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Effects Of Exposure To Violence On Health In Iraq Between 2006-2007

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**EFFECTS OF EXPOSURE TO VIOLENCE ON HEALTH
IN IRAQ BETWEEN 2006-2007**

by

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M.A., ECONOMICS, 2014

B.A., ECONOMICS, 2012

THESIS

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Dedication

to my family and to the memory of my father,
and
to those who passed away in conflicts around the world.

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Abstract

Iraq has experienced protracted years of war in last two decades. These prolonged years of war in Iraq manifested conflict and violence, degeneration of economic conditions and a serious breakdown of public health services. Deaths, injury and acts of violence such as kidnapping, threat and witnessing heavy casualties are only a few examples of events that Iraqi people experienced during war times. Conflict can result in lasting and profound consequences for the health of the Iraq population. The burden of the communicable, non-communicable disease and mental illnesses in war zone areas is rising rapidly and becoming a major challenge to global development. Using data from the 2006-2007 Iraq Household Socio-Economic Survey, I examine the association between violence exposure and morbidity for a sample of Iraqis individuals. We find that exposure to violence is associated with both increased incidence of chronic and acute illnesses, particularly respiratory and mental illness. Interestingly, the health of adolescents and adults appears to be most at risk to violence exposure while that of children is largely protected.

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Chapter 1: Introduction

Violence has probably always been part of the human experience. Its impact can be seen, in various forms, in all parts of the world. Each year, more than a million people lose their lives, and many more suffer non-fatal injuries, as a result of self-inflicted, interpersonal or collective violence. There are many possible ways to define violence. The World Health Organization 1996 (WHO) defines violence as: “The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation.”. Victims of violence can experience serious and long-lasting consequences in many forms of physical and mental problems.

Violence may be categorized in many different ways such as:

- I. Types of violent acts: physical, verbal, emotional, sexual, financial, etc.
- II. Precipitating factors: conflict, war, robbery, mental illness, etc.
- III. Contributing factors: poverty, culture, emotion, drugs and alcohol, psychosis, etc.
- IV. Impact of violence: death or disability, economic, morbidity, mental illness, etc.
- V. Those affected by violence: individuals, children, community, ethnic or minority group, etc.

Violence may occur only once or may occur frequently while escalating over a period of months or years. In any form, violence and abuse profoundly affect individual health and well-being. The roots of all forms of violence are founded in the many types of inequality which continue to exist and grow in society (Morris, 2007).

According to Heidelberg Institute for International Conflict Research (HIK, 2017), the world has experienced a total of 385 conflict in 2017 of which more than half 222 were violent conflicts. Any human society must find ways to prevent violence, to limit it and to find curative treatments to it. Otherwise, the worst is certain because: “violence has extraordinary mimetic effects, ... It looks like a flame that devours everything you can throw at it.” (Girard, 1972). “Armed conflict uproots individuals, families and entire communities, accounting for large numbers of internally displaced persons and refugees. Armed conflict

violates human rights and humanitarian law. Armed conflict diverts human and financial resources away from non-military purpose and finally armed conflict leads to further violence” (Levy et al, 2008). These description of a devouring, contagious and catastrophic violence could have been written in the light of events that Iraq society endured in the past two decades.

During the past two decades, Iraq has been caught up in a continuous wave of wars and conflict causing spread of violence and harmful effects on people’s living standards. The most recent war initiated by the US-led invasion in 2003 triggered a new wave of disruption in the country (Guerrero, 2009). Following the U.S. launched 2003 invasion, in February 2006, violence in Iraq had become increasingly sectarian in nature between Iraq Sunni and Shia groups. Frequent cases of mass kidnappings, suicide bombing, political assassinations, number of disappeared and missing persons, horrible crimes, sectarian cleansing, mutilation and rapes, all terrible events that were describing Iraq situation. Although violence decreased dramatically in the second half of 2007 and number of enemy attacks and murders in Iraq dropped (Kimberly, et al, 2008), violence continued through 2009 and rose again after a short period of relative calm between 2009 and 2011 (Houdeville,2017).The invasion and occupation directly led to hundreds of thousands of the deaths due to violence and other war-related violence such as air strikes, cross-fire, suicide bombs, sectarian killing, massacres and assassinations (Crawford, 2013). There are no accurate or reliable counts of such dead. However, the Brookings Institution’s “Iraq Index”¹ estimated that there were more than 115,000 civilians which had been killed in direct violence due to the war between 2003-2011 years. The peak of violent civilian death occurred during 2004 and 2008 (Crawford, 2013). The United Nations (UN) reported that 34,452 Iraqi civilians died only in 2006 (Cordesman, 2007).

In addition to direct deaths and injuries during combat, violent conflict also resulted in widespread Iraqi civilian’s death due to the indirect effects of war, so called “indirect death” as a consequence of the destruction of infrastructure or other war-related conditions such as internal displacement and starvation (Crawford,2013). The Geneva Declaration Secretariat (2008), suggested that “a reasonable average

¹ O’Hanlon, M. E., & Livingston, I. (2011). Iraq index. Tracking variables of reconstruction & security in post-Saddam Iraq, Brookings, 29 May 2011, P.3 and 32.

estimate would be a ratio of four indirect deaths to one direct death in contemporary conflicts in 2004-2007". According to United Nations Assistance Mission for Iraq (UNAMI) (2006), the conflict left households exposed to reduced access to health services, deteriorating drinking water and sewage systems, unstable electricity supply and disruption of household's daily life. Therefore, conflict not only disrupted Iraqi's access to basic or rudimentary needs in their daily life through direct damages to elements of infrastructures, but also affected their health by giving rise to the spread of disease due to deteriorated sanitation, environment and unhygienic conditions (Iqbal, 2008). Hagopian et al. (2011) estimated that although most mortality during 8 years of Iraq war (2003-2011) could be attributed to direct death due to war, nearly one-third of mortality were attributed to indirect cause such as deteriorated sanitation systems and increased health problems. Beside the direct and indirect death of civilian populations as a result of battle-induced trauma, Iraqi civilians also suffered from various types of chronic or acute disease in their later lifetime as a consequence of long-lasting violence (Tapp et al, 2008). There is growing concern about the increased prevalence of a range of adverse health outcome to varying degrees regardless of sex, age, ethnicity, religion among the people of Iraq following years of different forms of wars and conflicts. The Ministry of Health (MoH), Ministry of Planning (MoP) and World Health Organization (WHO) (2006) indicated that in 2006-2007 years, chronic illnesses such as heart disease, strokes, cancers, respiratory disease, hypertension and diabetes were the leading causes of the mortality in Iraq. Burnham et al. (2006) in a cross-sectional survey of Iraq between May 2006 and July 2006 estimated that cardiovascular disorders were the primary cause of non-violent death during this period.

The existing literatures about relation between exposure to war-related violence, community violence and health outcomes is diverse and there is abundance of literature about adverse effects of violence on the health of the population. The most immediate health outcome of violent conflict due to war is death or mortality which is measured quantitatively and qualitatively (Burnham et al, 2006; pizarro et al, 2006; Sibai et al, 2001). Epidemiologists usually use mortality rates to evaluate the severity of the impact of violent conflict on civilian populations (Toole and Waldman, 1997). Armed conflict also generates a series of deadly indirect impacts on communities apart from the number of people killed in combat. These indirect deaths can result from factors such as inability to access health care, damage to health system and

public health, incidence of preventable disease, malnutrition or unhygienic condition (Ratnayake et al, 2008). Therefore, understanding and exploring that to what extent exposure to violence can impact contributing factors of indirect death would be crucial, since number of the people died in this way who would otherwise have lived if armed violence had not devastated their communities. ICRC (2011); Iqbal (2008); Toole and Waldman (1997) assessed the indirect or secondary impact of the violent conflict on the overall public health system through evaluating the economic and infrastructural costs of conflict. They showed war-related conflict damages healthcare infrastructure, which results in adverse consequences. Studies by Hillis et al. (2017); Wright et al. (2016) established an association between exposure to community violence and physical health. In war afflicted countries, violent exposure increases the incidence of communicable disease (Gayer et al, 2007; Ghobarah et al, 2004; Sharara and Kanj 2014; Sisaye 2009; Toole and Waldman 1997), nutrition deficiency among children and adverse physical health of war-exposed children (Akresh et al. 2012; Duque 2017; Toole and Waldman 1997).

Another the most obvious area of concern resulting from exposure to violence and traumatic events is related to mental health (Roberts et al, 2009). Exposure to violence due to war (Altman et al, 2017) or community violence (Shields, 2010) is related to variety of mental health conditions such as depression, anxiety and post-traumatic stress disorders. Children and youth are among those which their exposure to violence and war creates substantial public health problem across several countries worldwide (Kletter, 2013). Studies on children in Israel found children who had been more exposed to violent attacks had higher post-traumatic stress disorder prevalence rate compared to those who were less exposed (Laufer, 2003). Researchers in 2006, in Baghdad, Mosul and Dohuk diagnosed 14% -36% of children and adolescents with symptoms of post-traumatic stress disorder (Frontieres, 2013).

The adverse effects of the Iraq war on health, regarding mortality among non-combat civilians and military personnel has been studied broadly (Burnham et al, 2006; Hagopian et al, 2011; Roberts et al, 2004). However, there is a gap in our understanding about the broader health impacts of exposure to violence in Iraq War, particularly among Iraqi non-combat civilians, regarding physical health (chronic disease morbidity, non-fatal injuries and disabilities, other acute disease) and mental health. In this paper, I

examine the association between exposure to violence due to Iraq war and health outcomes among Iraqis civilians. In particular, I analyze the association between exposure to war-related violence and conflict and the probability of experiencing acute or chronic health problems as well as injury. I further explore this association for specific illnesses including infectious or parasitic disease, gastrointestinal problems, respiratory disease, delivery complications, heart problems, mental illness, anemia, diabetes and paralysis. Therefore, firstly, this study adds to the economic literature on violence by examining the impacts of war and violence using micro-level data. Secondly, it contributes to the empirical research on war-affected countries and attempts to positively affect and magnify violence prevention efforts through sharing evidence-based study's findings with policy makers.

This thesis is organized into six chapters. The first chapter includes a short introduction about definition of violence, types of violence, its implications and some statistic information about direct and indirect deaths during Iraq war and sectarian violence. The second chapter contains an overall background on the conflict in Iraq and particularly reviews the main aspects of the 2006 sectarian conflict and provides an overview on Iraq health system before war and after different types of wars. Moreover, this chapter briefly describes the literature and highlights the key results of the empirical studies which have been proposed by other researchers on relation between violence and physical and mental health. The third section discusses the data and the variables used in this analysis. Chapter fourth introduces empirical models that have been used to explore this relationship. The fifth chapter includes the empirical results and estimates obtained with the use of the proposed models. Finally, there is a chapter with conclusions and discussions.

Chapter 2: Background

This section provides an overview of political events and periods of violence as they appear around the American occupation period in 2003 and gives an overview of sectarian violence during 2006-2007. It also covers some information on the possible conflict-relevant damages to health system.

2.1 Sectarian Violence During 2005-2007

The protracted Iraq war started in 2003 with the invasion of Iraq by the United States-led coalition. The American occupation intended to remove the government of Saddam Hussein that “developed and used weapons of mass destruction, harbored and supported terrorists, committed outrageous human rights abuse and defied the demands of United Nations and the world” and destroy the old Ba’athist dictatorship regime’s security structure (Houdeville, 2017). Although, there was bitter resentment and mistrust between the two major religious groups in the country (the Sunni and Shia) when the US-led force entered Iraq in April 2003, ordinary people, especially the Shia, believed in developing a political process to bring justice and protection and yearned for law and order throughout 2003 and early 2004. The local tribal leaders, clerics and members of the police and judiciary resisted violence (Tanner et al, 2004). However, gradually, U.S. mismanagement of the occupation brought about an active insurgency mostly in Sunni strongholds and violence progressed. Over time, Sunni insurgents started on attacking Shias as a way to regain political control. Shias militias did not respond with serious retribution until anti- Shia atrocities mounted sparking radical Shias leaders to organize violent responses (al-Khalidi and Tanner, 2006).

Although it was firstly an ethnic and sectarian war, it gradually fragmented following territorial and sectarian violence (Cordesman, 2007). “there is not a civil war in Iraq, but many civil wars and insurgencies involving a number of communities and organization struggling for power” (Stansfield, 2007). Hence, Iraq countered with a social and economic chaos in a way that armed groups and militias were broken and recomposed into multiple loosely affiliated subgroups and sub-militia like the Shia Al Sadr militia, Madhi army and Sunni armed organizations like the Islamic army in Iraq (IAI) and (AQM) Al Qaeda in Mesopotamia (visser, 2008). In February 2006, the Sunni organization Al-Qaeda in Iraq bombed

one of the holiest sites in Shia Islam, the al-Askari Mosque in Samarra and sectarian violence had clearly reached a new pitch. Immediately after the bombing, Shia militiamen, cleric and strongman Muqtada al-Sadr which was founder of Mahdi Army of Shia, stormed through Baghdad assaulting Sunni mosques and massacred Sunni civilians which led to retribution by Sunni rebels (al-Khalidi and Tanner, 2006).

The years 2006 and 2007 saw a dramatic increase of different types of violence, mass murders and sectarian cleansing (Lins de Albuquerque and O'Hanlon, 2012). Rising numbers of internally displaced persons (IDPs) was a key aspect of the sectarian violence since the mosque bombing in February. Numbers of Shia and Sunni families living in mixed neighborhoods were forcibly evicted from their homes or left voluntarily due to threats of violence from militias (UNAMI, February 2006). Ethnic groups used a soft ethnic cleansing tactic to intimidate members of opposing sects and nationalists who refused to take a side in the civil conflict. The UN estimated that number of IDP's in Iraq who were fleeing violence or had been threatened in their previous location was about 1.7 million with average displacement at 40,000 to 50,000 a month (Cordesman et al, 2007).

In addition to internal dislocation, ethnic and sectarian displacement created major refugee populations such that about 1.8 million Iraqi were living outside the country by 2006 (Luo, 2007). Jordan and Syria were the primary destination for the displaced people and tried to provide adequate services for largely unwanted refugee populations (Margesson et al, 2009). The last three months of 2007 were characterized by a marked decrease in extreme forms of violence, notably mass casualties, suicide attacks and sectarian cleansing, a trend which was attributed to shifting of forces like reduced insurgency operations and activities of important networks in violence like Al-Qaeda/ISIS and Jaysh Al-Mahdi (Houdeville, 2017). Despite the decrease in general levels of violence in the end of 2007, there were numerous incidents involving intimidation, bombing attacks, threats, kidnapping for ransom or other motives, torture, assassinations and extrajudicial killings. Both Sunni and Shia armed groups targeted civilians through suicide bombings and other attacks which had devastating consequences for the civilian population, while other attacks targeted government officials, religious figures and professional groups like lawyers, judges and journalists. Religious and ethnic minorities and other vulnerable groups also were victims of violent attacks, as women were called "honor crimes" (Unami, December 2007).

2.2 Iraq Health System During Conflict Years

Prior to the Iran-Iraq war of September 1980, Iraq once had a high standard of health care relative to the rest of the Arab region. Health care administered through the Ministry of health (MOH) with well-equipped, well-supplied, in modern hospitals and an adequate number of well-educated physicians and medical groups (Foran, 2008). Health system was highly centralized, hospital-oriented and fully government-subsided with revenues from the nationalized oil industry (WHO, 2006). However, in the last few decades the Iraq's health care capacity has been severely undermined by the effects of different wars, international sanctions, sectarian violence and political instability. Since the 1980-1988 Iran-Iraq war, health status among the people of Iraq deteriorated with the degradation of the country's infrastructure and diversion of funds from health sector (Alwan, 2004). According to the Iraq Living Condition Survey (ILCS), 2004, the total expenditure on health in 2001 was 3.2 % of GDP as a result of the diversion of Finance to fund three consecutive war. The situation even changed dramatically from 1990 onwards due to the gulf War and the following 13 years of embargo and economic sanctions. Although, the subsequent oil-for-food programme mitigated some of the effect of sanctions, but sanctions had a major effect on Iraq's health system and the health status of Iraqis (Al Hilfi, 2013). By then, capacity of the curative health system greatly was reduced and failed to reorient itself to the changing health need of the population (Diaz and Garfield, 2003). At the same time of the 2003 US-led invasion of Iraq, the health system with non-functioning equipment, inadequate drug supplies and fragile infrastructure was weak (Al-Hilfi et al, 2013). In the following sectarian violence years of 2006-2007, displacement within Iraq which was a result of sectarian conflict, general armed violence and fighting among militias and insurgents, had adverse consequences. Basic humanitarian needs and services including food, water and sanitation, fuel and electricity, shelter, health care and education were hugely deteriorated and placed massive burden on communities (Margesson et al, 2009). That time, kidnapping had become one of the most widespread common criminal enterprise conducted by insurgents and organized gangs. The United Nations Assistance Mission for Iraq (UNAMI) Human Rights Office (HRO), June 2006 reported that huge number of health workers including doctors, nurses and professionals in general were Kidnapped and assassinated by armed

groups which resulted in displacement of many skilled health workers to safer areas of the country or to other countries. In addition to threats to health workers' personal safety, medical personnel had difficulties in carrying out their work due to inadequate supply of electricity, increasing number of patients due to the increase in violence.

2.3 Literature Review

This section reviews the literature on exposure to violence and health. Violence in this literature can be defined in different ways. Domestic violence is aggressive behavior within home which involves the violent abuse of spouse or partner. Community violence refers to wide range of events such as attacks, gang wars, terrorist attacks, kidnappings, war-related violence, and sexual and physical abuse. Since Iraq is a country that has been experiencing prolonged years of wars in last two decades, I have tried to mostly explore findings of papers on war-related violence and health. However, since sexual violence also accounts for a sizable and hidden proportion of indirect conflict deaths in armed conflict, mainly among women and girls (Ratnayake et al, 2008). Therefore, I also include papers that study sexual violence. Health outcomes covered in the literature review include mental health, pregnancy complications, and some chronic or acute disease such as, blood pressure, heart disease, respiratory and gastrointestinal disease.

2.3.1 Effects of Violence on Mental Health

The term mental health is used to describe a wide range of conditions associated with mental conditions, which may or may not be of sufficient severity to warrant a diagnosis of a mental disorder or necessarily lead to the development of a mental disorder. Regardless, mental health problems can result in significant suffering and distress for individuals and their family and reduce productivity (World Health Organization, 2005). Based on World Health Organization, in 2012, individual attributes and behaviors, social and economic circumstances, and environmental factors are determinants of mental health and well-being. Therefore, exposure to violent conflict as an adverse environmental factor impacts mankind in different ways which mental health is one of those. The World Health Organization (2001) estimated that

10% of individuals exposed to traumatic events in armed conflicts situations, will develop clinically significant mental health distress. Overall, violence is an important source of stress and there is a significant consistency in the association between perceptions of insecurity and various diagnosed mental health problems (Altman et al, 2018). Over the years, studies have repeatedly shown high prevalence of mental health problems in individuals exposed to different types of violence. Kilpatrick et al. (2003) assessed the effect of exposure to interpersonal violence like sexual assault, physical assault and witnessing violence, on post-traumatic stress disorder (PTSD) and major depression in a sample of adolescents aged 12-17. There was a significant relation between all three forms of violence exposure and co-morbid PTSD and depression. Al-Nuaimi et al. (2015) studied this association in a combat area. In a sample of 480 Iraqi men aged above 18, they found that experiences such as seeing a shooting or stabbing, displacement, a friend or relative being exposed to violence and viewing corpses were significantly correlated with psychological changes. Overall, war and political violence have mental health consequences for victims, relatives, neighbors and communities. But, the severity and type of mental health disorders caused by war and political violence depends on many factors such as nature and intensity of the violence endured or witnessed, sociopsychological characteristics of the patient like age and sex, and type of location of refugee or new settlement (Ugalde and Richards, 1999). For example, Shield et al. (2010) showed that young women (18-25 years) were more likely than their men peers to report symptoms of depression and post-traumatic stress disorder (PTSD) after experiencing various forms of community violence like victimization, witnessing violence and hearing about violence. This was true for both recent and lifetime violence exposure. Among civil war veterans, younger soldiers were more likely to develop risks of co-morbid physical and nervous disease compare to older soldiers (Pizarro et al, 2006). However, race did not have effect in any forms of violence (Shield et al, 2010). Also, Shield et al. (2010) found that although witnessing violence in lifetime did have significant effect on PTSD, hearing about violence either in lifetime or in recent exposure did not have a significant effect on depression and PTSD. Types of mental health problems caused through violent conflicts is different depend on nature of violence endured. Wright et al. (2016) assess how the pre-displacement trauma particularly from kidnapping in Iraq affects the mental health of Iraqi refugees 1 year after settling in the U.S. They found that people who experienced pre-displacement kidnapping were more likely to be diagnosed with post-traumatic stress disorder than

Major Depressive Disorder (MDD). Witnessing violence in lifetime had significant effect on PTSD and not significant effect on depression among young adults (Shield et al, 2010).

2.3.2 Effects of Violence on Pregnancy Complications

Recent analyses show that maternal mortality declined by of 44 percent between 1990 to 2015, a declined ratio from 385 deaths to 216 deaths per 100,000 live births. According to the United Nations inter-agency estimates, this translates to an average annual rate of 2.3 percent reduction (UNICEF, 2016).

However, this is less than half the 5.5 percent annual rate needed to achieve the maternal mortality target for 2015 (UNICEF, 2016). It is estimated that in 2015, roughly 303,000 women died from pregnancy or childbirth-related complications around the world and it specially occurred in low-resource and developing countries (Alkema et al, 2016). In response to the Millennium Development Goals (MDGs), there has been growing attention to reducing maternal mortality over the past decades. World Health Organization defined maternal or obstetric morbidity as morbidity that is attributed to and/or aggravated by pregnancy or its management. Pregnancy complications are related to both short-term and long-term maternal mortality, which has adverse implications for women, their family and community (Hardee et al., 2012).

There are different aetiologies behind the maternal morbidity. Some are related to care that women receive during pregnancy and others related to social aspects or factors outer the health system. Attention to women's experiences of violence victimization in the context of armed conflict, sexual violence and other human rights violations may be crucial elements in understanding maternal morbidity (Falb et al., 2014). There are limited studies which pay attention to impacts of female exposure to different types of violence and pregnancy complications. Zapata et al. (1992) assessed the relationship between residing in communities affected by armed conflict and political violence and complications during pregnancy. Their study on 161 healthy Chilean women aged 19-40 who received prenatal care but lived under levels of political violence, revealed that probability of risk of pregnancy complications increased with living in high versus low-violence neighborhoods (Zapata et al., 1992). Falb et al. (2014) investigated the relationship between lifetime conflict victimization and intimate partner violence (IPV) victimization with pregnancy

complications using logistic model on a sample of 337 women living in refugee camps in Thai-Burma border. They found that women who experienced lifetime victimization had a three times greater probability of reporting pregnancy complications than those did not experience conflict violence. However, there was no significant relationship between IPV victimization and pregnancy complications. Bakken et al., (2015) also find adverse obstetric outcomes for refugee women who originated from conflict zones. They compared the obstetric outcomes of immigrant women originating from the conflict-zone countries such as Somalia, Afghanistan, Iraq and Kosovo with those of ethnic Norwegian women where all women giving birth at a low-risk maternity wards. Adjusting for maternal background characteristics, the odds of emergency caesarian section (CS), post-term birth, meconium-stained liquor and having a small for gestation age (SGA) infant were greater for Somali women compare to Norwegians. Additionally, the birth weight of babies whose mother originated from Iraq, Afghanistan and Somalia were lower than that of babies born to Norwegian women. Exposure to wars and conflict violence can also aggravate an existing high maternal mortality and morbidity rate by destroying health services and preventing access to them, as have been shown by Price and Bohara, (2012). They assessed effects of incidents of conflict-related violence on antenatal care (ANC) utilization in Nepal on women aged 15-49. They found that mothers received fewer ANC check-ups as the number of violent incidents in their village development committee (VDC) increased.

2.3.3 Effects of Violence on Blood Pressure

High blood pressure is a risk factor for several major illnesses including heart disease and strokes worldwide. It is crucial to find the factors that contribute to high blood pressure. Factors in adult life that are known to influence blood pressure include harmful use of alcohol, unhealthy diet, tobacco use, lack of physical activity, body mass and intake of salt. However, in searching for new ways to tackle adverse health outcomes related to hypertension, researchers have started to assess the effects of shocks on high blood pressure. Studies regarding the effects of violence exposure on the physical health outcomes particularly blood pressure are more limited. Wilson et al. (1998) showed that exposure to violence is an important environmental stressor and a risk factor for high blood pressure among African-American

adolescents. They found that adolescents who were victims of violence or witnessed violent acts in last year, had a lower probability of experiencing nighttime dipping in blood pressure compared to those who were not exposed to violence. Wilson et al. (2002) expanded their previous research by comparing nighttime dipping status in African-American female adolescents with their male counterparts who were subject to violence in their community. Findings suggested that both female and male adolescents exposed to direct victimization in last year were less likely to have a decreased nighttime blood pressure compare to unexposed peers. However, men were more likely than women to experience nighttime non-dipping status when exposed to indirect violence in last year.

In addition to short-term effect of violence on hypertension, researchers examined the long-term effects of violent political shocks. Ford and Browning (2013) examined the longitudinal association between exposure to physical violence with a weapon among male and female adolescents aged 11-17 on hypertension during adulthood. After adjusting for cardiovascular risk factors (BMI, daily smoking, alcohol abuse and depression) as mediators, male adolescents who witnessed violence had an increased risk of hypertension in adulthood compared to their unexposed peers. However, there was no significant association between violent victimization of male adolescent and their hypertension. For women the reverse happened, in other words, female who reported violent victimization had increased odds of hypertension in adulthood. Islam et al. (2015) also found similar results in assessing the health of adults who were adolescents or born during China's cultural revolution. Females and males who were adolescents during revolution showed higher blood pressure in adulthood.

2.3.4 Effects of Violence on Heart Disease

Most attention relating violence and heart disease has been directed towards the impact of sexual violence or intimate partner violence on heart disease. Clark et al. (2015) using National Longitudinal Study of Adolescent to Adult Health, established an association between exposure to victimization (threatened, pushed, slapped, injured or having unwanted sexual relation by partner) and perpetration in adolescents with elevated cardiovascular disease in adulthood. Wegman and Settler (2009) in a quantitative meta-analysis showed a relationship between childhood maltreatment and cardiovascular disease in

adulthood. However, fewer studies examine the impacts of war-related violence on heart disease among non-combat civilians. Poole (2012) demonstrates that cardiovascular diseases is a chronic illness that is adversely affected by long-term exposure to stresses of armed conflict. Poole (2012) showed that exposure to armed conflicts is linked to increased cardiovascular disease mortality especially among adult women. Sibai et al. (2001) looked at long-term impact of exposure to war in Lebanon (1975- 1991) on both cardiovascular disease (CVD) and mortality in the elderly population, where experience of war events, based on type of exposure, were aggregated into different clusters. Their analysis, after accounting for potential risk factors, sociodemographic and lifestyle variables, found that exposure to property losses (work-related problem, loss home and displacement) for both men and women, is associated with increased mortality. Moreover, although exposure to trauma (deaths, injuries, kidnapping and other threats) for men was not related to increased CVD risk, women who experienced traumas had significantly elevated CVD risk and higher CVD mortality rates. Flores et al. (2017) investigated this relationship among women in Mexico with a cross-sectional analysis during 2012-2013. They examined exposure to criminal violence and insecurity using Life Stressor Checklist and found a significant association between physical violence (being mugged, assaulted or threatened by stranger) and escalated risk of cardiovascular disease in middle-aged women. Pizarro et al. (2006) looked at the health impact of traumatic war experiences among civil war veterans exposed to violence such as witnessing the death of family members or comrades, being injured or being a prison of war (POW). Using military service records, they estimated that among all traumatic war experiences that veterans experienced, seeing the death of their friends or comrades was highly associated with increased risk of cardiac and gastrointestinal disease in their post-war lifetime. Additionally, soldiers who were young (≤ 31) when entered to military service were more likely to develop signs of cardiac and GI disease relative to veterans who were older at enlistment.

2.3.5 Effects of Violence on Respiratory Disease

According to World Health Organization report, respiratory diseases are diseases of the airways and structure of the lung. Some of the most common respiratory diseases are asthma, obstructive pulmonary disease and occupational lung disease. Asthma or lung diseases are more prevalence in low-income inner-city neighborhoods and among children.

Existing literature on lung development and childhood asthma showed that number of early risk factors including viral respiratory infections (Gern et al, 2005), perinatal factors like birthweight and gestational age (Barker et al, 1991), smoking during pregnancy (Hanrahan et al, 1992) are associated with reduced lung function over the life course. But, these factors can account for only a small proportion of the poor lung health outcomes (Suglia et al, 2008). Hillis et al. (2017) find that exposure of children to various forms of the violence including physical, sexual and emotional abuse or witnessing violence in their communities is associated with lasting impacts on children's well-being.

There are limited studies which assess role of the only community violence as a risk factor for respiratory disease. Wright and Steinbach (2001), based on four inner-city pediatric patients (12 years old African American girl, 15 years old Hispanic girl, 9 years old Caucasian girl, 3 years old girl) case study find that exposure to community violent events as a source of psychological and environmental stress seemed to be a common precipitant of asthma symptoms. Walker et al. (2008), using the Self-Regulation Model of Disease Management, observed that children (5-12 years) with asthma who exposed to community violence have increased asthma symptom relative to asthmatic peers who did not have violent exposure. Suglia et al. (2008) after adjusting for early risk factors such as in utero and second-hand tobacco smoke (SHS), birth weight and lower respiratory tract infections, examined the relationship between exposure to lifetime community violence and lung function among 313 urban children (boys and girls) aged 6-7. They found that boys exposed to lifetime community violence (mothers reported on their child's lifetime exposure) including hearing, witnessing or experiencing knife attacks, shooting or shoving were more likely to develop decreased lung function and girls who exposed to conflict at home like verbal aggression between parents had a decreased forced expiratory volume (FEV) and forced vital capacity (FVC). Moreover, Apter et al. (2010) added to these findings with a longitudinal study on an adult

population. They found that people with moderate or severe asthma who exposed to community violence had nearly twice the emergency department (ED) visits and hospitalizations for asthma compare to asthmatics who had not exposed to community violence. Moreover, asthma-related quality of life in exposed group was significantly lower on average. Islam et al. (2015) established a long- term association between exposure to violence and adult poor lung function. They found that Individuals who were born during China's cultural revolution or were adolescents during this period exhibited reduced lung capacity in later life.

2.3.6 Exposure to Violence and Gastrointestinal Disease

The existing literature on the impacts of violence on digestive disease are limited and mostly focused on impacts of exposure to sexual violence. Drossman et al. (1990) found that early life stress in the form of abuse plays a major role in the vulnerability of individuals to progress functional gastrointestinal disorders (FGD) later in life. In female outpatients, they found a strong relationship between functional bowel disorders and childhood sexual or physical abuse. Talley et al. (1994), minimized the selection bias may result from outpatient studies, since patients with abuse may be more likely to be referred to clinics with a functional bowel disorders, through a population-based survey in a random sample of residents of Olmsted county in Minnesota. They found that respondents who reported sexual or emotional abuse in childhood or/and adulthood were more likely to have symptoms with irritable bowel syndrome, dyspepsia or heartburn. Perona et al. (2005) contributed to these findings by evaluating functional gastrointestinal disorders (FGID) concurrently among 70 women experiencing domestic violence which was reported to police in the National Police Department in Barcelona, Spain, during 2001-2002. In the two thirds of the women, FGID onset occurred at the same time or shortly after the abuse happened. Bradford et al. (2012) characterized other types of traumatic events other than abuse by assessing association between different types of early adverse life events (EALs) such as general trauma (various stressful and traumatic events), physical, emotional and sexual abuse before age 18 and development of functional gastrointestinal disorders (FGIDs) including irritable bowel syndrome (IBS). They found that IBS patients had significantly

higher prevalence of four types of early adverse life events than the healthy control subjects (HCs), after adjusting for demographic variables, and these differences were mainly seen among women. Although, Hospital Anxiety Depression scales (HAD) (Bradford et al., 2012) and the brief symptom Inventory scales (BSI) (Talley et al., 1994) had all significantly positive association with irritable bowel syndrome (IBS), EALs (Bradford et al, 2012) and abuse (Talley et al, 1994), after controlling for psychological and somatic symptoms, still had association with IBS.

Exposure to war can be considered as another type of adverse life event which may impact on risk of developing gastrointestinal disorders (Klooker et al, 2009; Porter et al, 2011). Klooker et al. (2009) investigated impact of a stressful environment in the Netherlands due to World war II during 1940-1945 in a population-based cohort on the prevalence of Irritable bowel syndrome (IBS) in adults who born or were in utero during war. Although they could not distinguish to what extent developing IBS in adulthood could be ascribed to the war's stressful environment, nutrition deficiency or the incidence of infectious disease. But, in individuals who had been exposed to war conditions at 1-1.5 years age, the risks of developing IBS significantly increased. However, Porter et al. (2011) in a matched case-control study assessed effects of infectious gastroenteritis (IGE) and war-related stressors independently on the development of functional gastrointestinal disorders (FGD) in the deployment of U.S. military population to Iraq and Afghanistan during 2008-2009. Although their findings reported association between IGE (such as vomiting and diarrhea) during deployment and FGD risk, war-related stressors including viewing injured or dead persons, shooting gun or killing person or being threatened and scared and non-combat related stressors (alcohol abuse, feeling isolated) were not significantly associated with increase in FGD risk.

Chapter 3: Data

This chapter presents all the variables and data needed to perform the empirical analysis. The first section presents an explanation of the source from where the information came. Second part provides a description of all the interested variables in the study.

3.1 Data Description

This paper uses the data from Iraq- Household Socio- Economic survey 2006-2007. The total effective sample size of the IHSES 2007 is 17,822 households and 127,189 individuals. The survey was nominally designed to visit 18,144 households, 324 in each of 56 major strata. The Strata are the rural, urban and metropolitan sections of each of Iraq's 18 governorates, with the exception of Baghdad, which has three metropolitan strata. The sample was selected in two stages, with groups of majals (census Enumeration Areas) as Primary Sampling Units(PSUs) and households as Secondary Sampling Units.

The questionnaire was designed by Central Organization for Statistics and Information Technology (COSIT) and Kurdistan Region Statistics Organization (KRSO) in consultation with the World Banks consultants. It is composed of 18 sections. The IHSES, using 56 field teams distributed through all 18 Iraqi' governorates, collected data in 12 months. Each team consisted of one local supervisor, three interviews and one data entry operator. The interviews were supervised by 56 local supervisors along with regular supervision visits by central supervisors. One of the objectives of the Socioeconomic Survey 2007 were to provide indicators related to human development measurements, individual and household income levels, poverty measurements and indicators to meet the national accounts and family sector requirements. Other objectives were to build norms for constructing a Consumer Price Index, identify consumer expenditure patterns and impact of the various changes they have experienced and provide integrated system for the assessments of household living conditions.

3.2 Variable Description

The survey includes a module on morbidity experience. Respondents are asked whether they suffered from any acute illness or injury in last 30 days. If so, they are asked to report type of the illness or injury they suffered from. Respondents are similarly asked if they suffer from any chronic disease. If so, they are asked to report the specific chronic illness they suffer from. From these questions, we generate our dependent variables.

We generate three dependent variables capturing general health. These are individual experience in the last month of any injury (equals to 1 if individual suffers from any of injuries listed in the questionnaire, in last 30 days, equals to 0 if he/she does not), any acute illness (equals to 1 if individual suffers from any of acute disease listed in questionnaire, in last 30 days, equals to 0 if he/she does not) and any chronic disease (equals to 1 if individual suffers from any of chronic disease listed in questionnaire, in last 30 days, equals to 0 if he/she does not). The full list of reported illnesses and injuries are listed in the appendix A. In addition to general health problems, I also look at the association between violence and specific acute and chronic diseases of interest. I focus on particular illnesses that have either been found to be relevant in the literature on health and violence or those that are more widely experienced in this specific sample. The acute diseases I examine are self-reported respiratory, gastrointestinal, and infectious disease. Specific chronic illnesses I investigate are diabetes, mental illness, paralysis, heart problems and anemia. Each variable indicating of self-reported illnesses equal one if respondent reports suffering from that specific disease (answered yes) and equals to zero otherwise. The variable capturing heart problems is equal to one if the respondent reports either suffering from high blood pressure or cardiac disease². Similarly, mental illness is equal to one if respondents reported suffering from acute mental illness or a chronic psychological disease³. Finally, I also looked at the pregnancy or delivery complication as a health problem in women. First, woman aged 12-49 years are asked whether they have ever given birth to a child or not (stillbirths and miscarriages are not taken into account), then the women who answered (yes or no)

² Findings are similar if I examine cardiac disease and hypertension separately. Results available upon request.

³ Only 10 individuals report suffering from acute mental illness. Given that the survey does not include any details or extra explanations about difference between mental and psychic illness, I combine them into one variable. Moreover, results are largely the same if I examine acute mental illness and chronic psychological disease separately. These results are available upon request.

that question, are asked whether they ever experienced pregnancy or delivery complications. I only focus on women who gave birth in years 2005-2007, since questions on violence only cover the last 12 months. For this sample of women who gave birth in the given time frame. delivery complication equals to 1 if a woman had delivery complication (answers yes) and zero otherwise.

The primary independent variable of interest is exposure to violence. All households are asked to identify if they encountered dangerous or difficult situation during last 12 months. The survey asked about three general types of violence. First, households are asked whether any of the household members were exposed to or affected by violence due to abnormal situation or not (violence=1 if yes, violence=0 if not). Second, they are asked whether any household members have been adversely affected by kidnapping or life threats due to abnormal situation or not (kidnapping=1 if yes, kidnapping=0 if not). Third, they are asked whether any household members have been affected by other types of violence or not (violence other=1 if yes, violence other=0 if not). The survey does not detail what “other types of violence” consists of. However, it may include experiences such as domestic violence. We perform our analysis examining the effects of each of these three types of violence. I additionally, examine the effect of any violence which equals one if anyone in the household has been affected by any one of the three types of mentioned before violence and zero otherwise.

The surveys also include modules on education, expenditure and community characteristics. I calculate years of schooling for individuals who ever attended school as years of schooling that an individual report having minus the reported years of grade repetition. Of 104,172 individuals, 9 have negative years of schooling (years of repetition are greater than years of schooling). For these individuals, I assume that their years of schooling is equal to zero. I generate dummy variables on household waste disposal, water supply, sanitation, flooring as follows. First, household is asked to report the method of disposal of wastes (waste disposal=1 if household’s garbage is collected formally by government or private sector, otherwise, waste disposal=0). Second, stable water supply, household is asked about water availability and type of interruptions (stable water supply=1 if water from the network is available and stable or interruptions occurs once or less weekly and monthly, otherwise, stable water supply=0). Third, type of sanitation (categorical variable scaled from 1 to 5 where 1= public network, 2=septic tank, 3=covered

drain, 4= open drain, 5= other type). Forth, household's report of principal material for the flooring of housing unit (flooring=1 if brick or tile used in paving the house's floors, otherwise, flooring=0) and finally, since there was no sufficient information data regarding household income level, we used continuous total expenditure of households as a socio-economic status of household, measured in Iraqi dinar monthly by Paasche index⁴. I also generate dummy variables on Community support. Household were asked if they received help from community in response to violence that individuals encountered in last 12 months. community equals to 1 if household had been helped by community and equals to zero if not.

Households are asked about the distance from household to different services such as distance to nearest hospital, health center, elementary school, secondary school and market. We generate variables capturing distance to hospitals, health centers, elementary schools, secondary schools and markets as equal to one if this reported distance is closer than 1km and zero otherwise. For distance to hospital we combine private and public hospitals. Finally, we generate a dummy variable equal to one if the main road leading to the residential unit is paved and zero otherwise.

X is a matrix of control variables. Our control variables are divided in three groups: individual, household and community level controls. We have three control variables in individual level including gender (1=male, 0=female), continuous age variable and years of schooling. We have included five household level control variables in the model and six controls in community level.

Table 1 summarizes descriptive statistics for all health variables, violence variables, variables of interest and controls. Nearly 4.2 % of respondents experienced violence due to abnormal situation, about 1.9% exposed to kidnapping and 1.4% experienced other type of violence. Overall, 5.2 % of individuals have been affected by any type of violence.

⁴ Paasche index developed by German Economist Hermann Paasche for measuring current price or quantity levels relative to those of a selected base period.

Overall, 9.8% of individuals suffer from an acute disease, and 0.4% from any injury. Among interested acute illnesses, the largest proportion of people, on average 4.8% suffer, from respiratory disease, 0.9% from gastrointestinal and infectious disease. 8.85% of individuals suffer from chronic disease, 4.5% suffer from heart problems, 2.2% from diabetes, 0.2% experience mental illness and 0.35% suffer from anemia.

Average age in our sample is about 22 years. 50% of the sample is female, 65% live in urban area and 93% born in governorates which currently they live. Only a small proportion of respondents, 8.5% reported a female head of the household. Overall, the respondents on average have about 5 years of schooling, with about 20% not attending school at all. Maximum years of schooling in sample is 28 with minimum 0.

Household condition in terms of access to stable water supply and formal waste disposal system was unfavorable. High portion of the household encountered with interruptions in the availability of water, only about 22.13% of households had stable water supply. For the method of waste disposal, just 35.71% of households reported that their wastes are collected regularly by the government or private sector. The rest of the households burned, buried or threw outside their garbage. In terms of main sewage system, approximately 17.74% and 53.39% of households reported that a public network and septic tank is used, respectively, in their housing unit. The rest use an open drain or other sanitation system. Moreover, total expenditure of household on average estimated by Paasche index is about 127 thousand dinars which the least amount of expenditure was 20 dinars (in thousands) and the most was approximately 1892 dinars per month. Also about 2.2% of household reported receiving help from community in response to violence that encountered in last 12 months.

For the Socioeconomic status of households in the community level, approximately 50% of household have paved road to their housing units. In terms of distance to access to services, about 87% and 65% of household report that the distance from household to nearest elementary and secondary school respectively is less than 1 Km. A high proportion of households have more than 1km distance to nearest hospital, 23% and 49% of household report less than 1 km distance to the nearest hospital and health center, respectively. Finally, 59% of households reported that markets are placed in less than 1 km distance from their residential areas.

Table 2 presents average morbidity experiences of those exposed and not exposed to violence separately. Findings reveal that on average acute gastrointestinal and mental illness are significantly higher among individuals who were exposed to violence compared to those who were not. However, exposure to any violence is associated with lower rates of infectious disease and any acute disease.

In terms of chronic disease, exposure to any violence is strongly associated with increased incidence of diabetes, and heart problems, but anemia is higher among unexposed individuals compared to those exposed to violence.

In terms of control variables, those exposed to violence appear to be better off in a lot of variables than those not exposed to violence (Table 2). It may actually cause downward bias in my estimated violence effects, since without violence, we would expect all of these individuals to have better health than their worse off untreated counterparts.

Table 1: descriptive statistics

Variables	N	Mean	SD	Min	Max
Violence exposure:					
Exposure to violence due to abnormal situation	127,189	.042	.201	0	1
Exposure to kidnapping or life threats	127,189	.019	.135	0	1
Exposure to other type of violence	127,189	.014	.116	0	1
Any violence	127,189	.052	.223	0	1
Acute illness:					
Gastrointestinal	127,189	.009	.094	0	1
Respiratory	127,189	.048	.214	0	1
Infectious	127,189	.009	.096	0	1
Any acute disease	127,189	.098	.297	0	1
Chronic disease:					
Diabetes	127,189	.022	.146	0	1
Paralysis	127,189	.006	.077	0	1
Anemia	127,189	.003	.055	0	1
Heart problem	127,189	.045	.207	0	1
Mental illness	127,189	.003	.051	0	1
Any chronic disease	127,189	.088	.283	0	1
Any injury	127,189	.004	.067	0	1
Delivery complication	127,189	.336	.473	0	1
Individual level controls variables:					
Gender (male=1, female=0)	127,189	.498	.500	0	1
Age	127,189	22.807	18.392	0	106
Years of schooling	127,189	5.421	4.555	0	28
Born Here	127,189	.936	.245	0	1
Born urban area	127,189	.653	.476	0	1
Head of family (if female=1, if male=0)	127,189	.085	.279	0	1
Household level control variables:					
Total expenditure (in dinars)	127,189	126.833	77.766	20.742	1892.86
Formal waste disposal	127,189	.357	.479	0	1
Stable water supply	127,189	.221	.415	0	1
Sanitation	127,189	2.337	1.030	1	5

Table 1: (continued)

Brick or tile flooring	127,189	.430	.495	0	1
Community level control variables:					
Distance to nearest hospital	127,189	.229	.420	0	1
Distance to nearest health center	127,189	.493	.500	0	1
Distance to nearest elementary school	127,189	.866	.340	0	1
Distance to nearest secondary school	127,189	.646	.478	0	1
Distance to nearest market	127,189	.593	.491	0	1
Paved road	127,189	.504	.500	0	1
Being helped by Community	127,189	.022	.145	0	1

Table 2: summary statistic (T-test)

	<u>Treated (any violence=1)</u>			<u>Untreated (any violence=0)</u>			<u>Mean Difference⁵</u>
	(1)	(2)	(3)	(1)	(2)	(3)	(3)
Health variables:	N	Mean	SD	N	Mean	SD	Mean
Delivery complication	391	.309	.463	7,703	.338	.473	-.028
Any injury	6,664	.005	.071	120,336	0.004	.067	.001
Acute disease:							
Respiratory	6,664	.048	.215	120,336	.048	.214	.000
Gastrointestinal	6,664	.011	.106	120,336	.009	.094	.003**
infectious	6,664	.005	.070	120,336	.009	.097	-.005***
Any acute disease	6,664	.087	.283	120,336	.099	.298	-.011***
Chronic disease:							
Diabetes	6,565	.028	.164	118,133	.022	.145	.006***
Paralysis	6,567	.007	.084	118,121	.006	.076	.001
Anemia	6,566	.002	.041	118,124	.003	.056	-.001**
Heart problem	6,568	.051	.219	118,183	.044	.206	.006**
Mental illness	6,566	.003	.058	118,112	.003	.050	.001
Any chronic disease	6,574	.087	.282	118,325	.088	.283	-.001

*** p<0.01, ** p<0.05, * p<0.1

⁵ Mean difference= mean (1) _ mean (0)

Table 2: (continued)

Control variables	<u>Treated (any violence=1)</u>			<u>Untreated (any violence=0)</u>			<u>Mean Difference</u>
	N	(1) Mean	SD	N	(2) Mean	SD	(3) Mean
Individual-level							
Age	6,667	23.35	17.906	120,50	22.77	18.418	.574**
Gender	6,667	.504	.500	120,502	.498	.500	.005
Years of schooling	5,533	6.598	4.698	98,623	5.355	4.538	1.243***
Household-level							
Total expenditure	6,638	126.471	67.194	118,989	126.858	78.318	-.388
Stable water supply	6,667	.145	.352	120,445	.226	.418	-.081***
Formal waste disposal	6,667	.351	.477	120,469	.357	.479	-.006**
Sanitation	6,667	1.920	.704	120,457	2.360	1.040	-.439***
Brick or tile flooring	6,667	.579	.494	120,498	.422	.494	.157***
Community-level							
Distance to nearest hospital	6,660	.325	.468	120,376	.223	.416	.102***
Distance to nearest health center	6,660	.686	.464	120,295	.482	.500	.204***
Distance to nearest elementary school	6,660	.911	.285	120,383	.864	.343	.047***
Distance to nearest secondary school	6,660	.815	.388	120,376	.637	.481	.178***
Distance to nearest market	6,648	.758	.428	120,360	.584	.493	.174***
Paved road	6,667	.638	.481	120,502	.497	.500	.141***

*** p<0.01, ** p<0.05, * p<0.1

Chapter 4: Empirical Model

This chapter explains the econometric method that has been used to determine the relation between exposure to violence and different health outcomes. The method analyzed the probability that an individual has health problem when those individuals are exposed to violence and other cofounders are taken into account with fixed cluster effect.

4.1 Linear Probability Model

According to the literature reviews, we assume that there is an association between exposure to violence and health outcome.

To test the hypothesis and quantify the effect, a linear probability regression model with cluster level fixed effects is used to model health outcome as a dichotomous dependent variable. I use separate models to examine effect of each of the violence variables on the different health outcomes. Furthermore, I utilize second and third model with interaction term, to see how the effect of exposure to violence on health outcome would be different between women and men and examine the effects of receiving help from community on violence exposure and health association. This is performed by Stata 14 version software

$$1) \text{ Disease} = \beta_0 + \beta_1 \text{ violence} + \beta_3 X + \varepsilon$$

Response variables are some self-reported acute diseases (respiratory, gastrointestinal, infectious disease), chronic diseases (diabetes, paralysis, anemia, mental illness, heart problems) and delivery complication which we dichotomized each as yes (=1) if respondent suffers from that disease versus 0=no if he\she does not.

The explanatory variable in this study is violence which captures respondent's experiences of violence in last 12 months. There are three variables for measuring violence in household level which I have described them in previous chapter. Variable X contains the whole control variables;

Sociodemographic variables (gender, age) and measures of socioeconomic status (SES) such as years of schooling, household per capita expenditure, type of sanitation, method of waste disposal, stable water supply, and distance to nearest hospital, health center, elementary and secondary school; types of flooring in household and type of roads in community. I also include a vector of survey cluster fixed effects in order to control for community-level heterogeneity.

To examine the extent that the associations I find are due to heterogeneity at the individual, household, and community level, I use hierarchical linear cluster-level fixed effects regression model to see how effects of violence changes when we add more control variables. In the first step of analyses, we assess effect of each of violence variables on the health outcome with taking into account the time-invariant unobservable in the cluster level. In second step, individual-level control variables such as gender, age and years of schooling are entered; followed by household-level control variables (total expenditure, water supply, type of flooring, waste disposal and sanitation system) on the third step, and community-level variables (distance to nearest health services and hospitals, market and elementary or secondary school and type of community's roads) on the fourth step. The results are reported in the appendix.

In addition to equation (1), I explore the gender differences in the health effects of violence exposure with the following model

$$2) \text{Disease} = \beta_0 + \beta_1 \text{ violence} + \beta_3 X + \beta_4 \text{ violence} * \text{male} + \varepsilon$$

In the equation (2), the interaction term tells us whether effects of violence on probability of having disease is different between male and female, β_1 captures effects of violence on probability of having disease for female and $\beta_1 + \beta_2$ shows effects of violence on probability of having disease for men.

Finally, households may employ a variety coping strategies in response to violence, which can then impact health. In this way, they may mitigate the negative health effects of violence exposure. One potential coping strategies is receiving help from their community. I examine the extent that the health effects are mitigated due to the community support in response to violence.

$$3) \text{Disease} = \beta_0 + \beta_1 \text{ violence} + \beta_3 X + \beta_4 \text{ violence} * \text{community} + \varepsilon$$

If, in equation (3), I find that β_4 is statistically significantly positive, this indicates that the association between morbidity and violence exposure is, at least in part, due to insufficient and improper community help. If β_4 is negative, this indicates that the community support served to mitigate the negative consequences of violence.

Chapter 5: Empirical Results

In this chapter, through the linear probability regression, we examine the association between violence exposure and different types of illnesses including acute and chronic diseases while controlling for a number of individual, household, and community characteristics in addition to community fixed effects. Of course, these regressions only capture associations rather than casual effects since violence exposure and health are likely endogenous. However, for each regression I additionally examine the coefficient stability as I iteratively add controls capturing individual, household and community characteristics. Coefficients are remarkably stable to the inclusion and exclusion of controls indicating that any unobservable correlated with our controls are unlikely to be confounding our estimated results. These results can be found in tables 20-22 in the appendix(B-D). Moreover, most of our sample (approximately 93.6%) always resided in their current community. This mitigates concerns that households are selecting into certain communities based on exposure to violence.

I estimate equation (1) for our full sample as well as adults, adolescents, and children separately to examine heterogeneity across age groups. First, we estimate this relation in a pooled sample of Iraqi individuals. Then we divide sample to three subsamples adults (>18 years), adolescents (>10 & <=18 years) and children (<=10 years). At the end, through an interaction term, first, we compare effects of violence exposure on different types of health outcomes between female and males, and second examine role of community help on the violence-health association, through interaction between violence exposures and community help.

5.1 : Linear probability model in pooled sample

Table 3 presents the effects of violence exposure variables such as violence, kidnapping, violence other and any violence when dependent variables are any injury, any acute disease, any chronic illness, and delivery complication, while controlling for all control variables (individual, household and community level controls) and including community fixed effects. Results indicate that exposure to

violence due to abnormal situation in Iraq, experiencing other type of violence and being affected by any violence is significantly associated with increased likelihood of suffering from an injury. The likelihood of suffering from a chronic illness is significantly associated with exposure to violence, kidnapping, by 1.7% and 1.9%, respectively (at $p < 0.05$ significance level), and encounter any violence (by 2.1% at $p < 0.01$ significance level). Finally, I find that kidnappings and experiencing any violence are associated with an increase in the probability of experiencing an acute illness by 2% and 1.5%, respectively. Surprisingly, there is no significant association between and of the violence exposure variables and delivery complication among women.

In Table 4, we consider the effects of violence exposure on three individual acute illnesses (gastrointestinal, infectious and respiratory). Although I find no significant association between any of the violence exposure variables and gastrointestinal disease, all of the violence exposure variables but kidnapping are significantly associated with higher incidence of respiratory disease. This finding is very robust to the inclusion of all controls and including community fixed effects. Experiencing violence, other type of violence as well as being affected by any violence increases the probability of having respiratory disease by 1.1%, 2.1% and 1.1% respectively. However, interestingly, exposure to other type of violence is associated with decreased incidence of the infectious disease (0.7% at $p < 0.1$ significance level) and there is no significant association between other violence variables and infectious. Violence can reduce movement and thus interaction between communities and households. This immobility can result in mitigating the spread of infectious disease. For example, although HIV/AIDs widespread in southern Africa during the 1990s, infection rates were small in Angola until its almost three-decade civil war ended in 2002. This was largely due to much of the country being inaccessible to infected individuals throughout the duration of the war (Kendall et al, 2014). While we cannot test this explanation, this may also at least partially underlie the negative association between violence and infectious disease we find here.

Table 5 reports the result of regressions for association between violence exposure and individual chronic diseases of interest. I found that escalated incidence of mental illness is significantly correlated with all violence variables (at $p < 0.01$ significance level), adjusting for all controls and community fixed effects. Exposure to violence and experiencing any type of violence is associated

with an increase in the probability of experiencing heart problems by 1.2% and 1.3%, respectively, and by 0.7% and 0.4%, respectively, for paralysis. I find no statistically significant association between violence exposure and both anemia and diabetes illness.

Table 3: effects of violence exposure on any health in pooled sample

	<u>Any injury</u>				<u>Any acute disease</u>			
	Violence (1)	Kidnapping (2)	Violence Other (3)	Any Violence (4)	Violence (5)	Kidnapping (6)	Violence Other (7)	Any violence (8)
Violence Exposure	0.004** (0.002)	0.000 (0.002)	0.006** (0.003)	0.003* (0.002)	0.012 (0.007)	0.020** (0.008)	0.010 (0.012)	0.015** (0.006)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,645	102,645	102,645	102,645	102,676	102,676	102,676	102,676

	<u>Any chronic disease</u>				<u>Delivery complications</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.017** (0.008)	0.019** (0.009)	0.015 (0.013)	0.021*** (0.006)	0.054 (0.044)	0.009 (0.047)	0.049 (0.076)	0.014 (0.035)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,827	100,827	100,827	100,827	7,920	7,920	7,920	7,920

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 4: effects of violence exposure on acute disease in pooled sample

	<u>Gastrointestinal</u>				<u>Infectious</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.004	-0.004	0.001	0.001	0.001	-0.000	-0.007*	-0.000
	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676	102,676	102,676	102,676	102,676

	<u>Respiratory</u>			
	Violence	Kidnapping	Violence Other	Any Violence
Violence Exposure	0.011**	0.008	0.021***	0.011***
	(0.005)	(0.006)	(0.008)	(0.004)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 5: effects of violence exposure on chronic disease in pooled sample

	<u>Mental illness</u>				<u>Heart problem</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.004***	0.007***	0.005*	0.006***	0.012**	0.008	0.001	0.013***
	(0.002)	(0.002)	(0.003)	(0.001)	(0.006)	(0.006)	(0.010)	(0.005)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,619	100,619	100,619	100,619	100,688	100,688	100,688	100,688

	<u>Anemia</u>				<u>Diabetes</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	Violence Exposure	0.001	0.002	-0.002	0.001	0.007	-0.002	0.009
	(0.002)	(0.002)	(0.003)	(0.001)	(0.004)	(0.005)	(0.007)	(0.004)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,628	100,628	100,628	100,628	100,639	100,639	100,639	100,639

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 5: (continued)

	<u>Paralysis</u>			
	Violence	Kidnapping	Violence Other	Any Violence
	(1)	(2)	(3)	(4)
Violence Exposure	0.007***	0.003	0.006	0.004**
	(0.002)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	100,629	100,629	100,629	100,629

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

5.2: Linear probability model in subsamples of adults, adolescents and children

In Following tables, I examine the effects of violence exposure on overall any illness and injury, individual acute and chronic disease in the subsamples of adults (>18 years), adolescents (>10 & <=18) and children (<=10), adjusting for all controls and including community fixed effects.

In subsample of adults, violence exposure is highly associated with increased probability of experiencing any chronic disease. The prevalence of any chronic illness increases by 3%, 2.8% and 3.3% respectively when adults were exposed to violence, kidnapping and any violence, respectively (Table 6). Likewise, there is a positive relation between the violence variables and the other three generally morbidity variables: any injury, any acute disease and delivery complication, but they are not statistically significant (Table 6). Regarding three individual acute illness, respiratory disease is positively and significantly correlated with violence exposure in adult samples. Table 7 indicates that adults who reported being exposed to violence and any type of violence in last 12 months, have increased self-reported incidence of respiratory disease in the last 30 days by 1.2% and 0.9%, respectively. This result is consistent with finding that living in violent environment promotes respiratory disease (Wright & Steinbach,2001). Also, our findings are consistent with those of Islam et al. (2015) which established a long-term association between exposure to violence due to cultural revolution and adult reduced lung capacity in china, with to Apter et al. (2010) results which found that asthma symptom are exacerbated in adult populations with asthmatic disease who were exposed to community violence compare to peers who were not exposed.

For acute gastrointestinal disease, although t-test analysis identifies an increased incidence of gastrointestinal illness among individuals who were exposed to any type of violence compare to control group (ones did not experience), this association is not significant in our multivariate analysis, after adjusting for all controls and community fixed effects, among subsample of adults (Table7). These findings are consistent with a matched case-control study among U.S military personnel which suggests that self-reported war-related stressors were not significantly associated with the development of functional gastrointestinal disorders(FGD) identified by Defense Medical Surveillance System, although this effect was significant in univariate analysis (Porter et al, 2011). There is no significant relation for infectious disease among adults.

Table 8 reports the association between individual chronic illnesses and violence exposure among adults. We find that mental health of adults is adversely and significantly associated with exposure to violence. Self-reported violence exposure, being kidnapped, experiencing other type of violence and any violence increase the prevalence of the adult mental illness by 0.5%, 1.1%, 0.8% and 0.8%, respectively (Table 8). These results are consistent with the findings of a cross-sectional study by Al-Nuaimi et al, 2015 with self-reporting questionnaire which established that exposure to different type of war-related violence in Iraq was associated with psychological changes among adults (>18years).

In terms of heart problems, in t-test analysis, heart problems are significantly higher in the treated group (individuals who experienced any violence) compared to untreated ones (did not experience violence). This significant association remains robust, after accounting for all controls and community fixed effects. Experiencing violence and any violence is associated with increased incidence of heart problems, by 2% and 2.3%, respectively, among adults. These findings are consistent with outcomes of Flores et al, (2017) in a cross-sectional study which declared that adult Mexican women who were exposed to criminal violence and insecurity had a higher risk of cardiovascular disease.

Although, t-test analysis reveals that chronic diabetes are significantly higher in treated group (individuals who experienced violence) compare to untreated ones and chronic anemia in reverse is more prevalence in untreated group, those relation were not apparent in multivariate regression (Table 8). Chronic paralysis is also significantly related to violence exposure, other type of violence and any violence among adults.

For subsamples of adolescents, there is no significant association between violence exposure and any chronic or acute disease (Table 9). Nor is there a significant association between violence and any of the individual acute illnesses I examine. Mental illness is the only chronic illness significantly associated with violence exposure in this adolescent subsample (Table 11). I find that adolescents who were exposed to violence or have been affected by any violence, experience an increased probability of mental illness by 0.7% and 0.5%, respectively. This result is consistent with Kilpatrick et al. (2003) which documented an association between interpersonal violence and post-traumatic stress disorder (PTSD) and major depression in a sample of adolescents aged 12-17, and with Frontieres (2013).

Although Wilson et al. (1998) in a cross-sectional study showed violence exposure as a risk factor for higher blood pressure among African-American adolescents, we find no significant relation in subsample of adolescents. One possible explanation for this result could be that individual self-reported blood pressure and cardiac disease may not be a sensitive tool to measure these illnesses particularly for this younger population.

Finally, in subsample of children, we find no significant relation between any of the general or individual health problems I examine. Although, Suglia et al. (2018) established a relation between lifetime community violence exposure and decrease lung function among children (6-7 years), however, in our multivariate regression, this association is not significant for this child subsample. One possible explanation for this result could be that despite existing in an adverse conflict-related environment in community, children may be largely protected by their family or social support in their community.

5.3: Linear probability model with interactions term

In this study, we also compare effects of violence exposure on different health outcomes among females and males in our sample. The results are summarized in Tables 15,16 and 17.

Table 15 indicates that exposure to violence due to abnormal situation is associated with increased incidence of any acute illness for men and not for women. However, exposing kidnapping and any violence is related to higher risk of any acute disease for both men and women. Also, for men, exposure to violence is significantly correlated with elevated any injury risk. For women, being exposed to other type of violence is associated with an increased risk of any injury.

Among three acute illness, only violence exposure is strongly correlated with higher respiratory disease among females and males (Table 16). Females who reported being exposed to violence including violence due to abnormal situation, kidnapping, other type of violence and any violence have increased incidence of respiratory disease by 1.5%, 1.1%, 2% and 1.6%, respectively. For the men, only experiencing other type of violence is associated with a higher (2.2%) prevalence of acute respiratory illness. We find no

significant association for other acute diseases except for infectious disease for which exposure to other type of violence is associated with decreased level of infectious disease among female. Thus, our results on infectious diseases in the pooled sample may be driven by females.

For chronic illness, it seems that women are more prone to any chronic disease than male (Table 15). Among individual chronic illness, self-reported mental illness is strongly correlated with exposure to violence, kidnapping, other type of violence and any violence among both males and females (Table 17). This result is consistent with Al-Nuaimi et al (2015) & (2013) studies which showed that war-related violence in Iraq is associated with psychological changes in both female and male adults. Increased chronic paralysis risk also is significantly associated with violence exposure due to abnormal situation for both males and females (Table 17). Regarding heart problems, although violence exposure for men is not related to increased prevalence of heart problems, women who were exposed to violence, kidnapping and any violence have significantly higher incidence of heart problems (Table 17). This result is consistent with Sibai et al. (2001) which found that exposure to Lebanon war-time trauma such as death, kidnapping and other threats had a long-term impact on increased cardiovascular disease among women, although this relation was not seen for men. Table 17, also indicates that chronic diabetes is not related to violence exposure for men, while women who were affected by violence and any violence have significantly higher incidence of diabetes. We find no significant relation between violence exposure and chronic anemia among both female and male (Table 17).

Modelling with interaction term between violence exposure and community allowed us to test role of receiving help by the community in response to violence on the violence exposure and health outcomes relationships. We find that community support has a significant moderating effect in the association between violence and illnesses.

In a number of cases reporting receiving help from the community in response to violence reduces the effect of violence on illness (Table 18). Receiving help from community is significantly associated with decreased level of mental disorders by 1% in individuals who have been exposed to kidnapping. Previous studies also had showed role of social support as moderator on the violence and mental illness association. Shields et al. (2010) indicated that social support moderates the effects recent violence victimization on

depression and post-traumatic disorder (PTSD), while Altman et al. (2018) found that usually receiving the needed amount of social support is associated with increased odds of having depression compare to someone who always receives needed amount of support.

Community also shows significant moderating influence on the effect of violence exposure on respiratory disease. Results indicates that the effects of exposure to violence, kidnapping, other type o violence, and any violence on the probability of respiratory illness is reduced by receiving community help by 2.2%, 3.6%, 5.2% and 2.8%, respectively (Table 18). Community help likewise reduces the effect of being kidnapped, experiencing other type of violence on the incidence of experiencing any acute disease. Finally, receiving help from the community also mitigates the effects of exposure to any violence on heart problems, paralysis and any chronic illness.

Table 6: effects of violence exposure on any health in subsample adults (>18 years)

	<u>Any injury</u>				<u>Any acute disease</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.003	-0.001	0.010**	0.002	0.005	0.017	0.001	0.009
	(0.002)	(0.003)	(0.004)	(0.002)	(0.009)	(0.011)	(0.016)	(0.008)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	62,454	62,454	62,454	62,454	62,475	62,475	62,475	62,475
	<u>Any chronic disease</u>				<u>Delivery complications</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.030***	0.028**	0.013	0.033***	0.048	0.010	0.060	0.013
	(0.011)	(0.013)	(0.020)	(0.009)	(0.045)	(0.049)	(0.080)	(0.037)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	61,002	61,002	61,002	61,002	7,456	7,456	7,456	7,456

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 7: effects of violence exposure on acute disease in subsample adults (>18 years)

	<u>Gastrointestinal</u>				<u>Infectious</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.005	-0.005	0.003	0.002	-0.001	-0.000	-0.005	-0.001
	(0.003)	(0.004)	(0.005)	(0.003)	(0.003)	(0.003)	(0.005)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	62,475	62,475	62,475	62,475	62,475	62,475	62,475	62,475
<hr/>								
	<u>Respiratory</u>							
	Violence	Kidnapping	Violence Other	Any Violence				
Violence Exposure	0.012**	0.003	0.016	0.009*				
	(0.006)	(0.007)	(0.010)	(0.005)				
Controls included	Y	Y	Y	Y				
Community fixed effects	Y	Y	Y	Y				
Obs	62,475	62,475	62,475	62,475				

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 8: effects of violence exposure on chronic disease in subsample adults (>18 years)

	<u>Mental illness</u>				<u>Heart problem</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.005** (0.002)	0.011*** (0.003)	0.008** (0.004)	0.008*** (0.002)	0.020** (0.009)	0.014 (0.010)	-0.002 (0.016)	0.023*** (0.008)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	60,893	60,893	60,893	60,893	60,962	60,962	60,962	60,962

	<u>Anemia</u>				<u>Diabetes</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	Violence Exposure	0.001 (0.002)	0.001 (0.002)	-0.002 (0.003)	0.000 (0.002)	0.011 (0.007)	-0.003 (0.008)	0.015 (0.012)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	60,898	60,898	60,898	60,898	60,913	60,913	60,913	60,913

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 8: (continued)

	<u>Paralysis</u>			
	Violence	Kidnapping	Violence Other	Any Violence
	(1)	(2)	(3)	(4)
Violence Exposure	0.010***	0.004	0.010*	0.006**
	(0.003)	(0.004)	(0.006)	(0.003)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	60,901	60,901	60,901	60,901

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 9: effects of violence exposure on any health in subsample adolescents (>10 & <=18 years)

	<u>Any injury</u>				<u>Any acute disease</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.005	0.001	-0.003	0.001	-0.001	0.022	-0.006	0.013
	(0.004)	(0.004)	(0.006)	(0.003)	(0.014)	(0.016)	(0.023)	(0.012)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	24,009	24,009	24,009	24,009	20,015	20,015	20,015	20,015

	<u>Any chronic disease</u>				<u>Delivery complications</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	Violence Exposure	0.010	0.014	0.016	0.013*	-0.443	-	0.002
	(0.009)	(0.011)	(0.015)	(0.008)	(0.687)	-	(0.523)	(0.416)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	23,749	23,749	23,749	23,749	464	464	464	464

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 10: effects of violence exposure on acute disease in subsample adolescents (>10 & <=18)

	<u>Gastrointestinal</u>				<u>Infectious</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	-0.001	0.001	0.000	-0.001	-0.003	-0.005	-0.010	-0.003
	(0.004)	(0.005)	(0.007)	(0.004)	(0.005)	(0.005)	(0.007)	(0.004)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	24,015	24,015	24,015	24,015	24,015	24,015	24,015	24,015

	<u>Respiratory</u>			
	Violence	Kidnapping	Violence Other	Any Violence
Violence Exposure	-0.002	0.014	0.017	0.010
	(0.010)	(0.012)	(0.017)	(0.009)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	24,015	24,015	24,015	24,015

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.1

Table 11: effects of violence exposure on chronic disease in adolescents (>10 & <=18)

	<u>Mental illness</u>				<u>Heart problem</u>			
	<u>Violence</u>	<u>Kidnapping</u>	<u>Violence Other</u>	<u>Any Violence</u>	<u>Violence</u>	<u>Kidnapping</u>	<u>Violence Other</u>	<u>Any violence</u>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.007***	-0.000	0.000	0.005**	0.002	-0.001	0.004	0.002
	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	23,743	23,743	23,743	23,743	23,743	23,743	23,743	23,743

	<u>Anemia</u>				<u>Diabetes</u>			
	<u>Violence</u>	<u>Kidnapping</u>	<u>Violence Other</u>	<u>Any Violence</u>	<u>Violence</u>	<u>Kidnapping</u>	<u>Violence Other</u>	<u>Any violence</u>
	Violence Exposure	0.001	0.003	-0.003	0.002	-0.001	0.001	0.000
	(0.003)	(0.004)	(0.005)	(0.003)	(0.002)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	23,745	23,745	23,745	23,745	23,743	23,743	23,743	23,743

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 11: (continued)

	<u>Paralysis</u>			
	Violence	Kidnapping	Violence Other	Any Violence
	(1)	(2)	(3)	(4)
Violence Exposure	-0.001	0.000	0.002	-0.002
	(0.004)	(0.004)	(0.006)	(0.003)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	23,744	23,744	23,744	23,744

Standard errors in parentheses

All controls and community fixed effects included

***** p<0.01, ** p<0.05, * p<0.**

Table 12: effects of violence exposure on any health in subsample children (<=10 years)

	<u>Any injury</u>				<u>Any acute disease</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.003	-0.001	0.011	0.005	0.008	0.027	0.027	0.009
	(0.005)	(0.006)	(0.008)	(0.004)	(0.021)	(0.023)	(0.031)	(0.017)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	16,182	16,182	16,182	16,182	16,186	16,186	16,186	16,186

	<u>Any chronic disease</u>				<u>Delivery complications</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	Violence Exposure	-0.010	-0.006	0.017	-0.004			
	(0.011)	(0.013)	(0.017)	(0.009)				
Controls included	Y	Y	Y	Y				
Community fixed effects	Y	Y	Y	Y				
Obs	15,990	15,990	15,990	15,990				

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.

Table 13: effects of violence exposure on acute disease in subsample children (<=10)

	<u>Gastrointestinal</u>				<u>Infectious</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.007	-0.008	-0.001	0.002	0.007	-0.005	-0.006	-0.001
	(0.006)	(0.007)	(0.009)	(0.005)	(0.007)	(0.008)	(0.010)	(0.006)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	16,186	16,186	16,186	16,186	16,186	16,186	16,186	16,186

	<u>Respiratory</u>			
	Violence	Kidnapping	Violence Other	Any Violence
Violence Exposure	-0.004	0.028	0.016	0.005
	(0.016)	(0.018)	(0.025)	(0.014)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	16,186	16,186	16,186	16,186

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.

Table 14: effects of violence exposure on chronic disease in subsample children (<=10)

	<u>Mental illness</u>				<u>Heart problem</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	-0.000	0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)	(0.004)	(0.005)	(0.003)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	15,983	15,983	15,983	15,983	15,983	15,983	15,983	15,983

	<u>Anemia</u>				<u>Diabetes</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	Violence Exposure	0.002	0.001	-0.000	0.000	0.000	-0.000	-0.000
	(0.005)	(0.006)	(0.008)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	15,985	15,985	15,985	15,985	15,983	15,983	15,983	15,983

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0.

Table 14: (continued)

	<u>Paralysis</u>			
	Violence	Kidnapping	Violence Other	Any Violence
	(1)	(2)	(3)	(4)
Violence Exposure	0.002	-0.004	-0.000	-0.001
	(0.004)	(0.004)	(0.005)	(0.003)
Controls included	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y
Obs	15,984	15,984	15,984	15,984

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 15: effects of violence exposure on any health between female and male

	<u>Female</u>				<u>Male</u>			
	<u>Any injury</u>				<u>Any injury</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.002	-0.001	0.007**	0.001	0.007***	0.002	0.005	0.005***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,645	102,645	102,645	102,645	102,645	102,645	102,645	102,645

	<u>Female</u>				<u>Male</u>			
	<u>Any acute disease</u>				<u>Any acute disease</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.009	0.020**	0.005	0.015**	0.014*	0.019*	0.015	0.014**
	(0.008)	(0.010)	(0.014)	(0.007)	(0.008)	(0.010)	(0.014)	(0.007)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676	102,676	102,676	102,676	102,676

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 15: (continued)

	<u>Female</u>				<u>Male</u>			
	<u>Any chronic disease</u>				<u>Any chronic disease</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Violence Exposure	0.020**	0.020*	0.013	0.025***	0.013	0.018*	0.017	0.016**
	(0.009)	(0.010)	(0.014)	(0.007)	(0.009)	(0.011)	(0.015)	(0.007)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,827	100,827	100,827	100,827	100,827	100,827	100,827	100,827

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 16: effects of violence exposure on acute disease between female and male

	<u>Female</u>				<u>Male</u>			
	<u>Gastrointestinal</u>				<u>Gastrointestinal</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.003	-0.003	0.004	0.001	0.004	--0.006*	-0.002	0.001
	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676	102,676	102,676	102,676	102,676

	<u>Female</u>				<u>Male</u>			
	<u>Infectious</u>				<u>Infectious</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.000	-0.002	-0.007*	-0.001	0.002	0.002	-0.006	0.001
	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676	102,676	102,676	102,676	102,676

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 16:(continued)

	<u>Female</u>				<u>Male</u>			
	<u>Respiratory</u>				<u>Respiratory</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.015***	0.011*	0.020**	0.016***	0.007	0.005	0.022**	0.007
	(0.006)	(0.007)	(0.009)	0.005	(0.006)	(0.007)	(0.009)	(0.005)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	102,676	102,676	102,676	102,676	102,676	102,676	102,676	102,676

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 17: effects of violence exposure on chronic disease between female and male

	<u>Female</u>				<u>Male</u>			
	<u>Mental illness</u>				<u>Mental illness</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.004**	0.007***	0.006**	0.006***	0.005***	0.007***	0.004	0.005***
	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,619	100,619	100,619	100,619	100,619	100,619	100,619	100,619

	<u>Female</u>				<u>Male</u>			
	<u>Heart problem</u>				<u>Heart problem</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.018***	0.014*	0.007	0.020***	0.005	0.002	-0.004	0.007
	(0.006)	(0.008)	(0.011)	(0.005)	(0.007)	(0.008)	(0.011)	(0.006)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,688	100,688	100,688	100,688	100,688	100,688	100,688	100,688

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 17: (continued)

	<u>Female</u>				<u>Male</u>			
	<u>Anemia</u>				<u>Anemia</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	-0.000	0.003	-0.003	0.000	0.002	0.001	-0.001	0.001
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,628	100,628	100,628	100,628	100,628	100,628	100,628	100,628

	<u>Female</u>				<u>Male</u>			
	<u>Diabetes</u>				<u>Diabetes</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
Violence Exposure	0.014***	0.002	0.011	0.010**	-0.000	-0.008	0.007	0.001
	(0.005)	(0.006)	(0.008)	(0.004)	(0.005)	(0.006)	(0.008)	(0.004)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,639	100,639	100,639	100,639	100,639	100,639	100,639	100,639

Table 17: (continued)

	<u>Female</u>				<u>Male</u>			
	<u>Paralysis</u>				<u>Paralysis</u>			
	Violence	Kidnapping	Violence Other	Any Violence	Violence	Kidnapping	Violence Other	Any violence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence Exposure	0.007**	0.002	0.005	0.003	0.006**	0.005	0.007	0.004*
	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.005)	(0.002)
Controls included	Y	Y	Y	Y	Y	Y	Y	Y
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Obs	100,629	100,629	100,629	100,629	100,629	100,629	100,629	100,629

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Table 18: effects of community help in violence-illness association

	<u>Respiratory</u>	<u>Mental illness</u>	<u>Heart problem</u>	<u>Paralysis</u>	<u>Any acute disease</u>	<u>Any chronic disease</u>	<u>Any injury</u>
	Community	Community	Community	Community	Community	Community	Community
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Violence	.013*** (.006)	.004** (.002)	.013** (.006)	.008*** (.002)	.014* (.008)	.019** (.008)	.005** (.002)
Violence*community	-.022** (.008)	.002 (.003)	-.020 (.012)	-.013** (.005)	-.022 (.016)	-.033** (.016)	-.003 (.004)
Kidnapping	.013** (.006)	.009*** (.002)	.007 (.007)	.002 (.004)	.026*** (.009)	.020** (.009)	.001 (.002)
Kidnapping*community	-.036*** (.013)	-.010** (.004)	-.004 (.015)	.002 (.005)	-.037* (.019)	-.024 (.020)	-.003 (.005)
Violence other	.029*** (.009)	.003 (.003)	-.001 (.010)	.006 (.004)	.019 (.013)	.013 (.013)	.001* (.003)
Violence other*community	-.052*** (.017)	.010* (.005)	.006 (.020)	-.003 (.008)	-.054** (.025)	-.001 (.026)	.003 (.006)
Any violence	.014*** (.004)	.006*** (.001)	.015*** (.005)	.004** (.002)	.018*** (.006)	.024*** (.007)	.004** (.002)
Any violence*community	-.028*** (.010)	.001 (.003)	-.020* (.011)	-.009* (.005)	-.027* (.014)	-.040*** (.015)	-.004 (.004)
Observation	102,676	100,619	100,688	100,629	102,676	100,827	102,645

Standard errors in parentheses

All controls and community fixed effects included

*** p<0.01, ** p<0.05, * p<0

Chapter 6: Conclusion and discussion

6.1 Conclusion

This study examined the effects of violence exposure on different types of acute and chronic disease among Iraqi individuals during 2006-2007 years of sectarian conflict. Our findings revealed that adults and adolescents were among those which their health particularly their mental health, was adversely affected by different forms of violence exposure. Regression results with including all controls and community fixed effects indicated that adults and adolescents who were exposed to any type of violence had 0.8% and 0.5% significant increase in their self-reported mental disorders, and this significant relation also was apparent among both Iraqi females and males. This study adds to the findings of earlier studies which showed that exposure to violence was associated with psychological disorders among adults and adolescents (Al-Nuaimi et al, 2015, Al-Nuaimi et al, 2013, Kilpatrick et al, 2003, shield, et all 2010). Furthermore, we found that individuals, especially adults, who reported being exposed to violence due to abnormal situation or had been affected by any violence in last 12 months had increased incidence of acute respiratory illness, by 1.2% and 0.09%, of chronic heart problems by 2% and 2.3%, and of chronic paralysis, by 1% and 0.6%, respectively. Interestingly, women were more likely than men to develop chronic heart problems when they were exposed to violence. We also found that children's health appeared to be largely protected from the adverse health effects of violence. Moreover, we found a consistent moderating effect of receiving help from community in response to violence. Reporting being helped by one's community significantly reduced the negative effects of violence exposure on illness. This finding highlights the importance of community support in reducing the effects of violence in war-related areas.

There are certain limitations in this study which must be considered. First, since this study relied on respondents self-reported morbidity. Incidence of illness was not based on clinical diagnosis. This may result in measurement errors in our health data. For instance, accurate determination of some disease like blood pressure, diabetes, anemia require clinical examination or measurement with instruments or blood tests. Therefore, it is possible that individuals may not be able to accurately assess some of these conditions

unless they were able to receive a clinical diagnosis at some point. However, Bourgeois et al. (2007) reports that patient self-reports are better at identifying more externally symptomatic conditions such as respiratory illness, gastrointestinal and injuries than is data collected by national disease surveillance system. Second, this study was retrospective, thereby introducing potential recall bias. Also, the proportion of individuals in our sample who were exposed to violence is relatively small. Third, questions regarding violence exposure in questionnaire were asked briefly in a such a way that type of exposure of violence were not explained with detail in survey except kidnapping. We therefore do not know whether the violence reported is related to sexual abuse, physical or intimate partner violence, community violence or others. We therefore must be cautious in the inferences we can make from our findings, and can not specify the effects of specific types of violence on health outcomes. However, we assumed violence exposure as a war-related violence which were happening in Iraq due to its abnormal war situation.

Despite these limitations, this study has a number of important strengths. First, we have a large sample selected randomly from pool of Iraqi individuals of different 18 governorates. Also, a high proportion of people (95%) reported that they were born in a governorate that they lived in during interview. This helps to mitigate concerns over selection bias due to migration affecting our findings. Second, this study did not only focus on groups of individuals who were the main or direct target of violence during the war years. Instead, we were able to examine the association between violence exposure and different types of disease among all categories of individuals such as adults, adolescents and children and both females and males. Third, this study through including community fixed effects minimizes heterogeneity due to time-invariant observable and unobservable components at the cluster level.

Finally, the fact that we find fairly robust evidence that adults and adolescents, both male and female, who had been exposed to violence experienced increased incidence of chronic and acute illnesses, particularly respiratory and mental disorders, has important policy implications for communities which have been exposed to violence. It also has implications for preventions as well as interventions with adolescents and adults who have been exposed to violence. Furthermore, since community help had

significant moderating effects on violence-health relationships, interventions that promote community and social support seem critical in reducing health impacts of violence especially in war zones.

Appendix A

Table 19: List of illnesses and injuries

List of acute illness:	List of chronic disease:
Diabetes	Diabetes
Blood pressure	Blood pressure
Heart disease	Inflammation
Kidneys	Cancer
Tumors	Psychological disease
High blood cholesterol	Nervous system dis, & sensory organs (Paralysis)
Mental illness	Heart disease
Psychological disease	Respiratory
paralysis	Digestive system
Digestive system (Gastro disease)	Kidney
Thyroid Gland	Anemia
Hepatitis	Other
Respiratory	List of injuries:
Women disease such as post-natal complication	Torn ligaments
Blood disease	Head and internal injuries
Inflammation of thyroid Gland	Fractures
Skin disease and syphilis disease	Poisoning
Disease leading to impotency	Burns
Disease of sexual and urinary systems	Others
Parasitic and contagious disease	
Other disease	

Appendix B

Table 20: effects of violence exposure on any health in pooled sample

	<u>Any acute disease</u>				<u>Any chronic disease</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence indicator:								
Violence	0.011 (0.007)	0.010 (0.007)	0.012 (0.007)	0.012 (0.007)	0.011 (0.007)	0.015* (0.007)	0.017** (0.008)	0.017** (0.008)
Observation	127,030	104,080	102,862	102,676	124,899	102,183	101,009	100,827
R-squared	0.168	0.177	0.179	0.178	0.055	0.262	0.262	0.262
Kidnapping	0.025*** (0.008)	0.015* (0.008)	0.019** (0.008)	0.020** (0.008)	0.009 (0.008)	0.017** (0.009)	0.019** (0.009)	0.019** (0.009)
Observations	127,030	104,080	102,862	102,676	124,899	102,183	101,009	100,827
R-squared	0.168	0.177	0.179	0.178	0.055	0.262	0.262	0.262
Violence other	0.012 (0.012)	0.008 (0.012)	0.009 (0.012)	0.010 (0.012)	0.004 (0.012)	0.010 (0.013)	0.015 (0.013)	0.015 (0.013)
Observations	127,030	104,080	102,862	102,676	124,899	102,183	101,009	100,827
R-squared	0.168	0.177	0.178	0.178	0.055	0.262	0.262	0.262
Any violence	0.015*** (0.006)	0.012** (0.006)	0.014** (0.006)	0.015** (0.006)	0.013** (0.006)	0.019*** (0.006)	0.021*** (0.006)	0.021*** (0.006)
Observations	127,030	104,080	102,862	102,676	124,899	102,183	101,009	100,827
R-squared	0.168	0.177	0.179	0.178	0.055	0.262	0.262	0.262
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	Y	Y	Y	N	Y	Y	Y
Household controls	N	N	Y	Y	N	N	Y	Y
Community controls	N	N	N	Y	N	N	N	Y

Table 20: (continued)

Violence indicator:	<u>Any injury</u>				<u>Delivery complication</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence	0.002 (0.002)	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)	0.048 (0.043)	0.048 (0.043)	0.054 (0.044)	0.054 (0.044)
Observation	126,977	104,042	102,831	102,645	8,094	8,080	7,935	7,920
R-squared	0.057	0.057	0.058	0.058	0.614	0.614	0.621	0.621
Kidnapping	0.001 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.006 (0.046)	0.005 (0.046)	0.008 (0.047)	0.009 (0.047)
Observations	126,977	104,042	102,831	102,645	8,094	8,080	7,935	7,920
R-squared	0.057	0.057	0.058	0.058	0.614	0.614	0.620	0.621
Violence other	0.004 (0.003)	0.005* (0.003)	0.006* (0.003)	0.006** (0.003)	0.060 (0.074)	0.060 (0.074)	0.053 (0.075)	0.049 (0.076)
Observations	126,977	104,042	102,831	102,645	8,094	8,080	7,935	7,920
R-squared	0.057	0.057	0.058	0.058	0.614	0.614	0.620	0.621
Any violence	0.002 (0.001)	0.002 (0.002)	0.003* (0.002)	0.003* (0.002)	0.010 (0.035)	0.010 (0.035)	0.015 (0.035)	0.014 (0.035)
Observations	126,977	104,042	102,831	102,645	8,094	8,080	7,935	7,920
R-squared	0.057	0.057	0.058	0.058	0.614	0.614	0.620	0.621
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	Y	Y	Y	N	Y	Y	Y
Household controls	N	N	Y	Y	N	N	Y	Y
Community controls	N	N	N	Y	N	N	N	Y

Appendix C

Table 21: effects of violence exposure on any acute disease in pooled sample

Violence indicator:	Gastrointestinal				Infectious			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence	0.005** (0.002)	0.003 (0.002)	0.003 (0.002)	0.004 (0.002)	0.002 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Observation	127,030	104,080	102,862	102,676	127,030	104,080	102,862	102,676
R-squared	0.043	0.045	0.045	0.045	0.255	0.273	0.275	0.275
Kidnapping	0.003 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)
Observations	127,030	104,080	102,862	102,676	127,030	104,080	102,862	102,676
R-squared	0.043	0.045	0.045	0.045	0.255	0.273	0.275	0.275
Violence other	-0.001 (0.004)	0.000 (0.004)	0.001 (0.004)	0.001 (0.004)	-0.003 (0.004)	-0.006* (0.004)	-0.006* (0.004)	-0.007* (0.004)
Observations	127,030	104,080	102,862	102,676	127,030	104,080	102,862	102,676
R-squared	0.043	0.045	0.045	0.045	0.255	0.273	0.275	0.275
Any violence	0.003 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)
Observations	127,030	104,080	102,862	102,676	127,030	104,080	102,862	102,676
R-squared	0.043	0.045	0.045	0.045	0.255	0.273	0.275	0.275
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	Y	Y	Y	N	Y	Y	Y
Household controls	N	N	Y	Y	N	N	Y	Y
Community controls	N	N	N	Y	N	N	N	Y

Table 21: (continued)

	<u>Respiratory</u>			
Violence indicator:	(1)	(2)	(3)	(4)
Violence	0.006	0.010**	0.011**	0.011**
	(0.005)	(0.005)	(0.005)	(0.005)
Observation	127,030	104,080	102,862	102,676
R-squared	0.165	0.177	0.177	0.177
Kidnapping	0.012**	0.005	0.008	0.008
	(0.006)	(0.006)	(0.006)	(0.006)
Observations	127,030	104,080	102,862	102,676
R-squared	0.165	0.177	0.177	0.177
Violence other	0.022**	0.020**	0.020**	0.021***
	(0.008)	(0.008)	(0.008)	(0.008)
Observations	127,030	104,080	102,862	102,676
R-squared	0.165	0.177	0.177	0.177
Any violence	0.010**	0.009**	0.011***	0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
Observations	127,030	104,080	102,862	102,676
R-squared	0.165	0.177	0.177	0.177
Community fixed effects	Y	Y	Y	Y
Individual controls	N	Y	Y	Y
Household controls	N	N	Y	Y
Community controls	N	N	N	Y

Appendix D

Table 22: effects of violence exposure on any chronic disease in pooled sample

Violence indicator:	<u>Anemia</u>				<u>Diabetes</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.005 (0.004)	0.006 (0.004)	0.007 (0.004)	0.007 (0.004)
Observation	124,690	101,979	100,810	100,628	124,698	101,989	100,821	100,639
R-squared	0.043	0.049	0.048	0.048	0.032	0.118	0.119	0.119
Kidnapping	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	-0.003 (0.004)	-0.003 (0.005)	-0.003 (0.005)	-0.002 (0.005)
Observations	124,690	101,979	100,810	100,628	124,698	101,989	100,821	100,639
R-squared	0.043	0.049	0.048	0.048	0.032	0.118	0.119	0.119
Violence other	-0.002 (0.002)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)	0.005 (0.006)	0.008 (0.007)	0.009 (0.007)	0.009 (0.007)
Observations	124,690	101,979	100,810	100,628	124,698	101,989	100,821	100,639
R-squared	0.043	0.049	0.048	0.048	0.032	0.118	0.119	0.119
Any violence	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.004 (0.003)	0.005 (0.004)	0.006 (0.004)	0.006 (0.004)
Observations	124,690	101,979	100,810	100,628	124,698	101,989	100,821	100,639
R-squared	0.043	0.049	0.048	0.048	0.032	0.118	0.119	0.119
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	Y	Y	Y	N	Y	Y	Y
Household controls	N	N	Y	Y	N	N	Y	Y
Community controls	N	N	N	Y	N	N	N	Y

Table 22: (continued)

	<u>Mental illness</u>				<u>Heart problem</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence indicator:								
Violence	0.003** (0.001)	0.004*** (0.002)	0.004*** (0.002)	0.004*** (0.002)	0.008 (0.005)	0.010* (0.006)	0.011** (0.006)	0.012** (0.006)
Observation	124,678	101,969	100,801	100,619	124,751	102,041	100,870	100,688
R-squared	0.029	0.037	0.037	0.037	0.036	0.229	0.229	0.229
Kidnapping	0.006*** (0.001)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.003 (0.006)	0.006 (0.006)	0.008 (0.006)	0.008 (0.006)
Observations	124,678	101,969	100,801	100,619	124,751	102,041	100,870	100,688
R-squared	0.029	0.037	0.037	0.038	0.036	0.229	0.229	0.229
Violence other	0.004* (0.002)	0.004* (0.003)	0.005* (0.003)	0.005* (0.003)	-0.006 (0.009)	-0.001 (0.010)	0.001 (0.010)	0.001 (0.010)
Observations	124,678	101,969	100,801	100,619	124,751	102,041	100,870	100,688
R-squared	0.029	0.037	0.037	0.037	0.036	0.229	0.229	0.229
Any violence	0.004*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.009** (0.004)	0.012** (0.005)	0.014*** (0.005)	0.013*** (0.005)
Observations	124,678	101,969	100,801	100,619	124,751	102,041	100,870	100,688
R-squared	0.029	0.037	0.037	0.038	0.036	0.229	0.229	0.229
Community fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	Y	Y	Y	N	Y	Y	Y
Household controls	N	N	Y	Y	N	N	Y	Y
Community controls	N	N	N	Y	N	N	N	Y

Table 22: (continued)

	<u>Paralysis</u>			
	(1)	(2)	(3)	(4)
Violence indicator:				
Violence	0.005*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.007*** (0.002)
Observation	124,688	101,979	100,811	100,629
R-squared	0.036	0.052	0.052	0.052
Kidnapping	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Observations	124,688	101,979	100,811	100,629
R-squared	0.036	0.052	0.052	0.052
Violence other	0.006* (0.003)	0.006* (0.004)	0.007* (0.004)	0.006 (0.004)
Observations	124,688	101,979	100,811	100,629
R-squared	0.036	0.052	0.052	0.052
Any violence	0.003* (0.002)	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)
Observations	124,688	101,979	100,811	100,629
R-squared	0.036	0.052	0.052	0.052
Community fixed effects	Y	Y	Y	Y
Individual controls	N	Y	Y	Y
Household controls	N	N	Y	Y
Community controls	N	N	N	Y

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