

## The effect of armed conflict on Intimate Partner Violence (IPV): Evidence from the Boko Haram (BH) Insurgency in Nigeria

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**Abstract:** Intimate partner violence (IPV) is the most common form of violence against women in both conflict and non-conflict settings but in conflict settings it often receives less attention than other forms of gender-based violence (GBV), such as conflict-related sexual violence. Using data from the 2008 and 2013 Domestic Violence module of the Nigerian Demographic and Health Survey (NDHS) spatially linked to the Boko Haram (BH) actor file of the Armed Conflict Location and Events Database (ACLED), this paper employs a kernel-based difference-in-difference model to examine the effect of the BH insurgency on women's experience of physical and sexual IPV. It also examines the effect of the BH insurgency on women's experience of controlling behavior from a husband or partner, women's autonomy in household decision-making and their control over their own earnings. We find that BH insurgency is associated with slower progress towards effectively preventing and eliminating women's experiences of physical and sexual IPV. Controlling behaviors from husbands/partners and reductions in women's autonomy in household decision-making are heightened in locations that are impacted by the BH insurgency indicating that the BH insurgency adversely affects women's agency and exacerbates behaviors that are often pre-cursors to IPV.

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## 1. Introduction

Sexual violence is often used as a weapon of war, to control or exert power over a population. Gender-based violence (GBV) experienced in conflict affected areas varies across settings in terms of prevalence and perpetrator; women and girls bear the brunt of this violence (UN Women 2015). Rape in war and other forms of conflict-related GBV, including child sexual abuse, and sexual exploitation and their devastating consequences have been documented extensively (Vu et al. 2014; United Nations 2017; United Nations; World Bank 2018). High rates of intimate partner violence (IPV) have been recorded in several conflict settings (The Global Women's Institute and the International Rescue Committee 2016) but data are limited, and few studies are able to isolate the association between conflict and IPV risk from other IPV risk factors. This study adds to the literature that examines the association between exposure to conflict and IPV controlling for other risk factors using data gathered in Nigeria at the time of the Boko Haram (BH) insurgency. It adds to a small but growing evidence base that underscores the need for interventions that respond to IPV and seek to transform the norms that legitimize interpersonal violence in conflict-affected settings.

The focus of this paper on IPV is important. IPV is the most common form of GBV<sup>1</sup> in both conflict and non-conflict settings (GIWPS and PRIO 2017). It is defined by the World Health Organization (WHO) as actions by an intimate partner or ex-partner that result in physical, sexual or psychological harm, including physical aggression, sexual coercion, psychological abuse and controlling behaviors (WHO 2014). Conflicts have been found to increase all forms of GBV (Clark et al. 2010), however IPV is under-reported and often receives less attention compared to sexual violence perpetrated by armed forces (Khawaja 2004; Mchale et al 2011; Pittaway 2005; Stark and Ager 2011; Vu et al 2014). Violence against women and girls is a violation of basic human rights that has adverse impacts on human development at the level of the individuals, family and society. (Klugman et al 2014).

A body of evidence implies that, IPV will hinder recovery from conflict and is a barrier to increasing gender equality and moving people out of poverty. IPV causes physical and emotional traumas which are strongly correlated to poorer physical, sexual, reproductive and mental health outcomes throughout women's lives (Champion 1998; Golding 1999; Campbell 2002; WHO 2013; Falb et al. 2013; Falb et al. 2014; García-Moreno et al. 2014). It is associated with increased drug and alcohol use (Krug et al. 2002), loss of income (Crowne et al. 2011; Lindhorst et al. 2007; Reeves & O'Leary-Kelly 2007) and negatively impacts child development (Krug et al. 2002; Asling-Monemi et al. 2003; Holt et al. 2008; Silverman et al. 2009; Duvvury et al. 2012; Duvvury et al. 2013; Klugman et al. 2014; Raghavendra et al. 2017). IPV also feeds the intergenerational transmission of violence, as witnessing IPV as a child or experiencing violence may increase the likelihood of becoming an aggressor or a victim during adulthood (Roberts et al. 2010; Wilkins et al. 2014).

Between 2008 and 2013, rates of IPV in Nigeria decreased slightly from 18 to 16 percent. However, progress was uneven. Rates of IPV remained unchanged in urban areas, increased in the Southwest and Northeast region of the country, and decreased in other regions (see [Table 1](#)).

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<sup>1</sup> The United Nations (UN) Inter Agency Standing Committee (IASC) defines Gender Based Violence as “an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed differences (i.e. gender) between males and females” (IASC 2015). It includes physical, sexual or mental harm and encompasses Intimate Partner Violence (IPV) among others forms of violence.

Furthermore, progress in reducing IPV differs between Boko Haram affected areas and the rest of Nigeria. Controlling for differences in individual and household characteristics, we find that BH insurgency is associated with slower progress towards preventing and eliminating women's experiences of physical and sexual IPV. This finding implies that conflict may not always increase the prevalence of IPV but may set back progress in lowering IPV that could otherwise have been achieved.

Our findings contribute to two literatures. First, we extend the literature that quantifies the association between conflict and rates of IPV using nationally representative data. In addition, we analyze the association between conflict and indicators of behavior change that are associated with IPV risk; controlling behavior of male partners and women's ability to influence in household decision-making. We find controlling behaviors of husbands/partners and reductions in women's autonomy in household decision-making are heightened in locations that are impacted by the BH insurgency, indicating that the BH insurgency adversely affects women's agency and exacerbates behaviors that are often pre-cursors to IPV. Second, in analyzing IPV we expand the research literature examining the effect of conflict on human development in Nigeria. UNDP (2018) point to the destruction of social and economic infrastructure in the conflict affected areas. Measures of well-being – including food security, gender equality, access to health, education, clean water and sanitation - captured in the various reports and community surveys conducted in the region have all worsened. Research to date has focused on health outcomes and access to maternal health services. Ekhatior-Mobayode and Asfaw (2019) and Howell et al. (2018) find the BH insurgency reduced anthropometric measurements of children under five. And, Chukwuma and Ekhatior-Mobayode (2019) find that the BH insurgency decreased the probability of any antenatal care visits and decreased the probability of delivery at a health center by a skilled health professional.

We use a careful empirical strategy employing a quasi-experimental methodology to explore these conflict-related impacts. To estimate the effect of the BH insurgency on IPV we spatially link geo-referenced data on conflict events from the Armed Conflict Location and Event Database (ACLED) with survey data from two rounds of the Domestic Violence (DV) module of the Nigerian Demographic and Health Survey (NDHS) collected in the period before and during the BH insurgency, and apply a difference in difference approach.

The remainder of the paper is structured as follows. Section 2 provides some background on the IPV prevalence in Nigeria and the Boko Haram insurgency. Section 3 discusses the conceptual framework. Section 4 presents the data and empirical model specification. Results are presented in section 5 and section 6 concludes.

## 2. Background: IPV prevalence in Nigeria and the Boko Haram insurgency

The most recent estimate of IPV in Nigeria based on data from the 2013 NDHS suggests that 16 percent of women have ever experienced physical or sexual IPV (NPC 2014), a rate considerably lower than lifetime prevalence of IPV among ever-partnered women for Africa -37% (World Health Organization, 2013). However, IPV rates vary considerably across regions, reaching 28 percent in the South-South region ([Table 1](#)). Analysis of the NDHS data finds that there are significant ethnic and geographical differences in the likelihood of experiencing IPV (Lino et al. 2013; Nwabunike and Tenkorang 2015) and qualitative and smaller scale quantitative studies find

that attitudes to and experiences of IPV differ between religious and cultural groups<sup>2</sup> (Odimegwu and Okemgbo 2003; Antai and Antai 2008;). IPV is still widely condoned in Nigeria with 35 percent of women and 25 percent of men believing a husband is justified in beating his wife for any of the five reasons asked about in the survey<sup>3</sup> (NPC 2014).

Table 1: Women who have ever experienced physical or sexual violence by a husband or partner in Nigeria, by location and region, percent.

	<b>National</b>	<b>Urban</b>	<b>Rural</b>	<b>North-Central</b>	<b>North-East</b>	<b>North-West</b>	<b>South-East</b>	<b>South-South</b>	<b>South-West</b>
<b>2008</b>	18	18	19	26	17	7	24	39	14
<b>2013</b>	16	18	15	21	21	6	20	28	20

Source: 2008 and 2013 Nigerian Demographic and Health Survey reports

Between 2008 and 2013, a time period that corresponds to the onset of the BH insurgency, the national rate of IPV fell from 18 to 16 percent. However, this progress was uneven and in two regions, North East and South West, IPV prevalence rates increased. The BH insurgency was focused in north east Nigeria and so rise in IPV could be associated with conflict but equally could be driven by other factors that create variation in IPV prevalence rates in different locations in Nigeria. Our paper examines whether the conclusion that conflict has led to increased IPV can be supported by further analysis of the DHS data and we set out below some background to the conflict and identify the locations where communities were most impacted.

Boko Haram (BH) carried out its first known terrorist activity in the Northeastern state of Borno, Nigeria in 2009.<sup>4</sup> BH's activities were initially focused mostly in Northeastern Nigeria but from 2014 onwards its terrorist activities spread to the neighboring countries of Cameroon, Chad and Niger (UNHCR 2018). Between 2009 and 2017, the Armed Conflict Location and Events Database (ACLED) reports 2,378 conflict events<sup>5</sup> across Nigeria with BH as an actor. During this period, the Northeastern states of Borno, Yobe and Adamawa experienced the highest number of conflict events associated with the BH insurgency with 1678, 219 and 179 events respectively. The insurgency is responsible for large scale forced migration and an unprecedented regional and

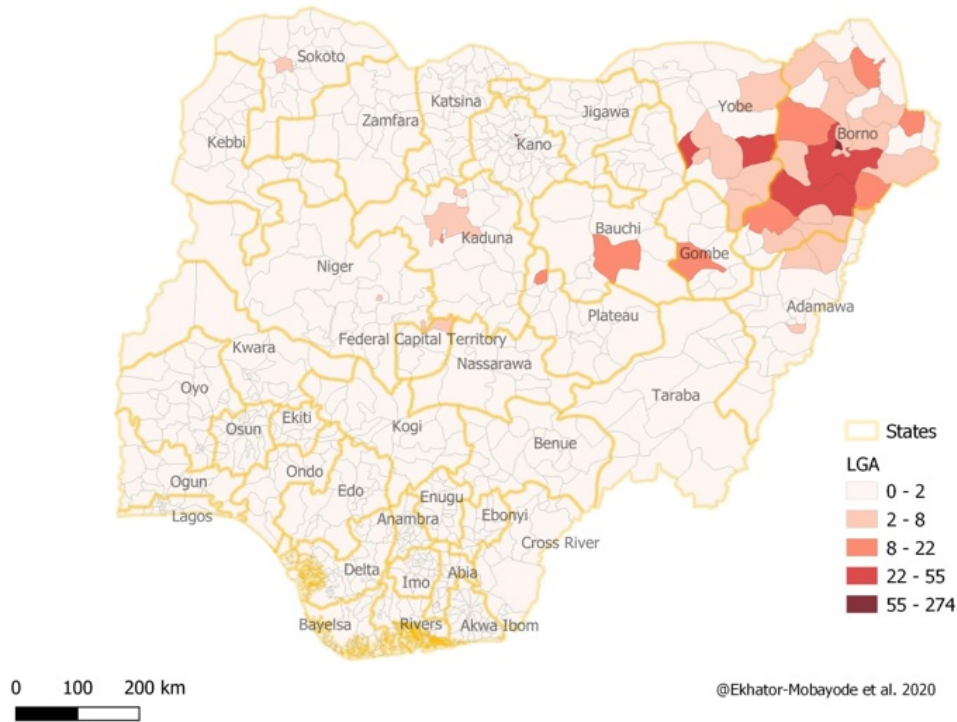
<sup>2</sup>Ethnicity is often used as a proxy for culture because it entails social norms that determines behaviors as well as the gender roles and power dynamics within the household and community as well as women's contribution to household decision-making (see Oyediran and Isiugo-Abanihe 2005).

<sup>3</sup> Reasons include: arguing with him, refusing sex, burning the food, neglecting the children, or going out without telling him.

<sup>4</sup> Armed Conflict Location & Event Data Project (ACLED). <https://www.acleddata.com/>, accessed March 10, 2018  
<sup>5</sup> BH events in the ACLED are defined as any incidents including riots, clashes, protests, riots or battles where BH is an actor.

humanitarian crisis (Read 2017).<sup>6</sup> In January 2017 an estimated 1.8 million people, mostly women and girls, in Northeastern Nigeria, needed protection from GBV (UNOCHA 2017).

Figure 1: Boko Haram events by Local Government Areas (LGAs) in Nigeria, 2009 – 2013



Source: Authors own calculation using data from ACLED BH actor file and Nigeria LGA shape files from the Database of Global Administrative Areas – GADM.

ACLED records of the location of conflict events with BH actors for 2009–2013, the time period that coincides with the DHS data collection on IPV prevalence rates, are shown in [Figures 1](#) and [2](#).<sup>7</sup> During this period, there were a total of 799 BH events (see [Table A1](#) for number of BH events in each Local Government Area (LGA)).<sup>8</sup> By far the most affected area was Maiduguri LGA in the Northeastern state of Borno with 274 BH events. Other highly impacted areas were Nasarawa LGA in the Northwestern state of Kano with 55 attacks, Konduga LGA and Damaturu LGA in the Northeastern state of Borno with 48 and 40 BH events, respectively, and Nangere LGA in the

<sup>6</sup> As of October 31, 2018, the UNHCR reports 231,474 Nigerian refugees in the region. Of these, 51% were in Niger while 44% and 5% of refugees were in Cameroon and Chad respectively. Most of the Nigerian refugees in Cameroon (98%) were in the far North and displaced by the BH insurgency (UNHCR 2018). It was also reported that 2,421,372 Internally displaced persons (IDPs) were in the region. Of these 80% were in Nigeria while 9% and 7% were in Cameroon and Chad respectively and 4% in Niger. All the IDPs in Chad and Niger and 94% of those in Nigeria were displaced by the BH insurgency. [https://data2.unhcr.org/en/situations/nigeriasituation#\\_ga=2.136643888.1888885269.1543034189-138741330.1543034189](https://data2.unhcr.org/en/situations/nigeriasituation#_ga=2.136643888.1888885269.1543034189-138741330.1543034189), accessed October 31, 2018.

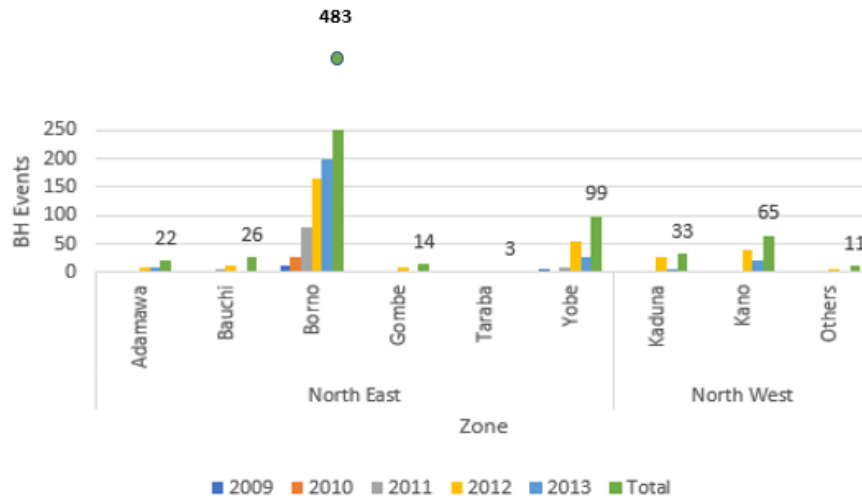
<sup>7</sup> In Nigeria, LGA's are the administrative subdivision of a state. There are 774 LGA's across 36 states and the Federal Capital Territory (FCT).

<sup>8</sup> Based on data downloaded from [www.acleddata.com](http://www.acleddata.com) on 30<sup>th</sup> August 2018.

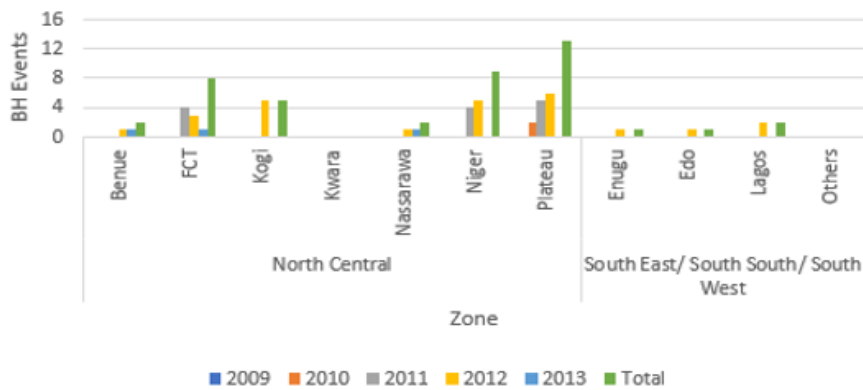
Northeastern state of Yobe with 33 BH events. These five LGAs accounted for about 60% (479) of the total BH events for the period.

Figure 2: BH events by state and year in Nigeria, 2009 – 2013

Panel A



Panel B



Source: Authors own calculation using data from ACLED BH actor file.

Conflict-induced displacement and violence associated with the BH insurgency have been widely reported to have exacerbated violence against women (UNOCHA 2017; Read 2017). The BH insurgency has been consistently associated with territorial control, forced recruitment, hostage taking and violence against women and girls as well as men and boys (Nagarajan 2017). BH is notorious for employing various tactics for terrorizing communities.<sup>9</sup> In February 2014, 59 boys were killed at a Federal Government College in Buni Yadi, Yobe State by BH and girls were ordered to leave school and get married (Hemba 2014). A few months later, in April 2014, over 200 school girls were abducted in Chibok, Borno state with BH insisting that the education of the girl child is taboo (National Consortium for the Study of Terrorism and Responses to Terrorism 2014). In February 2018, BH was also responsible for the abduction of 110 school girls in Dapchi, Yobe State.<sup>10</sup> Since 2013, at least 1,000 children have been abducted by BH.<sup>11</sup> Men and boys have been indiscriminately targeted and have fled their families because of the risk of being recruited by BH or killed by law enforcement (Dietrich 2015).

Increases in IPV associated with the BH insurgency have become a matter of deep concern (IRC 2017a; IRC 2017b; UNOCHA 2018). Women in communities affected by the BH insurgency report increased arguments and violence within the home, and sometimes ultimately abandonment by their partners (Nagarajan 2017). They often attribute abandonment to the inability of a male partner to provide for his family and his frustration with being unable to do so (World Bank 2018). For men, living in conflict affected situations can create barriers to meeting traditional social norms surrounding masculinity, for example to be in control of property, land, income, their lives and the lives of their families in general and lead to increased stress and depression (IRC 2012; Narayan 2000; Slegh et al. 2014; Women's Commission for Refugee Women and Children 2005) which are risk factors for the perpetration of IPV (Clark et al. 2010; Hanmer and Klugman 2016).

The BH insurgency is also associated with changing marriage practices and incentivizing early marriage, the latter a risk factor for experiencing IPV. Women and girls have been coerced or persuaded into associating with BH with promises of religious knowledge, a higher social position than that accorded to them by preexisting patriarchal gender norms and/or reducing financial burdens through marriage to BH members (Nagarajan 2017). In some communities BH has eased the cost of marriage ceremonies by sponsoring them and ordered the payment of bride price to the bride instead of her family thereby incentivizing brides to marry early. Reports document that families in BH affected areas arrange early marriages for their daughters both to reduce pressure on household resources (Campagne and Begum 2017) and in exchange for protection (International Crisis Group 2016).

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9 Report of the Secretary-General on the situation in Central Africa and the activities of the United Nations Regional Office for Central Africa, UN Doc. No. S/2016/996, 28 Nov 2016, para. 28; Amnesty International estimates that more than 2,000 women and girls were abducted by Boko Haram between 2009 and 2015, many of whom were forced into marriage with Boko Haram fighters. Amnesty International, Nigeria: 'Our Job Is to Shoot, Slaughter and Kill': Boko Haram's Reign of Terror in North East Nigeria, 14 April 2015, p. 59.

<sup>10</sup> Aljazeera, News (25 February 2018). "110 Nigerian schoolgirls still missing after attack: Minister" Aljazeera Media network. Retrieved 1 September 2018.

<sup>11</sup> <https://www.unicef.org/press-releases/more-than-1000-children-northeastern-nigeria-abducted-boko-haram-since-2013>, accessed January 7, 2019

### 3. The impact of armed conflict on IPV: conceptual framework and evidence

How does armed conflict translate into increased risk of violence perpetrated by an intimate partner? The ecological framework (Heise 1998) has been widely adopted to understand the origins of gender-based violence. This section applies the framework to the evidence on the impacts of BH insurgency on individuals and communities to identify potential causal pathways.

The ecological framework conceptualizes violence as a multi-dimensional phenomenon, based on the complex interplay between factors related to violence against women at different levels of the social ecology. The social ecology consists of personal history, the microsystem, the exosystem and the macrosystem. Personal history refers to individual experiences that determine one's response to microsystem and exosystem stressors. The microsystem explains the subjective meanings assigned to interactions in which a person directly engages with another. While the exosystem refers to both formal and informal social structures that affect one's environment and influences what happens there.

Conflict triggers changes in the social ecology at the individual level (microsystem) and in formal and informal social structures (exosystem). At the individual level, evidence suggests that men and women respond differently to the high levels of psychological stress experienced due to conflict. For example, a study on conflict-affected areas of the Democratic Republic of Congo (DRC) found that men tend to cope with extreme stress and trauma using strategies that seek to avoid and reduce feelings of vulnerability, including alcohol and substance abuse, behaviors commonly associated with increased perpetration of IPV, while women more frequently seek some form of help or turn to religion (Slegh et al. 2014).

In the case of Boko Haram, conflict can also affect individual relationships through their influence on marriage practices. Increased rates of child and early marriage to Boko Haram insurgents result in some women and girls having little choice about marrying a potentially violent partner and often have no option but to remain in the marriage (IRC 2012; Wirtz et al. 2014). Conflict can also alter individual behaviors. Personal violence outside the home may spill over into relationships with intimate partners, as disputes and disagreement often escalate into violence and abuse—potential triggers for increased rates of IPV (Kiss et al. 2015). The breakdown of law and order, or social support and safety systems such as the extended family or village groups (exosystem factors) may also reduce protective factors that, at the individual level, allow intervention and prevention of IPV (Clark et al. 2010; Horn 2010).

The different consequences of stress related to unemployment and income loss for men and women is another potential driver of increased rates of male perpetration of IPV. Frequently conflict creates barriers to employment and so men may find it difficult to fulfill the traditional role of male breadwinner and protect the family. As a corollary, women's labor market participation often increases in conflict settings and the income they generate become more important for family welfare (Buvinic et al. 2013; Justino 2018). In some conflict settings, men face higher barriers to employment than women, as evidenced by research on the Palestinian Israeli conflict which suggests that the localization of economic activities resulting from conflict is more likely to adversely impact the labor market opportunities for men than women (Institute for Women's Studies 2008). These changes in the gender division of labor can threaten masculinity and are often associated with increased use of violence by men. For example, a study of DRC found that for men, work and income are central to their identities, and the loss of either seems to have serious



consequences in terms of mental health with both men and women reporting lack of work and income as a trigger for men's use of violence (Slegh et al. 2014).

Several studies in the IPV literature have examined the prevalence and key drivers of IPV using the ecological framework (see Heise 1998; Walker 2006; Capaldi et al. 2012; Breiding Chen, & Black 2014; Widom and Wilson 2015). The literature also encompasses analysis of the relationship between harmful social norms that condone IPV and women's experience of IPV (see Linos et al. 2013; Haj-Yahia and Clark 2013; Antai 2011; Tenkorang 2018). Experience of controlling behavior and loss of autonomy have been categorized as forms of violence themselves but also, they may be precursors to or key drivers of more severe forms of IPV (Aizpurua et al. 2017). For example, Antai (2011) examines controlling behavior, power relations within intimate relationships and IPV against women in Nigeria and finds that controlling behavior by husband/partner is associated with a higher likelihood of experiencing physical violence. Also, women who justified wife beating and earned more than their husband/partner were more likely to experience physical and sexual violence, while women who had decision-making autonomy had a lower likelihood of experiencing physical and sexual violence. Tenkorang (2018) examines women's autonomy on three decisions- economic decision-making<sup>12</sup>, family planning decision-making<sup>13</sup> and sexual autonomy<sup>14</sup>- and women's experiences of four types of IPV- physical, sexual, emotional and economic - in Ghana. He finds that at the individual level, family planning decision-making was negatively associated with all four types of violence while economic decision-making autonomy was positively associated with emotional and economic violence. Also, living in a community where women had higher levels of sexual autonomy was associated with a lower likelihood of physical and economic violence. Finally, in a systematic review of 23 studies, McCarthy et al. (2018) examine the association of 64 measures of harmful social norms and behaviors categorizing them into three main thematic areas—views on gender roles/norms, acceptance of violence against women, and gender-related inequities in relationship power and control—and their association with male perpetration of IPV. Overall, these measures were positively associated with IPV perpetration in 45 percent of the cases. Measures inclusive of acceptance of violence against women or beliefs about men's sexual entitlement, followed by those that measured respondents' views on gender roles/norms, were most consistently associated with IPV perpetration.

Few studies have examined the effect of conflict on IPV or key drivers of IPV in fragile and conflict settings. The research conducted to date finds a positive correlation between conflict and increased rates of IPV. Kelly et al (2018) find that residing in a conflict fatality-affected district in

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<sup>12</sup> Economic decision-making is measured as a “weighted summative index derived from women's responses to four questions as follows: Who usually decides how the money you earn will be used? Who usually decides how your husband's/partner's earnings will be used? Who usually makes decisions about health care for you? Who usually makes decisions about major household purchases?” (Tenkorang 2018).

<sup>13</sup> Family planning decision-making is measured as a “weighted summative index derived from women's responses to three questions: Who usually makes decisions about how many children to have? Who usually makes decisions about when to have sexual intercourse? Who usually decides whether or not to use contraceptives/ condoms?” (Tenkorang 2018).

<sup>14</sup> Sexual autonomy is measured as “a weighted summative index derived from 11 questions asking if, a married woman, can refuse to have sex with her husband/partner if she doesn't want sex; he is drunk; she is sick; he mistreats her; she is menstruating; he does not want to use a condom/contraceptive; she finds out that he has other girlfriends/partners; he refuses to give her housekeeping money; he humiliates her; he refuses to pay the children's school fees; or he has an STI, such as HIV” (Tenkorang 2018).

Liberia was associated with a 50 percent increase in the risk of IPV compared to residing in a district where there were no conflict-related fatalities. Women living in a district that experienced 4-5 cumulative years of conflict were also more likely to experience IPV. Gallegos and Guitierrez (2016) examine the effect of women's exposure to the internal conflict in Peru in childhood and teenage years on the likelihood that they will perpetrate or experience domestic violence. Findings suggest that female exposure to the internal conflict in Peru increases their risk of being both a perpetrator and a victim of IPV. The study also finds that women exposed to more conflict events are more likely to justify violence against women and stay in a violent relationship. Østby (2016) using subnational data on armed conflict events with individual-level data on partner abuse from DHS surveys in 17 Sub-Saharan African countries finds that the intensity of armed conflict intensity in the home region has an independent and significant effect on women's risk of experiencing sexual IPV. Falb et al. (2013) examine the effect of conflict on past-year IPV among refugee women affected by the conflict in Burma (Myanmar). They find that women who experienced conflict victimization<sup>15</sup> were 6 times more likely to report past-year IPV than women who had not experienced conflict victimization.

Turning to drivers of IPV in conflict affected and fragile settings, results from a number of studies are consistent with the hypothesis that the impact of conflict outside the home spills over to affect individuals within the household. Bruck and Stojetz (2019) examine exposure to wartime sexual violence by armed groups and find exposure to sexual violence by armed groups against women makes male veterans about 30 percentage points more likely to commit physical – but not sexual – IPV 18 years later (on average). Saile et al. (2013) examine the prevalence and predictors of current partner violence experienced by women in post-conflict Uganda. The authors suggest that women's prior exposure to war-related traumatic events as well as men's level of alcohol-related problems were associated with higher levels of partner violence against women. And Gupta et al.'s (2012) study of South Africa during apartheid of men who were liberation supporters and men who were government supporters found an association between experiencing major human rights violation (HRV) and victimization of close friends or family members and with perpetration of physical IPV. For liberation supporters, experiences of custody related HRV were also linked with IPV perpetration. Clark et al. (2010) examine the effect of political violence on female experiences and male perpetuation of IPV in Palestine and find that political violence is significantly related to higher risk of IPV. Specifically, the direct exposure of a husband to political violence was associated with 89 percent higher odds of reporting physical violence, and 123 percent higher odds of reporting sexual violence compared with women whose husbands were not directly exposed to political violence. Similarly, Gupta et al. (2009) find that exposure to political violence in their country of origin increased the likelihood of male immigrants to the USA perpetrating IPV.

Qualitative studies have shed more light on the interactions between factors at different levels of the ecological framework, pointing to causal pathways and showing a more nuanced dynamic. For example, using focus groups, Horn et al. (2014) explore women's perceptions of the causes of IPV in conflict settings in Sierra Leone and Liberia. The findings suggest that wars increased the use of violence by some men, which was driven by the normalization of violence as a way of responding to frustrations and challenges. However, the war also resulted in women becoming

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<sup>15</sup> Falb 2013 describes conflict victimization as “targeted violence against civilian women, including sexual violence which is seen as a “tactic of war” and associated with a range of negative outcomes, including poor mental health stigma, isolation, and shame; and increased vulnerability to HIV and other sexually transmitted infections”.

economically active, which in this case decreased IPV, as the pressure on men to provide for their families reduced. Also, economic independence and interventions provided women with the option of leaving a violent relationship. Thus, IPV risk is linked to both formal and informal social structures that create gender inequality, including financial dependence on men, traditional gender norms surrounding masculinity as well as the broader changes in social norms and behaviors related to interpersonal violence that occur during conflict.

#### 4. Data and model specification

##### 4.1 Data and sample construction

Data are drawn from the 2008 and 2013 Nigerian Demographic and Health Survey (NDHS) which include Domestic Violence (DV) modules that sample 23,752 and 27,634 women respectively.<sup>16</sup> The NDHS includes information on the location of the interview and its GPS coordinates. Observations from the 2008 NDHS provide data for the period before the BH insurgency while observations from the 2013 NDHS provide data for the period during the BH insurgency. Exposure to BH conflict is measured using Armed Conflict Location and Event Database (ACLED) which records events whether they generate fatalities or not. The data on events are reported by date, location, agent and type.

Our sample is made up of data drawn from 664 Local Government Area (LGAs) across all 36 States, including the Federal Capital Territory (FCT). Observations from the 2008 and 2013 NDHS are linked to the BH events recorded in ACLED using the GPS co-ordinates provided in both datasets. To match the timing of the NDHS surveys we use geocoded BH events that occurred between 2009 and 2013.<sup>17</sup> During this period 799 BH events in Nigeria were recorded in ACLED. Because of the intensity of the BH insurgency, interviewers during the field work of the 2013 NDHS could not reach some conflict-affected areas (NPC 2014). As we exploit variations in the timing and location of BH events, observations from the 2008 NDHS from LGAs not surveyed in the 2013 NDHS - Maidugiri in Borno State and Damaturu and Nangere in Yobe State - are excluded from our analysis.

##### 4.2 Outcome variables

Both the 2008 and 2013 NDHS DV modules follow international global standards for the measurement of intimate partner violence. Ever partnered women were asked questions about experiences of violence using a modified version of the Conflict Tactics Scale (Straus 1990), a commonly used instrument in both the DHS and stand-alone violence against women and girls surveys.<sup>18</sup> To measure experience of physical or sexual IPV, women are asked if they ever

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<sup>16</sup> The NDHS is a nationally representative cross-sectional household survey that provides data on population, health, and nutrition for women aged 15-49.

<sup>17</sup> Because the ACLED often reviews specific periods of conflict to ensure accuracy, there may be changes to the data in selected countries or targeted conflicts throughout the year. The ACLED data used for the analysis in this study was downloaded from [www.acleddata.com](http://www.acleddata.com) on 30<sup>th</sup> August 2018.

<sup>18</sup> Sociologist Straus 1990 developed the original Conflict Tactics Scale (CTS) which consists of a series of individual acts of physical and sexual violence (Straus, 1979, 1990). The modified list used by the NDHS includes only fewer acts of physical and sexual violence (see appendix section A2). If a woman confirms that any one of the specified acts or outcomes has taken place, she is considered to have experienced physical or sexual violence. By asking separately

experienced certain behaviors from their husband/partner including pushing, slapping, arm twisting, punching, kicking, choking, attacking with weapon, forceful sexual intercourse, forceful performance of other sexual acts. When an ever-partnered woman reports experiencing physical or sexual IPV, they are asked when the first episode occurred in years after marriage or having a partner. They are also asked if there were any episodes in the 12 months preceding the survey.<sup>19</sup> Because we exploit the timing and location of IPV in the BH affected area, our analysis focuses on women's experiences of physical or sexual IPV in the year preceding the survey – commonly taken to mean that women are currently experiencing violence (Abramsky et al. 2011). Using this information, we create a dichotomous variable measuring past year physical or sexual IPV, which equals to 1 if a woman answers yes to experiencing any behaviors about physical or sexual IPV from her husband/partner in the past 12 months and 0 otherwise.

We use information on men's controlling behavior and women's autonomy in decision-making to examine key drivers of IPV. Both the 2008 and 2013 NDHS contain some information on women's autonomy in household decision-making and individual behaviors that are related to gender norms that can be used to examine BH's impact on these behaviors. We explore whether women's experiences of controlling behavior from her husband/partner, women's household decision-making autonomy and women's decision-making autonomy over her own earnings are affected by the BH insurgency. To determine if a woman experiences controlling behavior from her husband/partner, the NDHS asks if a husband/partner gets jealous when she talks to other men, accuses her of unfaithfulness, does not permit her to meet female friends, limits her contact with family or insists on knowing where she is at all times. Using this information, we create the variable for controlling behavior, which equals to 1 if a woman answers yes to any of these questions and 0 otherwise. Women's household decision-making autonomy is measured by a woman's involvement in three types of household decisions: her ability to decide to access health care services for herself; her ability to make decisions about major household purchases; and, her ability to decide when to visit her family or relatives. A woman has household decision-making autonomy if she makes decisions alone or jointly with her husband/partner. The variable capturing women's household decision-making autonomy is an index that ranges from 0 to 3, corresponding to the number of household decisions in which a woman is solely or jointly involved with her husband/partner. A higher score indicates a higher level of empowerment (NPC 2014). To determine earnings decision-making autonomy women who earned cash for work in the 12 months preceding the survey, are asked who usually decides how their earnings are spent. The variable capturing women's earnings decision-making autonomy is equal to 1 if a woman makes decisions alone or jointly with her husband/partner and 0 otherwise.

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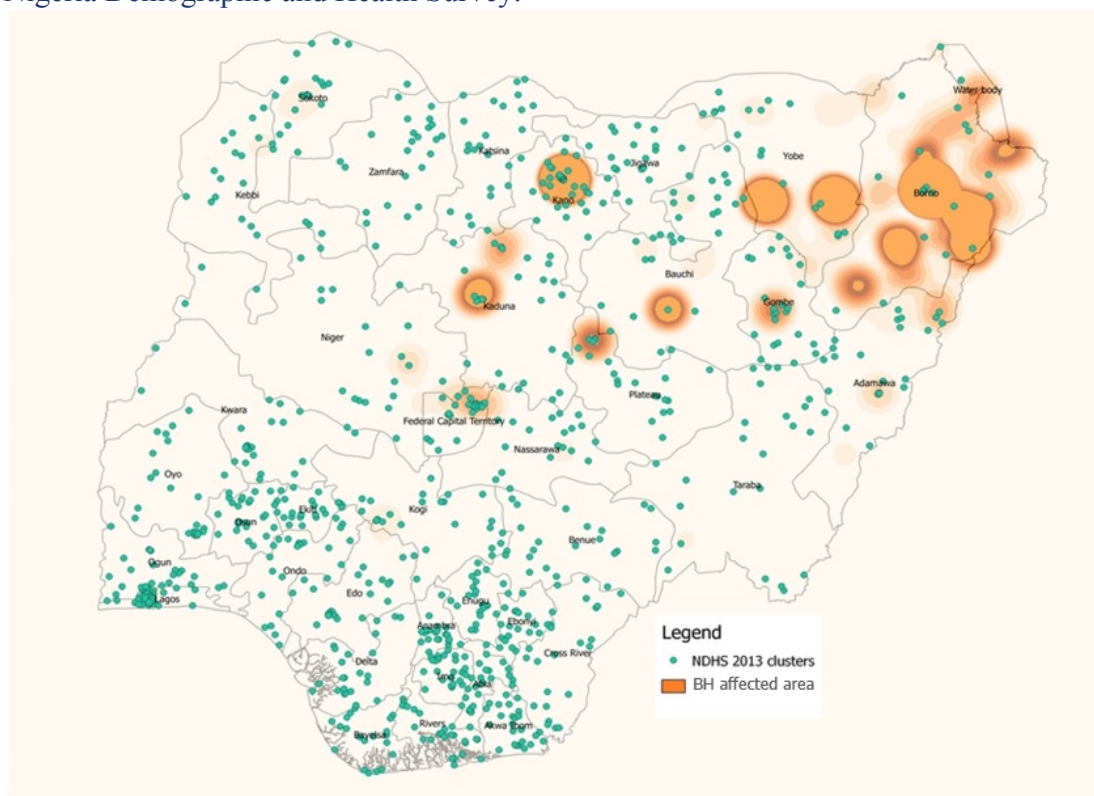
about specific acts of violence, the NDHS measure of physical or sexual violence using the modified CTS approach is not affected by different perceptions of what constitutes violence by women (Sunita and Johnson, 2004). Sunita and Johnson 2004 states that *"for example, a woman has to specify if she was ever "slapped," not whether she has ever experienced violence. All women would probably agree what constitutes a slap, but what constitutes a violent act or what is understood as violence may vary among women and across cultures."*

<sup>19</sup> Although the 2013 NDHS reports the woman's location of residence at the time of the survey information about any previous location and reasons for relocation is not collected which means that information about migration due to the BH insurgency is not available from the survey.

### 4.3 Exposure to the BH insurgency

Exposure to conflicts such as the BH insurgency is defined in different ways in the literature. It can be defined as residence in administrative areas with conflict events (see for example Akresh et al., 2012; Ekhtor-Mobayode and Asfaw, 2018) or as residence within specified buffer zones (predefined radius) around conflict events. For example, in mapping the number of children affected by conflict in affected countries, Bahgat et al. (2018) use a buffer zone of 50 km to determine the number of children living in conflict zones arguing that it is a reasonable distance within which conflict events could be expected to impact people's lives. However, Chukwuma and Ekhtor-Mobayode's (2019) analysis of the impact of the BH insurgency on access to maternal health services in Nigeria uses much smaller buffer zones--between 3 km and 10 km radius--on the basis that 10 km is a reasonable maximum catchment area for access to health centers. Howell et al.'s (2018) examination of the impact of civil conflict on child nutrition and mortality in Nigeria uses buffer zones of between 2 km and 10 km. We define exposure to the BH insurgency as residence within a 10 km radius of any BH event during the study period (Figure 3). We chose a smaller exposure zone, rather than a Local Government Area or a larger zone as recent research in BH affected states found that the experiences of women and girls were greatly dependent on BH activities in their localities (Nagarajan 2017). Applying the 10 km buffer zone definition of exposure, we find that 11 percent of the women in our study sample lived within 10 km of any BH event both before and during the BH insurgency. These are the women that make up the treatment group in our study.

Figure 3: BH attacks between 2009-2013 occurring within 10km of communities surveyed by the Nigeria Demographic and Health Survey.



#### 4.4 Control Variables

A body of research shows that factors affecting the risk of experiencing IPV such as education, socioeconomic status, formal marriage, alcohol abuse, cohabitation, age, attitudes and experiences of IPV appear to be common across several country settings (Abramsky et al. 2011; Heise 2011; Klugman et al. 2014, Hanmer and Klugman 2016). However, some risk factors may be culturally specific or specific to particular social groups within countries; thus, we include religion and ethnicity as Nigeria specific control variables as discussed in Section 2. We classify covariates as follows: individual characteristics, partner characteristics, household characteristics as well as attitudes and experiences of IPV and Nigeria specific factors. (Table 2).<sup>20</sup>

Table 2: Variables used in the analysis

<b>A. IPV</b>	
1. Past year physical or sexual IPV	Woman experienced physical or sexual IPV in the 12 months preceding the NDHS.
<b>B. Drivers of IPV</b>	
1. Controlling behavior by husband/partner	Woman's husband/partner exhibits any control issue. **
2. Women's household decision-making autonomy index	Number of household decisions made alone or jointly with husband/partner
3. Women's earnings decision-making autonomy	Woman decides how her earnings are spent alone or jointly with husband/partner.
<b>C. Covariates</b>	
<b>Individual characteristics</b>	Age in years*; Education*; Employment status*; Type of earnings; Total number of children born; Married as a child
<b>Partner characteristics</b>	Age in years*; Education*; Employment status*; Sometimes or often Drunk
<b>Household characteristics</b>	Polygamous household; Household size*; Location (rural/urban*); Wealth*
<b>Attitudes and experiences of IPV</b>	Father beat mother; Condone wife beating
<b>Nigeria specific factors</b>	Culture proxied by ethnicity, religion and state dummies capturing differences in socio-economic conditions between states

Note: \* denotes variables used in the matching stage. \*\* defined as answering yes to whether a husband/partner gets jealous when she talks to other men, accuses her of unfaithfulness, does not permit her to meet female friends, limits her contact with family or insists on knowing where she is at all times.

<sup>20</sup> We do not include exosystem factors such as controlling behavior by husband/partner and indicators of women's empowerment / agency as covariates because these factors are jointly determined with IPV and thus endogenous.

#### 4.5 Model Specification

We test the hypothesis that, in the absence of the BH insurgency, changes in the rates of IPV before and during the BH insurgency would have been the same in the BH affected areas and in areas unaffected by BH (hereafter non-BH areas). To estimate the effect of the BH insurgency on women's experience of IPV, we specify the following difference-in-difference (DD) model.

$$IPV_{ily} = \beta_0 + \beta_1 PostBH_y + \beta_2 BHArea_l + \beta_3 PostBH_y * BHArea_l + \beta_4 X_{ily} + \varepsilon_{ily} \quad (1)$$

The DD model exploits the variation in timing and location of the BH insurgency. This allows for the avoidance of biases from comparisons of IPV rates before and after 2009 that could be the results of factors other than BH attacks. The unit of observation for equation (1) is a woman.  $IPV_{ily}$  is the outcome variable indicating if a woman  $i$ , interviewed in an area  $l$ , and NDHS year  $y$ , experienced IPV.  $PostBH_y$  is a binary variable indicating the NDHS year the woman was interviewed. It is 1 for observations from the 2013 NDHS during the BH insurgency and 0 otherwise.  $BHArea_l$  indicates whether the woman resides in a BH affected area. It is a binary variable equal to 1 if the woman resides within a 10 km radius of any BH event between 2009 and 2013 and 0 otherwise. The covariates listed in [Table 2](#) are represented by  $X_{ily}$ . Finally,  $\varepsilon_{ims}$  is the stochastic error term.

The parameter of interest is  $\beta_3$ , which measures the average treatment on the treated. That is, the effect of the BH insurgency on women's experiences of IPV, as measured by the change in IPV between BH affected areas and non-BH areas before and after the BH insurgency. In other words, it estimates the effect of the presence of the BH insurgency on IPV in the BH affected areas.<sup>21</sup>

#### 4.6 Estimation Bias

In standard DD models, there are two common causes of estimator bias. First, selection bias across time and groups (Stuart et al. 2014). Second, using data from repeated cross sections as opposed to longitudinal data can cause estimates to be biased due to terms that must remain unchanged to ensure before-after comparability (Blundell and Dias 2009). For our model, selection bias across time could occur if the composition of the sample in the BH and non-BH affected areas changes in the period before and during the BH insurgency due to the BH insurgency. Alternatively, selection bias across groups could occur if the composition of the sample changes across the BH and non-BH affected area. Population movements to and from the BH affected area because of the operations of law enforcement, forced returns and flight from the conflict could affect the composition of women in the BH affected area before and after the BH insurgency. This could cause selection biases to occur both across group and time.

We address these potential sources of bias as follows. First, as discussed in Section 4.1, we exclude from our analysis observations from the 2008 NDHS from areas not surveyed in the 2013 NDHS on the account of the BH insurgency to ensure before-after comparability. Second, we employ a

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<sup>21</sup> We also check if the intensity of exposure to BH may affect the likelihood of increased IPV beyond residing in an area where the BH insurgency is present i.e. we determine the marginal effect of BH events in the BH affected area, by accounting for the number of BH events in the affected area within the study period. However, we find that each additional BH event has no significant effect on the outcome variables, except in the case of earnings decision-making autonomy where the impact is 0.1 per cent. This is likely because we do not have observations from the areas of the country where the largest number of BH attacks took place.

kernel-based propensity score matching method to ensure that the profile of women in BH areas and non-BH areas are similar based on observables.

The kernel-based propensity score matching (PSM) method estimates each woman's propensity for residing in the BH-affected area during the period of the BH insurgency using a kernel density function. Each of the three control groups (women who reside in the BH area in the period before the BH insurgency, women who reside in the non-BH area before the insurgency and women who reside in the non-BH areas after the BH insurgency) are then matched to the sample of women who reside in the BH area in the period during the BH insurgency. The common support is composed of the sample of women who reside in the BH area to whom counterfactuals are found in each of the three control samples. The method weights each of the individual observations in the three control groups based on propensity scores creating a balanced control group that does not differ systematically from the treated group on observables. The balanced sample is then used to estimate the average treatment effect of residing in the BH area during the BH insurgency on IPV outcomes using the DD model specified in equation (1) and applying the weights from the PSM.<sup>22</sup>

One advantage of the kernel-based PSM is that it does not uniquely pair observations and as such minimizes the risk of data imbalance and model dependence (Jann, 2017). However, a key assumption is that only variables that are fixed over time (or pre-treatment variables) should be included in estimating the propensity scores. Caliendo et al. (2005) argue that previous research and information about the institutional settings should be employed in building the model. Hence, we rely on evidence from Ceriani and Verme (2018) who find that age; education; employment status; and, ownership of household assets are associated with the decision to stay or flee from BH affected areas.<sup>23</sup> The study sample is thus matched on individual characteristics of the women and their partners using the following variables age; education; and employment status; household size, type of settlement (urban versus rural); and household wealth status<sup>24</sup> (see [appendix section A3](#) for kernel-based matching results). Equation (1) is then estimated on the common support of the matched sample.

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<sup>22</sup> This is implemented with the “*diff*” command in Stata by Villa 2016.

<sup>23</sup> Larger household size, being male, being older and being unemployed were associated with not migrating during conflict while more years of education was associated with migrating during conflict.

<sup>24</sup> We use household wealth as a proxy for ownership of household assets.



## 5. Results

### 5.1 Difference-in-difference (DD) estimates

IPV trends in BH affected areas from the matched sample are shown in [Table 3](#). The matched sample contains data on 2,570 women living in the BH affected area and 21,300 women living in areas not affected by BH. In the BH affected area, the proportion of women experiencing physical or sexual IPV is unchanged at around 10 percent. In the non BH area however IPV rates fall from 17 to 12 percent between 2008 and 2013.

Table 3: Rates of Intimate Partner Violence in Nigeria before Boko Haram (2009) and after Boko Haram (2013), percent

Variable	BH Area			Non BH Area			N (Total)
	Before BH	During BH	Difference	Before BH	During BH	Difference	
Past year physical or sexual IPV	11	10	1	17	12	-5***	
N	1126	1444		9585	11715		23870

Source: Authors own calculation using data from the 2008 and 2013 Nigerian Demographic and Health Survey

Note: BH Area defined as NDHS clusters exposed to any BH Event within 10km between 2009 and 2013.

\*\*\* Difference in means between before BH and during BH is significant at the 1% level.

After controlling for a woman's, partner and household characteristics, attitudes towards and experiences of IPV, ethnicity, religion and state fixed effects, the results of the DD model show that the presence of BH increases the probability of a woman's experience of physical or sexual IPV by 3.7 percentage points ([Table 4](#)).

The individual and household characteristic associated with increased risk of women's experience of physical or sexual IPV are: having more children (0.3 percentage points for each additional child), marriage as a child (2.6 percentage points), having a sometimes or often drunk partner (14.6 percentage points) and marriage in a polygamous household (1.7 percentage points). Both indicators of attitudes towards and experiences of IPV are also associated with increased IPV risk; having a father who beat their wife/partner (12.4 percentage points) and condoning wife beating (4.4 percentage points) The finding that the highest IPV risk is associated with having a mother who was beat by their husband/partner and having a husband/partner who is sometimes or always drunk is consistent with other research about generational cycles of IPV (see Lipsky et al. 2005; Knight et al. 2013; Thornberry et al. 2011) and the association of IPV perpetration with drug and alcohol abuse (see Lipsky et al. 2005; Thompson and Kingree 2006; Tumwesigye et al. 2012; Devries et al. 2013; Hanmer and Klugman 2016).

There is a weak association between receiving earnings in kind as opposed to no earnings and lower IPV risk (-4.7 percentage points) and membership of certain ethnic groups is associated with lower IPV risk. Our findings are consistent with other research using Nigeria's DHS data; being Hausa and Fulani as opposed to being Yoruba is associated with lowering risk of physical or sexual IPV by -5.3 and -5.2 percentage points respectively.<sup>25</sup>

<sup>25</sup> Nwabunike and Tenkorang's (2015) analysis of the 2008 NDHS finds that Hausa women are less likely to experience physical and sexual violence, compared with Yoruba women).

Table 4: Difference-in-differences estimate of the effect of the Boko Haram insurgency on Intimate Partner Violence in Nigeria

Variables	Past year physical or sexual IPV
$PostBH_y * BHArea_t$	0.037** (0.015)
<b>Individual characteristics</b>	
Type of earnings (reference category: no earnings)	
<i>Cash only</i>	-0.017 (0.018)
<i>Cash and kind</i>	-0.031 (0.022)
<i>Kind only</i>	-0.047* (0.027)
Total number of children born	0.003** (0.001)
Married as a child (before 18 years of age)	0.026*** (0.008)
<b>Partner characteristics</b>	
Sometimes or often drunk	0.146*** (0.013)
<b>Household characteristics</b>	
Polygamous household	0.017** (0.008)
<b>Attitudes and experiences of IPV</b>	
Father beat mother	0.124*** (0.017)
Condone wife beating	0.044*** (0.009)
<b>Nigeria specific factors</b>	
Ethnicity (reference category: Yoruba)	
<i>Igbo</i>	0.003 (0.020)
<i>Hausa</i>	-0.053** (0.021)
<i>Fulani</i>	-0.052* (0.030)
<i>Other ethnic group</i>	0.006 (0.017)
Religion (reference category: Christianity)	
<i>Islam</i>	0.004 (0.011)
<i>Traditional African religion</i>	-0.002 (0.033)
<i>Other religion</i>	-0.037 (0.163)
Before BH (Non-BH Area)	
Before BH (BH Area)	9585 1126
During BH (Non-BH Area)	11715
During BH (BH Area)	1444
Total	23870
R-squared	0.11

Note: Variables used to estimate the kernel propensity scores are dropped State fixed effects are included. The kernel density function is Epanechnikov with a bandwidth of 0.06. Probit estimation is used for the propensity score in the first stage. \*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level. Robust standard errors in parentheses.

## 5.2 The BH insurgency and key drivers of IPV

In both the BH affected and unaffected areas, the proportion of women experiencing controlling behavior from their husband/partner increases during the BH insurgency. However, the increase is greatest in the BH area where the number of women reporting controlling behavior from their husband/partner increases from 60 to 70 percent during the BH insurgency. In contrast, there is only a small increase in the percentage of women experiencing controlling behaviors (from 60 to 62 percent) in the non BH areas (Table 5).

Table 5: Women's experience of controlling behavior by husband/partner and women's decision-making autonomy in Nigeria before and after Boko Haram, 2009 and 2013, percent

Variables	BH Area			Non BH Area			N (Total)
	Before BH	During BH	Difference	Before BH	During BH	Difference	
<b>Controlling behavior by husband/partner</b>	60	70	10***	60	62	2***	
N	1127	1444		9600	11715		23886
<b>Women's household decision- making autonomy</b>							
<i>Autonomy over healthcare</i>	50	44	-6***	50	49	-1	
<i>Autonomy over major household purchases</i>	39	41	2**	44	50	6***	
<i>Autonomy over visits to friends and family</i>	52	49	-3*	62	58	-4***	
N	1127	1443		9596	11711		23877
<b>Women's earnings decision-making autonomy</b>	89	92	3***	84	89	5***	
N	1039	1383		7449	10823		20694

Source: Authors own calculation using data from the 2008 and 2013 Nigerian Demographic and Health Survey

Note: \*\*\* Difference in means between before BH and during BH is significant at the 1% level. \*\* Difference in means between before BH and during BH is significant at the 5% level. \* Difference in means between before BH and during BH is significant at the 10% level.

The proportions of women with decision-making autonomy changes during the BH insurgency in both the BH affected areas and the non BH areas. However, there is not a systematic pattern of decreased decision-making autonomy in the BH affected areas compared to the non BH areas. In both areas, autonomy over health care decisions and autonomy over decisions to visit friends and family decreases and autonomy over major household decisions and disposition of earnings increases. Reductions in autonomy over health care decisions are greater in the BH area than the non BH area (6 percentage points vs 1 percentage point) but there is little difference between the BH and non BH areas in the reductions in autonomy over visits to friends and family. The increase in the proportion of women who have autonomy over major household purchases is larger in the non BH areas than the BH areas (6 percentage points vs 2 percentage points). Finally, the increase in the proportion of women having earnings decision-making autonomy is lower in the BH area than in the non-BH area (3 percentage vs. 5 percentage points).

We examine the impact of the BH insurgency on the key drivers of IPV by estimating the DD model in equation (1) on the common support of the matched sample, using controlling behavior by husband/partner, an index of women's household decision-making autonomy and women's earnings decision-making autonomy as the outcome variables (Table 6).

After controlling for individual and household characteristics, attitudes to and experiences of IPV, ethnicity, religion and state fixed effects, the BH insurgency increases the probability of women's

experience of controlling behavior by husband/partner by 13.8 percentage points and reduces the probability of women's household decision-making autonomy by 22.4 percentage points but has no statistically significant effect on women's earnings decision-making autonomy.

Having a sometimes or often drunk partner is associated with increased risk of women's experience of controlling behavior from their husbands/partners (11.1 percentage points) while receiving earnings and having more children are associated with decreased risk of women's experience of controlling behavior (5.2 percentage points for cash only earnings, 11.2 percentage points for earnings in cash and kind and 0.8 percentage points for each additional child). Also associated with increased risk of women's experience of controlling behavior from husband/partner are having a father who beat his wife/partner, condoning wife beating and practicing Islam as opposed to Christianity. (8.3, 13.1 and 3.4 percentage points respectively).

Table 6: Difference-in-differences estimates of the effect of the Boko Haram insurgency on women's experience of controlling behavior and decision-making autonomy in Nigeria

<b>Variables</b>	<b>(1)</b> Controlling behavior by husband/partner	<b>(2)</b> Women's household decision- making autonomy	<b>(3)</b> Women's earnings decision-making autonomy
<b><i>PostBH<sub>y</sub> * BHArea<sub>t</sub></i></b>	0.138*** (0.034)	-0.224** (0.101)	-0.013 (0.008)
<b>Covariates</b>			
<b>Individual characteristics</b>			
Type of earnings (reference category: no earnings)			
<i>Cash only</i>	-0.052** (0.022)	0.076 (0.105)	-
<i>Cash and kind</i>	-0.112*** (0.031)	0.169 (0.138)	-
<i>Kind only</i>	-0.062 (0.053)	-0.351 (0.097)	-
Total number of children born	-0.008*** (0.002)	0.033*** (0.001)	0.003*** (0.001)
Married as a child	0.002 (0.013)	-0.147*** (0.061)	0.001 (0.005)
<b>Partner characteristics</b>			
Sometimes or often drunk	0.111*** (0.018)	0.116 (0.079)	-0.010 (0.007)
<b>Household characteristics</b>			
Polygamous household	-0.005 (0.013)	-0.221*** (0.063)	0.009* (0.005)
<b>Attitudes and experiences of IPV</b>			
Father beat mother	0.083*** (0.019)	0.073 (0.088)	-0.010 (0.007)
Condones wife beating	0.131*** (0.014)	-0.318*** (0.006)	-0.011** (0.005)

*Continued.*

Table 6 Continued.

Variables	(1)	(2)	(3)
	Controlling behavior by husband/partner	Women's household decision- making autonomy	Women's earnings decision-making autonomy
<b>Nigeria specific factors</b>			
Ethnicity (reference category: Yoruba)			
<i>Igbo</i>	-0.007 (0.030)	-0.004 (0.128)	-0.003 (0.010)
<i>Hausa</i>	0.016 (0.038)	-0.071*** (0.136)	-0.033*** (0.011)
<i>Fulani</i>	0.006 (0.042)	-0.813*** (0.172)	-0.094*** (0.014)
<i>Other ethnic groups</i>	-0.015 (0.027)	-0.484*** (0.107)	-0.004 (0.009)
Religion (reference category: Christianity)			
<i>Islam</i>	0.034** (0.017)	-0.619*** (0.078)	0.013** (0.006)
<i>Traditional African religions</i>	0.022 (0.046)	-0.733*** (0.300)	-0.107*** (0.027)
<i>Other religion</i>	0.075 (0.164)	-0.973** (0.135)	-0.137 (0.190)
N			
Before BH (Non-BH Area)	9600	9596	7449
Before BH (BH Area)	1127	1127	1039
During BH (Non-BH Area)	11715	11711	10823
During BH (BH Area)	1444	1443	1383
Total	23886	23877	20694
R-squared	0.10	0.38	0.08

Note: Variables used to estimate the kernel propensity scores are dropped are dropped. We log-transform the index of women's household decision-making autonomy before estimating the model to allow for the reporting of the estimates in terms of percentages. To take care of zero values, we add 0.0001 to the index before taking the log. Thus, the estimates reported calculated as  $(e^{\beta} - 1)$ . The estimations account for state fixed effects to account for the clustering of IPV among women residing in the same state. The kernel density function is epanechnikov with a bandwidth of 0.06. Probit estimation is used for the propensity score in the first stage. Kernel-based DD estimates are on the common support. The results are robust to employing a logit estimation of the propensity scores in the first stage, a gaussian kernel density function as opposed to an epanechnikov kernel density function and varying the bandwidth of the kernel density function. \*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level. Standard errors in parentheses are robust.

Turning to women's household decision-making autonomy there is a marked difference between the correlates of this variable and the correlates of controlling behavior of husbands/partners. The strongest correlates are related to marital status, child marriage, ethnicity and religion. Having more children is associated with increased likelihood of decision-making autonomy while marriage as a child, marriage in a polygamous household and condoning wife beating are associated with reduced likelihood of women's household decision-making autonomy (14.7, 22.1, and 31.8 percentage points respectively). Ethnicity and religion are also associated with women's household decision-making autonomy- being Hausa, Fulani and from other ethnic group as opposed to being Yoruba decreases the probability of women's household decision-making autonomy (7.1, 81.3 and 48.4 percentage points respectively) while practicing Islam, the traditional African religions and other religions as opposed to practicing Christianity is associated with decreased women's household decision-making autonomy (61.9, 73.3 and 97.3 percentage points respectively).

Women's earnings decision-making autonomy is positively associated with having more children and marriage in a polygamous household (0.3 and 0.9 percentage points respectively) while condoning wife beating is associated with reduced likelihood of women's earnings decision-making autonomy (1.1 percentage points). Again ethnicity and religion are strongly associated with decision-making autonomy- being Hausa, or Fulani as opposed to being Yoruba and practicing the traditional African religion as opposed to practicing Christianity decreases the probability of women's earnings decision-making autonomy (3.3, 9.4 and 10.7 percentage points respectively) while practicing Islam as opposed to Christianity increases the probability of women's earnings decision-making autonomy by 1.3 percentage points. Our finding of the association between being an ethnic group other than Yoruba and practicing other religions as opposed to Christianity with lower household and earnings decision-making autonomy underscore the significance of ethnic and religious social variation as factors determining women's empowerment are consistent with other research on Nigeria (Fuseini and Kalule-Sabiti 2015; Kritz and Makinwa-Adebusoye 1999).

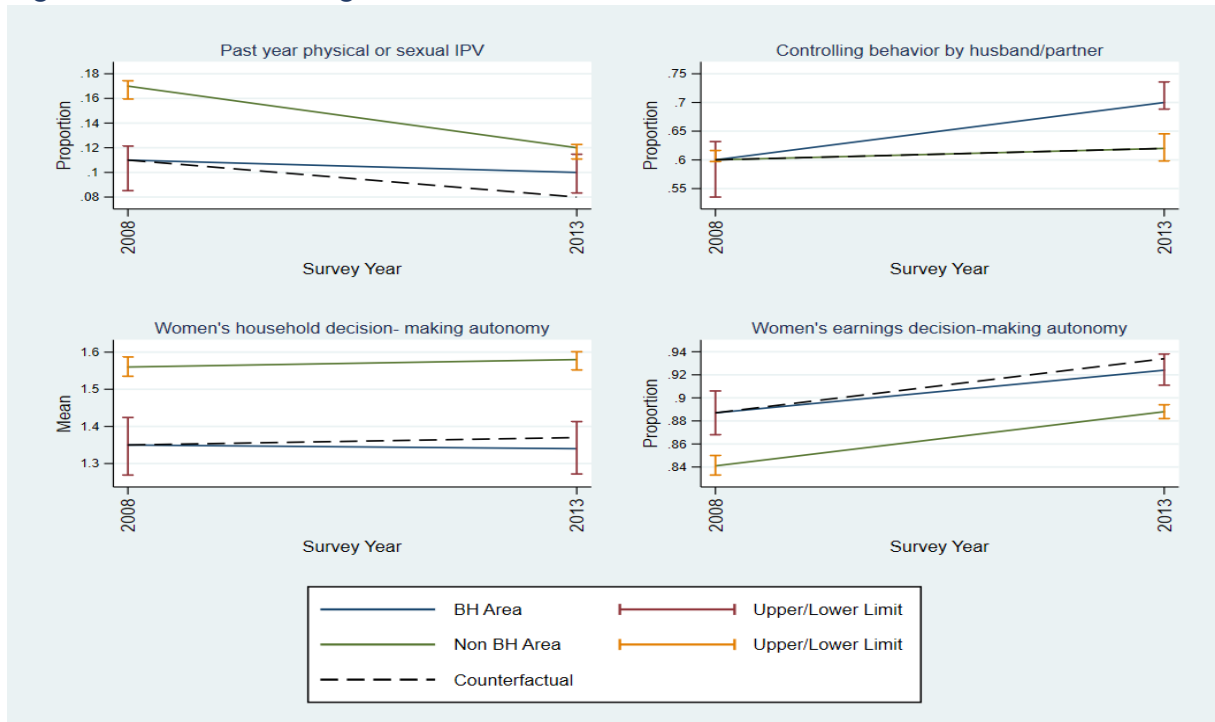
To sum up, the presence of BH is associated with large increases in recognized drivers of IPV, controlling behavior of husband/ partners and women's lack of agency as proxied by autonomy in household decision-making. It increases the probability of women's experience of controlling behavior by husband/partner by 13.8 percentage points and reduces the probability of women's household decision-making autonomy by 22.4 percentage points. The correlates of these drivers differ, however. Controlling behavior is mitigated by women's earnings of any kind and exacerbated by women's attitudes to and experience of IPV and her husband/ partner's use of alcohol. Cultural factors such as religion and ethnicity are strongly associated with women's household decision-making autonomy and being in a polygamous marriage, being married as a child and condoning IPV are associated with less decision-making autonomy for women.

### 5.3. Evidence in support of the DD estimation method

A key identifying assumption in the DD model specified in equation (1) is that in the absence of the BH insurgency, the differences in the trends of IPV between the BH affected and unaffected area would be the same. To reinforce the plausibility of our DD model, we proceed to a placebo test. While we cannot explicitly test this assumption, we present evidence in support of parallel trends. First, in [Figure 4](#), we present graphs of the mean levels of IPV and its key drivers before and during the BH insurgency. The graphs suggest that in the period before the BH insurgency,

the trends in outcomes are parallel between the BH affected area for physical or sexual IPV, controlling behavior by husband/partner and women’s household decision-making autonomy as well as women’s earnings decision-making autonomy suggesting that the key identifying assumption holds.

Figure 4: Before and during BH trends



Second, we present results from a placebo analysis. For this analysis, we examine only observations from the DV module of the 2008 NDHS- the unaffected cohort- and assume women interviewed in the first half of the survey period (June, July and August 2008) make up the placebo sample before BH insurgency while those interviewed in the second half of the survey period (September, October and November 2008) make up the placebo sample for the period during the BH insurgency. Since IPV outcomes were less favorable in the BH area, if we find significant coefficients our conclusion is that factors other than BH are responsible for the outcomes and the association between BH and less favorable outcomes is spurious. The results from this estimation are presented in [Table 7](#). We find no spurious significant coefficient. Although, the coefficient of women’s household decision-making autonomy is significant, this seems unrelated to the BH insurgency as the direction of the effect is not the same as we find in our main analysis. While, this result is not proof of parallel trends in outcomes between the BH and non BH area, it supports the conclusion that the significant effects of the BH insurgency on women’s experiences of IPV and its drivers are not spurious.

Table 7: Difference-in-differences estimates of the effect of the Boko Haram insurgency on Intimate partner violence, women’s experience of controlling behavior by husband/partner and women’s decision-making autonomy in Nigeria- Placebo Analysis.

Variables	(1)	(2)	(3)	(4)
	Past year physical or sexual IPV	Controlling behavior by husband/partner	Women’s household decision- making autonomy	Women’s earnings decision-making autonomy
<b><i>PostBH<sub>y</sub> * BHAreaPlacebo<sub>t</sub></i></b>	-0.008 (0.021)	-0.018 (0.043)	0.236*** (0.049)	0.017 (0.016)
Covariates				
Individual characteristics	Yes	Yes	Yes	Yes
Partner characteristics	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
Before BH placebo (Non-BH Area)	5985	5997	5994	4611
Before BH placebo (BH Area)	664	664	664	604
During BH placebo (Non-BH Area)	3136	3138	3138	2663
During BH placebo (BH Area)	460	461	461	433
Total	10245	10260	10257	8311
R-squared	0.14	0.15	0.31	0.12

Note: Variables used to estimate the kernel propensity scores are dropped are dropped. Note: The estimations account for state fixed effects to account for the clustering of IPV among women residing in the same state. The kernel density function is epanechnikov with a bandwidth of 0.06. Probit estimation is used for the propensity score in the first stage. Kernel-based DD estimates are on the common support. The results are robust to employing a logit estimation of the propensity scores in the first stage, a gaussian kernel density function as opposed to an epanechnikov kernel density function and varying the bandwidth of the kernel density function. \*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level. Standard errors in parentheses are robust.

#### 5.4 Limitations of the study

It is likely that the study underestimates the effect of the BH insurgency as areas with the largest number of conflict events are not captured in our analysis. Also, the BH insurgency is a regional crisis and we do not consider BH activities in the neighboring countries of Cameroun, Chad and Niger which affect Nigerian communities located in areas bordering these countries. Therefore, our estimates represent a lower bound for the effect of the BH insurgency.

Another limitation is caused by the study reliance on GPS coordinates provided in the NDHS as well as the ACLED to identify the BH area. The geo-coordinates of the NDHS clusters are randomly displaced to protect the privacy of the respondents (Elkies et al. 2015). Urban clusters are displaced up to 2km while rural clusters are displaced up to 5km (Perez-Heydrichet et al. 2013). The measurement error introduced might lead to attenuation bias in regressions (Skiles et al. 2013) although robustness analysis does not suggest this is a problem in our estimations.<sup>26</sup>

Furthermore, although the NDHS allows us to examine the effect of conflict on some drivers of IPV, it does not provide enough information to examine important pathways through which the BH insurgency may translate to IPV such as extreme stress and trauma, changing marriage practices and other microsystem and exosystem factors suggested by the ecological framework.

<sup>26</sup> We check if our results are likely to be affected by this bias by restricting the analysis in table 4 and 6 to only urban areas where the offset is smaller. We find that our results are robust to this restriction (see appendix table [A4a](#) and [A4b](#)).



## 6.0 Conclusion

Our findings add to a growing body of research that establishes a link between exposure to violent political conflict and IPV. We find that the presence of BH increases the probability that women experience physical or sexual IPV by about 4 percentage points after controlling for known correlates of IPV; partner's alcohol use, previous exposure to IPV and condoning IPV as a social norm.

Finding an association between conflict and higher IPV risk is noteworthy as it is not revealed by descriptive statistics on changes in IPV prevalence rates in locations exposed to the BH insurgency. Controlling for differences in individual and household characteristics, descriptive statistics show that IPV rates in the BH affected areas remained unchanged from the period before the BH insurgency to the period during the BH insurgency. However, IPV declined by 5 percentage points in non-BH affected areas. Therefore, the association of an increased probability of women's experience of physical or sexual IPV with the BH insurgency implies that conflict has stopped progress towards the reduction of IPV that could otherwise have been achieved. We interpret our results as a lower bound of the average causal effect of the BH insurgency on physical or sexual IP as there are no observations during BH phase for many of the most severely impacted areas.

Previous research has established the association between increased male perpetration of IPV and conflict related trauma, exposure to political violence and behaviors that are associated with increased IPV risk such as increased alcohol abuse (Bruck and Stojetz 2019; Clark et al. 2010; Gupta et al. 2009, 2012; Saile et al. 2013). Our results extend this literature through establishing a link between exposure to conflict and other behaviors that are known to increase IPV risk. We find that exposure to BH increases the probability of women's experience of controlling behavior from husbands/partners by about 14 percentage points and decreases the probability of women's autonomy in household decision-making by around 22 percentage points. Access to incomes for women is associated with reduced risk of experiencing controlling behavior from a male partner which suggests that promoting women's economic opportunities in conflict settings might have positive spillover effects on behavioral norms. These results add to the thin evidence base on how exposure to conflict may change interpersonal behaviors and further research is required to understand the pathways through which conflict exacerbates women's experience of IPV.

IPV is a violation of women's and girl's human rights, a manifestation of gender inequality, and constrains and compromises human development. IPV response and prevention is therefore integral to the success of humanitarian and development policies and programs in conflict settings. Programs that respond to and prevent IPV include strengthening health and other services and facilitating easy and affordable or free access for survivors of IPV. Health services need to respond to post-traumatic psychological and mental health issues and substance abuse, due to their potential to be both a trigger and consequence of IPV. Programs to address and change harmful gender norms and behaviors at an individual and community level are needed. Promising interventions include community, school and faith-based initiatives which can be used to affect wider community-level change (Glass et al., 2019; Palm, 2019; Siddiq, Hemat & Corboz, 2018). Maintaining an 'all-of-community' approach and ensuring programming is centered on women and girls and designed in a way to ensure accountability to them are critical elements to the success of these types of interventions (What Works to Prevent VAWG Programme, 2016).

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## Appendix

### A1. BH Events in Nigeria

Table A1: Distribution of BH events in Nigeria (2009 to 2013)

Geo-political zone	State	LGA	2009	2010	2011	2012	2013	Total
<b>North Central</b>	Benue	Gboko	0	0	0	0	1	1
		Oturkpo	0	0	0	1	0	1
	Federal Capital Territory (FCT)	Bwari	0	0	4	3	1	8
		Kogi	0	0	0	2	0	2
		Kotonkar	0	0	0	1	0	1
		Lokoja	0	0	0	1	0	1
		Okehi	0	0	0	1	0	1
		Nassarawa	0	0	0	1	1	2
	Niger	Chanchaga	0	0	1	3	0	4
		Lapai	0	0	2	0	0	2
		Suleja	0	0	1	2	0	3
	Plateau	Jos North	0	2	5	6	0	13
	<b>Total</b>			<b>0</b>	<b>2</b>	<b>13</b>	<b>21</b>	<b>3</b>
<b>North East</b>	Adamawa	Demsa	0	0	1	0	0	1
		Ganye	0	0	0	0	2	2
		Girie	0	0	2	0	1	3
		Hong	0	0	0	5	2	7
		Madagali	0	0	0	1	2	3
		Maiha	0	0	0	1	0	1
		Michika	0	0	0	0	1	1
		Yola South	0	0	0	3	1	4
	Bauchi	Bauchi	2	3	5	7	0	17
		Darazo	0	0	0	0	1	1
		Gamjuwa	0	0	0	2	0	2
		Itas/Gad	0	0	0	1	0	1
		Jama're	0	0	0	1	0	1
		Katagum	0	0	1	0	0	1
		Misau	0	0	1	0	0	1
		Ningi	0	0	0	1	1	2
	Borno	Abadam	0	0	0	0	2	2
		Askira/U	0	0	0	2	4	6
		Bama	0	0	0	3	4	7
		Biu	0	0	3	7	2	12
		Chibok	0	0	0	6	0	6
		Damboa	0	0	2	4	23	29
		Gubio	0	0	0	2	0	2
		Guzamala	0	0	0	2	4	6
		Gwoza	0	0	0	0	22	22
		Hawul	0	0	0	0	3	3
		Jere	0	0	0	1	2	3
		Kaga	0	0	0	0	6	6
		Kala/Balge	0	0	0	1	0	1
		Konduga	0	1	0	14	33	48
		Kukawa	0	0	0	0	10	10
		Mafa	0	0	1	1	4	6
Magumeri	0	0	0	11	1	12		
Maidugur	10	27	73	104	60	274		
Marte	0	0	0	1	3	4		
Mobbar	0	0	0	2	2	4		
Ngala	1	0	0	4	7	12		
Nganzai	0	0	0	1	6	7		
Shani	0	0	1	0	0	1		

Table A1 continued.

Table A1 continued.

Geo-political zone	State	LGA	2009	2010	2011	2012	2013	Total
	Gombe	Akko	1	0	0	7	2	10
		Funakaye	0	0	0	1	0	1
		Kwami	0	0	1	0	0	1
	Taraba	Nafada	0	0	1	0	1	2
		Ibi	0	0	0	1	0	1
		Takum	0	0	0	1	1	2
	Yobe	Damaturu	1	1	7	24	7	40
		Fika	0	0	0	1	0	1
		Fune	0	0	0	1	2	3
		Geidam	0	0	1	1	2	4
		Gujba	0	0	0	2	6	8
		Gulani	0	1	0	0	2	3
		Karasuwa	0	1	0	0	0	1
		Nangere	4	0	0	26	3	33
		Potiskum	1	0	0	0	2	3
Tarmuwa	0	0	0	0	1	1		
Yusufari	0	0	0	1	1	2		
<b>Total</b>			<b>20</b>	<b>34</b>	<b>100</b>	<b>254</b>	<b>239</b>	<b>647</b>
<b>North West</b>	Jigawa	Biriniwa	0	0	0	1	0	1
		Guri	0	0	0	0	1	1
	Kaduna	Birnin-G	0	0	0	0	1	1
		Chikun	0	0	0	1	0	1
		Igabi	0	0	0	4	0	4
		Ikara	0	0	0	1	0	1
		Kaduna North	0	0	0	1	0	1
		Kaduna South	0	0	1	11	3	15
		Kagarko	0	0	0	0	1	1
		Kajuru	0	0	0	1	0	1
	Kano	Kudan	0	0	0	1	0	1
		Sabon-Ga	0	0	0	7	0	7
		Bunkure	0	0	0	0	1	1
		Gezawa	0	0	0	0	2	2
		Gwale	0	0	0	0	1	1
		Minjibir	0	0	0	0	1	1
		Nassaraw	0	0	2	39	14	55
		Tarauni	0	0	0	1	0	1
		Ungogo	0	0	0	0	2	2
		Warawa	0	0	0	1	0	1
		Wudil	1	0	0	0	0	1
	Katsina	Bakori	0	1	0	0	0	1
		Kankara	0	0	1	0	0	1
	Kebbi	Gwandu	0	0	2	0	0	2
	Sokoto	Silame	0	0	0	1	0	1
		Wamakko	0	0	0	2	1	3
			Yabo	0	0	0	1	0
<b>Total</b>			<b>1</b>	<b>1</b>	<b>6</b>	<b>73</b>	<b>28</b>	<b>109</b>

Table A1 Continued.

Geo-political zone	State	LGA	2009	2010	2011	2012	2013	Total
<b>South East</b>	Enugu	Enugu North	0	0	0	1	0	1
Total			<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>South South</b>	Edo	Etsako We	0	0	0	1	0	1
Total			<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>South West</b>	Lagos	Ikeja	0	0	0	1	0	1
		Ikorodu	0	0	0	1	0	1
Total			<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>
<b>Grand Total</b>			<b>21</b>	<b>37</b>	<b>119</b>	<b>352</b>	<b>270</b>	<b>799</b>

Source: Authors own calculation from ACLED BH Actor file

## A2. Definition of Physical and Sexual IPV in the NDHS

Table A2. Questions asked to women in the NDHS to determine experience of physical or sexual violence.

<b>Physical violence</b>	<b>Sexual violence</b>
<b>Does (did) your (last) husband/partner ever do any of the following things to you?</b>	<b>Does (did) your (last) husband/partner ever do any of the following things to you?</b>
(a) Push you, shake you, or throw something at you?	(a) Physically force you to have sexual intercourse with him even when you did not want to?
(b) Slap you?	(b) Physically force you to perform any other sexual acts you did not want to?
(c) Twist your arm or pull your hair?	(c) Force you with threats or in any other way to perform sexual acts you did not want to?
(d) Punch you with his fist or with something that could hurt you?	
(e) Kick you, drag you, or beat you up?	
(f) Try to choke you or burn you on purpose?	
(g) Threaten or attack you with a knife, gun, or any other weapon	

Source: National Population Commission (NPC) [Nigeria] and ICF International. 2014. Nigeria Demographic and Health Survey 2013. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International.

### A3. Matching

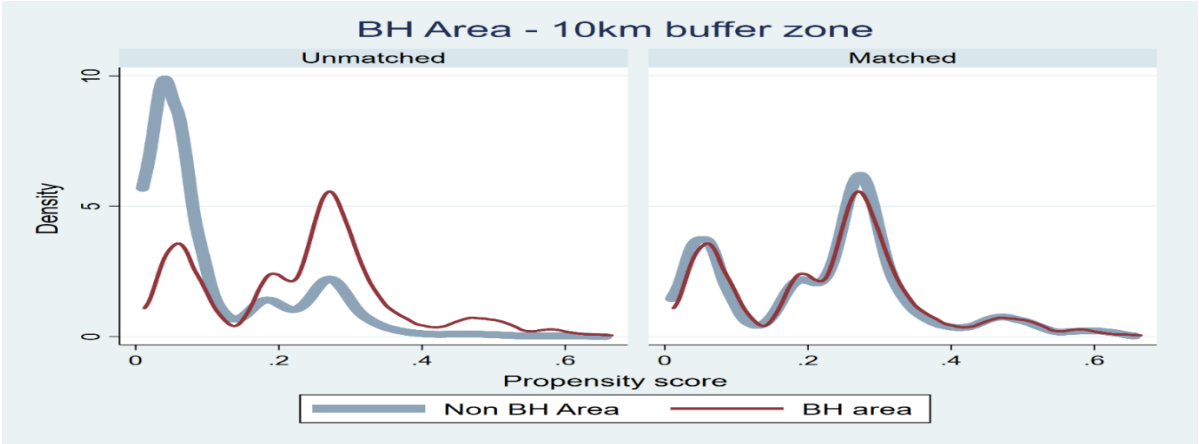
Table A3 presents the summary statistics in the period before the BH insurgency for the matched and unmatched sample in the BH and Non BH area to examine if the composition of the sample is reasonably balanced. Figure A3 also presents the kernel densities of the propensity scores before and after matching. Over 99 percent of the sample in the period before the insurgency is on common support. The differences in means of the key covariates in the BH affected and unaffected area but for woman's age are significantly different. However, after matching, the differences in means of all the key covariates are not significantly different. This provides evidence that the composition of the sample is reasonably balanced on the selected set of observable characteristics between women residing in the BH affected area as well as women residing in the BH unaffected area after matching.

Table A3: Balancing Test for Before-BH insurgency sample

Variables	Unmatched			Matched (Common support)		
	Non-BH Area	BH Area	P value	Non-BH Area	BH Area	P value
<b>Individual characteristics</b>						
Age (years)	31.74	32.05	0.1194	32.22	31.92	0.4984
Primary educ	0.26	0.18	<0.0001	0.19	0.17	0.3929
Secondary educ	0.25	0.30	0.0005	0.30	0.30	0.9406
Higher educ	0.07	0.14	<0.0001	0.15	0.14	0.7720
<b>Partner characteristics</b>						
Age (years)	41.47	42.10	0.0369	41.99	41.90	0.8539
Primary educ	0.24	0.18	<0.0001	0.19	0.19	0.4766
Secondary educ	0.30	0.30	0.490	0.32	0.29	0.4799
Higher educ	0.12	0.22	<0.0001	0.22	0.23	0.7378
<b>Household characteristics</b>						
Household size	5.64	5.92	0.0009	5.64	5.81	0.3667
Urban	0.26	0.65	<0.0001	0.65	0.65	0.9698
Poor	0.22	0.17	0.0003	0.15	0.18	0.5389
Middle	0.19	0.15	0.0008	0.13	0.16	0.3767
Rich	0.18	0.21	0.0119	0.18	0.19	0.5918
Richest	0.16	0.40	<0.0001	0.43	0.41	0.7213
Number of observations	9590	1126	10716	9585	1126	10711

Note: Data are % or as indicated. The p-values are for the two-sample t-test with equal variances (H<sub>0</sub>: Difference in means =0 and H<sub>a</sub>: Difference in means ≠0). Variables capturing employment status are omitted because there is not enough variation. \*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level.

Figure A3: Kernel density graph before and after matching





#### A4. Restricting the analysis to only urban areas

Table A4a: The effect of the Boko Haram insurgency on Intimate Partner Violence in Nigeria- Urban sample

Variables	Past year physical or sexual IPV
<b><math>PostBH_y * BHArea_t</math></b>	<b>0.035**</b> (0.018)
<b>Individual characteristics</b>	
Type of earnings (reference category: no earnings)	
<i>Cash only</i>	-0.027 (0.022)
<i>Cash and kind</i>	-0.062** (0.027)
<i>Kind only</i>	-0.044* (0.044)
Total number of children born	0.004** (0.002)
Married as a child	0.018* (0.010)
<b>Partner characteristics</b>	
Sometimes or often drunk	0.141*** (0.015)
<b>Household characteristics</b>	
Polygamous household	0.025** (0.011)
<b>Attitudes and experiences of IPV</b>	
Father beat mother	0.109*** (0.021)
Condones wife beating	0.048*** (0.012)
<b>Nigeria specific factors</b>	
Ethnicity (reference category: Yoruba)	
<i>Igbo</i>	-0.001 (0.021)
<i>Hausa</i>	-0.058** (0.024)
<i>Fulani</i>	-0.028 (0.050)
<i>Other ethnic group</i>	0.001 (0.019)
Religion (reference category: Christianity)	
<i>Islam</i>	-0.007 (0.012)
<i>Traditional African religion</i>	-0.040 (0.060)
<i>Other religion</i>	0.351 (0.375)
Before BH (Non-BH Area)	2482
Before BH (BH Area)	732
During BH (Non-BH Area)	4123
During BH (BH Area)	1126
Total	8463
R-squared	0.10

Note: Variables used to estimate the kernel propensity scores are dropped are dropped. The estimations account for state fixed effects. The kernel density function is epanechnikov with a bandwidth of 0.06. Probit estimation is used for the propensity score in the first stage. \*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level. Robust standard errors in parentheses

Table A4b: The effect of the Boko Haram insurgency on women's experience of controlling behavior by husband/partner and women's decision-making autonomy in Nigeria – urban sample

Variables	(1) Controlling behavior by husband/partner	(2) Women's household decision- making autonomy	(3) Women's earnings decision- making autonomy
<b><i>PostBH<sub>y</sub> * BHArea<sub>t</sub></i></b>	0.116*** (0.003)	-0.295* (0.167)	-0.001 (0.014)
<b>Covariates</b>			
<b>Individual characteristics</b>			
Type of earnings (reference category: no earnings)			
<i>Cash only</i>	-0.063** (0.029)	0.251 (0.198)	-
<i>Cash and kind</i>	-0.124*** (0.038)	0.841 (0.260)	-
<i>Kind only</i>	-0.044 (0.084)	-0.594 (0.667)	-
Total number of children born	-0.009*** (0.003)	0.037*** (0.018)	0.005*** (0.001)
Married as a child	0.013 (0.016)	-0.258** (0.010)	0.007 (0.008)
<b>Partner characteristics</b>			
Sometimes or often drunk	0.109*** (0.021)	0.195 (0.119)	-0.010 (0.010)
<b>Household characteristics</b>			
Polygamous household	0.011 (0.018)	-0.137*** (0.110)	0.011 (0.009)
<b>Attitudes and experiences of IPV</b>			
Father beat mother	0.089*** (0.022)	-0.043 (0.137)	-0.002 (0.011)
Condomes wife beating	0.137*** (0.016)	-0.352*** (0.100)	-0.014* (0.008)
<b>Nigeria specific factors</b>			
Ethnicity (reference category: Yoruba)			
<i>Igbo</i>	-0.009 (0.032)	0.046 (0.183)	-0.002 (0.015)
<i>Hausa</i>	0.014 (0.047)	-1.484*** (0.214)	-0.019 (0.017)
<i>Fulani</i>	-0.007 (0.060)	-1.033*** (0.334)	-0.083*** (0.027)
<i>Other ethnic group</i>	-0.016 (0.030)	-0.341*** (0.159)	0.011 (0.013)
Religion (reference category: Christianity)			
<i>Islam</i>	0.019 (0.019)	-0.885*** (0.121)	0.013 (0.010)
<i>Traditional African religion</i>	0.062 (0.079)	-1.519** (0.587)	-0.097* (0.051)
<i>Other religion</i>	-0.090 (0.285)	-2.142** (3.563)	0.101 (0.374)
<hr/>			
N			
Before BH (Non-BH Area)	2485	2484	2112
Before BH (BH Area)	732	732	694
During BH (Non-BH Area)	4122	4121	3951
During BH (BH Area)	1126	1125	1092
Total	8465	8462	7849
R squared	0.10	0.37	0.07

Note: Variables used to estimate the kernel propensity scores are dropped. We log-transform the index of women's household decision-making autonomy before estimating the model to allow for the reporting of the estimates in terms of percentages. To take care of zero values, we add 0.0001 to the index before taking the log. Thus, the estimates reported calculated as  $(e^{\beta} - 1)$ .