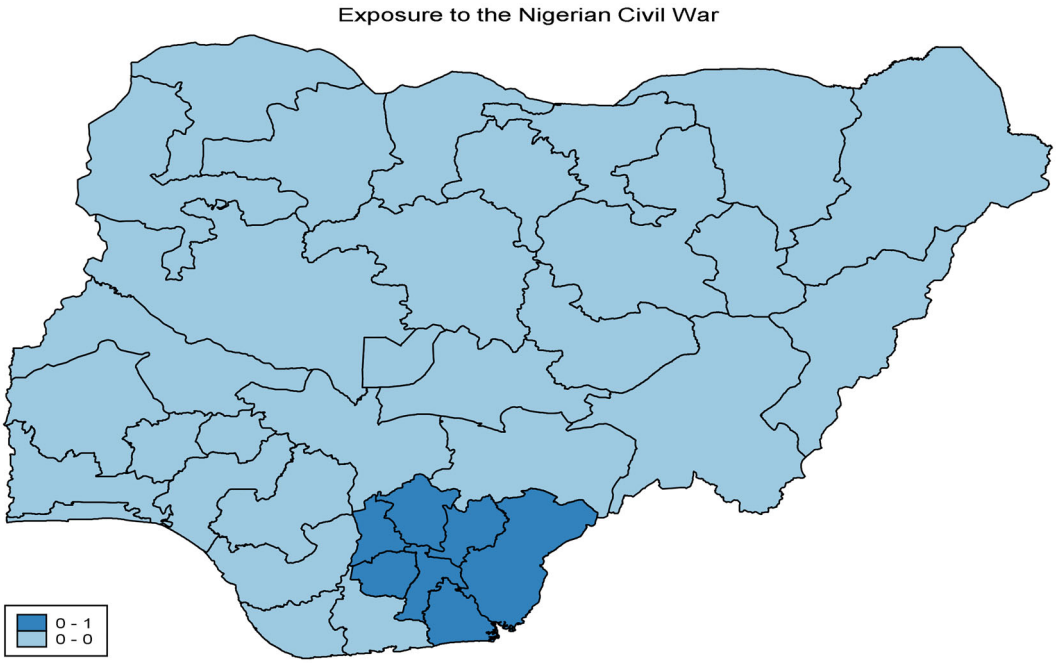

Figure 2. The dark-blue portion of the map represents the states exposed to the Civil War.

Moreover, for the mental health questionnaire, the 2015 GHS interviews only the head of households or senior member of the households. The personal identification of the individuals interviewed under this question is not provided. Hence, we restrict the control variables used in the regression to household characteristics or household head variables.

The composite score based on the ten-item questions from the CES-D-10 questionnaire ranges from 0 to 30. See Table A1 in the appendix for descriptive of the components of the items in the CES-D-10 questionnaire used to construct the depressive score, which is the outcome variable used in this study. From our analysis, high CES-D score indicates poor mental health or higher depressive symptoms (Andresen et al., 1994). Following Singhal (2019), we adopt a cut-off of 10 and above as indicator for evidence of severe depressive symptoms.

Summary statistics in Table 1 reveal that the average score on the CES-D is 7.053 for the sample and about 29% of the sample exhibits symptoms of severe stress. Figure 3 presents the distribution of the CES-D scores used in the analysis.

Table 2 shows the incidence of psychological well-being by war exposure. We define war exposure as the interaction of war-exposed cohort and war-exposed area. The average CES-D score for the non-exposed group is 6.925, compared to the 7.709 CES-D score for the war-exposed group. The difference is statistically significant at the 1% level. For severe stress, the descriptive statistics reveal that 28% of non-exposed group reported severe stress, while 33% of the war-exposed group reported severe stress. We conduct further descriptive analysis using the disaggregated components from the CES-D score. The results reveal significant differences for different items captured between non-exposed group and war-exposed group.

4.2. Empirical strategy

To estimate the relationship between early life exposure to the civil war and psychological well-being in adulthood, this paper adopts a difference-in-differences strategy. The identification strategy exploits variation in exposure to the civil war by birth cohort and region. We define the treatment or war-exposed group as those groups born or in utero during the war (born

Table 1. Summary statistics

Variables	Mean	Standard deviation
CES-D Score	7.053	5.181
Severe stress	0.285	0.452
War cohort x war exposure	0.163	0.369
Cohort 1951-60 x War exposure	0.097	0.295
Cohort 1961-1970xWar exposure[4]	0.067	0.249
In utero x War exposure	0.008	0.088
Age of household head	51.897	6.723
Household head married	0.780	0.414
Household head literate	0.874	0.331
Family size	6.379	3.312
Household head employed	0.870	0.335
Male household head	0.806	0.395
Household asset value (log)	10.735	1.509
Rural dummy	0.683	0.465
Household has electricity (dummy)	0.531	0.499
HH own mobile phone (dummy)	0.752	0.431
HH own bank account (dummy)	0.401	0.490
Observations	2,523	

Source: Authors' computation using the Nigerian General Household Surveys 2015/2016.

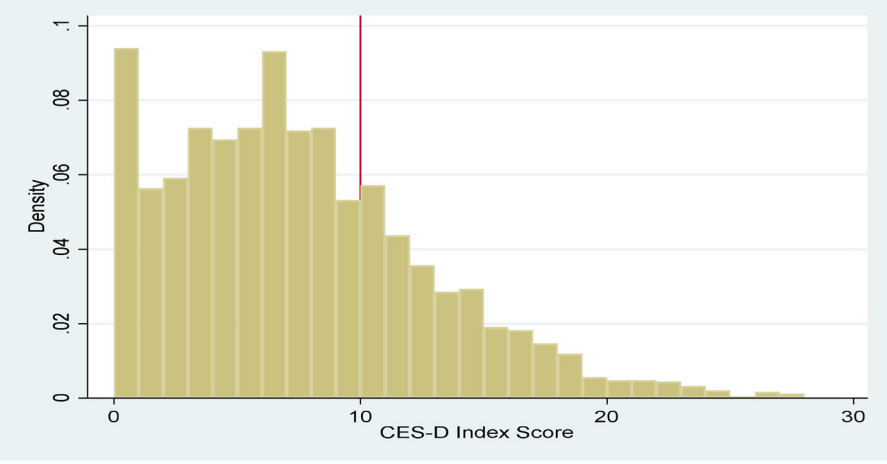

Figure 3. Histogram of CES-D Score. The red line at a CES-D score of 10 denotes the threshold for severe stress.
Source: Authors' computation based on the 2015/16 Nigerian General Household Survey (GHS).

between January 1951 and October 1970) and living in the areas exposed to the war. We present two distinct control groups: (i) First, individuals from the war-exposed areas who were born in the four-year period following the war, that is, from November 1970 to December 1974. (ii) second, the same birth cohorts (1951-1974) but from the non-war exposed areas.

We estimate Equation (1) below:

$$Y_{ijt} = \alpha + \beta_1 \left(war_{areaj} \times Cohort_{it} \right) + \beta_2 X_{ijt} + \delta_r + \tau_t + \varepsilon_{ijt} \quad (1)$$

where Y_{ijt} denotes CES-D score for individual i belonging to region j and born in year t. war_{area} denotes the areas (ethnicity) exposed to the civil war and $Cohort_{it}$ includes four cohorts, namely: those exposed to war *in utero*, those born 1961-1970, and those born 1951-1960, where the omitted category are those born between November 1970 and December 1974. The interactions of war region with

Table 2. Test of mean difference

Variables	Non-War exposed cohort	War exposed cohort	Difference standard error (difference)
CES-D score	6.925	7.709	−0.784***
	(0.114)	(0.234)	(0.278)
Severe stress	0.277	0.330	−0.053**
	(0.010)	(0.023)	(0.024)
No. of days disturbed about …	0.626	0.723	−0.098**
	(0 .019)	(0.039)	(0. 047)
No. of days have trouble concentrating	0.584	0.869	−0.285***
	(0.018)	(0.042)	(0.046)
No. of days feel depressed	0.675	1.024	−0.350***
	(0.018)	(0.043)	(0.046)
No. of days feel everything was a burden	0 .536	0.633	−0.097**
	(0.018)	(0.040)	(0.044)
No. of days feel afraid	0.539	0.468	0.071
	(0.018)	(0.034)	(0.044)
No. of days sleep restless	0.763	1.034	−0.270***
	(0.019)	(0.041)	(0.047)
No. of days feel lonely	0.562	0.609	−0.047
	(0.019)	(0.044)	(0.047)
No. of days feel like not getting up in the morning	0.764	0 .990	−0.227***
	(0.019)	(0.043)	(0.047)
No. of days hopeful about the future	0.999	0.619	0.379***
	(0.026)	(0.046)	(0.062)
No. of days feel happy	0.878	0.738	0.140**
	(0.023)	(0.046)	(0.056)
Observations	2,111	412	

Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Standard errors are in parentheses.

each of the four cohorts are the variables of interest and capture the effect of an individual's exposure to the civil war on psychological well-being. X_{ij} is a vector of individual and household characteristics, which include household size, dummy variable for married household head, asset values, own bank account, household head employed, dummy variable for male household head, household head literate, and rural residence; δ_r and τ_t capture region-fixed effects and birth-fixed effects, respectively; and ε_{ijt} is a random, idiosyncratic error term. We estimate the regressions using ordinary least squares (OLS), and standard errors are clustered at the state level to account for serial correlation.[5]

In order to interpret β_1 as the effect of the civil war on psychological well-being, we must assume that in the absence of the war, the affected cohorts and the cohorts born after the war exhibit parallel trends in their CES-D score and severe stress (psychological well-being) respectively. First, we consider the validity of the parallel trend assumption in Figure 4. In Figure 4, we show the CES-D score by birth year in war-exposed and non-exposed ethnic groups to the war. The vertical line on birth year, 1970, indicates the year the civil war ended, which distinguishes the affected cohorts from the control cohorts. Then, we test whether the results of this study are confounded by the differential post-war health policies. Figure 4 shows that cohorts in war-exposed ethnic group, on average, have higher CES-D scores compared to non-exposed cohorts. Moreover, in the post-war period (after 1970), Figure 4 shows decline in CES-D scores for the war-exposed cohorts. In Figure A1 in the appendix, we show the parallel trend for the disaggregated questions captured in the CES-D questionnaire.

5. Results and discussions

Table 3 presents the results of exposure to the Nigerian civil war on the CES-D score among household heads. From Column 4 of Table 3, which is the standard specification, we control

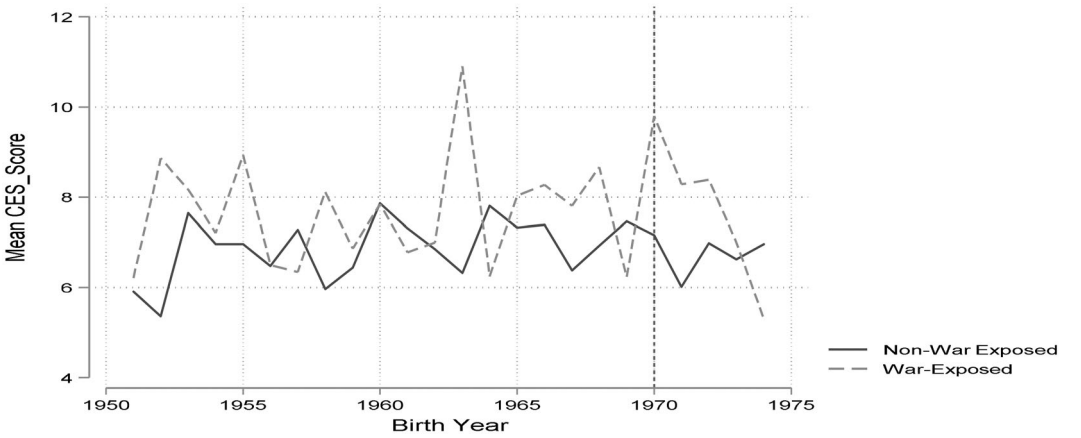

Figure 4. Parallel trend of CES-D score between war-exposed and non-war exposed groups.

Table 3. Effect of exposure to civil war on CES-D score

	(1)	(2)	(3)	(4)
Dependent variable: log. CES-D score				
Exposed x 1951-60	0.194*	0.213**	0.246**	0.151*
	(0.096)	(0.097)	(0.108)	(0.080)
Exposed x 1961-69	0.182	0.218*	0.214*	0.123
	(0.120)	(0.121)	(0.120)	(0.123)
Exposed x utero	0.491***	0.519***	0.455***	0.360**
	(0.125)	(0.141)	(0.142)	(0.140)
Year of birth FE	No	Yes	Yes	Yes
Region	No	No	Yes	Yes
Control variables	No	No	No	Yes
R-squared	0.010	0.042	0.049	0.078
Observations	2523	2521	2521	2521

Notes: Robust standard errors clustered at the state level in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Age of household head excluded because it is collinear with birth year fixed effects. The control variables in the regression include household size, dummy variable for married household head, asset values, own bank account, household head employed, dummy variable for male household head, household head literate, and rural residence.

for individuals and household characteristics, birth fixed effects and region fixed effects, we find that individual's born between 1951 and 1960, exposure to the war increases the CES-D score by 0.151; and for those born between 1961 and 1969, exposure to the war increases the CES-D score by 0.123; and for in utero individuals, exposure to the civil war increases CES-D score by 0.360. These results are consistent with Singhal (2019) who investigated the effects of early life exposure to the bombing of Vietnam on mental health in adulthood. Moreover, we estimate the relationship between exposure to the civil war using a binary outcome variable (severe stress) in which we generate a dummy variable equal to one, if the CES-D score is greater than or equal to 10, and zero otherwise. See Table A2 in the appendix for the results. We find statistically significant results for the effects of exposure to the war on CES-D indicator only for individuals exposed in utero to the Nigeria civil war. Moreover, Table A3 presents disaggregated (variables) components of items from the CES-D questionnaire, and in Table A4, we present the results of the effect of the war on psychological well-being based on regional exposure to the war. We find consistent estimates for Tables 3 and A4.

Table 4. Heterogeneity in the effects of civil war on CES-D score

	(1) Male HH	(2) Female HH	(3) Urban dweller	(4) Rural dweller
Exposed x1951-60	0.088	0.419***	0.064	0.309**
	(0.093)	(0.136)	(0.089)	(0.118)
Exposed x1961-9	0.056	0.391***	0.119	0.102
	(0.128)	(0.113)	(0.137)	(0.118)
Exposed x in utero	0.479***	0.070	0.172	0.766***
	(0.126)	(0.235)	(0.182)	(0.141)
Year of birth FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
R-squared	0.068	0.157	0.082	0.118
Observations	2033	488	1721	800

Notes: Robust standard errors clustered at the state level in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Age of household head excluded because it is collinear with birth year fixed effects. The control variables in the regression include household size, dummy variable for married household head, asset values, own bank account, household head employed, dummy variable for male household head, household head literate, and rural residence.

5.1. Heterogeneities

In Table 4, we present heterogeneous effects of exposure to war on psychological well-being. We consider heterogeneities in psychological well-being by gender and location of residence (urban-rural residence). From Column 1 of Table 4, we report the findings for male household heads, and results show that exposure to the civil war in utero increases the CES-D score by 0.479. From Column 2 of Table 4, which presents results for the female household sample, we find that exposure to the civil war increases CES-D scores by 0.419 and 0.391 for cohorts with date of birth 1951 to 1960, and 1961 to 1969. Columns 3 and 4 report findings for households with rural and urban residences. For the rural residents, exposure to the war in utero increases the CES-D score by 0.309 for cohorts born between 1951 and 1960; and increases the CES-D score by 0.766 for the in-utero cohort. We however find no statistically significant effects for the urban residents of the nexus between exposure to the civil war and CES-D score. These findings speak to results obtained by Akbulut-Yuksel, Tekin, and Turan (2022).

5.2. Mechanisms or pathways

We explore potential mechanisms through which exposure to the civil war affects psychological well-being. We consider mechanisms that are drivers of mental health such as illness, food consumption score, literacy, unemployment, and dietary diversity (Allen, Balfour, Bell, & Marmot, 2014; Jones, 2017;). From Column 1 of Table 5, we find that exposure to the civil war in utero increases the likelihood of being unemployed among household heads or senior members of the household. Column 2 of Table 5 reports the relationship between exposure to the civil war and household income. We obtained a negative and statistically significant association between exposure to the war and household income for cohorts exposed to the war and born between 1960 and 1969. A decline in household income could result in the inability of households to obtain essential items related to diet and nutrition, which could be linked to mental well-being (Firth, Gangwisch, Borisini, Wootton, & Mayer, 2020). In column 3, we examine the association between exposure to the war on access to electricity. The results reveal that exposure to the civil war is associated with a decline in access to electricity, and the statistically significant effects are for cohorts born between 1951-60, and 1961-69. This finding relates to evidence on

Table 5. Determinants of mental health

	(1) Unemployed	(2) Log income	(3) Electricity	(4) Formal account	(5) Illness
Exposed x 1951-60	−0.003	−0.616	−0.090**	−0.021	0.115***
	(0.041)	(0.479)	(0.042)	(0.037)	(0.036)
Exposed x 1961-69	0.021	−1.356***	−0.082*	−0.100**	−0.033
	(0.030)	(0.455)	(0.043)	(0.048)	(0.050)
Exposed x in utero	−0.076*	−0.208	−0.072	−0.156	0.190**
	(0.040)	(0.580)	(0.112)	(0.107)	(0.071)
Year of birth FE	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
R-squared	0.064	0.307	0.357	0.226	0.076
Observations	2521	2521	2517	2521	2521

Notes: Robust standard errors clustered at the state level in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
The control variables used are indicated in Table 4.

the connection between electricity access and food security, which could indirectly be linked to psychological well-being (Candelise, Saccone, & Vallino, 2021). From Columns 4 and 5 of Table 5, we examine the relationship between exposure to the civil war and ownership of formal account, and self-reported illness or health well-being. We find a negative relationship between exposure to the civil war and ownership of formal accounts, which is a proxy for financial inclusion. Evidence has shown that financial inclusion could have effect on mental well-being (Ajefu, Demir, & Haghpanahan, 2020). Moreover, in Column 5, we find that exposure to war is positively associated with self-reported illness. These findings contribute to the literature on the determinants of mental health or psychological well-being.

5.3. Moderating impacts of the war on mental health: the role of human capital

Based on the extant literature, we investigate the possible moderating effect of the civil war on mental health (Akresh et al., 2023). We identify educational level completed as a moderating factor in the relationship between exposure to the civil war and psychological well-being.

In Table 6, the results of the interaction term of exposure to the civil war and years of schooling, and the coefficient of years of schooling indicate that educational level completed is negatively associated with psychological well-being (mental health). Although the results reveal an association between educational level completed and mental well-being, we are unable to establish a causality relationship between the variables due to the potential endogeneity of educational level completed. Hence, our analysis of the role of human capital discussed in Table 6 is correlation rather than causation among the variables captured in the analysis.

5.4. Threat to identification: migration

One potential threat to identification of the effects of early life exposure to the civil war on psychological well-being is the migration of individuals from war-exposed regions to non-exposed regions during the war. Unfortunately, the 2015 Nigerian General Household Surveys (NGHS) data used in this study provides no information on migration of the individuals covered in the survey. Therefore, we are unable to investigate or undertake econometric analysis for migrants (movers) and non-migrants (non-movers), respectively. Notwithstanding this limitation in our data, migration could constitute a threat to the internal validity of this study.

However, to allay some of the concerns associated with migration in this paper, we provide evidence on migration in relation to the Nigerian civil war. Before the civil war broke out, there was a

Table 6. Moderating effects of education on the effect of war on mental health

War cohort x exposed	0.185
	(0.187)
War cohort x Exposed x educational level	−0.099*
	(0.054)
Education level completed	−0.204***
	(0.072)
R-squared	0.069
Observations	2,521
Year of birth FE	Yes
Region FE	Yes
Control variables	Yes

Notes: Robust standard errors clustered at the state level in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
The control variables used are indicated in Table 4.

Table 7. Exposure to civil war and CES-D score –placebo test

Variable	CES-D score
Born 1951-60 x War Exposure	−0.369**
	(0.166)
Born 1961-70 x War Exposure	−0.427**
	(0.168)
In utero x War Exposure	−0.246
	(0.218)
Year of birth FE	Yes
Region FE	Yes
Controls	Yes
Observations	2,046
R-squared	0.103

Notes: Robust standard errors clustered at the enumeration area level in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
The control variables used are indicated in Table 4.

massive return migration of the Igbos seeking refuge in their homeland (about 1.5 million people) in the South-Eastern region (Aall, 1970; Akresh et al., 2012a). Hence, this reduces the likelihood of having a significant number of the Igbos outside of their region. Further, evidence from the Federal Office of Statistics (1999, 2000) shows about 95.3% and 95.8% of Nigerians are residents in their states of birth. Hence, most migration in Nigeria are not across states but rather within states, e.g. migration in Nigeria mostly occurs from rural to urban areas and not across states. Also, migration within the same region has been found to account for about 4.2% of the people. Based on this evidence, the threat due to endogenous migration is grossly minimised in this study (Ajefu, 2019).

5.5. *Robustness checks: placebo tests*

The regression results presented in the previous analysis, including Figure 4 and A1 rest on the parallel trend assumption, which assumes that in the absence of the war, the difference in CES-D score between the war exposed (treatment) and non-war exposed (control) cohorts would have remained constant over time. In Table 7, we conduct a placebo analysis (falsification test) in which we drop the war exposed states and randomly assigned states in the Northern and Western regions as war exposed states[6]. In the placebo analysis, we find that pseudo-war exposure is associated with a decline in CES-D scores among heads of household. For further analysis, we

measure regional exposure to the war by considering the south-east region as the war exposed region interacted with the age cohorts as presented in previous results above, the results are similar to those presented in Table 3. See Table A4 for the results using regional exposure to the war.

6. Conclusion

In this paper, we estimate the long-term effects of exposure to the Nigerian Civil War on psychological well-being in adulthood. Using a difference-in-differences approach in which we exploit variation in exposure to the civil war by birth cohorts and region, we find that exposure to the civil war is associated with decreased psychological well-being (proxied by an increase in depressive score) in adulthood. We explored potential mechanisms through which early life exposure to the civil war affect psychological well-being in adulthood, which include illness, unemployment, household income, ownership of formal accounts, and access to electricity. It is important to note that our analysis of the mechanisms is mainly suggestive given existing literature on the drivers or determinants of depressive symptoms. In addition, our analysis reveals heterogeneities by gender and location in the effect of exposure to the civil war on psychological well-being.

The findings in this paper shed light on the potential long-term legacies of exposure to the Nigerian Civil War on psychological well-being. While empirical evidence has demonstrated the short-term effects of conflicts on outcomes such as education, poverty, health, domestic violence, and household behaviour, among others, the extent to which early life exposure to violent conflict or economic shocks impacts the long-term mental health of the exposed populations, and in particular the channels through which this occurs, is also limited. Exploring the connection between exposure to conflict and later life outcomes has important implications for the development of policies to stem the consequences of early life exposure to conflict on psychological well-being later life. Moreover, understanding the channels through which conflicts can perpetuate poor mental health is important for designing post-war or public health policies to mitigate the deleterious consequences of civil conflict.

Notes

1. For a survey of literature on the effects of early life exposure to conflict on later-life outcomes (Akresh et al., 2012; Akresh et al., 2023; Singhal, 2019).
2. Studies from biomedical literature reveal that during infancy, the brain is likely to sensitive to sustained exposure to heightened cortisol or toxic stress levels (Singhal, 2019). These changes can alter the brain structure, with implications on the ability to regulate stress and fear responses, including the risks of developing mental and behavioural problems in later life (Danese & McEwen, 2012; Shonkoff et al., 2012).
3. Full list of all 371 tribes in Nigeria, states where they originate - Vanguard News (vanguardngr.com).
4. This cohort includes individuals born between January 1961 and January 1970 when the war ended.
5. For the analysis, we use high-dimensional fixed effects command in Stata, which is given as reghdfe.
6. We assigned the following states as war-exposed states: Kogi, Kwara, Nasarawa, Ogun, Sokoto, Taraba, Oyo, and Jigawa.

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Data availability statement

The Stata codes used to generate the results presented in this paper will be made available upon request.

References

Aall, C. (1970). Relief, nutrition and health in the Nigerian/Biafran War. *Journal of Tropical Pediatrics*, *16*(2), 70–90. doi:10.1093/tropej/16.2.70

Adhvaryu, A., Fenske, J., Kala, N., & Nyshadham, A. (2024). Fetal origins of mental health: Evidence from Africa. *Economic Development and Cultural Change*, *72*(2), 493–515. doi:10.1086/722536

Adhvaryu, A., Fenske, J., & Nyshadham, A. (2019). Early life circumstance and adult mental health. *Journal of Political Economy*, *127*(4), 1516–1549. doi:10.1086/701606

Ajefu, J. B. (2019). Measuring the causal effect of women's schooling on contraceptive use in Nigeria. *Development Southern Africa*, *36*(5), 716–729. doi:10.1080/0376835X.2019.1593109

Ajefu, J. B., & Casale, D. (2021). The long-term effects of violent conflict on women's intra-household decision-making power. *The Journal of Development Studies*, *57*(10), 1690–1709. doi:10.1080/00220388.2021.1873285

Ajefu, J. B., & Casale, D. (2025). Long-term effects of childhood exposure to war on domestic violence. *The European Journal of Development Research*, *37*, 124–151. doi:10.1057/s41287-024-00659-4

Ajefu, J. B., Demir, A., & Haghpanahan, H. (2020). The impact of financial inclusion on mental health. *SSM - Population Health*, *11*, 100630. doi:10.1016/j.ssmph.2020.100630

Ajefu, J. B., & Sonne, S. E. W. (2022). The association between terrorist attacks and mental health: Evidence from Nigeria. *Oxford Development Studies*, *50*(4), 336–351. doi:10.1080/13600818.2022.2072448

Akbulut-Yuksel, M. (2014). Children of war: The long-run effects of large-scale physical destruction and warfare on children. *Journal of Human Resources*, *49*(3), 634–662. doi:10.1353/jhr.2014.0021

Akbulut-Yuksel, M. (2017). War during childhood: The long run effects of warfare on health. *Journal of Health Economics*, *53*, 117–130. doi:10.1016/j.jhealeco.2017.02.005

Akbulut-Yuksel, M., & Yuksel, M. (2017). Heterogeneity in the long term health effects of warfare. *Economics & Human Biology*, *27*, 126–136.

Akbulut-Yuksel, M., Tekin, E., & Turan, B. (2022). *World War II Blues: The long–lasting mental health effect of childhood trauma* (Working Paper No. 30284). Cambridge, MA: National Bureau of Economic Research.

Akresh, R., Bhalotra, S., Leone, M., & Osili, U. O. (2012a). War and stature: Growing up during the Nigerian civil war. *American Economic Review*, *102*(3), 273–277. doi:10.1257/aer.102.3.273

Akresh, R., Bhalotra, S., Leone, M., & Osili, U. (2023). First and second-generation impacts of the Biafran war. *Journal of Human Resources*, *58*(2), 488–531. doi:10.3368/jhr.58.4.0118-9272R1

Akresh, R., Lucchetti, L., & Thirumurthy, H. (2012b). Wars and child health: Evidence from the Eritrean–Ethiopian conflict. *Journal of Development Economics*, *99*(2), 330–340. doi:10.1016/j.jdeveco.2012.04.001

Allen, J., Balfour, R., Bell, R., & Marmot, M. (2014). Social determinants of mental health. *International Review of Psychiatry (Abingdon, England)*, *26*(4), 392–407. doi:10.3109/09540261.2014.928270

Almond, D. (2006). Is the 1918 influenza pandemic over? Long-term effects of in utero influenza exposure in the post-1940 U.S. population. *Journal of Political Economy*, *114*(4), 672–712. doi:10.1086/507154

Almond, D., Chay, K., & Lee, D. (2005). The costs of low birth weight. *Quarterly Journal of Economics*, *120*(3), 1031–1083. doi:10.1162/003355305774268228

Almond, D., & Currie, J. (2011). Killing me softly: The fetal origins hypothesis. *The Journal of Economic Perspectives: a Journal of the American Economic Association*, *25*(3), 153–172. doi:10.1257/jep.25.3.153

Almond, D., Currie, J., & Duque, V. (2018). Childhood circumstances and adult outcomes: Act II. *Journal of Economic Literature*, *56*(4), 1360–1446. doi:10.1257/jel.20171164

Almond, D., Edlund, L., Li, H., & Zhang, J. (2007). Long-term effects of the 1959-1961 China Famine: Mainland China and Hong Kong. NBER Working Paper No. 13384.

Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of short form of the CES-D. *Journal of Preventive Medicine*, *10*, 77–84.

Arpino, B., Conzo, P., & Salustri, F. (2022). I am a survivor, keep on surviving: Early-life exposure to conflict and subjective survival probabilities in adult life. *Journal of Population Economics*, *35*(2), 471–517. doi:10.1007/s00148-021-00859-w

Bamiduro, S. O. (1983). Press and politics in Nigeria's first republic 1960-1966. *Journal of the Historical Society of Nigeria*, *11*(3/4), 107–129.

Barker, D. J. (1990). The fetal and infant origins of adult disease. *BMJ (Clinical Research ed.)*, *301*(6761), 1111–1111. doi:10.1136/bmj.301.6761.1111

Barker, D. J. (1995). Fetal origins of coronary heart disease. *BMJ (Clinical Research ed.)*, *311*(6998), 171–174. doi:10.1136/bmj.311.6998.171

Bhalotra, S., Karlsson, M., & Nilsson, T. (2017). Infant health and longevity: Evidence from a historical intervention in Sweden. *Journal of the European Economic Association*, *15*(5), 1101–1157. doi:10.1093/jeea/jvw028
Bhalotra, S. R., & Venkataramani, A. (2013). Cognitive development and infectious disease: Gender differences in investments and outcomes. IZA Discussion Paper No. 7833.
Brown, R. (2018). The Mexican drug war and early-life health: The impact of violent crime on birth outcomes. *Demography*, *55*(1), 319–340. doi:10.1007/s13524-017-0639-2
Candelise, C., Saccone, D., & Vallino, E. (2021). An empirical assessment of the effects of electricity access on food security. *World Development*, *141*, 105390. doi:10.1016/j.worlddev.2021.105390
Chen, Y., & Zhou, L.-A. (2007). The long-term health and economic consequences of the 1959–1961 famine in China. *Journal of Health Economics*, *26*(4), 659–681. doi:10.1016/j.jhealeco.2006.12.006
Cunha, F., & Heckman, J. (2007). The technology of skill formation. *American Economic Review*, *97*(2), 31–47. doi:10.1257/aer.97.2.31
Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, *106*(1), 29–39. doi:10.1016/j.physbeh.2011.08.019
Dunn, P. M. (2007). Perinatal lessons from the past: Sir Norman Gregg, ChM, MC, of Sydney (1892–1966) and Rubella Embryopathy. *Archives of Disease in Childhood*, *92*(6), 513–514.
Federal Office of Statistics. (1999). Annual abstract of statistics various years.
Federal Office of Statistics. (2000). Social statistics in Nigeria various years.
Firth, J., Gangwisch, J. E., Borisini, A., Wootton, R. E., & Mayer, E. A. (2020). Food and mood: How do diet and nutrition affect mental wellbeing? *BMJ (Clinical Research ed.)*, *369*, m2382. doi:10.1136/bmj.m2382
Ghobarah, H. A., Huth, P., & Russett, B. (2003). Civil wars kill and maim people – Long after the shooting stops. *American Journal of Political Science*, *97*(2), 189–202.
Gleditsch, N. P., Wallensteen, P., Eriksson, M., Sollenberg, M., & Strand, H. (2002). Armed conflict 1946-2001: A new dataset. *Journal of Peace Research*, *39*(5), 615–637. doi:10.1177/0022343302039005007
Hoek, H. W., Brown, A. S., & Susser, E. (1998). The Dutch famine and Schizophrenia spectrum disorders. *Social Psychiatry and Psychiatric Epidemiology*, *33*(8), 373–379. doi:10.1007/s001270050068
Institute for Economics & Peace. (2018). The economic value of peace 2018: Measuring the global economic impact of violence and conflict, Sydney. Retrieved from http://visionofhumanity.org/.reports
Islam, A., Ouch, C., Smyth, R., & Wang, L. C. (2017). The intergenerational effect of Cambodia's genocide on children's education and health. *Population and Development Review*, *43*(2), 331–353. doi:10.1111/padr.12047
Jones, A. D. (2017). Food insecurity and mental health status: A global analysis of 149 countries. *American Journal of Preventive Medicine*, *53*(2), 264–273. doi:10.1016/j.amepre.2017.04.008
Kesternich, I., Siflinger, B., Smith, J. P., & Winter, J. K. (2014). The effects of World War II on economic and health outcomes across Europe. *The Review of Economics and Statistics*, *96*(1), 103–118. doi:10.1162/REST_a_00353
Kitagawa, E. M., & Hauser, P. M. (1973). *Differential mortality in the United States: A study in socio-economic epidemiology*. Cambridge, MA: Harvard University Press.
La Mattina, G., & Shemyakina, O. N. (2017). Domestic violence and childhood exposure to armed conflict: Attitudes and experiences. Households in Conflict Network.
Li, Y., & Sunder, N. (2021). What doesn't kill her, will make her depressed. *Economics and Human Biology*, *43*, 101064. doi:10.1016/j.ehb.2021.101064
Lindeboom, M., & Ewijk, R. (2015). Babies of the war: The effect of war exposure early in life on mortality throughout life. *Biodemography and Social Biology*, *61*(2), 167–186. doi:10.1080/19485565.2015.1047489
Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, *35*(Extra issue), 80–94. doi:10.2307/2626958
Mathers, C. D., Fat, D. M., & Boerma, J. (2008). *The global burden of disease: 2004 update*. Geneva: World Health Organisation.
Minoiu, C., & Shemyakina, O. N. (2014). Armed conflict, household victimization, and child health in Côte d'Ivoire. *Journal of Development Economics*, *108*, 237–255. doi:10.1016/j.jdeveco.2014.03.003
Okonjo-Iweala, N. (2012). *Reforming the unreformable: Lessons from Nigeria*. Cambridge, MA: The MIT Press, Massachusetts Institute of Technology.
Palmer, M., Nguyen, C. V., Mitra, S., Mont, D., & Groce, N. E. (2019). Long-lasting consequences of war on disability. *Journal of Peace Research*, *56*(6), 860–875. doi:10.1177/0022343319846545
Pasha, M., Rockmore, M., Tan, C. M., & Thamarapani, D. (2023). Early life exposure to above average rainfall and adult mental health. *Oxford Bulletin of Economics and Statistics*, *85*(4), 692–717. doi:10.1111/obes.12548
Ravelli, G. P., Stein, Z. A., & Susser, M. W. (1976). Obesity in young men after famine exposure in utero and early infancy. *The New England Journal of Medicine*, *295*(7), 349–353. doi:10.1056/NEJM197608122950701
Saing, C. H., & Kazianga, H. (2020). The long-term impacts of violent conflicts on human capital: US bombing and, education, earnings, health, fertility and marriage in Cambodia. *The Journal of Development Studies*, *56*(5), 874–889. doi:10.1080/00220388.2019.1618449
Shemyakina, O. (2011). The effect of armed conflict on accumulation of schooling: Results from Tajikistan. *Journal of Development Economics*, *95*(2), 186–200. doi:10.1016/j.jdeveco.2010.05.002
Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., … Wood, D. L., Committee on Psychosocial Aspects of Child & Family Health and Committee on Early Childhood, Adoption,

and Dependent Care. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232–e246. doi:10.1542/peds.2011-2663

Simpson, B. (2014). The Biafran secession and the limits of self-determination. *Journal of Genocide Research*, *16*(2-3), 337–354. doi:10.1080/14623528.2014.936708

Singhal, S. (2019). Early life shocks and mental health: The long-term effect of war in Vietnam. *Journal of Development Economics*, *141*, 102244. doi:10.1016/j.jdeveco.2018.06.002

Stein, Z., Susser, M., Saenger, G., & Marolla, F. (1975). Famine and human development: The Dutch Hunger Winter of 1944-1945. *Annals of Internal Medicine*, *83*(2), 290.

Ugalde, A., Patricia, L. R., & Anthony, Z. (1999). Health consequences of war and political violence. In L. Kurtz (Ed.), *Encyclopedia of violence, peace and conflict* (Vol. 2, pp. 103–121). San Diego, CA: Academic.

World Bank. (2011). *World development report 2011: Conflict, security and development*. Washington DC: World Bank.

World Humanitarian Data and Trends. (2017). *UN. Office for the coordination of humanitarian affairs*. Policy Development and Studies Branch. United Nations Digital Library.

Appendix

Table A1. Centre For epidemiologic studies depression scale (scoring)-10 questions

During the last 7 days, how many days […]		Mean	Std. dev.	Minimum	Maximum
1	Were you disturbed by things that don't normally bother you?	0.642	0.874	0	3
2	Did you have trouble concentrating on what you were doing?	0.631	0.861	0	3
3	Did you feel depressed?	0.732	0.870	0	3
4	Did you feel that everything you did was a burden?	0.552	0.828	0	3
5	Were you hopeful about the future?	0.937	1.166	0	3
6	Did you feel afraid?	0.528	0.818	0	3
7	Was your sleep restless?	0.807	0.881	0	3
8	Were you happy?	0.855	1.052	0	3
9	Did you feel lonely?	0.569	0.885	0	3
10	Did you feel like not getting up in the morning?	0.801	0.882	0	3

Notes: Respondents were asked to indicate how often they had these feelings in the last week on a four-scale metric – 'never (0 days in a week)', 'sometimes (1-2 days of the week)', 'often (3-4 days of the week)', and 'all the time (5-7 days of in a week)'. These responses are coded from 0 to 3 respectively. The response scale is reversed for the positive questions, so that they have the same signs as those negative questions.

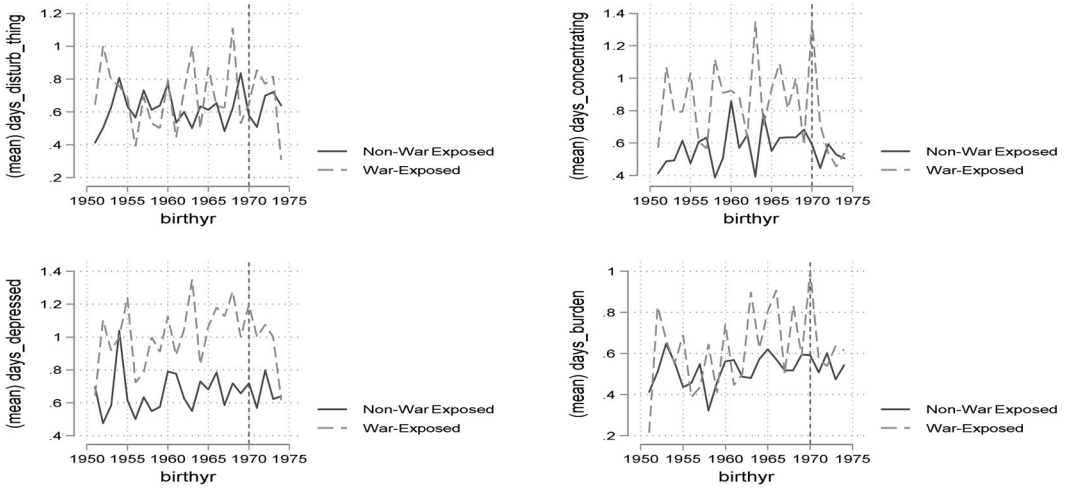

Figure A1. Graphs of selected disaggregated questions captured in the CES-D questionnaire.

Table A2. Exposure to civil war and severe stress

Variable	CES-D dummy
Born 1951-60 x War Exposure	0.027
	(0.047)
Born 1961-70 x War Exposure	0.022
	(0.071)
In utero x War Exposure	0.209**
	(0.104)
Birth Year FE	Yes
Region FE	Yes
Controls	Yes
Observations	2,521
R-squared	0.052

Notes: Estimation of Equation (1) by ordinary least squares. Robust standard errors clustered at the enumeration area in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. The control variables used are indicated in Table 4.

Table A3. Robustness check using CES-D components

	During the last 7 days, how many days [...]									
Variable	Disturbed	Afraid	Lack concentration	Feel depressed	Burdened	Restless sleep	Hopeful	Happy	Feel lonely	Feel like not getting up
Born 1951-60 x	0.021	−0.0.11	0.262*	0.221***	0.131*	0.261**	−0.257	−0.106	0.022	0.053
Exposed	(0.146)	(0.108)	(0.145)	(0.072)	(0.079)	(0.124)	(0.165)	(0.093)	(0.123)	(0.084)
Born 1961-70 x	0.020	−0.042	0.206	0.265*	0.163	0.253**	−0.424***	−0.258***	0.069	0.094
Exposed	(0.119)	(0.096)	(0.157)	(0.161)	(0.115)	(0.114)	(0.154)	(0.087)	(0.129)	(0.124)
In utero x	0.066	0.424**	0.654**	0.289*	0.388*	0.520***	−0.0247	−0.161	0.186	0.081
Exposed	(0.144)	(0.125)	(0.276)	(0.187)	(0.205)	(0.188)	(0.1725)	(0.133)	(0.212)	(0.125)
Birth Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521
R-squared	0.048	0.064	0.070	0.086	0.041	0.051	0.0844	0.078	0.0977	0.041

Notes: Estimation of Equation (1) by ordinary least squares. Robust standard errors clustered at the enumeration area in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
The control variables used are indicated in Table 4.

Table A4. Regional exposure to civil war and CES-D score

Variable	CES-D score
Born 1951-60 x War Region	0.224**
	(0.083)
Born 1961-70 x War Region	0.029
	(0.109)
In utero x War Region	0.294**
	(0.135)
Birth Year FE	Yes
Region FE	Yes
Controls	Yes
Observations	2,521
R-squared	0.080

Notes: Estimation of Equation (1) by ordinary least squares. Robust standard errors clustered at the enumeration area in parentheses. Abbreviations: CES-D, Center for Epidemiological Studies-Depression; FE, fixed effects. Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. The control variables used are indicated in Table 4.