

**EMOTIONAL AND PHYSICAL CHILD ABUSE IN THE AFTERMATH OF NATURAL  
DISASTERS: A FOCUS ON HAITI**

By

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## Abstract

**Background:** Child abuse remains a public health and human rights issue with severe consequences. Natural disasters can cause physical, social, and psychological stressors, which may lead to an increase in child directed abuse.

**Objective:** The aim of this study was to i) investigate the social and living conditions of households in Haiti pre- and post 2010 Haiti earthquake, ii) to determine the household prevalence of emotional, physical, and severe physical abuse in children aged 2-14 post-earthquake, and iii) to explore the association between earthquake-related loss and experiences of emotional, physical, and severe physical child abuse in the household.

**Methods:** A nationally representative sample of Haitian households from the 2005/6 (n=9888) and 2012 (n=13181) cycle of the Demographic and Health Survey (DHS) was used. Descriptive analysis was summarized using frequencies and measures of central tendency. Chi-squared and independent T-tests were used to compare data that was available pre-and post-earthquake. Associations between earthquake-related loss and emotional, physical, and severe physical child abuse was assessed using multivariate log-binomial regression models.

**Results:** Comparing pre-post-earthquake, noteworthy improvements were observed in the educational attainment of the household head (9.1% decrease in “*no education*” category) and in possession of the following household items: electricity, television, mobile-phone, and radio. The prevalence estimates of emotional, physical, and severe physical abuse, in the month prior to the 2012 survey, was 78.5%, 77.0%, and 15.4% respectively. Two years following the earthquake, death of a household member was associated with a higher likelihood of a child being victim to emotional (RR=1.11, 95% CI: 1.05-1.17) and severe physical abuse (RR=1.49, 95% CI: 1.14-1.94). Conversely,

injury of a household member was associated with a lower likelihood of a child experiencing emotional abuse (RR=0.67, 95% CI: 0.52-0.87). Visual mapping revealed that the prevalence of severe physical abuse in settlement camps was notably higher (25.0%) compared to the overall prevalence in Haiti (15.4%).

**Conclusions:** Results of this study highlight a need to better protect children in Haiti from abuse. We found associations between some forms of earthquake related loss and child abuse patterns that would warrant further study and consideration in other contexts of natural disaster.

## **Co-Authorship**

**This thesis presents the work of Sony Subedi, in collaboration with her co-supervisors**

**Dr. Colleen Davison and Dr. Susan Bartels.**

The idea to conduct both objectives of this study was Dr. Susan Bartels' and Dr. Colleen Davison's collectively. The first objective of this study was to perform a descriptive analysis of the demographic characteristics, socioeconomic situations, and living conditions of households in Haiti (pre-and post-earthquake), and to determine the household prevalence of emotional, physical, and severe physical abuse in Haiti after the 2010 earthquake (Manuscript 1). The second objective is to examine the association between experiences of earthquake-related loss and emotional, physical, and severe physical child abuse in the household while considering potential confounding variables and the interactive effects of several social, economic, and demographic factors (Manuscript 2). The statistical analyses, interpretation of results, and writing of the manuscripts were performed by Sony Subedi with feedback and guidance from Dr. Davison and Dr. Bartels.

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## **List of Abbreviations**

CI	Confidence Interval
CDC	Centre for Disease Control and Prevention
CRC	Convention on the Rights of the Child
DHS	Demographic and Health Surveys
IDB	Inter-American Development Bank
MICS	Multiple Indicator Cluster Surveys
CTSPC	Parent-Child Conflict Tactics Scale
PSS	Perceived Stress Scale
RR	Relative Risk
SD	Standard Deviation
TBI	Traumatic Brain Injury
WHO	World Health Organization
WSW	West South West

## List of Definitions

A *child* is defined by the United Nations as a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier<sup>1</sup>.

*Child abuse* refers to all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity<sup>2</sup>

*Physical abuse* refers to any punishment in which physical force is used and intended to cause some degree of pain or discomfort, however light<sup>1</sup>.

*Emotional abuse* includes the failure of a caregiver to provide an appropriate and supportive environment, and includes acts that have an adverse effect on the emotional health and development of a child. Such acts include restricting a child's movements, denigration, ridicule, threats and intimidation, discrimination, rejection and other non- physical forms of hostile treatment<sup>3</sup>.

*Corporal punishment* refers to the violence inflicted on children by parents, caregivers, teachers, and others in the name of "discipline"<sup>4</sup>.

*Natural disasters* are catastrophic events with atmospheric, geologic, and hydrologic origins. Such disasters include: earthquakes, volcanic eruptions, landslides, tsunamis, floods, and droughts<sup>5</sup>.

*Earthquake-related loss* (for the purpose of this thesis) will refer to two types of losses that some households experienced as consequences of the 2010 Haiti earthquake: i) death or injury of household member and ii) damage of home.

## **CHAPTER 1**

### **Introduction**

## **1.1 PURPOSE**

The main purpose of this thesis is to build understanding around the prevalence and possible predictors of child abuse in the context of the earthquake that occurred in Haiti in 2010.

Specifically, this thesis aims to i) examine socio-demographics, socioeconomic settings, and living conditions in Haiti before and after the devastating January 12, 2010 earthquake, ii) to determine the household prevalence of emotional, physical, and severe physical child abuse following the earthquake, and iii) to explore the association between earthquake-related loss and experiences of emotional, physical, and severe physical child abuse in Haiti. Results from this study will help describe patterns of child abuse in contexts of natural disasters and could help to inform prevention, mitigation, and response strategies.

## **1.2 BACKGROUND**

The Democratic Republic of Haiti has a history of being the poorest nation in the Western hemisphere, suffering from weak governance, economic instability, and a history of foreign exploitation<sup>1</sup>. On January 12, 2010, Haiti experienced a 7.0 magnitude earthquake that claimed approximately 300,000 lives and displaced more than one million people<sup>2</sup>. Physical factors such as the shallow epicenter of the earthquake (increased shaking at the earth's surface), proximity to the densely populated capital city (Port-au-Prince), poor residential, commercial and public infrastructure, and the lack of an adequate emergency response system have been identified as some of the factors that played a role in the earthquake's extremely high mortality<sup>3</sup>. This catastrophic event also left hundreds of thousands of people homeless, unemployed, injured, and/or psychologically distressed<sup>4</sup> and a year following the earthquake, 810,000 individuals continued to be displaced living in camps in the surrounding areas of Port-au-Prince<sup>5</sup>.

Harmful consequences of the earthquake have directly impacted the children of Haiti. Direct risks for children in natural disasters include: death and injuries, vulnerability to malnutrition and infectious diseases, psychological trauma, and all types of abuse, neglect and exploitation<sup>6</sup>. Of these direct risks to children in natural disasters, this thesis will predominantly focus on child abuse.

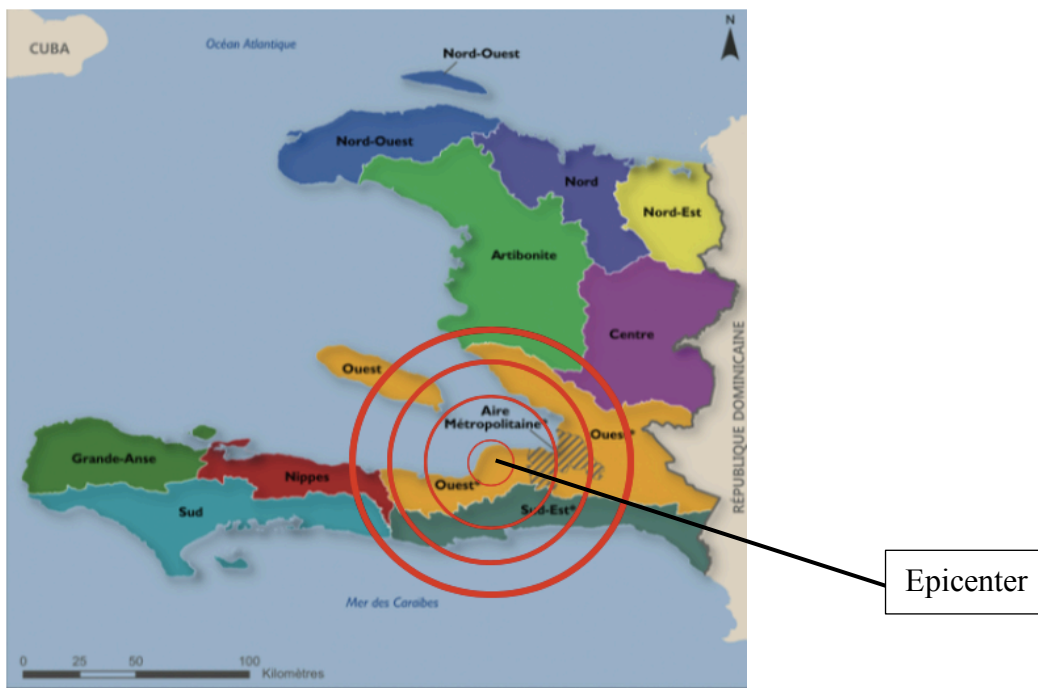
Under post disaster situations, where stress is increased and social support is decreased, child abuse is expected to be more common<sup>7</sup>. Like all form of abuse, emotional and physical abuse of a child is a violation of the rights of the child and it is extremely damaging to health and development throughout the lifespan<sup>8,9</sup>. Child abuse refers to all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity<sup>10</sup>. Emotional abuse includes the failure of a caregiver to provide an appropriate and supportive environment, and includes acts that have an adverse effect on the emotional health and development of a child<sup>11</sup>. Such acts include restricting a child's movements, denigration, ridicule, threats and intimidation, discrimination, rejection and other non- physical forms of hostile treatment<sup>11</sup>. Physical abuse refers to any punishment in which physical force is used and intended to cause some degree of pain or discomfort, however light<sup>12</sup>. A category of severe physical abuse was also created to explore patterns of extreme forms of physical abuse.

For this thesis, emotional, physical, and severe forms of physical abuse will be highlighted.

Childhood abuse has been associated with a plethora of both physical and psychological adverse health outcomes<sup>13,14,15</sup> as well as psychiatric and medical diagnoses including depression, anxiety disorders, eating disorders, posttraumatic stress disorder (PTSD), chronic pain syndromes, fibromyalgia, and chronic fatigue syndrome<sup>16, 17,18,19</sup>. Compared to adults who were not abused as children, those who experienced childhood abuse are more likely to engage in high-risk behaviors including smoking, substance abuse, unsafe sex<sup>20,21</sup>. Children who are abused are also more likely

to report an overall lower health status as adults; and to use more health services<sup>22</sup>. Although there are limited studies examining the association between natural disasters and child abuse, the existing literature has identified a consistent link between natural disasters and a post-disaster increase in child abuse<sup>7,23</sup>. Given the importance of child abuse as a public health and human rights issue, this thesis aims to address the current literature gap regarding child-targeted emotional and physical abuse in context of natural disasters.

## MAP OF HAITI



*Figure 1.* Map of Haiti with marked epicenter (Source: DHS Haiti Final Report, 2012)

Haiti is situated in the West Indies and shares the island of Hispaniola with the Dominican Republic. As seen in *Figure 1*, Haiti is divided into 10 regions (Aire Métropolitaine/Reste-Outer, Sud-Est, Nord, Nord-Est, Artibonite, Centre, Sud, Grand Anse, Nord-Ouest, and Nippes). The figure above also shows the earthquake's epicenter in relation to the capital city of Port-au-Prince.



### **1.3 OBJECTIVES AND HYPOTHESIS**

(i) The first objective of this study is to perform a descriptive analysis of the socio-demographic characteristics, socioeconomic situation, and living conditions of households in Haiti (pre- and post-earthquake), and to determine the household prevalence of child emotional, physical, and severe physical abuse in Haiti after the 2010 earthquake. We hypothesize that the majority of the socio-demographic characteristics, socioeconomic situation, and living conditions will differ pre- and post-earthquake.

(ii) The second objective is to examine the association between experiences of earthquake related loss and emotional, physical, and severe physical child abuse in the household while considering potential confounding variables and the interactive effects of several social, economic, and demographic factors. We hypothesize that a child in a household that has experienced earthquake-related losses will be at a higher likelihood of experiencing emotional, physical, and severe physical abuse following the 2010 Haiti earthquake.

### **1.4 THESIS ORGANIZATION**

The following thesis conforms to the Queen's University School of Graduate Studies and Research Guideline "General forms of Thesis" (School of Graduate Studies Queen's University 2016). The second chapter consists of a detailed literature review. The third chapter (Manuscript 1) examines the socio-demographic characteristics, socioeconomic situations, and living conditions (pre- and post-earthquake), and determines the household prevalence of physical, emotional, and severe physical child abuse post-disaster (2010 Haiti earthquake). The fourth chapter (Manuscript 2) examines the association between experiences of earthquake related loss and emotional, physical, and severe physical child abuse in the household. The final chapter provides a general discussion of

the study's findings and summarizes the strengths and limitations as well as the public health contribution and future implications of the study.

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## **CHAPTER 2**

### **Literature Review**

## **2.1 GENERAL OVERVIEW**

The purpose of this literature review is to summarize existing scientific literature relating to emotional and physical child abuse in the context of the 2010 Haiti earthquake. This literature review describes the scope of the problem, theoretical frameworks, findings from previous studies, and possible risk factors/predictors of child abuse.

### **Scope of the Issue**

Child abuse is a public health and human rights issue that is prevalent worldwide. The World Health Organization's Consultation on Child Abuse Prevention states that child abuse or maltreatment constitutes all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power<sup>1</sup>. Globally, it is estimated that up to one billion children aged 2–17 years have experienced physical, sexual, or emotional abuse or neglect in the past year<sup>2</sup>. More specifically, a meta-analysis of global data found that 22.6% of individuals are physically abused as children, 36.3% experience emotional abuse, and 16.3% face physical neglect<sup>2</sup>.

From a human rights perspective, emotional and physical child abuse violates one of the basic rights of the child: protection from all forms of violence (Article 19, Convention on the Rights of the Child)<sup>3</sup>. Child abuse is not only ethically wrong, but it also harms the child's physical, emotional, and social development, and has important economic and social consequences<sup>4,5,6</sup>.

Abuse against children is thought to be influenced by many factors, including parental exposure to violence earlier in life, substance use, mental health issues, and traumatic events such as natural disasters<sup>7,8,9,10</sup>. The World Health Organization (WHO) estimates that approximately 160 million people are affected by natural disasters every year. Even more concerning is the possibility of an

expected increase in the frequency and magnitude of natural disasters in the future due to climate change<sup>11,12</sup>. Thus, if a relationship between natural disasters and child abuse in the household exists in some settings, occurrences of child abuse would be expected to increase in severity and frequency. Examples of outcomes that could lead to stress include destruction/damage of property, death and or injury of loved ones, loss of employment, and lack of social support<sup>13,14</sup>.

### **2.2.1 Health Outcomes Associated with Emotional Abuse**

Emotional abuse, which may occur in isolation or in conjunction with other forms of abuse, is often considered hidden and is the least studied of all forms of child abuse<sup>15</sup>. When one type of abuse occurs, it is likely that there is an overlap of other forms of abuse<sup>16</sup>. Emotional abuse is studied less than physical or sexual abuse as the consequences are thought to be more elusive<sup>17</sup>. It should also be noted that, similar to other forms of abuse, emotional abuse occurs in different forms and the definitions vary from culture to culture<sup>15</sup>. Despite it being the least studied form of abuse, there exists a vast number of studies that recognize emotional abuse as a public health issue associated with a multitude of adverse health outcomes and high-risk behaviors. For instance, emotional abuse at a young age can lead to several neuropsychological outcomes including disturbance in brain limbic systems, dissociative symptoms, anxiety, depression, low self-esteem, hostility and delinquency<sup>18,19</sup>. To exemplify, statistically significant associations have been found between emotional abuse and depressive disorders (OR=3.06; 95% CI 2.43–3.85)<sup>20,9</sup>. Experiences of emotional abuse is also a risk factor for severe consequences such as suicidal ideation, partly mediated by mental disorders<sup>21</sup>. Additionally, childhood emotional abuse has also been identified as a predictor for high-risk behaviors in adolescence and adulthood. For example, a study in six public high schools in rural Oregon established that emotional abuse was associated with an increase in substance abuse among students in the 10th, 11th, and 12th grades (OR= 1.40 for



tobacco;  $p < 0.05$ ) and (OR= 1.48 for alcohol;  $p < 0.01$ )<sup>9</sup>. This study also noted that youth who have experienced more than one form of abuse are at especially high risk of substance use<sup>9</sup>.

### **2.2.2 Health Outcomes Associated with Physical Abuse**

Similar to emotional abuse, physical abuse against children can have numerous negative physical and mental health consequences. Evidence has revealed that the mixture of numerous types of abuse are associated with increased short and long term negative health outcomes<sup>4</sup>. In a population-based cohort of middle-aged men and women, childhood physical abuse forecasted worse mental and physical health outcomes decades after the abuse<sup>22</sup>. Similar to the consequences of emotional abuse, physical abuse can result in various mental disorders<sup>4</sup>. Children who experienced physical abuse face the following negative health outcomes: 21.0% increase in medical diagnoses, 22.0% increase in the number of physical symptoms, 24.0% increase in depression, 27.0% increase in anger, and a 23% increase in anxiety<sup>22</sup>. In addition, physically abused children have a significantly increased risk of suicidal behavior (OR=3.00; 95% CI 2.07–4.33), compared with individuals who had not experienced physical abuse in childhood<sup>20</sup>. Furthermore, children who are physically abused are at significantly higher risk of alcohol abuse as they become older (OR=1.26; 95% CI 1.03–1.55) and at significantly higher risk of contracting sexually transmitted infections (OR=1.78; 95% CI 1.50–2.10) relative to non-abused individuals<sup>20</sup>. It is apparent that there are several consequences of physical child abuse that can negatively impact both mental and physical well-being and increase subsequent high-risk behaviors.

## **2.3 THEORETICAL FRAMEWORKS**

### **2.3.1 Frustration-Aggression Theory**

Researchers, particularly in the fields of sociology and psychology, have recognized that in disaster and post disaster circumstances, where there is increased stress and decreased social support, child abuse may be more common<sup>23,24,25</sup>. This phenomenon can be theoretically explained by the prolific Frustration-Aggression Theory developed in the 1930s by Robert R. Sears, O.H. Mowrer, Leonard W. Doob & John Dollard<sup>26</sup>. The hypothesis of this theory states that “*the occurrence of aggressive behavior always presupposes the existence of frustration and, contrariwise, that the existence of frustration always leads to some form of aggression*” (p.1)<sup>26</sup>. Additionally, according to this theory, aggression can be directed at the source of the frustration or redirected at some other person or object<sup>26</sup>. Following a natural disaster, when many aspects of daily life have been disrupted, it is probable that individuals would feel increased stress, helplessness, and frustration<sup>27,28</sup>. The Frustration-Aggression Theory is therefore pertinent to this study, which in part explores whether earthquake-related loss, in the forms of i) death or injury of family member or ii) damage of home, significantly influences emotional, physical, and/or severe physical child abuse in the household.

### **2.3.2 Bronfenbrenner’s Ecological Model**

Another applicable model that can be used to explore the possible predictors of child abuse in the aftermath of a natural disaster is the Bronfenbrenner’s Ecological Model. In the past few decades, researchers have increasingly relied on this model to help understand the individual and environmental factors that may determine the development and well-being of a child<sup>29</sup>. Researchers in the field of child maltreatment and abuse have specifically used this model to investigate relationships between multiple predictors of child abuse. The core concepts of Bronfenbrenner’s Ecological model help to explain the causes of child abuse by examining child abuse as a

multifaceted phenomenon caused by an interaction of factors at different ecological levels. The various systems/layers of Bronfenbrenner's Ecological Model include the microsystem (environment where the child lives and moves), mesosystems (interactions between people in the microsystems), ecosystem (broader community in which the child lives) and the macrosystems (attitudes, ideologies, values, laws and customs of a culture or subculture<sup>30</sup>). In regard to this study, Bronfenbrenner's model is useful in establishing the individual and environmental factors that may situate children at higher risk of being victims of abuse after the 2010 Haiti earthquake. For this thesis, the following individual and environmental factors will be assessed as factors that may confound or influence the relationship between earthquake-related loss and emotional, physical, and severe physical child abuse in the household: age of child, sex of child, household wealth, marital status of head of household, highest educational attainment of household head, number of household members, and urban/rural residence.

## **2.4 PREVIOUS FINDINGS**

### **2.4.1 Global Prevalence of Physical and Emotional Abuse**

Data about child abuse in the context of natural disasters is very limited. However, data from non-disaster settings reveals that prevalence estimates vary considerably across low, middle, and high income countries. Globally, it is estimated that 22.6% of individuals are physically abused as children, 36.3% experience emotional abuse, and 16.3% face physical neglect<sup>31</sup>. In East Asia and the Pacific Region, the life time prevalence of child physical abuse ranged between 39.5% and 66.3%, compared to 31.3% and 78.3% for emotional abuse<sup>32</sup>. In India, where one-fifth of the world's children reside, 69% of children (aged 5–12 years) reported physical abuse, while around 50% reported emotional abuse<sup>33</sup>. In South Africa, the lifetime prevalence of physical abuse was 34% compared to 16% for emotional abuse 15–17 year olds<sup>34</sup>. In contrast, in high-income

countries, the annual prevalence of physical abuse was found to be 4–16% compared to 10% that were neglected or psychologically abused<sup>35</sup>.

Globally, numerous studies have estimated the prevalence of child abuse, however, the methods of measuring prevalence or incidence of abuse are not consistent across countries. Gathering data on the prevalence of child abuse can include self-reports from victims, self-reports from parents or caregivers, and official statistics from agencies and organizations (child-protection services or police)<sup>35</sup>. Variations in the methods used to collect and measure child abuse data can result in different estimates of the true prevalence of child abuse. Additionally, in contexts where child abuse is a hidden phenomenon, the prevalence estimates of abuse are likely to underestimate the true prevalence.

#### **2.4.2 Prevalence of Emotional and Physical Abuse in Haiti**

Although emotional and physical abuse against children is a common occurrence worldwide, there are a scarce number of published studies on child abuse in Haiti. In 2012, the Violence against Children Survey (VACS) (n=2916) became the first national survey of violence/abuse against children in Haiti<sup>36</sup>. The VACS study aimed to measure i) the national lifetime prevalence of all forms of abuse (physical, emotional, and sexual) against children in Haiti under the age of 18 and ii) the prevalence of all forms of abuse experienced by 13 to 17 year old's 12 months prior to the survey<sup>36</sup>. The study indicated that almost two-thirds of respondents in the 18- to 24- age group had experienced physical abuse before the age of 18 compared to one-third of respondents who had experienced emotional abuse. Among 13 to 17 year-old respondents, one-third had experienced both emotional and physical violence in the 12 months prior to the study<sup>36</sup>. The VACS study differs from this current study as it investigated child abuse that was perpetrated by both household

members and other authority figures such as teachers, police officers, security personnel, and religious leaders. The VACS study also differs from our study in regards to the age group of interest. The VACS study focused on the 13-17 and the 18 to 24 age group while our study focused on the 2-14 age group.

### **2.4.3 Associations Between Natural Disasters and Child Abuse**

In one of the first efforts to examine whether child abuse occurrences differ before and after natural disasters, researchers analyzed child abuse reports one year before and after Hurricane Hugo, the Loma Prieta Earthquake, and Hurricane Andrew. Results found that reported cases of child abuse were disproportionately higher six months following two out of the three disasters (Hurricane Hugo and Loma Prieta Earthquake)<sup>23</sup>. For instance, six months following Hurricane Hugo, the total rate of physical, emotional, and sexual abuse increased from 101.86 to 121.37 per 100,000<sup>23</sup>. Likewise, six months following the Loma Prieta Earthquake total rates of physical, emotional, and sexual abuse increased from 344.07 to 367.11 per 100,000<sup>23</sup>. In contrast, following Hurricane Andrew, the total rate of physical, emotional, and sexual abuse decreased from 112.00 to 90.44 per 100,000<sup>23</sup>. The authors of this study speculate that the difference in findings could be due to the official or unofficial interventions and counseling for victims that were attempted following the third disaster<sup>23</sup>. In addition, Walter Fahr of the Louisiana Department of Social Services hypothesized that because the state of Louisiana has a history of being impacted by hurricanes, the residents may have been more accustomed to coping with the consequences of the disaster<sup>23</sup>. Relatedly, a study in North Carolina found that there was a fivefold increase (RR=5.1, 95%CI=1.3-20.4), in abusive head trauma among toddlers aged two or younger, six months after hurricane Floyd<sup>24</sup>. Lastly, in Haiti, researchers explored the experiences of violence and abuse among internally displaced adolescent girls aged 12-17 pre- and post-disaster. A majority reported

physical, psychological, or sexual abuse both pre- (59%) and post- (64.1%) earthquake, however the pre-post disaster differences were not statistically significant<sup>37</sup>. It is important to note that the sample in the later study was small (78 participants) and 60% of the participants did not answer questions about abuse pre-post disaster<sup>37</sup>. Thus, factors such as the small sample size, the differences in age groups, female specific results, and the large amount of missing data limits their study, and also limits our ability to compare the results to this study.

It can be concluded that some, but not all, of the existing evidence indicates that child abuse heightens after major disasters. It is worth noting that a disaster's effects may be mediated by the geographic location, cultural and social factors, laws, and the disaster itself. Additionally, developing countries such as Haiti, are disproportionately affected by the ramifications of natural disasters because they often lack proper resources, infrastructure, and disaster-preparedness practices<sup>38</sup>.

## **2.5 CONFOUNDERS AND EFFECT MODIFIERS**

### **2.5.1 Confounders**

Confounding occurs when a relationship of interest is distorted or hidden by the effects of a third factor that is related to both the exposure and outcome but not found on the causal pathway<sup>39</sup>.

Potential confounders in the relationship between earthquake-related loss and child abuse include: household wealth, marital status of household head, highest educational attainment of household head, urban/rural residence, and number of household members.

### **Household Wealth (Wealth Index)**

Household wealth is a potential confounder of concern as it may be associated with both the exposure (earthquake-related loss) and the outcome (child abuse). In general, less wealthy households are more likely to live in homes with poor infrastructure that are at greater risk of being damaged or destroyed during an earthquake. Secondly, past studies indicate that poverty is associated with higher rates of all forms of child abuse in the household<sup>40,41</sup>.

### **Highest Educational Attainment of Household Head**

The highest level of education of the head of household is a potential confounder in the relationship between earthquake-related loss and child abuse. Individuals who are well-educated are more likely to be financially prosperous and to live in homes that are stable and solidly constructed,<sup>42</sup> thus decreasing their risk of earthquake-related losses. Secondly, individuals who are well-educated may not abuse their children as frequently as less educated individuals as they may be more aware of what constitutes child abuse, the rights of the child, and the negative health and development consequences of child abuse<sup>43,44</sup>.

### **Marital Status**

Marital status is a potential confounder in the relationship between earthquake-related loss and child abuse. Single-parent households may be less financially secure and consequently may reside in homes that are less stable and solidly constructed. Thus, their homes may be disproportionately affected by earthquake damage. Relatedly, child abuse has been identified as a risk among mother-only homes<sup>45</sup>. Moreover, a national survey of six thousand households found single parents to use violence towards their children more frequently compared to parents in dual-parent households<sup>45</sup>.

### **Urban/Rural Residence**

Urban/Rural residence is a potential confounder in the relationship between earthquake-related loss and child abuse. This is an important indicator in the context of natural disasters since the housing materials (wall, roof, flooring, etc.) and how solidly a house is constructed may vary between different places of residence. For instance, in 2012 approximately 50% of households in rural Haiti had clay or sand soil flooring, compared to only 9% in urban areas<sup>46</sup>. Similarly, in urban areas, the housing floor was constructed of concrete or masonry 78% of the time compared to 42% in rural areas<sup>46</sup>. Although there is no reliable data on materials used for roofing and walls in Haiti, it can be presumed that houses built in urban areas generally would be built using sturdier materials that are better able to withstand an earthquake. Accordingly, the most significant risk factor for earthquake-induced mortality and morbidity is the degree of damage to the building<sup>47</sup>. In regards to the outcome of interest, children living with families facing housing-related hardships are almost two times more likely to be involved in an abuse or maltreatment investigation (OR = 1.91,  $p < 0.001$ )<sup>48</sup>.

### **Number of Household Members**

The number of members in a household is a potential confounder in the relationship between earthquake related loss and child abuse. Households in Haiti vary in size with small and “nuclear” families of one to four persons, larger families with more siblings, and families who also host extended members and relatives under the same roof. It can be assumed that households with numerous members in the home are more likely to lose a loved one during a natural disaster. In regards to the outcome of interest, past studies indicate that children living in households with numerous family members may be at a higher risk of child abuse<sup>49</sup>. To illustrate, one study examined child abuse and neglect in blended households, or households where a non-related parental figure resides, and found that the risk of physical and sexual abuse was higher compared



with other household types<sup>49</sup>. Likewise, a study in Egypt that used the Demographic and Health Surveys data found that children living in households with three to five children were at higher risk of child abuse in comparison to households with fewer children<sup>50</sup>.

### **2.5.1 Effect Modifiers**

Effect modification occurs when the effect of an exposure on an outcome depends on a third factor. While children are not responsible for the abuse inflicted upon them, certain child characteristics have been recognized to increase the risk or potential for abuse. Although no previous studies have established any effect modifiers in the association between losses experienced from natural disasters/earthquakes and child abuse, a scan of the literature revealed that *sex of child*<sup>51</sup> and *age of child*<sup>50,44</sup> may potentially act as effect modifiers.

#### **Sex of Child**

While examining the association between earthquake-related loss and child abuse, sex of the child is a sensible effect modifier to test. If a child of one sex has a greater risk of experiencing abuse compared to the other sex, the strength of the association will be influenced. A literature search revealed that different forms of abuse may be higher in one sex compared to the other. For instance, females are generally at a higher risk of sexual abuse, while male children are at greater risk of physical abuse<sup>51</sup>.

#### **Age of Child**

The age of a child is another potential effect modifier in the relationship between earthquake-related loss and child abuse in the household. Past research indicates inconsistent links between age

of child and risk of child abuse, however, a majority of the studies have indicated that children who are under the age of five may be at higher risk of all forms of abuse/neglect<sup>50,44</sup>.

## **2.6 SUMMARY AND THESIS RATIONALE**

The main aim of this study is: i) to determine the household prevalence of emotional, physical, and severe physical abuse in children (aged 2-14) following the January 12, 2010 earthquake (7.0 Mw) that struck near Port-au-Prince, Haiti and ii) to explore the association between earthquake-related loss and experience of emotional, physical, and severe physical child abuse in the household. The proposed study will contribute to public health literature by advancing knowledge around natural disasters and their potential influences on emotional and physical child abuse. Past research has shown that disasters have adverse impacts on short- and long-term physical and mental health of children, negatively affecting their quality of life. However, there is a lack of epidemiological and population-based studies evaluating the impact of natural disasters on child abuse. There has been no previous study investigating the association between earthquake-related loss and emotional and physical child abuse, particularly in a low resource setting such as Haiti. Epidemiologic and population-based studies are necessary to make informed decisions on how best to prevent violence against children in the contexts of natural disasters. This study thus aims to contribute new data that could inform prevention efforts, interventions, and policies that directly address children, caregivers, and humanitarian responders in post-disaster settings.

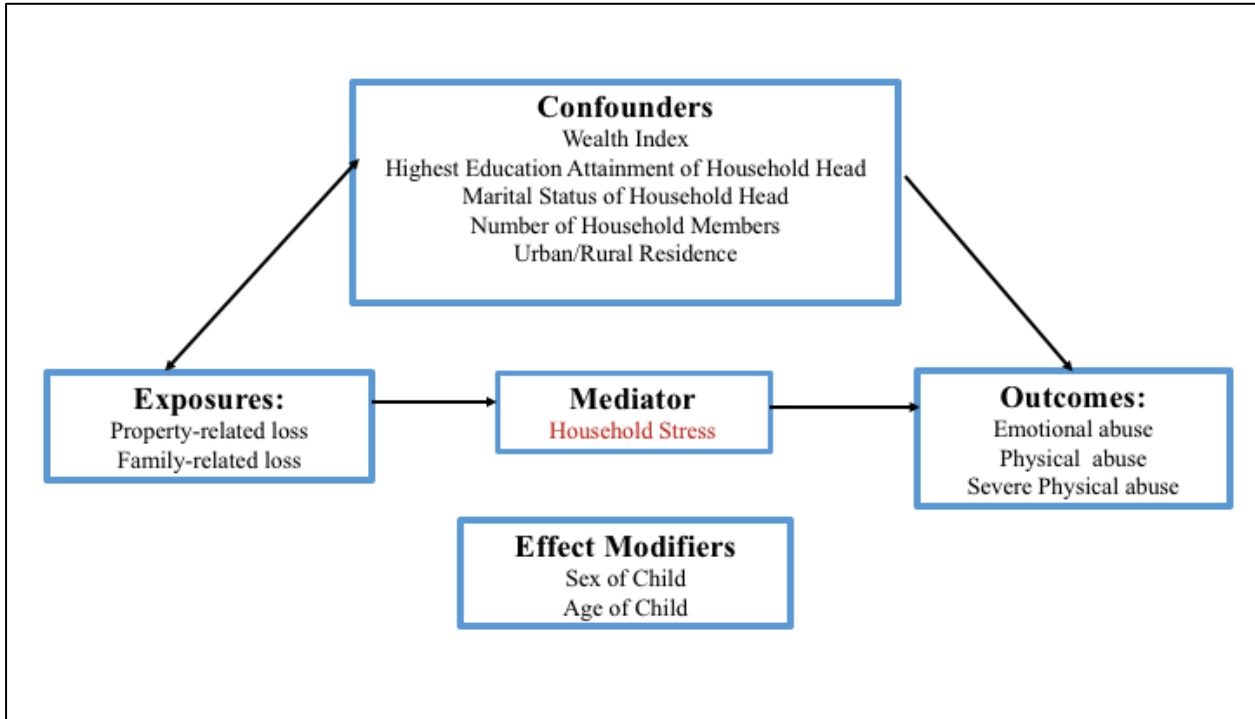


Figure 1. Conceptual model illustrating the relationship between different types of earthquake-related loss and different types of child abuse

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## **CHAPTER 3**

### **Socio-demographic Characteristics, Socio-economic Situation, Living Conditions, and Emotional, Physical, and Severe Physical Abuse Patterns in the context of the 2010 Earthquake**

## Abstract

**Objectives:** The aim of this study was to investigate the socio-demographics, socio-economic situation, and living conditions of households pre- and post 2010 Haiti earthquake, and to determine the household prevalence of emotional, physical, and severe physical abuse in children aged 2-14 post-earthquake.

**Methods:** Nationally representative samples of Haitian households from the 2005/6 (n=9888) and 2012 (n=13181) phases of the Demographic and Health Surveys (DHS) were used. Descriptive analyses were summarized using frequencies and measures of central tendency. Chi-squared and independent T-tests were used to compare data that was available pre-earthquake and post-earthquake.

**Results:** Comparing pre-post-earthquake, noteworthy improvements were observed in the educational attainment of the household head (9.1% decrease in “*no education*” category) and in possession of household: electricity, television, mobile-phone, and radio. The prevalence estimates of emotional, physical, and severe physical abuse in 2012 was 78.5%, 77.0%, and 15.4% respectively. Pre-post estimates for abuse measures were not available.

**Conclusions:** There were dramatic changes in Haitian households between 2006 and 2012. The prevalence estimates of child abuse in Haiti highlight an urgent need for interventions aimed at reducing occurrences of household child abuse.

### **3.1 INTRODUCTION**

The Republic of Haiti, home to approximately 10.4 million people, has been plagued by a history of political, economic, and disaster-related challenges<sup>1</sup>. On January 12, 2010, a 7.0 magnitude earthquake struck near Port-au-Prince, the capital and most populated city of Haiti<sup>2</sup>. The earthquake resulted in 300,000 deaths and displaced more than one million people<sup>2</sup>, causing economic, social, and familial distress. Massive earthquakes like this and similar natural disasters are known to cause increased stress, loss/and or destruction of property, loss and/or injury of family members, mental health complications, scarcity of basic provisions, and destruction of social networks<sup>3</sup>. In addition, nine months after the earthquake, an outbreak of cholera spread across Haiti and resulted in thousands of deaths<sup>4</sup>. Such change and disruption often creates an unhealthy and stressful environment, which may render children more vulnerable to abuse in the household<sup>5</sup>. Although a number of studies have indicated that child abuse is increasingly prevalent after disasters,<sup>3</sup> the full extent of the problem has not been thoroughly studied, particularly in Haiti.

A review of the recent literature revealed limited epidemiological research on the demographic variables, socio-economic situations, and living conditions before and after natural disasters and there are very few studies examining the prevalence of emotional child, physical, and severe physical child abuse in the household following disasters.

#### **3.1.1 Defining Emotional and Physical Child Abuse**

Abuse of children is a widespread violation of human rights and an important public health issue. Child abuse refers to all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity<sup>6</sup>. The two forms of abuse that will be highlighted in this analysis are emotional and physical abuse.

Emotional abuse refers to the failure of a caregiver to provide an appropriate and supportive environment, and includes acts that have an adverse effect on the emotional health and development of a child<sup>7</sup>. Such acts include restricting a child's movements, denigration, ridicule, threats and intimidation, discrimination, rejection and other non- physical forms of hostile treatment<sup>7</sup>. Secondly, physical abuse refers to any punishment in which physical force is used and intended to cause some degree of pain or discomfort, however light<sup>8</sup>. A "severe physical abuse" category will also be examined by combining two of the most severe forms of abuse from the physical abuse indicators: *Hit or slapped child on the face, head, or ears* and *Beat child again and again, as strong as possible*.

### **3.1.2 Convention on the Rights of the Child**

The Convention on the Rights of the Child (CRC) was created with the intention of guaranteeing children their rights in all circumstances. Article 19 states that: Children have the right to be protected from being hurt and mistreated, physically or mentally<sup>8</sup> by their parents, or anyone else who looks after them. In terms of discipline, the Convention does not specify what forms of punishment parents should use. Nevertheless, from the United Nation's perspective, any form of discipline involving violence is unacceptable<sup>8</sup>. Although the Democratic Republic of Haiti ratified the CRC in 1995<sup>9</sup>, children who are disaster victims are still at risk of having their rights violated, including their right to be protected from emotional, physical, and severe physical child abuse.

### **3.1.3 Haiti's Position on Child Abuse and Corporal Punishment**

Corporal punishment can be defined as violence inflicted on children by parents, caregivers, teachers, and others in the name of "discipline"<sup>10</sup>. Corporal punishment has been acknowledged by UNICEF and the United Nations Secretary General's as the most common form of violence against

children<sup>11</sup>. A law prohibiting and eliminating all forms of abuse, violence, maltreatment or inhuman treatment against children was published in the Official Gazette of the Government of Haiti, "Le Moniteur" No. 41 of the Thursday, June 5, 2003<sup>12</sup>. Article 2 of this law states that "all forms of abuse and violence against children and their exploitation are prohibited"<sup>12</sup>. Similarly, the Law of 24 September 2001, prohibits the use of corporal punishment in families and schools<sup>13</sup>. Despite these efforts to eliminate corporal punishment, the committee on the Rights of the Child remains concerned at the persistent practice of corporal punishment by parents or teachers and the ill-treatment of children in Haiti<sup>14</sup>.

This objective of this study is to provide a descriptive overview of demographic characteristics, socioeconomic situation, and living conditions of Haitian citizens as well as to report on the household prevalence of emotional, physical, and severe physical child abuse following the earthquake in Haiti. Some variables are available at two time periods (pre- and post the 2010 earthquake). However, the child abuse data is only available post-earthquake and therefore is only reported for a single time point.

## **3.2 METHODS**

### **3.2.1 Study Sample**

This study uses data from the Demographic and health Survey (DHS). The DHS is a nationally-representative household survey funded by the United States Agency for International Development (USAID)<sup>15</sup>. It provides data for a range of monitoring and impact evaluation indicators in the areas of population and health. Since 1984, the DHS Program has provided technical assistance to demographic and health surveys in over 90 countries, including Haiti<sup>15</sup>. To address the study objective of examining the sociodemographic characteristics, socioeconomic situation, and living

conditions, this study used Haiti specific data from the 2005/2006 (household n= 9998) and 2012 (household n=13181) cycles of the Demographic and Health survey (See *Appendix B* for survey sample flowchart). To determine the prevalence of emotional and physical child abuse in the household, data from the 2012 cycle was used. All analyses were weighted by appropriate DHS sampling weights.

Both the pre-earthquake (2005/6) and post-earthquake (2012) surveys used a two-stage sampling design where the sample population were stratified and drawn at two levels<sup>16</sup>. First, the 10 geographic regions of Haiti and a “camps” region were separated into urban and rural parts to form the sampling strata. The “Metropolitan Area” region only had urban areas and was stratified according to the six communes, thus, a total of 26 sampling strata was created<sup>16</sup>. Households were then randomly sampled within each strata proportionally to the actual distribution of the population. The households were pre-selected in the central office prior to the start of fieldwork rather than by teams in the field who may bias the selection<sup>16</sup>. To prevent bias, no changes or replacements were allowed in the field. For the camps, sites were selected from the most up-to-date list at the time of the survey, and due to the highly mobile nature of the camp population, the collection of data in the camps immediately followed the household enumeration process so that the selected households were not lost before the survey took place<sup>16</sup>.

### **3.2.2 Descriptive Variables**

***Descriptive Variables.*** This study examined data for household demographic characteristics, living conditions, and socio-economic situations for both the 2005/2006 (pre-earthquake) and 2012 (post-earthquake) DHS cycles. Demographic variables include: *urban/rural residence, number of household members, age of household head, sex of household head, marital status of household*

*head*, and *highest educational attainment of household head*. Living conditions were examined using the following indicators: (i) household possessions such as: *electricity, a radio, a television, a mobile phone, a landline phone*, and/or *a refrigerator* and (ii) *sharing of toilet facilities with other households*. The socio-economic situation was established using the *wealth index*, a composite measure of a household's cumulative living standard. The wealth index is calculated using data on a household's ownership of selected assets, materials used for housing construction, types of water access, and sanitation facilities<sup>16</sup>. Each household is assigned a score for each criteria and the sum of all scores is calculated per household. Households are then ranked in ascending order of total score and divided into 5 equal workforce categories<sup>16</sup> from 1 (lowest quintile) to 5 (highest quintile). For DHS questions and possible answer choices see *Appendix A*.

### **3.2.3 Indicators for Emotional and Physical Abuse**

***Emotional and Physical Abuse Variables.*** Data on emotional abuse were collected by randomly selecting a child aged 2-14 in each household and asking the household respondent if the randomly selected child experienced any of the following acts committed by anyone in the household in the month prior to the 2012 survey : (i) *yelled or screamed at child*, (ii) *called child dumb, lazy, or another name*, (iii) *revoked privileges to child*, (iv) *asked child to kneel*, and (v) *deprived the child of meal to punish him/her*. Similarly, data on physical abuse were collected by asking the household respondent whether or not any of the following were experienced by the randomly selected child in the past month: (i) *Shook child*, (ii) *Pulled child's ears*, (iii) *Hit or slapped child on the face, head, or ears*, (iv) *Hit or slapped child on hand, arm or leg*, (v) *Hit child on bottom with hands*, and (vi) *Beat child again and again, as strong as possible*". Respondents were also asked if they believed the "*child needs to be physically punished to be brought up properly*". A severe physical abuse variable was created by combining two of the most severe forms of physical abuse (iii) *Hit or*



*slapped child on the face, head, or ears and (vi) Beat child again and again, as strong as possible.*

For DHS questions and possible answer choices see *Appendix A*.

### **3.2.4 Statistical Analysis**

Descriptive analyses were performed to determine socio-demographic characteristics, socio-economic situation, living conditions, and the household prevalence of emotional, physical, and severe physical child abuse. Continuous variables were summarized using measures of central tendency (mean) and dispersion (range and standard deviation). Categorical variables were summarized using frequencies and percentages. Socio-demographic, socio-economic, and living-condition data were summarized for both the 2005/2006 (pre-earthquake) and 2012 (post-earthquake) DHS cycles. Emotional, physical, and severe physical child abuse data were summarized only for the 2012 post-earthquake DHS cycle. A Chi-square test (critical p-value of  $<0.05$ ) was used to compare categorical data that was available pre-earthquake and post-earthquake and an independent t-test (critical p-value of  $<0.05$ ) was used to compare continuous data that was available pre-earthquake and post-earthquake.

## **3.3 RESULTS**

### **3.3.1 Socio-demographic Characteristics**

Most socio-demographic characteristics, socio-economic situations, and living conditions changed significantly from the pre-earthquake (2005/06) to post-earthquake (2012) time periods. Among the statistically significant differences ( $P<0.05$ ), the most notable were seen for: sex of household head, and highest education attainment of household head. The sex of household head changed from 56.3% male in 2005/6 to 59.4% male in 2012. There were improvements made in the highest education attainment of the household head. The most notable change occurred in the “no

*education*” category, where the frequency of household heads without any formal education decreased from 44.1% in 2005/6 to 35.0% in 2012. Lastly, 4.7% of the study population were living in camps after the earthquake (*Table 1*).

### **3.3.2 Socio-economic Situation and Living Conditions**

A Pearson Chi-square test was conducted for the observed differences in socio-economic situations and living conditions pre-and post-earthquake. There was a statistically significant difference (p-value<0.05) seen for wealth status, with the proportion of respondents in the “poorest” category (1<sup>st</sup> quintile) being higher in 2005/6 (19.7%) than in 2012 (17.8%). Despite this difference, the population was divided relatively evenly throughout the five wealth index quintiles both pre-earthquake and post-earthquake. Additionally, a Chi-square test revealed that there were statistically significant differences in the possession of the following household items pre-and post-earthquake: electricity (33.9% in 2005/6 and 38% in 2012), television (25.9% in 2005/6 and 29.4% in 2012), landline telephone (4.4% in 2005/6 and 1.8% in 2012), mobile phone (17.3% in 2005/6 and 77.2% in 2012), radio (60.8% in 2005/6 and 54.8% in 2012), and sharing toilet with other households (47.8% in 2005/6 and 48.8.4% in 2012). In contrast, there was no statistically significant difference in the proportion of households who owned refrigerators (9.7% in 2005/6 and 9.9% in 2012), and land for agriculture before and after the earthquake (61.3% in 2005/6 and 62.6% in 2012) (*Table 2*).

### **3.3.3 Household Prevalence of Emotional, Physical, and Severe Physical Child Abuse**

The prevalence of at least one form of emotional, physical, and severe physical abuse in the month prior to the 2012 survey was 78.5%, 77.0%, and 15.4% respectively. The most common act of emotional abuse was “*yelled or screamed at child*” (54.8%), followed by “*asked child to kneel*”

(48.8%), “*called child dumb, lazy, or another name*” (27.0%), “*revoked privileges to child*” (25.3%) and “*deprived child of meal*” (2.1%). In regards to physical abuse, 28.5% of the respondents believed that their child needed to be physically punished to be brought up properly. The most common form of physical abuse was “*hit child on the bottom with hands*” (53.7%), followed by “*hit or slapped child on the hand, arm, or leg*” (38.9%), “*shook child*” (20.2%), “*pulled child’s ears*” (14.0%), “*beat child again and again, as strong as possible*” (13.4%), and lastly, “*hit or slapped child on face, head, or ears*” (4.6%) (**Table 3**).

### **3.4 DISCUSSION**

#### **3.4.1 Emotional and Physical Abuse**

There were some alarming findings regarding the prevalence estimates of child abuse in the household. Though different forms of child abuse often occur together<sup>17</sup>, we have chosen to analyze them separately in this study. When analyzed individually, both physical and emotional abuse were very common while severe physical abuse was less common. Although, we do not have baseline prevalence estimates of emotional or physical abuse pre-earthquake in Haiti, the estimates we found are considerably higher compared to global estimates (22.6% for physical abuse and 36.3% for emotional abuse<sup>18</sup>).

In addition to violating his / her basic human rights, any form of abuse can have severe negative implications to a child’s well-being including short- and long-term physical and psychological adverse health outcomes. Although the nature of and attitudes toward emotional and physical abuse are often rooted in cultural and societal norms, both the World Report on Violence and Health<sup>19</sup> and the World Report on Violence Against Children<sup>11</sup> acknowledges child abuse as a universal violation of human rights across all nations and cultures. Although Haiti ratified the Convention on

the Rights of the Child in 1995, and there are existing Haitian laws that prohibit corporal punishment<sup>14</sup>, there is an immediate need for better enforcement policies and stricter penalties around child abuse. Additionally, there is a necessity for awareness campaigns that encourage healthy forms of child discipline. Furthermore, a nation-wide campaign is essential to educate caregivers in Haiti regarding what is considered child abuse and also the short- and long-term adverse health and development outcomes that are caused by all forms of abuse. Moreover, to change current practices of child abuse in the household, changing the cultural norms around aggressive discipline is also needed.

### **3.4.2 Socio-demographic, Socio-economic, and Living Condition Characteristics**

This paper presents important data on demographic characteristics, socio-economic characteristics, and living conditions, which are important determinants of the economic and health status of a population. Regarding the socio-demographic results, the 2012 survey revealed that approximately 5.0% of the population reported living in camps. Although there is no DHS data to compare the number of people living in camps before and after the earthquake, the number of people living in camps is likely to be higher after the earthquake, since the Government of Haiti reported that 1.3 million people were living in temporary shelters in the Port-au-Prince metropolitan area immediately after the earthquake<sup>2</sup>. The household head was predominantly male for both cycles of the survey, which is expected given that Haiti is considered a patriarchal society. Moreover, the percentage of households who shared a toilet with other households slightly increased after the earthquake. This is potentially due to the fact that 105,000 homes were destroyed and over 208,000 were damaged as a result of the disaster<sup>2</sup>. Moreover, in 2012, only one third of the surveyed population had electricity in the household. This low number is worrying, considering that lack of

electricity has negative implications for safety, for children who want to study at home and for adults who earn a living from working at home.

While statistical differences were found in most of the sociodemographic categories, meaningful differences appear to be related most to household possessions and the level of educational attainment of the household head. One of the most notable and positive findings of this study was the drastic 59.9% increase in the household possession of mobile phones from 2005/6 to 2012. An explanation for this increase is the opening of a third private cellular phone company in Haiti in 2010, which allowed the country to reach a much higher mobile density<sup>20</sup>. The increase in mobile phone usage may benefit the citizens of Haiti in numerous ways. Firstly, numerous studies have shown that mobile phone usage can be beneficial in disaster and disease outbreak situations as it may be easier to communicate, and also geospatially to locate the movement of people<sup>20,21</sup>. Existing approaches to assessing population movements immediately after natural disasters, such as eye-witnesses, transport surveys, and manual registration of individuals at emergency-relief centers, are often inadequate<sup>21</sup>. A post-earthquake geospatial study in Haiti that anonymously tracked 1.6 million Subscriber Identity Module (SIM) cards found that estimates of population movements could be delivered rapidly with high validity in areas with high mobile phone use<sup>20</sup>. Additionally, in low- and middle-income countries, mobile phones have shown some promise in increasing knowledge of health and modifying health behavior, such as smoking cessation and alcohol intake<sup>22</sup>. Relatedly, in the future, awareness about child abuse and the resulting negative implications could be shared through mobile devices.

Another positive change after the earthquake was the improvement of educational attainment of the household head. Although the reason behind the notable decrease in “*no education*”, and the

increase in “*primary*”, “*secondary*”, and “*higher education*” cannot be definitively ascertained, some evidence-based speculations can be made. After recognizing that Haiti had one of the lowest school enrolment rates in the world, in 2007 the World Bank funded the Education For All (EFA) adaptable program<sup>23</sup>. This program was in effect from 2007- 2010; and in 2011, the government of Haiti and the World Bank began the second phase of EFA<sup>23</sup>. The objective of the EFA Project for Haiti was to improve and rebuild the education system through the implementation of sustainable programs to improve: (a) access, particularly of under-served populations, to primary education; (b) quality of primary education; and (c) the institutional capacity in the education sector<sup>23</sup>. Since 2007, the World Bank has contributed US\$108 million to the EFA program, and more than 1.5 million children in Haiti have received a tuition waiver<sup>23</sup>. Improved educational attainment may also be secondary to the massive world-wide humanitarian response which followed after the disaster, and resulted in large numbers of governmental and non-governmental organizations joining efforts to improve the health, education, and economy in Haiti.

### **3.5 STRENGTHS AND LIMITATIONS**

#### **3.5.1 Strengths**

There are many strengths to this study. Firstly, given that the Demographic and Health Surveys use nationally representative samples, the results are generalizable at the country level. More specifically, this analysis used large sample sizes of 9998 and 13181, which provided large statistical power, thus minimizing random error and helping to detect a significant result where one existed. Furthermore, this study helps address a gap in current literature by providing information on socio-demographic characteristics, socio-economic situations, and living conditions pre-and post-disaster while providing the prevalence of household child-targeted emotional, physical, severe physical abuse post-earthquake. The findings may be helpful for understanding current

settings in Haiti and for comparison against data from future DHS cycles. Lastly, similar to other secondary analyses of cross-sectional data, this study was relatively quick and inexpensive to complete.

### **3.5.2 Limitations**

The results of this manuscript must be considered in the context of some limitations. Child abuse related data were only available post-earthquake, and consequently we were not able to compare pre-post-earthquake prevalence estimates for child abuse in Haiti. However, the post-earthquake estimates do indicate that they are higher than global averages and higher than rates previously published Haiti in the Violence Against Children in Haiti study<sup>24</sup>. Secondly, the household survey was conducted approximately two years after the earthquake, which may result in an underestimation of the true prevalence of child abuse directly after the disaster when stress and disruption were likely higher. It is likely however, that the effects of the earthquake on families continued in Haiti as a result of the widespread cholera epidemic<sup>4</sup>, the continued rebuilding of homes and displacement of people<sup>25</sup>, the fragile economy<sup>26</sup> and political insecurity<sup>27</sup>. In addition, there is a possibility of social desirability bias in this study since child abuse is a sensitive topic, and respondents who abused the randomly selected child may have answered questions in a manner that would be viewed more favorably by the interviewer. This would lead to underreporting of child abuse.

### **3.6 CONCLUSION**

This study showed some similarities, but predominantly meaningful differences in the socio-demographic characteristics, socio-economic situations, and living conditions of households in Haiti before and after the 2010 earthquake. Noteworthy differences included the increased mobile

phone possession and the improvement of education attainment for household heads. This study also ascertained that the household prevalence of emotional, physical, and severe physical abuse is high and there is an immediate need for enforcement of existing policies, interventions, and awareness campaigns around the severity of all forms of child abuse and their associated short and long term adverse health and development outcomes.



Table 1. Comparison of socio-demographic characteristics pre-and post-2010 Haiti earthquake

<b>Sociodemographic Characteristics</b>	<b>2005/2006 cycle</b>		<b>2012 Cycle</b>		
<b>Variable</b>	<b>N</b>	<b>Mean (sd)</b>	<b>N</b>	<b>Mean</b>	<b>P-value</b>
<b>Number of Household Members</b>	9998	4.67 (2.5), Range:1-27	13181	4.49 (2.5) Range:1-26	<0.001*
<b>Age of Household Head (years)</b>	9998	46.8 (15.8)	13181	46.5 (16.0)	0.155
<b>Variable</b>	<b>N</b>	<b>Frequency (%)</b>	<b>N</b>	<b>Frequency (%)</b>	
<b>Sex of Household Head</b>					
Male	5632	56.3	7830	59.4	<0.001*
Female	4366	43.7	5351	40.6	
<b>Marital Status of Household Head</b>					
Never Married	650	6.6	1047	8.0	<0.001*
Married	6817	68.9	8924	67.9	
Widowed	1419	14.3	1773	13.5	
Divorced	1008	10.2	1399	10.6	
<b>Highest Educational Attainment of Household Head</b>					
No education	4407	44.1	4606	35.0	<0.001*
Primary	3223	32.2	4482	34.0	
Secondary	2003	20.0	3402	25.8	
Higher	304	3.0	658	5.0	
Don't know	38	0.4	25	0.2	
<b>Urban/Rural Residence</b>					
Urban	3876	38.8	5414	41.1	0.458
Rural	6122	61.2	7767	58.9	
<b>Region and Camps</b>					
Aire Metropolitaine/Reste-Ouest	3814	38.1	4803	36.4	Data for camps were not collected in 2005/6
Sud-Est	565	5.7	669	5.1	
Nord	894	8.9	1150	8.7	
Nord-Est	327	3.3	450	3.4	
Artibonite	1699	17.0	2171	16.5	
Centre	781	7.8	818	6.2	
Sud	699	7.0	959	7.3	
Grand'Anse	391	3.9	495	3.8	
Nord-Ouest	528	5.3	600	4.6	
Nippes	301	3.0	453	3.4	
Camps	N/A	N/A	614	4.7	
Total	9998	100.0	13181	100.0	

\*P-values for Independent T-test for continuous variables and Pearson Chi-square test for categorical variables comparing 2005/6 and 2012 data

Table 2. Comparison of socio-economic situations and living conditions pre-and post- 2010 Haiti earthquake

Socio-economic Characteristics Variable	2005/2006 cycle		2012 Cycle		P-value
	N	Frequency (%)	N	Frequency (%)	
<b>Household Wealth Index</b>					
Poorest	1957	19.7	2342	17.8	<0.001*
Poorer	1941	19.4	2681	20.3	
Middle	2044	20.4	2874	21.8	
Richer	2113	21.1	2784	21.1	
Richest	1943	19.4	2500	19.0	
<b>Household Possessions</b>					
<b>Electricity</b>					
Yes	3389	33.9	5002	38.0	<0.001*
No	6608	66.1	8178	62.0	
<b>Refrigerator</b>					
Yes	968	9.7	1305	9.9	0.599
No	9018	90.3	11875	90.1	
<b>Television</b>					
Yes	2529	25.9	3880	29.4	<0.001*
No	7464	74.7	9300	70.6	
<b>Telephone (land-line)</b>					
Yes	437	4.4	232	1.8	<0.001*
No	9549	95.6	12941	98.2	
<b>Mobile Phone</b>					
Yes	1728	17.3	10179	77.2	<0.001*
No	8263	82.7	3001	22.8	
<b>Land for Agriculture</b>					
Yes	6126	61.3	8253	62.6	0.040*
No	3867	38.7	4926	37.4	
<b>Radio</b>					
Yes	6074	60.8	7226	54.8	<0.001*
No	3922	39.2	5951	45.1	
<b>Shared Toilet with Other Households</b>					
Yes	3117	47.8	5054	48.8	<0.001*
No	3402	52.2	4817	51.2	

\*P-values from Pearson Chi-square tests for significant difference in proportions comparing 2005/6 and 2012 data

Table 3. Prevalence estimates of emotional, physical, and severe physical child abuse in the household in the month prior to survey in 2012

<b>Emotional and Physical Child Abuse Indicators (2012 cycle)</b>		
<b>Variable</b>	<b>N</b>	<b>Frequency(%)</b>
<b>Emotional Abuse Indicators</b>		
<b>i. Asked Child to Kneel</b>		
Yes	4078	48.8
No	4272	51.2
<b>ii. Deprived Child of Meal</b>		
Yes	173	2.1
No	8176	97.9
<b>iii. Yelled or Screamed at Child</b>		
Yes	4572	54.8
No	3777	45.2
<b>iv. Revoked Privileges to Child</b>		
Yes	2115	25.3
No	6235	74.7
<b>v. Called Child Dumb, Lazy, or Another Name</b>		
Yes	2258	27.0
No	6092	73.0
<b>Experience of At Least One Form of Emotional Abuse Listed Above</b>		
Yes	6554	78.5
No	1797	21.5
<b>Physical Abuse Indicators</b>		
<b>i. Hit or Slapped Child on the Hand, Arm, or Leg</b>		
Yes	3247	38.9
No	5101	61.1
<b>ii. Hit Child on Bottom with Hands</b>		
Yes	4942	53.7
No	3409	40.8
<b>iii. Hit or Slapped Child on Face, Head, or Ears</b>		
Yes	383	4.6
No	7964	95.4
<b>iv. Pulled Child's Ears</b>		
Yes	1168	14.0
No	7151	86.0
<b>v. Hit Child on the Bottom with Hands</b>		
Yes	4481	53.7
No	3870	46.3
<b>vi. Beat Child Again and Again, as Strong as Possible</b>		
Yes	1121	13.4
No	7226	86.6
<b>vii. Shook Child</b>		
Yes	1685	20.2
No	6665	79.8
<b>Experience of At Least One Form of Physical Abuse Listed Above</b>		
Yes	6432	77.0
No	1919	23.0
<b>Severe Physical Abuse (physical abuse indicators: iii &amp; vi)</b>		
<b>Experience of at Least one form of Severe Physical Abuse</b>		
Yes	1289	15.4
No	7062	84.6

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## **CHAPTER 4**

### **Analysis of the Relationship Between Earthquake-related Losses and the Frequency of Child-directed Emotional, Physical, and Severe Physical Abuse in Haiti**

## Abstract

**Background:** Child abuse is a public health and human rights issue that is prevalent worldwide. All forms of abuse against children can have numerous negative physical and mental health consequences. Under post disaster situations, where there is a potential for increased stress and decreased social support among caregivers, the risk of child-targeted abuse may be higher.

**Objective:** The aim of this study was to explore the association between two forms of earthquake-related losses (family-related and property-related) and the experience of emotional, physical, and severe physical child abuse in the household for children aged 2-14 in Haiti.

**Methods:** A nationally representative sample of Haitian households from 2012 cycle of the Demographic and Health Survey (DHS) was used. Descriptive analyses were summarized using frequencies and measures of central tendency. The association between earthquake-related loss and emotional, physical, and severe physical child abuse was assessed using log-binomial regression models. To explore patterns of child abuse in relation to proximity to the epicenter, basic mapping was used to examine the prevalence of all forms of abuse by the 10 geographic regions and camps.

**Results:** Two years following the earthquake, death of a household member was associated with a higher likelihood of a child being victim to emotional (RR=1.11, 95% CI: 1.05-1.17) and severe physical abuse (RR=1.49, 95% CI: 1.14-1.94). Conversely, injury of a household member was associated with a lower likelihood of a child experiencing emotional abuse and thus was identified as a protective factor (RR=0.67, 95% CI: 0.52-0.87). Mapping revealed no conclusive patterns between the proximity of each region to the epicenter and the prevalence of the different forms of abuse. However, the prevalence of severe physical abuse in settlement camps was found to be notably higher (25.0%) compared to the overall prevalence in Haiti (15.4%).



**Conclusions:** There were associations between earthquake-related losses and some forms of child abuse; the results were not consistent across all exposures and outcomes. The high prevalence of reported child abuse indicates a need for interventions to reduce child abuse in homes and settlement camps in Haiti.

## **4.1 INTRODUCTION**

### **Background**

One of the most damaging natural disasters of the past decade occurred on January 12, 2010 in the Republic of Haiti<sup>1</sup>. A devastating 7.0 magnitude earthquake occurred 25 km West-Southwest of the capital city, Port-au-Prince<sup>2</sup>. This catastrophe caused approximately 300,000 deaths and displaced more than one million people<sup>1</sup>. As a result of its high mortality rate, the Inter-American Development Bank (IDB) claimed this earthquake to be the most destructive event any country has experienced in modern times<sup>3</sup>. This natural disaster caused immense trauma to many vulnerable people, including the 4.5 million children, who make up nearly half of the total population in Haiti<sup>4</sup>. Approximately 110,000 children under the age of 18 lost their lives as a result of the earthquake and more than 1.2 million children were considered to be extremely vulnerable to violence, exploitation, and abuse in the earthquake's aftermath<sup>5</sup>.

Worldwide, countless children are impacted by natural disasters every year. Such catastrophic events disrupt physical and social environments causing an increase in familial stress in the household<sup>6,7</sup>. Nonetheless, epidemiological studies focusing on children and natural disasters, both in Haiti and globally, are scarce. From the limited studies that do exist, it has been established that in post disaster situations, when stress in the home is increased and social support is decreased, occurrences of child abuse are more likely to occur<sup>7,8</sup>.

#### **4.1.1 Defining Physical and Emotional Child Abuse**

Child abuse refers to all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity<sup>9</sup>.

Emotional abuse refers to the failure of a caregiver to provide an appropriate and supportive environment, and includes acts that have an adverse effect on the emotional health and development of a child<sup>10</sup>. Such acts include restricting a child's movements, denigration, ridicule, threats and intimidation, discrimination, rejection and other non- physical forms of hostile treatment<sup>10</sup>. Secondly, physical abuse refers to any punishment in which physical force is used and intended to cause some degree of pain or discomfort, however light<sup>11</sup>. In order to examine the relationship between earthquake related loss and extreme forms of physical abuse, two forms of physical maltreatment were incorporated to form a third category, *severe physical abuse: Hit or slapped child on the face, head, or ears and Beat child again and again, as strong as possible*.

#### **4.1.2 Convention on the Rights of the Child and Haiti's Position on Child Abuse and Corporal Punishment**

The Convention on the Rights of the Child (CRC) was created with the intention of guaranteeing children their rights in all circumstances. Article 19 states that: Children have the right to be protected from being hurt and mistreated, physically or mentally<sup>11</sup>. In terms of discipline, the Convention does not specify what forms of punishment parents should use. Nevertheless, from the United Nation's perspective, any form of discipline involving violence is unacceptable<sup>11</sup>. Although the Republic of Haiti ratified the CRC in 1995<sup>12</sup>, children are still at risk of having their rights violated, perhaps even more so in the aftermath of a catastrophic disaster.

Corporal punishment can be defined as violence inflicted on children by parents, caregivers, teachers, and others in the name of "discipline"<sup>13</sup>. Corporal punishment has been acknowledged by UNICEF as the most common form of violence against children<sup>14</sup>. A law prohibiting and eliminating all forms of abuse, violence, maltreatment or inhuman treatment against children was

published in the Official Gazette of the Government of Haiti, "Le Moniteur" No. 41 of the Thursday, June 5, 2003<sup>15</sup>. Article 2 of this law states that "all forms of abuse and violence against children and their exploitation are prohibited"<sup>15</sup>. Similarly, the Law of 24 September 2001, prohibits the use of corporal punishment in families and schools<sup>16</sup>. Despite efforts to eliminate corporal punishment in the home, the committee on the Rights of the Child remains concerned at the persistent practice of corporal<sup>17</sup> punishment by parents or teachers and the ill-treatment of children in Haiti<sup>18</sup>.

#### **4.1.3 Child Abuse and Associated Health and Development Outcomes**

The association between experiences of child abuse and poor physical and mental health outcomes later in life has been well documented<sup>19,20,21,22, 23,24,25</sup>. These adverse outcomes include psychiatric and medical diagnoses such as depression, anxiety disorders, eating disorders, posttraumatic stress disorder (PTSD), chronic pain syndromes, fibromyalgia, and chronic fatigue syndrome. Compared with adults who did not experience child abuse, those who suffered childhood abuse are more likely to engage in high-risk behaviors including smoking, substance abuse, unsafe sex<sup>26,27</sup>. Children who are abused are also more likely to report an overall lower health status as adults and to use more health services<sup>28</sup>. Child abuse not only negatively influences the health of a child, but it can also have disadvantageous consequences on a child's education. For example on average, children who are abused receive lower grades, score lower on cognitive assessments, and get suspended from school more frequently<sup>29,30</sup>. Relatedly, children who have experienced early abuse may also develop behavior problems including emotional instability and aggressiveness towards others<sup>31</sup>.

#### **4.1.4 Natural Disasters and Physical and Emotional Child Abuse**

The phenomenon of child abuse following a natural disaster has not been comprehensively studied, however, existing research has shown some trends. Previous studies have established a link between natural disasters and an increase in child abuse and it has been proposed that this increase stems from the additional stress on parents and caregivers triggered by the event, by a lack of social support, and by subsequent mental health sequelae<sup>7,8</sup>. The association between family-level stress and levels of child abuse in the home has also been explored in other traumatic settings such as wars. At the time of the Iraq war, parents in high-conflict areas were more likely to use moderate and severe forms of corporal punishment against children aged 2-14<sup>32</sup>.

In one of the first attempts to examine patterns of child abuse after natural disasters, researchers analyzed child abuse reports one year before and after Hurricane Hugo, the Loma Prieta Earthquake, and Hurricane Andrew<sup>7</sup>. Six months following Hurricane Hugo, the total rate of physical, emotional, and sexual abuse increased from 101.86 to 121.37 per 100,000<sup>7</sup>. Relatedly, six months following the Loma Prieta Earthquake total rates of physical, emotional, and sexual abuse increased from 344.07 to 367.1 per 100/000<sup>7</sup>. In contrast, following Hurricane Andrew, the total rate of physical, emotional, and sexual abuse decreased from 112.00 to 90.44 per 100,000<sup>7</sup>. The authors of this study believe that the inconsistency in findings could be explained by the interventions focused on helping victims that were attempted following the disaster and also because the citizens of Louisiana have a history of dealing with the aftermath of Hurricanes<sup>7</sup>. Finally, an ecologic study conducted in North Carolina found a fivefold increase in non-accidental head trauma among toddlers aged two years or younger, six months after hurricane Floyd (RR=5.1, 95%CI =1.3-20.4)<sup>8</sup>.

#### **4.1.5 Research Objective and Hypothesis**

The objective of this study was to examine the association between two forms of earthquake-related loss (property-related and family-related) with experiences of emotional, physical, and severe physical child abuse in the household while considering potential confounding variables and the interactive effects of several social, economic, and demographic factors. It is hypothesized that following natural disasters, children in households that experienced earthquake-related losses in the 2010 Haiti earthquake will be at a higher likelihood of experiencing emotional, physical, and severe physical abuse.

## **4.2 METHODS**

### **4.2.1 Study Design and Data Source**

This cross-sectional study used data from the Demographic and Health Survey (DHS). The DHS is a nationally-representative household survey funded by the United States Agency for International Development (USAID)<sup>33</sup>. It provides data for a range of monitoring and impact evaluation indicators in the areas of population and health. Since 1984, the DHS Program has provided technical assistance to demographic and health surveys in over 90 countries, including Haiti<sup>33</sup>.

The post-earthquake (2012) survey used a two-stage sampling design where the sample population were stratified and drawn at two levels<sup>34</sup>. First, the 10 geographic regions of Haiti and a “camps” region were separated into urban and rural parts to form the sampling strata. The “Metropolitan Area” region only had urban areas and was stratified according to the six communes, thus, a total of 26 sampling strata was created<sup>34</sup>. Households were then randomly sampled within each level proportionally to the actual distribution of the population. The households were pre-selected in the central office prior to the start of fieldwork rather than by teams in the field who may have biased

the selection<sup>34</sup>. To prevent bias, no changes or replacements were allowed in the field. For the camps, sites were selected from the most up-to-date list at the time of the survey, and due to the highly mobile nature of the camp population, the collection of data in the camps immediately followed the household enumeration process so that the selected households were not lost before the survey took place<sup>34</sup>. The samples were weighted by appropriate DHS sampling weights. Of the 13181 households surveyed in 2012, 8367 listed at least one child among its members. These households responded to a series of abuse-related questions that were asked with respect to one randomly selected child in the household. Among the 8367 households, 8351 (99.8%) answered child abuse-related questions (See flow chart in *Appendix B*).

#### **4.2.2 Indicators for Earthquake-related Loss**

Earthquake-related loss refers to both property-related loss and family-related loss experienced in the aftermath of the earthquake. Property-related loss refers to *damage of home*. Family-related loss includes: *injury of at least one household member* and / or ii) *death of at least one household member*. For DHS questions and possible answer choices see *Appendix A*.

#### **4.2.3 Indicators for Emotional, Physical, and Severe Physical Abuse**

Data on emotional abuse were collected by randomly selecting a child aged 2-14 from each eligible household and asking the household respondent if the randomly selected child had experienced any of the following events in the past month: (i) “*yelled or screamed at child*”, (ii) “*called child dumb, lazy, or another name*”, (iii) “*revoked privileges to child*”, (iv) “*asked child to kneel*”, and (v) “*deprived the child of meal to punish him/her*”. Similarly, data on physical abuse were collected by asking the household respondent whether any of the following were experienced by the randomly selected child in the past month: (i) *Shook child*, (ii) *Pulled child’s ears*, (iii) *Hit or slapped child*

on the face, head, or ears, (iv) *Hit or slapped child on hand, arm or leg*, (v) *Hit child on bottom with hands*, and (vi) *Beat child again and again, as strong as possible*". To assess if there were different associations with earthquake-related losses and the most severe forms of physical abuse, we created a "severe physical abuse" category by combining two of the most extreme forms of physical abuse (iii) *Hit or slapped child on the face, head, or ears* and (vi) *Beat child again and again, as strong as possible*. For DHS questions and possible answer choices see *Appendix A*.

#### **4.2.4 Covariates**

Potential confounders that were assessed in all regression analyses include: *wealth index* (a composite measure of a household's cumulative living standard calculated using data on a household's ownership of selected assets, materials used for housing construction, types of water access, and sanitation facilities), *highest educational attainment of household head*, *urban/rural residence*, *marital status of household head*, and *number of household members*. *Sex of child* and *age of child* were included in all models as potential effect modifiers.

#### **4.2.5 Statistical Analysis**

##### **Descriptive Analysis**

Statistical analyses were performed using SPSS (version 25.0) and STATA (version 15.1) statistical software programs. Descriptive statistics were provided for property-related and family-related losses following the earthquake. Categorical values were summarized using frequencies and percentages. Continuous values were summarized using measures of central tendency (mean) and dispersion (range and standard deviation). Mapping was also conducted with the aim of comparing emotional, physical, and severe physical abuse across the 10 of Haiti's geographic regions: Aire Metropolitane/Reste-Ouest, Sud-Est, Nord, Nord-Est, Artibonite, Centre, Sud, Grand' Anse, Nord-



Ouest, and Nippes. In addition, a dedicated “camps” category was included by DHS to represent households who were displaced after the earthquake and were living in temporary camps at the time of the survey.

### **Multivariate Regression Modelling**

To address the association of interest, multivariable log-binomial regression models were used to estimate relative risk (RRs) and 95% confidence intervals (CIs). The computed RRs represent the likelihood of a child experiencing a specific form of abuse in the household for each specific exposure of earthquake-related loss. Effect modification by child age and biological sex were considered by including interaction terms in all models with a standard cut-off of  $p < 0.05$ . To create the most parsimonious model and identify any potential confounders, a backwards elimination method was used with a liberal cut-off criterion of  $p < 0.15$ .

## **4.3 RESULTS**

### **4.3.1 Descriptive Results**

**Emotional, Physical, and Severe Physical Abuse by Geographic Regions.** In Chapter 3, we established that the prevalence of emotional, physical and severe physical abuse in the month prior to the survey was 78.5%, 77.0% and 15.4% respectively. A visual analysis of abuse prevalence in relation to the 10 geographic regions of Haiti and their proximity to the epicenter did not identify any strong conclusive patterns. However, among households residing in camps at the time of the survey, the prevalence of severe physical abuse (25.0%) was found to be disproportionately higher as compared to children who did not live in camps (see *Figure 1* and *Table 2*).

### **Descriptive Results of Property and Family-related Losses**

Among the entire sample (n=13181 households), 72.3% of households reported that they lived in the same housing prior to the earthquake and 38.0% of household respondents reported that their home had been damaged by the earthquake. Only 33.6% of the damaged homes had been evaluated by a team of experts and among these, 28.7% were categorized as red (unstable), 25.0% as yellow (damaged but stable), and 23.3% as green (safe). Houses of the remaining respondents were not categorized or the respondents were not aware of their homes' categorization (*Table 1*).

In regard to injury and death, 4.0% of the sample reported that there was at least one member in the household who was injured compared to 2.7% who reported that at least one household member had died during the earthquake or later because of his/her injuries. Among those affected, the average number of wounded persons per household was 1.17 (SD=0.50) with a range of 1-6, compared to an average of 1.59 (SD=1.20) deaths per household with a range of 1-11 (*Table 1*).

#### **4.3.2 Multivariate Regression Modelling Results: Family-related Loss**

##### **Injury of a Household Member and Emotional Abuse**

Children in households that reported household member injuries were at 0.67 times the risk of experiencing emotional abuse compared to children in households that did not report household member injuries (RR= 0.67, 95%CI:0.52-0.87). Thus, in this model, exposure to household member injury was found to be protective against emotional abuse. The model was adjusted for significant covariates including: wealth index, marital status of household head, number of household members, and urban/rural residence (*Table 3*).

### **Injury of a Household Member and Physical Abuse**

There was no association between injury of a household member and physical child abuse in the household (RR=1.00, 95% CI: 0.93-1.06). This model was adjusted for significant covariates including wealth index and marital status of household head (*Table 3*).

### **Injury of a Household Member and Severe Physical Abuse**

There was no association between injury of a household member and severe physical child abuse in the household (RR=0.97, 95% CI: 0.74-1.26). This model was adjusted for significant covariates including wealth index, marital status of household head, highest educational attainment of household head, number of household members, and urban/rural residence (*Table 3*).

### **Death of a Household Member and Emotional Abuse**

Children in households that reported death of a household member were at 1.11 times the risk of experiencing emotional abuse compared to children in households that did not report the death of a household member (RR=1.11, 95% CI: 1.05-1.17). The model was adjusted for significant covariates including wealth index, marital status of household head, number of household members, and urban/rural residence (*Table 3*).

### **Death and Physical Abuse**

There was no association between death of a household member and physical child abuse in the household (RR=1.00, 95% CI: 0.92-1.09). This model was adjusted for wealth index and marital status of household head (*Table 3*).

## **Death and Severe Physical Abuse**

Children in households that reported death of a household member were at 1.49 times the risk of experiencing severe physical abuse compared to children in households that did not report death of a household member (RR=1.49, 95% CI: 1.14-1.94). This model was adjusted for the following significant covariates: wealth index, marital status of household head, highest educational attainment of household head, number of household members, and urban/rural residence (*Table 3*).

### **4.3.3 Multivariate Regression Modelling Results: Property-related Loss**

Effect-modification occurs when the association between an exposure and outcome differs across levels of a third variable (the effect modifier)<sup>35</sup>. Interaction terms (*child age* and *child sex*) were used to test for effect modification in all relationships between both family-related and property-related losses and all three forms of child abuse. Interaction terms (*child age* and *child sex*) were used to test for effect modification in all relationships between both family-related and property-related losses and all three forms of child abuse. Effect-modification was only found in the property-related loss models. In the relationship between damage of home and emotional abuse, child age was an effect modifier. Similarly, child age was also found to be an effect modifier in the relationship between damage of home and physical abuse. In the relationship between damage of home and severe physical abuse, both child age and child sex were found to be effect modifiers. Thus, the relative risks for the sample population were explored by age and sex subgroups. The subgroups for emotional and physical abuse consisted of: younger child (age 2-4) and older child (age 5-14), while the subgroups for severe physical abuse consisted of: younger female child (age 2-4), older female child (age 5-14), younger male child (age 2-4), and older female child (age 5-14). The age groups were divided as such since the Centre for Disease Control and Prevention

(CDC) considers younger age (4 years and under) as an individual risk factor for child abuse and neglect<sup>36</sup>.

#### **Damage of Home and Emotional Abuse**

There was no association between damage of home and emotional child abuse in the household (RR= 0.99, 95% CI: 0.93-1.06). This model was adjusted for the following significant covariates: wealth index, marital status of household head, urban/rural residence, and number of household members (*Table 4*).

#### **Damage of Home and Physical Abuse**

There was no association between damage of home and emotional child abuse in the household (RR= 1.07, 95% CI: 0.98-1.03). This model was adjusted for the following significant covariates: adjusted for wealth index, marital status of household head, and urban/rural residence (*Table 4*).

#### **Results by Subgroup: Child Age and Child Sex**

##### **Damage of Home and Severe Physical Abuse (younger male child, age 2-4)**

There was no association between damage of home and severe physical child abuse in the household for the younger male child subgroup (RR= 0.82, 95% CI: 0.56-1.21). This model was adjusted for the following significant covariates: wealth index, highest educational attainment of household head, and number of household members (*Table 5*).

##### **Damage of Home and Severe Physical Abuse (older male child, age 5-14)**

There was no association between damage of home and severe physical child abuse in the household for the older male child subgroup (RR=1.06, 95% CI: 0.90-1.24). This model was

adjusted for the following significant covariates: marital status of household head, highest education attainment of household head, and urban/rural residence (*Table 5*).

#### **Damage of Home and Severe Physical Abuse (younger female child, age 2-4)**

There was no association between damage of home and severe physical child abuse in the household for the younger female child subgroup (RR=1.03, 95% CI: 0.67-1.58). This model was adjusted for the following significant covariates: wealth index and highest education attainment of household head (*Table 5*).

#### **Damage of Home and Severe Physical Abuse (older female child, age 5-14)**

There was no association between damage of home and severe physical child abuse in the household for the older female child subgroup (RR=1.16, 95% CI: 0.96-1.40). This model was adjusted for the following significant covariates: wealth index, marital status of household head, urban/rural residence, and number of household members (*Table 5*).

## **4.4 DISCUSSION**

### **4.4.1 Main Findings**

Child abuse in the aftermath of natural disasters remains an understudied topic both in Haiti and globally. This cross-sectional study contributes to the limited literature by examining two forms of earthquake-related losses (family-related and property-related) and their associations with emotional, physical, and severe physical abuse experienced by children aged 2-14 in Haitian households. The rationale behind this research stems from the theory that following a natural disaster, when much of the everyday life is disrupted and stress levels are increased, caregivers may take their frustration out on other individuals, including their children. Studies to better understand

predictors of child abuse are essential due to the multitude of negative mental, physical, and developmental outcomes associated with all forms of abuse. Additionally, any form of abuse is considered a violation of the basic rights of the child according to the UN Convention on the Rights of the Child.

While exploring the association between the various forms of earthquake-related loss and emotional, physical, and severe physical child abuse, we found that the relationships are not consistent across all forms of exposures (earthquake-related loss) and outcomes (child abuse types). It is important to note that the survey used in this study was administered approximately two years following the earthquake. Thus, both the statistically significant and non-significant relative risks obtained may be underestimating the true influence that earthquake-related losses have on the occurrences of emotional, physical, and severe physical child abuse.

In regard to the family-related losses, death and injury, the log-binomial regression models revealed that the strongest association exists between death of a family member and a child-targeted severe physical abuse. Relatedly, there also exists an association between death in the household and emotional abuse in the household. The significant relationships that were found may be at least in part explained by the influence of stress at the family level. Frustration-Aggression Theory was developed by Robert R. Sears, O.H. Mowrer, Leonard W. Doob and John Dollard in the 1930s<sup>37</sup>. According to this theory, aggression can be directed at the source of one's frustration or redirected at some other person or object<sup>37</sup>. Although the survey was conducted two years following the earthquake, the grief and stress that one may experience after losing a partner, child, or relative can result in loss of security and sense of stability which can last much longer than two years. Therefore, if there had been a death in the household, parental figures may feel increased stress, helplessness, and frustration and consequently take out their frustration on others, including their

own children for some period of time. Additionally, stress related to the large cholera outbreak that followed the earthquake was certainly ongoing in 2012 and could have contributed to strain at the household level<sup>38</sup>.

In contrast, injury of a household member is associated with a lower likelihood of a child experiencing emotional abuse. Interestingly, in this relationship, injury of a household member acts as a protective factor against emotional abuse. Although the reason for “*injury of a household member*” acting as a protective effect is not entirely clear, one possibility is that if a child in the household is injured, parental figures may be less likely to emotionally abuse the child. Likewise, if parental figures themselves are severely injured, they may be less inclined to emotionally abuse their children.

We did not find any significant associations between damage of home and emotional, physical, or severe physical abuse. For severe physical abuse, the relative risks for younger males was considerably lower (RR=0.82, 95% CI: 0.56-1.21) and the older females considerably higher (RR=1.16, 95% CI: 0.96-1.40) compared to all other subgroups, although the findings were not statistically significant. Further exploration of these potential age-gender patterns are warranted in future studies.

In addition to the log-binomial regression modelling, we conducted a basic mapping analysis of all forms of abuse in households by each of the 10 geographic regions and households living in camps (*Figure 3*). This mapping revealed that occurrences of severe physical child abuse were disproportionately higher among children residing in camps (25.0% prevalence) two years after the earthquake compared to children not living in camps (*Table 2 & Figure 1*). One might expect that a child would be less likely to be abused in camps where people are living in close proximity to other families who are likely to witness the acts of violence. However, given that corporal punishment



may be more accepted in Haitian culture, parents might not be deterred by others observing acts of child maltreatment. The potential explanation for the high prevalence of severe physical abuse could be due to the even greater levels of stress, frustration, and lack of social support experienced by parents living in camps compared to parents who were not living in camps.

#### **4.4.2 Comparisons with Past Studies**

Curtis, Miller, and Berry (2000) were the first researchers to empirically investigate whether the incidence of reported child abuse differed following major natural disasters<sup>7</sup>. Their study found that child abuse reports were disproportionately higher in the three months and the six months following two of the three natural disasters studied (Hurricane Hugo and Loma Prieta Earthquake)<sup>7</sup>. This study mainly observed the proportions and rates of child abuse reports before and after the earthquake and did not conduct regression modelling, which poses challenges when comparing it to the current study. In addition, it is also challenging to compare their results to this study since the two investigations measure abuse at different post-disaster time points. In another study, Keenan et al (2003) analyzed changes in the incidence of inflicted traumatic brain injury (TBI) after a hurricane. Results of this study showed that in the six months after Hurricane Floyd, the rate of inflicted TBI in children under age two showed a fivefold increase (RR= 5.1, 95% CI:1.30-20.4) in counties severely affected by the disaster in comparison to unaffected or less affected counties where the rate did not increase<sup>8</sup>. Although this study examined a severe form of physical child abuse in the aftermath of a natural disaster, it is important to note that the study design, methodology, cultural norms, geographic region, and the post-disaster measurement of abuse differ considerably from our study.

## **4.5 STRENGTHS AND LIMITATIONS**

### **4.5.1 Strengths**

This study has several strengths. Firstly, to the best of our knowledge, no study in Haiti, and indeed few studies in the world, have examined the association between natural disasters and child abuse in the household. Secondly, DHS is a nationally representative study, which provided the opportunity to analyze a robust sample of Haitian households. The large sample sizes provide adequate statistical power, which allow for an exploration of sub-group patterns and many confounding variables. Furthermore, the response rate for this study was 99%, eliminating the threat of non-response bias. Lastly, given the nature of cross-sectional studies, this current study was relatively quick and inexpensive to complete.

### **4.5.2 Limitations**

In addition to strengths, this study does have a number of limitations. There is a possibility of recall error given the retrospective nature of the cross-sectional study. Since the exposure in our study is earthquake-related loss, it is possible that respondents did not accurately recall the death, injury, or damage of home that occurred two years prior to the survey. It is also possible that survey respondents may not have accurately remembered if they emotionally and/or physically abused the randomly selected child in the month prior to the survey. Nevertheless, respondents who responded “yes” or “no” to the earthquake-related losses and also those who responded “yes” or “no” to child abuse would both be subject to recall error. Thus, it is difficult to conclude whether recall error in this situation would under or over report the estimates of the exposure and the outcome and it is likely non-differential. Secondly, considering that child abuse is a sensitive topic, social desirability could have occurred if respondents who abused the randomly selected child did not admit to the abuse and answered in way that was perceived to be more favorable to the interviewer. In this

study, social desirability bias would lead to differential misclassification, which would result in potential underreporting of emotional, physical, and severe child abuse for the randomly selected child. Another limitation is a possible underestimation of the effect. Provided that the household survey was conducted approximately two years after the earthquake, it is likely that earthquake-related stress level was lower than it was closer to the date of the earthquake. Thus, if stress is a mediator in this relationship, both the statistically significant and null results between earthquake related loss and emotional, physical, and severe physical abuse may be underestimated. However, the devastating cholera outbreak which followed directly after the earthquake<sup>38</sup> could have contributed to further stresses in the household even two years following the earthquake.

#### **4.6 PUBLIC HEALTH CONTRIBUTION**

This study contributes to public health literature by advancing knowledge of how natural disasters potentially influence emotional and physical child abuse. Past research has shown that child abuse can result in adverse impacts on short- and long-term physical and mental health of children, negatively affecting their quality of life. However, a major obstacle is the lack of epidemiological and population-based studies evaluating the impact of natural disasters on patterns of child abuse, particularly for Haiti. Further epidemiologic and population-based studies are necessary. The results of this study stress the need for interventions and further study specifically related to the prevention of violence against children in Haiti and in other contexts of natural disaster.

There may be some role for parent and caregiver education around positive forms of discipline and the potential negative impacts of child abuse. Home visits by trained nurses or social workers to provide support, education, and information on proper parenting and caregiving has shown promise for preventing child maltreatment<sup>39</sup>. In rural areas, not as easily reached by media-related

awareness campaigns, community-level workshops, radio programming, or dialogues at community sites such as churches may play an important role in raising awareness about child abuse.

Law and policies are imperative in the prevention of child abuse since they depict abusive behavior as an unlawful act, that abusing children is not acceptable and that perpetrators can face legal action<sup>40</sup>. Although Haiti has ratified the Convention on the Rights of the Child<sup>12</sup>, and there are existing laws that aim to protect children from violence and abuse<sup>18</sup>, there is an apparent need for additional supports and perhaps stricter enforcement. Child abuse is often a hidden phenomenon, occurring in private homes, making it difficult to identify and mitigate<sup>41,42</sup>. Stakeholders in this arena include the Haitian government, law enforcement officers, child protection workers, humanitarian organizations, community leaders, community groups and the families themselves.

Cultural and social norms are influential in shaping individual behavior, including the use of violence<sup>40</sup>. In Haiti, the regularity of child abuse may be influenced by cultural and social acceptance of violence as a method of resolving conflict with a child or disciplining a child<sup>43</sup>.

According to the World Health Organization, studies that evaluate the effectiveness of interventions challenging social and cultural norms supportive of violence are rare<sup>40</sup>. Among the interventions that have been evaluated, mass media approaches which use educational entertainment methods to bring about social change through television soap operas and other forms of entertainment have been recognized for successfully changing socially and culturally influenced attitudes and behaviors<sup>44</sup>. Additionally, legislation can also be a key tool in changing behavior and perception of social norms<sup>45</sup>. To illustrate, in Sweden, public support for corporal punishment declined from 53% in 1965 to 11% in 1994 after a legislation banning physical abuse by caregivers was introduced<sup>45</sup>.

## **4.7 CONCLUSION**

Abuse against children is increasingly recognized as an urgent public health and human rights issue which can cause various adverse physical, psychological, and behavioral health outcomes<sup>46</sup>. Our results suggest that even two years after a natural disaster, death of a household member can influence the likelihood of a child experiencing emotional and severe physical abuse. Meanwhile, injury of a household member may decrease the likelihood of emotional abuse.

Furthermore, children living in camps are at a much higher risk of severe forms of physical abuse than children not living in camps. Although there is a scarcity of research, the potential for an increase in child abuse in the aftermath of a natural disaster should not be neglected.

To more conclusively answer the question of interest, replications of this research are needed.

Provided that any form of abuse against a child causes profound and long-term health impacts and violates basic human rights, it is imperative to design more population and epidemiological studies to understand predictors of child abuse in the aftermath of natural disasters.

Table 1. Property and family-related loss in the aftermath of the 2010 Haiti earthquake

Earthquake Related-loss Indicators		
Variable	N	Frequency (%)
<b>Property related indicators</b>		
<b>Lived in current housing during the earthquake</b>		
Yes	9065	72.3
No	3465	27.7
<b>Housing damaged during earthquake</b>		
Yes	5007	38.0
No	8172	62.0
<b>i. Evaluation of house damage by a team of experts</b>		
Yes	1679	33.6
No	3018	60.3
Don't know	308	6.1
<b>ii. If evaluated, classification of house damage?</b>		
Red (unstable)	481	28.7
Yellow (damaged but stable)	419	25.0
Green (safe)	391	23.3
Did not put a color	292	17.4
Don't know	92	5.5
<b>Injury and death indicators</b>		
<b>One or more household members wounded during the earthquake</b>		
Yes	531	4.0
No	12649	96.0
<b>One or more household member killed during the earthquake or later because of his/her wounds</b>		
Yes	355	2.7
No	12785	97.0
Don't know	38	0.3
Variable	N	Mean (sd)
Number of wounded persons	531	1.17 (0.50), Range (1-6)
Number of person killed during the earthquake or later because of their wounds	355	1.59 (1.20), Range (1-11)

*Table 2.* Prevalence of emotional, physical, and severe physical abuse in 10 geographic regions and camps

Region	N	Emotional n (%)	Physical n (%)	Severe Physical n (%)
<b>Aire Metropolitaine</b>	2938	2246 (76)	2234(76)	454 (16)
<b>Sud-Est</b>	443	362 (82)	342 (77)	65 (15)
<b>Nord</b>	816	659 (81)	654 (80)	141 (17)
<b>Nord-Est</b>	321	249 (78)	260 (81)	40 (13)
<b>Artibonite</b>	1259	995 (79)	938(75)	176 (14)
<b>Centre</b>	607	476 (79)	468 (77)	89 (15)
<b>Sud</b>	608	498 (82)	487 (80)	76 (13)
<b>Grand'Anse</b>	334	272 (82)	261 (78)	60 (18)
<b>Nord-Ouest</b>	423	330 (78)	328 (78)	62 (15)
<b>Nippes</b>	300	230 (76)	228 (76)	48 (16)
<b>Camps</b>	301	235 (78)	230(76)	75 (25)

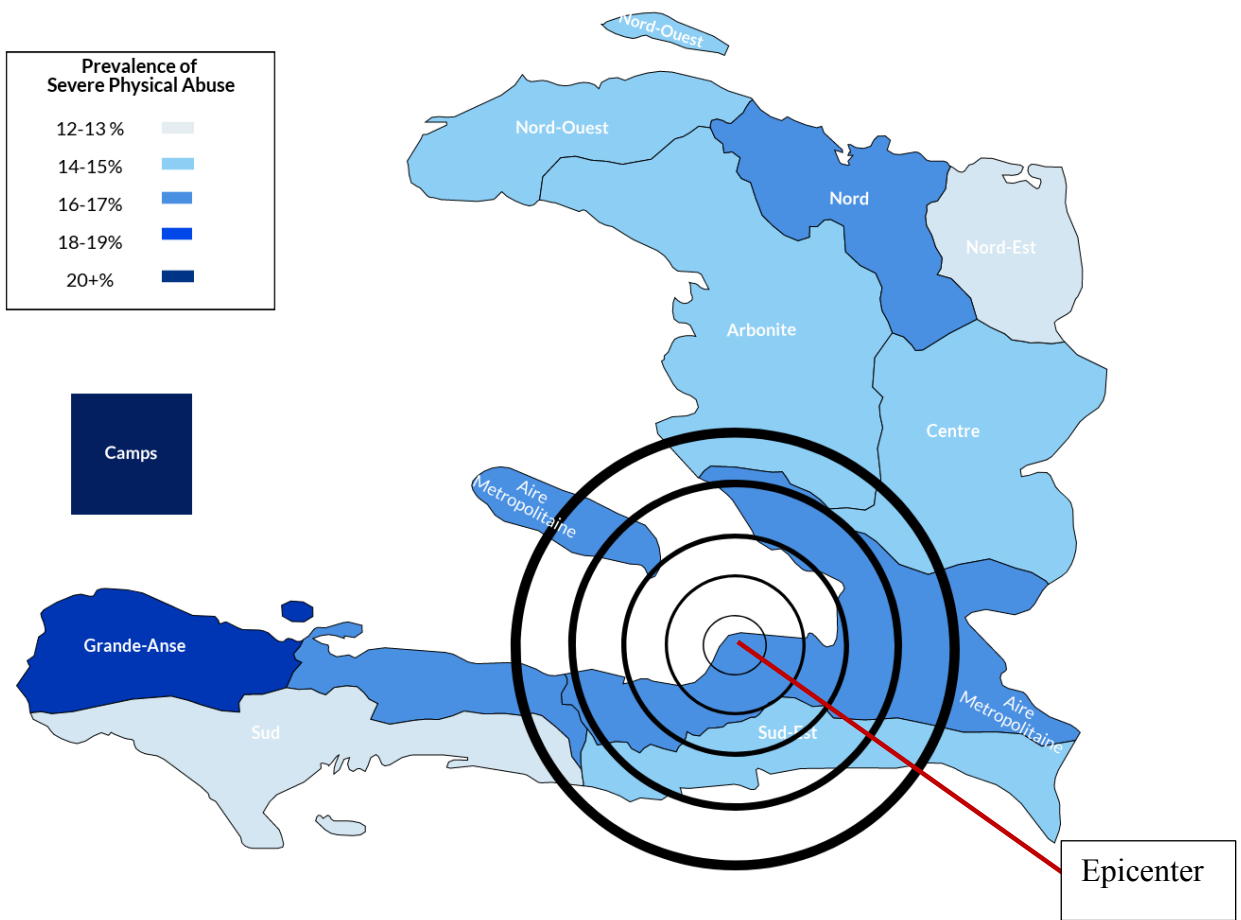


Figure 1. Prevalence of severe physical abuse in 10 geographic regions and camps in Haiti



Table 3. Association between injury or death of household member(s) and emotional, physical, and severe physical child abuse

Exposure		Emotional Abuse*		Physical Abuse**		Severe Physical Abuse***		
n	%	Unadjusted Model RR (95%CI)	Adjusted Model RR (95%CI)	Unadjusted Model RR (95%CI)	Adjusted Model RR (95% CI)	Unadjusted Model RR (95% CI)	Adjusted Model RR (95% CI)	
<b>Injury or Death of Household Member(s)</b>								
<b>No Injury or Death</b>	7784	93.0	referent	referent	referent	referent	referent	referent
<b>Injury</b>	367	4.4	<b>0.83 (0.84-0.98)</b>	<b>0.67 (0.52-0.87)</b>	0.97 (0.91-1.04)	1.00 (0.93-1.06)	1.18 (0.92-1.49)	0.97 (0.74-1.26)
<b>Death</b>	220	2.6	<b>1.09 (1.11-1.16)</b>	<b>1.11 (1.05-1.17)</b>	1.00 (0.92-1.08)	1.00 (0.92-1.09)	<b>1.62 (1.25-2.11)</b>	<b>1.49 (1.14-1.94)</b>

\*Model adjusted for Wealth Index, Marital Status of Household Head, Number of Household Members, and Urban/Rural Residence

\*\*Model adjusted for Wealth Index and Marital Status of Household Head

\*\*\*Model adjusted for Wealth Index, Marital Status of Household Head, Highest Education Attainment of Household Head, Number of Household Members, and Urban/Rural Residence

Table 4. Association between damage of home and emotional and physical child abuse stratified by child age

Exposure		Emotional Abuse*		Physical Abuse**	
n	%	Unadjusted Model RR (95% CI)	Adjusted Model RR (95% CI)	Unadjusted Model RR (95% CI)	Adjusted Model RR (95% CI)
<b>Younger Child (Age 2-4)</b>					
<b>No Damage</b>	1263	62.2	referent	referent	referent
<b>Damage</b>	768	37.8	0.97 (0.94-1.06)	0.99 (0.93-1.06)	1.04 (1.00-1.08)
<b>Older Child (Age 5-14)</b>					
<b>No Damage</b>	3937	62.1	referent	referent	referent
<b>Damage</b>	2399	37.9	1.01 (0.97-1.03)	1.01 (0.98-1.04)	0.99 (0.97-1.03)

- Effect modification present by child age: p-value <0.004 (emotional abuse)
- Effect modification present by child age: p-value <0.00003 (physical abuse)

**Younger Child (Age 2-4)**

\*model adjusted for significant covariates: Wealth Index, Marital Status, and Urban/Rural Residence

\*\* model adjusted for significant covariates: Wealth Index, Marital Status, and Urban/Rural Residence

**Older Child (Age 5-14)**

\* model adjusted for significant covariates: Wealth Index and Marital Status of Household Head

\*\* model adjusted for significant covariates: Wealth Index and Marital Status of Household Head

Table 5. Association between damage of home and severe physical abuse stratified by child age and sex

Exposure		Severe Physical Abuse***		
	n	%	Unadjusted Model RR (95% CI)	Adjusted Model RR (95% CI)
<b>Younger Male Child (age 2-4)</b>				
<b>No Damage</b>	638	61.8	referent	referent
<b>Damage</b>	395	38.2	0.88 (0.63-1.24)	0.82 (0.56-1.21)
<b>Older Male Child (Age 5-14)</b>				
<b>No Damage</b>	2033	62.2	referent	referent
<b>Damage</b>	1234	37.8	<b>1.15</b> <b>(1.01-1.32)</b>	1.06 (0.90-1.24)
<b>Younger Female Child (age 2-4)</b>				
<b>No Damage</b>	624	62.6	referent	referent
<b>Damage</b>	373	37.4	0.95 (0.63-1.42)	1.03 (0.67-1.58)
<b>Older Female Child (age 5-14)</b>				
<b>No Damage</b>	1901	62.0	referent	referent
<b>Damage</b>	1164	38.0	1.16 (0.98-1.38)	1.16 (0.96-1.40)

- Effect modification present by child age: p-value <0.000001
- Effect modification present by child sex: p-value <0.001

**Younger Male Child**

\*\*\* Model Adjusted for significant covariates: Wealth Index, Highest Educational Attainment of Household Head, and Number of Household Members

**Older Male Child**

\*\*\*Model Adjusted for significant covariates: Marital Status, Highest Education Attainment of Household Head, and Urban/Rural Residence

**Younger Female Child**

\*\*\*Model Adjusted for significant covariates: Wealth Index and Highest Education Attainment of Household

**Older Female Child**

\*\*\*Model adjusted for significant covariates: Wealth Index, Marital Status of Household Head, Urban/Rural Residence, and Number of Household Members

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## **CHAPTER 5**

### **General Discussion**

## **5.1 STUDY SUMMARY**

The first objective of this thesis was to investigate the social and living conditions of households in Haiti pre-and post 2010 Haiti earthquake, and to determine the household prevalence of emotional, physical, and severe physical abuse in children aged 2-14 post-earthquake. The second objective was to examine the association between experiences of earthquake-related loss and emotional, physical, and severe physical child abuse in Haitian households while considering potential confounding variables and the interactive effects of several social, economic, and demographic factors including: Wealth Index, Highest Education Attainment of Household Head, Marital Status of Household Head, Urban/Rural Residence, Number of Household Members, Child Age, and Child Sex.

## **5.2 SUMMARY OF KEY FINDINGS**

### **5.2.1 Manuscript 1**

Chi-square and independent t-tests revealed that most of the socio-demographic characteristics, socio-economic situations, and, living conditions changed significantly between the pre-earthquake (2005/06) and post-earthquake (2012) periods. The living conditions of households were assessed by the possession of certain durable goods. A Chi-square test revealed that there were statistically significant increases in the possession of some household items pre-and post-earthquake: electricity (33.9% in 2005/6 and 38% in 2012), television (25.9% in 2005/6 and 29.4% in 2012), mobile phone (17.3% in 2005/6 and 77.2% in 2012), and sharing of toilet facilities with other households (47.8% in 2005/6 and 48.8.4% in 2012). There were statistically significant decreases in the possession of landline telephone (4.4% in 2005/6 and 1.8% in 2012) and radio (60.8% in 2005/6 and 54.8% in 2012).

Additionally, there were improvements observed in the education attainment of the household head, particularly reductions in the “*no education*” category (decreased from 44.1% in 2005/6 to 35.0% in 2012).

Data concerning emotional, physical, and severe physical child abuse were collected approximately two years following the earthquake. A systematic method was used to randomly select one child aged 2-14 from each household that had reported having at least one child. The household respondents were asked if the randomly selected child had experienced a variety of forms of abuse in the month prior to the survey. The prevalence estimate for emotional abuse in the month prior to the 2012 survey was 78.5%, compared to 77.0% for physical abuse and 15.4% for severe physical abuse. We did not have data for prevalence of abuse prior to the earthquake and thus pre-post comparisons around child abuse were not made however, these estimates are higher than the global averages for these types of child abuse<sup>1</sup>. Although sexual abuse was not studied, it is possible that it may be overlapping with the physical and emotional abuse since individuals that have experienced one form of abuse are more likely to experience at least one additional form of abuse<sup>2</sup>.

### **5.2.2 Manuscript 2**

Multivariate log-binomial regression models were developed to test the association between two forms of earthquake related losses (family-related plus property related) and emotional, physical, and severe physical child abuse in Haitian households. For family-related losses, death and injury, the strongest association existed between death of a family member and child-targeted severe physical abuse (RR=1.49, 95% CI: 1.14-1.94). Similarly, an association between death in the household and emotional abuse in the household was also established (RR=1.11, 95% CI: 1.05-1.17). Conversely, injury of a household member was associated with a lower likelihood of a child

experiencing emotional abuse and thus, was identified as a protective factor (RR=0.67, 95% CI: 0.52-0.87). With respect to property-related loss and emotional abuse and physical abuse, *child age* was found to be an effect modifier. In regards to property-related loss and severe physical abuse, we found that both *child age* and *child sex* were effect modifiers. Therefore, the relative risks for the sample population were determined according to sub-groups. The sub-groups for emotional and physical abuse consisted of younger child (age 2-4), and older child age (5-14). Sub-groups for severe physical abuse consisted of younger female child (age 2-4), older female child (age 5-14), younger male child (age 2-4), and older female child (age 5-14). In the log-binomial regression models, there were no significant associations between damage of home and any form of abuse, among any of the sub-groups. Although the results were not statistically significant, among the four subgroups, younger male children living in households damaged by the earthquake appeared to have the lowest relative risk of experiencing severe physical abuse, whereas an older female child appears to have the highest relative risk.

Lastly, maps were created to visually present different forms of child abuse in the 10 geographic regions of Haiti while also identifying those households living in camps. The aim of this mapping exercise was to explore visual patterns between proximity to the earthquake's epicenter and prevalence of emotional, physical, and severe physical child abuse. Although mapping did not reveal any conclusive geographic patterns, the prevalence of severe physical child abuse was disproportionately higher among children residing in camps two years after the earthquake compared to children not living in camps.

## **5.3 VALIDITY**

### **5.3.1 Internal Validity**

Internal validity refers to the extent to which the results of a study reflect the true situation in the study sample in the absence of any alternative explanation<sup>3</sup>. In epidemiological studies, internal validity can be compromised due to systematic errors including selection bias, information bias, and/or confounding bias, which are discussed below.

#### **Selection bias**

Selection bias occurs when the sample of individuals included in the study are systematically different from the target population<sup>3</sup>. This thesis used a sample from a large-scale, population-based survey intended to represent the Haitian population, which minimized selection bias. To ensure that the sample is truly nationally representative, some demographic statistics of this study were compared with demographic statistics of the General Population and Housing Census (RGPH) of 2003. When compared to the statistics of the Census, the statistics of this study were quite parallel. The DHS utilized two-stage sampling procedures that were not associated with the exposure or outcomes of interest. Aligning with the DHS standard procedure, the households were pre-selected in the central office prior to the start of fieldwork rather than by teams in the field who may biased the selection. In order to further prevent bias, no changes or replacements were allowed in the field. Sources of selection bias such as volunteer bias, healthy worker effect, loss to follow up, and low response rates were not of concern. Thus, the results of thesis are not likely to be biased by sampling procedures.

### **Information Bias**

Information bias is a distortion in the measure of association caused by a lack of accurate measurement or classification of key study variables (exposure, outcome, or confounders)<sup>3</sup>. There are two forms of misclassification that can occur in relation to information bias: non-differential and differential misclassification. Non-differential misclassification occurs when measurement error and any resulting misclassification occur equally in all groups being compared<sup>3</sup>. In the presence of systematic misclassification, estimates of the association between exposure and outcome will almost always be biased towards the null, and therefore underestimate the true effect<sup>3</sup>. Conversely, differential misclassification occurs when the measurement error and resulting misclassification occur to a greater extent in one group relative to another<sup>3</sup>. In the presence of differential misclassification, the estimates of the association between exposure and outcome can either be biased towards or away from the null, depending on the circumstances<sup>3</sup>. Social desirability and recall error are potential forms of information bias in this study where the topic of child abuse is sensitive and the exposure and outcome (earthquake related-loss) are answered retrospectively.

### **Social Desirability Bias**

Social desirability bias refers to the tendency of some respondents, but not others, to report in a way they perceive to be more socially acceptable<sup>4</sup>. Social desirability bias is particularly important when studying a sensitive topic such as child abuse. For this thesis, social desirability may have led to systematic misclassification for child abuse outcomes. This might have occurred if respondents who abused the randomly selected child under-reported acts of abuse in an attempt to mitigate judgement from the interviewer. The resultant underreporting of abuse would represent a non-differential misclassification and would bias the “true” effect towards the null.

## **Confounding**

Confounding occurs when a relationship of interest is distorted or hidden by the effects of a third factor that is related to both the exposure and outcome but not found on the causal pathway<sup>5</sup>. Confounding factors are important to control for as they may show an association, hide an association, or alter the strength of an association. In the second manuscript, we used multivariate modelling to control for following possible confounders: household wealth, marital status of household head, highest educational attainment of household head, urban/rural residence, and number of household members. Possible confounders were identified using a backwards elimination method with a liberal cut-off of  $p < 0.15$ . If confounding was present, the associated covariate was included in each specific multivariate log-binomial model. The significant confounders that were controlled for varied across regression models depending on the specific form of earthquake-related loss and the type of child abuse. The level of confounding that was controlled for also varied across the different relationships that were explored. The most drastic changes in unadjusted and adjusted effect estimates were found in the relationship between injury of a household member and emotional abuse where the unadjusted (RR=0.83, 95% CI:0.84-0.98) and adjusted (RR= 0.67, 95% CI: 0.52-0.87) relative risks varied. Similarly, in the relationship between death of a household member and severe physical abuse, the unadjusted (RR=1.62, 95% CI: 1.25-2.11) and adjusted (RR=1.49, 95% CI: 1.49-1.94) relative risks changed noticeably. Among the list of confounders considered in the multivariate log-binomial regression models, household wealth index, marital status of household head, and highest educational attainment of household head were most commonly included as statistically significant confounders, and also appeared to be the strongest confounders.



## **Reliability and Validity**

It is important to accurately measure the intent of indicators (validity) and insure that the measures are replicable across settings and over time (reliability)<sup>6</sup>. This study uses child abuse related indicators from the DHS, which are derived from the widely used Child Discipline Module from the Multiple Indicator Cluster Surveys (MICS), which was adapted from the Parent-Child Conflict Tactics Scale (CTSPC)<sup>7</sup>. The CTSPC has yielded moderate to good indicators of test-retest reliability, as well as discriminant and construct validity<sup>8</sup>. In addition, the International Society for the Prevention of Child abuse and Neglect (ISPCAN) has pilot tested the CTSPC child abuse screening tool across low, middle, and high income countries including Colombia, Iceland, India, and the Russian Federation before supporting it to be used in other countries<sup>6</sup>. Furthermore, prior to MICS adopting the CTSPC, in their Child Discipline Module, household survey specialists and field teams investigated and addressed any challenges in implementing the module in the following areas i) respondents not understanding the questions as intended, ii) asking for questions to be repeated or better explained, iii) having trouble formulating their responses, and iv) feeling uncomfortable when certain questions were asked<sup>6</sup>.

### **5.3.2 External Validity**

External validity refers to the degree to which the findings of a study can be generalized beyond the study's sample<sup>9</sup>. Because the sample was nationally and geographically representative, and since survey weights were applied, we believe the results are generalizable within Haiti. The generalizability of these results are limited to children between the ages of 2 and 14 since data was only collected for this age group. Likewise, the results of this study may not be generalizable to countries or regions outside of Haiti, particularly because child disciplinary practices and social and cultural norms surrounding different forms of child maltreatment vary widely across cultural and

national contexts and areas where natural disasters are different or did not occur<sup>10</sup>. Some other factors that constrain this study from being generalizable to other countries include the differences in the susceptibility to extreme forms of natural disasters, economic and political circumstances, post-disaster recovery efforts, and legislation and policies around child abuse.

#### **5.4 CAUSALITY**

In 1965, Sir Austin Bradford Hill published a series of criteria to aid researchers in deciding if observed epidemiologic associations are causal. This section will outline certain criteria that are applicable to this study. To reiterate, in our study, injury of a household member was associated with a lower likelihood of the randomly selected child being emotionally abused, while death of a family member was associated with a higher likelihood. Secondly, death of a family member was associated with a higher likelihood of severe physical abuse amongst the randomly selected child. The discussions of causality will focus on these relationships.

##### **Temporality**

Bradford Hill's Criteria outlines that minimal conditions needed to establish a causal relationship between an exposure and an outcome is temporality<sup>11</sup>. This criterion states that for an exposure to cause an outcome, it must precede the occurrence of the outcome<sup>11</sup>. Because cross-sectional studies measure both the exposure and outcome at a single time point, these designs typically do not allow for verification of temporality<sup>12</sup>. However, in the current study, reverse causality cannot occur, since no form of abuse would cause earthquake-related loss. As such, temporality between the exposure and outcome is established for this study.

### **Strength of Association**

Strength of association criteria states that the stronger an association is (described in this study by RR), the less likely it is to result from bias or confounding<sup>3</sup>. Our statistically significant RRs ranged from 0.67 to 1.47 with the strongest association found between death of a family member and a randomly selected child being victim to severe physical abuse. Although there is no universal agreement on what is considered weak or strong, an effect of 2.0 or greater is generally considered to be moderate and an effect of 5.0 or more as strong<sup>3</sup>. Thus, following this guideline, all of our significant associations were weak. Having said that, a strong association is not necessary to make an association causal. In addition, it is important to not be dismissive of “weak” effects, especially since child abuse is serious and any strength of association may be of great public health importance.

### **Consistency**

Consistency refers to finding similar results in different types of studies in various populations<sup>3</sup>. Considering that there are very few studies, in Haiti and globally, that explore child abuse in the aftermath of natural disasters, the lack of consistency caused by inadequate number of studies, should not in itself rule out causality. In one study, child abuse reports were disproportionately higher six months following two out of the three disasters (Hurricane Hugo and Loma Prieta Earthquake)<sup>13</sup>. Similarly, there was a fivefold increase in abusive head trauma among toddlers aged two or younger, six months after Hurricane Floyd<sup>14</sup>. In our study, we found significant associations between death of a family member and the increased likelihood of emotional and severe physical abuse pertaining to the randomly selected child. Conversely, we found that injury of a household member decreased the likelihood of emotional abuse. While comparing consistencies in results, it is important to consider that our study and the few existing prior studies differ in regard to the

research methodologies, geographic regions, pre-post survey periods, measures of abuse, and age groups.

### **Plausibility**

Plausibility refers to the scientific and logical plausibility of an association. If there is a plausible mechanism through which an exposure might cause an outcome, this can strengthen a causal argument<sup>3</sup>. In this thesis, we can refer to theories such as Frustration-Aggression developed in the 1930s by Robert R. Sears and colleagues to lend support to the mechanism where the stress experienced by parental figures from traumatic situations can lead to them taking out their frustration on others, including their children. When parents face stressful situations, it is plausible that children are at greater risk of abuse<sup>13</sup>. Thus, this theory demonstrates plausibility between the exposure and outcomes of interest.

## **5.5 STRENGTHS AND LIMITATIONS**

### **5.5.1 Study Strengths**

The current study has several strengths. Firstly, given that the Demographic and Health Surveys use nationally representative samples, the results are generalizable at the country level. More specifically, the first manuscript used a large sample size of 13181 households while manuscript 2 used a sample of 8351 households, which provided adequate statistical power allowing tests for many confounders and effect modifiers, thereby strengthening the study's internal validity. Additionally, the response rates for both phases of the surveys were 99% with missing data accounting for less than 1% of the study population. This limited any bias in effect estimates due to missing data. Finally, considering the nature of cross-sectional studies, this study was relatively quick and inexpensive to complete.

### 5.5.2 Study Limitations

In regard to the first manuscript, child abuse data was only available post-earthquake, and consequently we were not able to compare pre-post-earthquake prevalence estimates for child abuse. For our second manuscript, standard limitations of cross sectional studies apply. There is a possibility of recall error in this study given the retrospective nature of cross-sectional studies. When respondents were surveyed two years post-disaster, they may not have accurately recalled if the exposure occurred (family-related loss or property-related loss). It is also possible that survey respondents may not have accurately remembered if they emotionally and/or physically abused the randomly selected child in the month prior to the survey. However, respondents who responded “yes” or “no” to the earthquake-related losses and also those who responded “yes” or “no” to child abuse would both be subject to recall error. Consequently, it is difficult to conclude whether recall error in this situation would under or over report the child abuse prevalence. Secondly, social desirability bias may have occurred since child abuse is a sensitive topic, and respondents who abused the randomly selected child may have had the tendency to answer questions in a manner that would be viewed more favorably by the interviewer. This would lead to differential misclassification, resulting in potential underreporting of abuse and a biasing of the results towards the null. It is also possible that some respondents were unaware of whether other household members had abused the randomly selected child in the month prior to the survey. As such, this would contribute to the issue of underreporting of child abuse. Lastly, this survey was conducted approximately two years following the earthquake. Assuming that stress is a mediator in the relationship between earthquake-related loss and child abuse, and that earthquake-related stress among parents and caregivers was lower two years later compared to immediately after the earthquake, the true measure of effect may be underestimated. However, the cholera outbreak

which followed 10 months after the earthquake<sup>15</sup> is likely to have added further experiences of frustration and suffering in Haitian households even two years following the earthquake.

## 5.6 PUBLIC HEALTH IMPLICATIONS

Child abuse remains a preventable public health and human rights issue around the world with the consequences of abuse negatively affecting an individual's quality of life as a child and through adulthood. Past research has consistently established that there are long-term negative physical, mental, and development-related health outcomes associated with all forms of child abuse<sup>16,17,18,19</sup>. This study found alarming prevalence estimates of emotional (78.5%), physical (77%), and severe physical abuse (15.4%) against children aged 2-14 in Haiti. Additionally, our results suggest that the already high prevalence of abuse appears to be further exacerbated by earthquake related losses even two years after the earthquake occurred. Specifically, death of a household member was associated with a higher likelihood of a child being victim to emotional (RR=1.11, 95% CI: 1.05-1.17) and severe physical abuse (RR=1.49, 95% CI: 1.14-1.94). Importantly, children residing in settlement camps after the earthquake were at higher risk of experiencing severe physical abuse compared to children not living in camps (25% prevalence as compared to 15.4%). This finding is critical to highlight considering that the indicators for severe physical abuse include detrimental acts of violence such as “*beat child again and again as hard as possible*” and “*hit or slapped child on the face, head, or ears*”. Detrimental acts of violence are of more concern as they can lead to serious injury and grave mental health outcomes.

The results of this study highlight a need for better protection of children in Haiti against violence and abuse, particularly in the aftermath of natural disasters. To prevent or lower the prevalence of child abuse in Haiti, there is a need for better collaboration between policy makers, governmental organizations, child protection workers, and humanitarian organizations. Organizations that are

particularly invested in the protection of children in Haiti include UNICEF, Beyond Borders, Fondation Enfant Jésus (FEJ), Brigade pour la protection des mineurs (BPM), PLAN International, and Save the Children. In addition, the L'Institut de bien être social et de la recherche (IBESR) works closely with main government child protection services, the youth protection squad, and a unit of the Haitian National Police to protect children against violence, abuse, and exploitation.

Currently, the effectiveness of very few interventions around preventing child abuse and maltreatment have been studied. Among those that have been assessed, parental education programs aimed at increasing knowledge of child development, and encouraging positive child management strategies have shown some positive results in preventing child maltreatment<sup>20</sup>.

Relatedly, education-focused home visitation by nurses or trained personnel has successfully been used as a tool to prevent child abuse<sup>21</sup>. Furthermore, since social tolerance of abusive behavior can be learned in childhood<sup>22</sup>, educating children on violence prevention and harm reduction may be beneficial.

With respect to the high prevalence of severe physical abuse in settlement camps, it would be important for awareness programs to reach families living in settlement camps. Additionally, since we identified settlement camps to be high-risk areas for severe forms of child abuse, more support to parents may be needed in these settings.

## **5.7 FUTURE RESEARCH DIRECTIONS**

In summary, there were significant changes in living conditions and socio-demographic factors in pre- and post-earthquake Haiti and an alarmingly high prevalence of emotional, physical, and severe physical child abuse. There were associations between earthquake-related losses and some forms of child abuse, however, the results were not consistent across all exposures and outcomes. While this research has not provided a definite conclusion regarding patterns of emotional,

physical, and severe physical child abuse following disasters, it offers a conceptual and methodological foundation to guide future research in this area. In order to expand the existing evidence base, this study needs to be replicated using nationally representative data pre-post in other disaster settings. Ideally, replicated studies would use definitions and measures of emotional, physical, and severe physical abuse that are similar to the current study and would collect both pre- and post- earthquake data with the later being three months to one year after the disaster so that results can be compared to previous studies.

Alternatively, the association between natural disasters and child abuse could be explored using a longitudinal study design where repeated measures follow particular households over a period of time. The different time points of data collection would allow researchers to establish whether the changes in stress levels, which are typically higher right after disasters, result in higher incidences of abuse. In addition, assuming that stress is a mediator in the relationship between natural disasters and child abuse, measuring parental stress levels (by using the Perceived Stress Scale (PSS)<sup>23</sup> for instance) may prove to be valuable in better understanding the relationship. Moreover, in our study we were limited to having data only pertaining to abuse of children aged 2-14. Since, a child is generally defined as an individual under the age of 18, future research should consider a wider age range.

In regard to the mapping exercise, to better explore patterns of child abuse in relation to the epicenter, methodology for more accurately detecting the earthquake's impact within a given region could also be developed. Lastly, more advanced spatial epidemiological methods to statistically assess spatial patterns using data on household location and abuse outcomes pre-post-earthquake are recommended.



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## APPENDIX A

### Key Survey Items

Table 1. Demographic variables for descriptive analysis

<b>Demographic Variables</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Sex of household head</b>	<i>Is (NAME) male or female?</i>	Male= 1, Female=2
<b>Age of household head</b>	<i>How old is (NAME)?</i>	In Years:
<b>Sex of child</b>	<i>Is (NAME) male or female?</i>	Male=1, Female=2
<b>Age of child</b>	<i>How old is (NAME)?</i>	In years:
<b>Urban/Rural residence</b>	<i>Urban or rural</i>	Urban=1, Rural=2
<b>Number of household members</b>	<i>How many members live in your household?</i>	Members= _____
<b>Marital status</b>	<i>What is (NAME)'s current marital status?</i>	Married or living together=1 Divorced/Separated=2 Widowed=3 Never married and lived together=4
<b>Highest level of education</b>	Highest level of education the household member attended. Any member below the lower age limit for the education questions is classified in the "No education" category.	No education=0 Primary=1 Secondary=2 Higher=3

Table 2. Socio-economic situation variables for descriptive analysis

<b>Socio-economic situation variables</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Wealth Index</b>	The wealth index is a composite measure of a household's cumulative living standard. The wealth index is calculated using easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities.	Generated with a statistical procedure known as principal components analysis, the wealth index places individual households on a continuous scale of relative wealth: Poorest=1 Poorer=2 Middle=3 Richer=4 Richest =5

Table 3. Living condition variables for descriptive analysis

<b>Living Conditions Variables</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Toilet facilities shared with other households</b>	Do you share this toilet facility with other households?	Yes=1 No=0
<b>Does your household have: electricity? radio? television? mobile phone? fixed phone? refrigerator?</b>	Does your household have: electricity? radio ? television? mobile phone? fixed phone? refrigerator?	Electricity: Yes=1, No=2 radio: Yes=1, No=2 television: Yes=1, No=2 mobile phone: Yes=1, No=2 fixed phone: Yes=1, No=2 refrigerator: Yes=1, No=2

Table 4. Outcome variables measuring emotional child abuse

<b>Variables measuring emotional child abuse</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Yelled or screamed at child</b>	<i>In the past month, did you or anyone else in your household scream or yell at (NAME OF THE CHILD OF Q.159)?</i>	Yes=1 No=2
<b>Called child dumb, lazy, or another name</b>	<i>In the past month, have you or anyone else in your household called (NAME OF THE CHILD OF Q.159) idiot, lazy, ugly or anything else Of this genre?</i>	Yes=1 No=2
<b>Revoked privileges to child</b>	<i>In the past month, did you or anyone else in your household withdraw privileges at (NAME OF THE CHILD OF Q.159), or was anything forbidden to him / She loves, or is she forbidden to leave the house?</i>	Yes=1 No=2
<b>Asked child to kneel</b>	<i>In the past month, did you or anyone else in your household ask (NAME OF THE CHILD OF Q.159) to kneel?</i>	Yes=1 No=2
<b>Deprived the child of meal to punish him</b>	<i>In the past month, did you or anyone else in your household deprive a meal to punish him or her (NAME OF THE CHILD OF Q.159)?</i>	Yes=1 No=2

Table 5. Outcome variables measuring physical child abuse

<b>Variables measuring physical child abuse</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Shook child</b>	<i>In the past month, did you or anyone else in your household shake (NAME OF THE CHILD OF Q.159)?</i>	Yes=1, No=2
<b>Pulled child's ears</b>	<i>In the past month, did you or anyone else in your household pull the ears from (NAME OF THE CHILD OF Q.159)?</i>	Yes=1, No=2
<b>Hit or slapped child on the face, head, or ears</b>	<i>In the past month, did you or anyone else in your household slap (NAME OF THE CHILD OF Q.159) on the face, head or ears?</i>	Yes=1, No=2
<b>Hit or slapped child on hand, arm, or leg</b>	<i>In the past month, did you or anyone else in your household slap (NAME OF THE CHILD OF Q.159) on your hands, arms or legs?</i>	Yes=1, No=2
<b>Hit child on the bottom</b>	<i>In the past month, did you or anyone else in your household hit or stamp (NAME OF THE CHILD OF Q.159) the child on their bottom with your hands?</i>	Yes=1, No=2
<b>Beat child again and again, as strong as possible</b>	<i>In the past month, did you or anyone else in your household beat (NAME OF THE CHILD OF Q.159), that is, did you beat him/her again and again , as strong as possible?</i>	Yes=1, No=2

Table 6. Exposure variables measuring property-related loss

<b>Property-related loss indicators</b>	<b>DHS Question</b>	<b>Description of measure</b>
<b>Living in same housing pre-post-earthquake</b>	<i>At the time of the earthquake, did you live in the current housing?</i>	Yes=1, No=2
<b>Evaluation of the damage of house by a team of experts</b>	How was your home classified, red, yellow or green?	Red(unstable) = 1 Yellow (damaged but stable) = 2 Green (safe)= 3
<b>Repairs are already made or are going on</b>	<i>Have repairs already been done or are ongoing?</i>	Already made=1 In process=2 No=3

Table 7. Exposure variables measuring family-related loss

<b>Family-related loss variables</b>	<b>DHS Question</b>	<b>Description of measure</b>
<i>Person killed during the earthquake or later because of his/her wounds</i>	<i>Was anyone who lived in the same household as you at the time of the earthquake killed at the time of the earthquake or later as a result of his/her injuries?</i>	<i>Yes= 1, No=2</i>
<i>Number of persons killed during the earthquake or later because of their wounds</i>	<i>How many people were killed at the time of the earthquake or later as a result of their injuries?</i>	<i>number= _____</i>
<i>One or more people wounded during the earthquake</i>	<i>Of the people who are currently living in this household, is there one or more people who were injured at the time of the earthquake?</i>	<i>Yes=1, No=2</i>

## APPENDIX B

Figure 1. Study population flow chart summarizing the selection of the 2005/6 and 2012 study samples for manuscript 1

### Manuscript 1

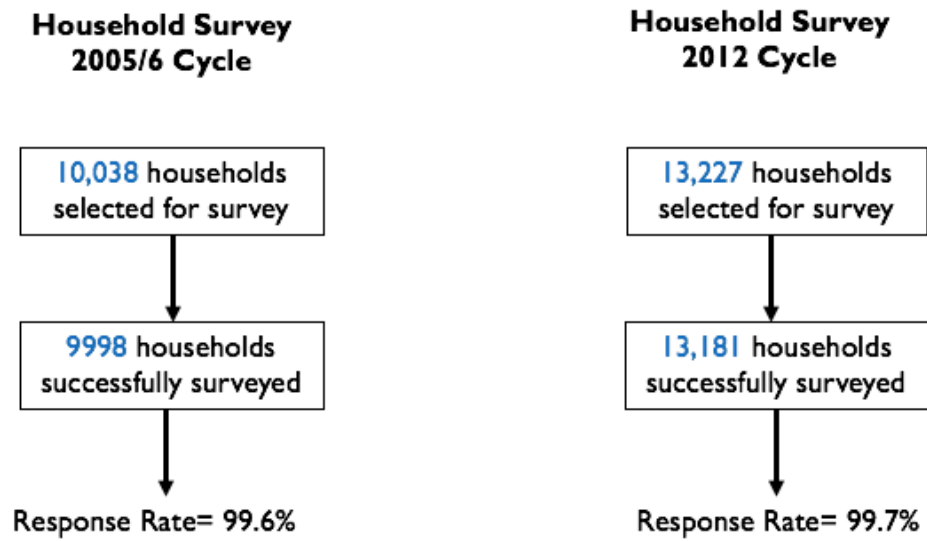
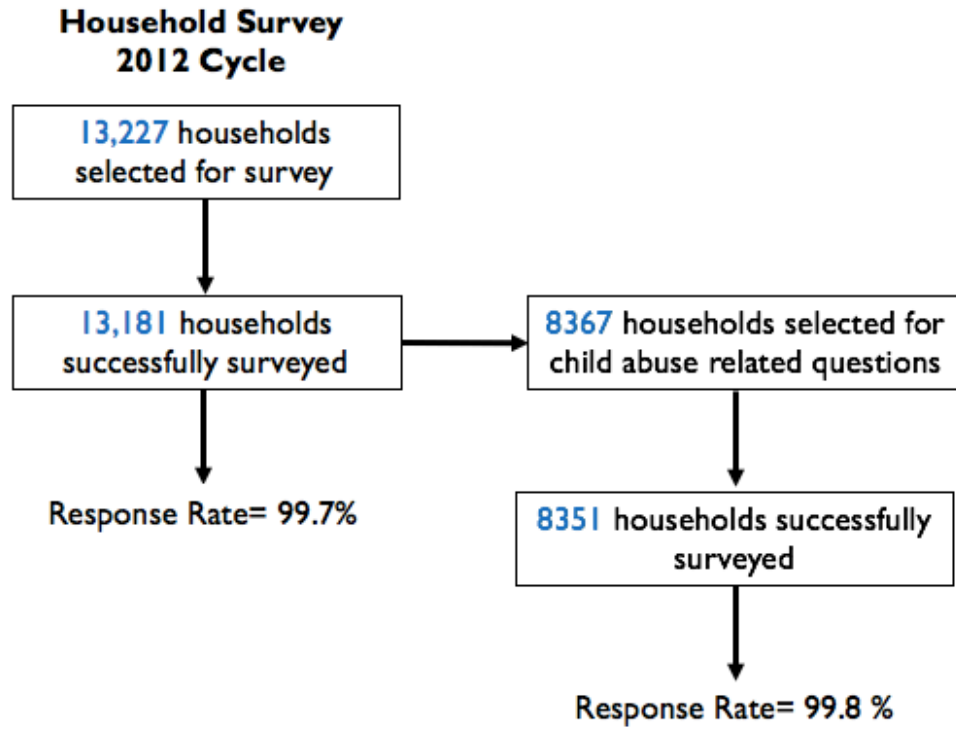




Figure 1. Study population flow chart summarizing the selection of the 2012 study sample for manuscript 2

## Manuscript 2



\*Households with at least one child aged 2-14 were eligible for the child-abuse related questions

**APPENDIX C**  
**Ethics Approval**



**QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS  
RESEARCH ETHICS BOARD (HSREB)**

**HSREB Renewal of Ethics Clearance**

July 24, 2018

Ms. Sony Subedi  
Department of Public Health Sciences  
Queen's University

**ROMEO/TRAQ #: 6021581**

Department Code: EPID-587-17

Study Title: Emotional and Physical Child Abuse in the Context of Natural Disasters: A Focus on Haiti

Review Type: Delegated

Date Ethics Clearance Effective: July 24, 2018

Ethics Clearance Expiry Date: July 24, 2019

Dear Ms. Subedi,

The Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board (HSREB) has reviewed the application. This study, including all currently approved documentation has been granted ethical clearance until the expiry date noted above.

Prior to the expiration of your ethics clearance, you will be reminded to submit your renewal report through ROMEO. Any lapses in ethical clearance will be documented below.

Yours sincerely,

A handwritten signature in black ink that reads "Albert L. Clark".

Chair, Health Sciences Research Ethics Board

*The HSREB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations, Canadian General Standards Board, and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP). Federalwide Assurance Number: FWA#:00004184, IRB#:00001173*

*HSREB members involved in the research project do not participate in the review, discussion or decision*