

Exploring associations between violent discipline and aggressive behavior in children ages 4-5 in
The Republic of Nicaragua: A secondary data analysis of the 2011 Demographic and Health
Survey

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Abstract

Exploring associations between violent discipline and aggressive behavior in children ages 4-5 in The Republic of Nicaragua: A secondary data analysis of the 2011 Demographic and Health Survey

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Introduction: According to UNICEF 4 out of 5 children aged 2 to 14 are subjected to some kind of violent discipline in their home. Exposure to adverse child experiences, such as child maltreatment, has shown to predict aggressive behavior in children. Literature shows that aggressive behavior increases in toddlerhood, but declines in prevalence at ages 3-4 years. By 4-5 years old, children should be developed enough to cooperate with other children. Continuation of aggressive behavior is an early warning sign of many child behavioral disorders. These emotional and behavioral disorders often go undiagnosed in most low-income settings, such as Nicaragua.

Objective: The objective of this study was to look at population-level data to explore the potential associations between violent discipline and aggressive behavior in children ages 4-5 years old in Nicaragua.

Methods: This study was a secondary data analysis of Nicaragua's 2011/2012 Demographic and Health Survey. Our weighted sample included 1,347 women with children ages 4-5 years old. We used two selections of the Women's Questionnaire: Section 4 Child's Health 48-59 months, and Section 8 Roles of Gender and Interfamily Violence. Our outcome variable was whether a 4-5-year-old frequently gets into other fights with other children (e.g.: hit, bite, kick). While our main predictors of interest were whether a

mother believes in physical punishment is necessary to educate her child (e.g. slap, spank, punch), and whether the child receives violent discipline. Our potential confounders of interest were maternal age, maternal education, urban/rural residency, and gender of the child. We first conducted a univariate analysis of the dataset including all individuals with information on the given variables of interest. Then, logistic regression was used to evaluate the presence of aggressive behavior as a binary outcome.

Results: Of the 1,347 women in the data, we found that 17% of women believed that physical punishment was necessary to educate her child. Of women that believe in physical punishment, 81% of these women actually perform violent discipline. 49% of 4-5 year olds frequently get into physical fights (hitting, biting, kicking). When we broke this prevalence down by gender, we found that 28% of male children were getting into fights compared to 21% of female children. We found that the child had higher odds of getting into physical fights when their mother believed in physical punishment compared to children whose mother did not believe in physical punishment (AOR 1.60, 95% CI 1.06, 2.42). We found that, like the belief model, children had higher odds of getting into fights with other children if they have experienced violent discipline (AOR 1.60, 95% CI 1.07, 2.38) compared to children who have not experienced violent discipline.

Conclusion: To our knowledge, this is the first study that looks at the association between violent discipline and aggressive behavior in 4-5 year-olds at the population level in Nicaragua. As anticipated, we found a very strong association with both a mother's belief in physical punishment and violent discipline with aggressive behavior in children ages 4-5 in Nicaragua.

Background and Introduction

Child abuse violates the most basic rights of children. UNICEF defines violent discipline as “actions taken by a parent or caregiver that are intended to cause a child physical pain or emotional distress as a way to correct behavior and act as a deterrent” (1) According to the Convention of the Rights of the Child the state must take “all appropriate legislative administrative, social and educational measures to protect the child from all forms of physical or mental violence, injury or abuse, neglect or neglect treatment, maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal guardian(s) or any other person who has the care of the child” (Article 19, Section 1) (2).

According to UNICEF, around 4 out of 5 children between the ages of 2 to 14 worldwide are subjected to some kind of violent discipline in their homes (3). Violent discipline often goes unreported and unnoticed, and has become ingrained within some cultures without a clear understanding of the repercussions it has on the child. Global assessments such as UNICEF’s Multiple Indicator Cluster Survey (MICS) have begun to assess child protection by including questions on violent discipline, while Demographic and Health Surveys have begun to include similar questions if the MICS has yet to be implemented in the country, like Nicaragua.

Exposure to adverse child experiences, such as child maltreatment, has been shown to predict aggressive behavior in children (4,5), particularly early childhood. In the context of this paper, aggressive behavior is defined as the act of hitting, biting, or kicking another individual as it is defined in Nicaragua’s Demographic and Health Survey.

Longitudinal epidemiological studies with birth cohorts have shown that physical aggression occurs in children as young as 12 months (6), and then increases in toddlerhood partly explained by the developing feelings of autonomy (6,7). At age 2 children show defiant behavior as an essential social and emotional milestone (8). But physical aggression should begin to decline in prevalence at ages 3 and 4 years-old which could be because of the moral development, socialization of the child (9), and those who do not learn to regulate their aggression are at highest risk for serious violent behavior through adolescence and adulthood (7) . By age 4 and 5

years old, children should be developed enough to cooperate with other children and less likely to show aggressive behavior (8). This is important due to aggression towards others is an early warning sign of child behavioral disorders (10). According to the DSM-V, aggressive behavior is a symptom of many emotional behavioral problems, such as: conduct disorder (CD), oppositional defiant disorder (ODD), or attention-deficit/hyperactivity disorder (ADHD) (11). Children with emotional and behavioral problems tend to grow up in hostile home environments (12) and have higher odds of many negative, short and long term health consequences. For example, they tend to have poor school performance falling behind in primary school or more likely to drop out, rejected by their peers (13) more likely to be diagnosed with disorders like Oppositional Defiant Disorder (ODD)/Conduct Disorder (CD) and Attention Deficit Hyperactivity Disorder (ADHD) and have issues with substance abuse (14). These emotional and behavioral disorders often go undiagnosed in most low-income settings, such as Nicaragua.

Nicaragua is a lower-middle income country in central America with a population of about 6.08 million people. With a decreasing under-5 mortality rate of 24 per 100,000 (15), Nicaragua is able to now focus on more holistic development of children. Poor primary school performance is particularly an issue in Nicaragua, where only 55% of primary students in Nicaragua actually finish primary school (15). This number is extremely low compared to many other Latin American/Caribbean countries (see Appendix 1, Table 1).

Violent discipline has the potential to severely impact the early behaviors in children, which create a wave of emotional and behavioral issues that affect a child's potential to live a successful, healthy life. Although this association may seem strong, there is no study that we are aware of that looks at these two variables at the population level in Nicaragua using secondary data analysis of the DHS, and continues to be an understudied area of focus.

In this context, the general objective of this study was to look at population-level data to explore the potential associations between violent discipline and aggressive behavior in children ages 4-5 years old in Nicaragua with three specific objectives in mind: 1) To determine the prevalence of children ages 4-5 years old that frequently get into fights with other children in Nicaragua; 2) Assess whether a mother's belief in physical punishment against children is associated with a 4-5

year old child’s frequency to get into fights with other children; and 3) Assess whether different methods of discipline against children are associated with a 4-5 year old child’s frequency to get into fights with other children.

Theoretical Framework:

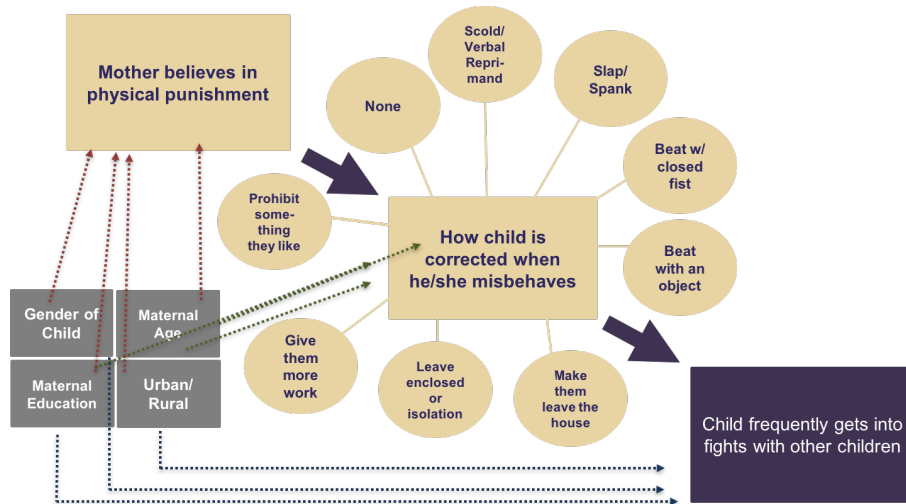


Figure 1

Figure 1 represents the theoretical framework of our research, which presents different pathways in which a mother might believe in physical punishment, how a caregiver disciplines their child, or whether a 4-5-year-old child frequently gets into fights. Because a mother’s belief in physical punishment will effect how she disciplines her child, we put the disciplinary practice in the causal pathway with the outcome being if the child frequently gets into fights with other children. Our potential confounders of interest are believed to potentially effect both predictors of interest and the outcome variable, shown above.

Methods

Data:

The current study analyzes data from Nicaragua’s 2011/2012 Demographic Health Survey (DHS). The DHS is a cross-sectional, household survey conducted by trained interviewers that

follows international protocols that ensure accurate, nationally representative data, and to protect the privacy of the individuals. For each woman with children, a set of questions is asked about one randomly selected child to gather selective, age-specific information about child health, as well as parenting practices. Anthropometric measures are taken of this child using standard DHS protocol (16).

Nicaragua's 2011/2012 DHS includes 21,960 households in both urban and rural areas of 15 departments and 2 autonomous regions of the Caribbean Coast. The DHS uses a stratified two-stage cluster design, with the first stage including the Enumeration Areas (EA) that are drawn from the Census files, and the second stage where in each EA a sample of households are drawn from an updated household list (16). For this study, we used information from two sections of the DHS Women's Questionnaire: 1) Section 4: Child's Health 48-59 months, and 2) Section 8: Roles of Gender and Interfamily Violence. The Women's Questionnaire had a sample of 15,266 women. Given the study design of the DHS, we created a weighted sample of 1,347 women with children ages 4-5 years old as a representative sample for the entire population of Nicaragua.

Study variables

Our outcome variable was aggressive behavior, found in Section 4 of the 4-5 year-old "Child Health" sections asking the mother if her child "frequently gets into fights (ie: biting, kicking, hitting) with other children? Yes/No. If the mother answered "yes" we measured the variable "child fights" as 1.

Our main predictors of interest are maternal belief in physical punishment under Section 8: Roles of Gender and Interfamily Violence, stating "Do you believe that in order to education your children that physical punishment is necessary, for example slapping, spanking, punching? Yes/No. The mother was then asked "In this home how are children corrected when they misbehave?". The mother was then given a list of punishments to choose, including the following: (a) scolding/verbal reprimands; (b) prohibit something they like; (c) slaps/spanks; hitting with the hand or fist; (d) beating with a belt, ruler, rope, stick or other object; (e) leaving enclosed or isolated; (f) giving them more work; (g) making them leave the house; (h) I do not

correct my children; and (i) other. The mother could answer as many as were applicable, leading to our second predictor of interest violent discipline. For the context of this study, we defined violent discipline if a mother chose any of the following discipline techniques: slap/spank, hit with a hand or fist, beat with an object (belt, ruler, rope, stick or other object), leave enclosed or isolation, and make the child leave the home. These particular discipline techniques were chosen under the guideline of UNICEF's definition of violent discipline. (See Appendix 2)

The controlled predictors of interest included, maternal age at the time the survey was conducted, maternal education, gender of the child, urban and rural residency and region: (Pacific region [Chinandega, León, Managua, Masaya, Granada, Carazo, and Rivas departments], North-Central region [Boaco, Chontales, Jinotega, Matagalpa, Estelí, Madriz, and Nueva Segovia departments], and Atlantic region [Río San Juan department, Autonomous North-Atlantic Region, and Autonomous South Atlantic Region]). Maternal age was used as a continuous variable for the majority of the analysis until categorized by age groups. For this analysis, maternal education is defined as completion of primary school and no education, secondary and technical school, and university or higher education. Urban/rural residence and region was designated by census tracts in this dataset.

Statistical Analysis:

In the 2011/2012 DHS there was 15,266 total women with children ages 4-5 years old. This sample was then weighted due to the sample procedure for the DHS being cluster sampling. Sampling weights are to decrease bias and to represent a sample for the population as a whole. The total weighted sample was 1,347 total women with children ages 4-5 years old and all following analysis conducted uses this sample size.

We first conducted a univariate analysis of the dataset including all individuals with information on the given variables of interest. Then, logistic regression was used to evaluate the presence of aggressive behavior as a binary outcome. We ran two separate logistic regression models: one for maternal belief in physical punishment and one for violent discipline due to violent discipline

being in the causal pathway of our theoretical framework (see Figure 1). For each model, we controlled for maternal age, maternal education, gender of the child, and urban/rural residency.

To explore the association between aggressive behavior and maternal belief in physical punishment and violent discipline we fit the models previously described stratifying for maternal age, maternal education and region. Maternal age was divided into categories: 26 years and younger; 26-35 years old; and 36 years and older. Instead of stratifying by urban/rural residency, we stratified each module for region (Pacific, Atlantic, and Central). Maternal education was divided into categories: Primary and below, Secondary or Technical school, and University or higher education.

All analysis was conducted using Stata 14.1. The Nicaraguan 2011/2012 DHS is a publically available dataset, in which ethical review and informed/voluntary participation was granted. (DHS) Interviews were performed as privately as possible.

Results:

Descriptive Results

All descriptive results take the sampling design of the survey into account. Of the 1,347 women in the weighted sample, 50.5% of the women came from urban areas with 53% coming from the Pacific region which many of the urban cities, including the capital Managua, are located in the Pacific region. 32% are from the Central region and 15% from the Atlantic region. The majority of the sample had at least a primary education with 41% having a Primary education or less, 37% had completed secondary or technical school, while 11% completed a university or higher education. About 41% of women were between the ages of 26-35 years old, while 29% of women were under the age of 25 years old. In addition, of the women in the data set 53% of them had male children. 17.1% of women in the dataset believed that physical punishment was necessary to educate their child.

Of the 1,347 women in the data, we found that 17% of women believed that physical punishment was necessary to educate her child. Of women that believe in physical punishment, 81% of these women actually perform violent discipline, while 15% of women who do not believe in physical punishment actually perform violent discipline on their child. In regards to disciplinary practices, 26% of women stated that they use at least one of the physical punishments (slap/spank, beat, beat with an object) with 21% beating with an object, 2.4% beating with a closed fist, and 3.1% answering slap/spank. Less than 1% of women in the weighted sample answered that they put their child in isolation, or kicked them out of the home. 49% of 4-5 year olds frequently get into physical fights (hitting, biting, kicking). When we broke this prevalence down by gender, we found that 28% of male children were getting into fights compared to 21% of female children. See full descriptive results in Table 2 & 3.

Analytic Results

Belief Module:

Logistic regression estimates the change in the odds of 4-5 year olds frequently getting into fights associated with the presence of the model predictors, holding other factors constant. About our second aim, finding the association between a mother's belief in physical punishment and a 4-5 year-old frequently getting into fights, we found that the child had higher odds of getting into physical fights when their mother believed in physical punishment compared to children whose mother did not believe in physical punishment (AOR 1.60, 95% CI 1.06, 2.42). We found no difference between female and male children. Using female children as the comparison, male children had higher odds of frequently getting into fights (AOR 1.24, 95% CI 0.88, 1.76), but did not prove to be statistically significant. We found that when a mother had an education above primary school, the child had lower odds of frequently getting into fights than when their mother had a secondary education (AOR .95, 95% CI 0.64, 1.40) compared to a child whose mother had a primary education or less. Although the mother having a secondary education did not prove to be statistically significant, a mother having a university education or higher proved to be a statistically significant protective effect giving a child lower odds of getting into fights (AOR 0.43, 95% CI 0.25, 0.72) compared to children whose mother hds a primary education or less.

We found that children that live in an urban area have lower odds of getting into fights with other children when their mother believed in physical fights (AOR 0.76, 95% CI 0.52, 1.10) compared to children that live in a rural area.

When stratifying the adjusted logistic regression by different subpopulations of women, we saw many changes emphasizing the change among levels of education. Among women that have a university education or higher, we found that 4-5 year-old children are 3 times (AOR 3.23, 95% CI 1.11, 9.36) more likely to get into physical fights when mothers believed in physical punishment compared to women who don't. Among women with a secondary or technical education, children are also 3 times more likely to get into fights (AOR 3.32, 95% CI 1.63, 6.79) when their mother believes in physical punishment compared to women in the same category who do not. We saw no significance among women with a primary education or less (AOR 0.94, 95% CI 0.54, 1.62). We did find statistical significance among women that live in the Pacific region. Among women who are living in the Pacific region their children have a higher odds (AOR 1.25, 95% CI 0.71, 2.21) of getting into fights when their mother believed in physical punishment compared to women who also live in the Pacific region who did not believe in physical punishment. See full results in Table 4.

Violent Discipline Module:

Our third aim was to assess whether different methods of discipline against children are associated with a 4-5-year-old child's frequency to get into fights with other children. We found that, like the belief model, children had higher odds of getting into fights with other children if they have experienced violent discipline (AOR 1.60, 95% CI 1.07, 2.38) compared to children who have not experienced violent discipline. Like the belief model, there was a protective effect having a mother who had a university education or higher with a child having lower odds of getting into fights (AOR 0.45, 95% CI 0.26, 0.76) compared to children who had a mother with primary education or less.

For stratification of the violent model, we fit an adjusted logistic regression for all predictors of interest. Unlike the belief model, we did not see many statistically significant findings. Among women who were in the age category 26-35 years old, there were higher odds of children that get

into fights (AOR 1.97, 95% CI 1.08, 3.57) that experience violent discipline compared to children whose mothers are between the ages of 26-35 and do not experience violent discipline. Among female children, the females that experience violent discipline have almost a 2 times higher odds of getting into fights (AOR 1.77, 95% CI 1.04, 3.03) than female children that do not experience violent discipline. Unlike male children, who saw no significant association (AOR 1.44, 95% CI 0.82, 2.50). Living in the Pacific region was again a protective effect, giving children who live in the Pacific region who experience violent discipline 2 times (AOR 2.30, 95% CI: 1.29, 4.09) more likely to get into fights than children who do not experience violent discipline in the Pacific region.

Discussion:

To our knowledge, this is the first study that looks at the association between violent discipline and aggressive behavior in 4-5 year-olds at the population level in Nicaragua. As anticipated, we found a very strong association with both a mother's belief in physical punishment and violent discipline with aggressive behavior in children ages 4-5 in Nicaragua.

The analysis revealed that approximately half (49%) of 4-5 year olds were frequently getting into physical fights (hitting, biting, kicking) with other children, which within context is about half of a kindergarten class frequently getting into physical fights with one another. When we broke up the prevalence by gender, we surprisingly did not see much of a difference between males and females. But with half of children frequently getting into fights with one another has the potential to effect children from staying on track academically and with only 55% of primary students finishing primary school in Nicaragua, this is cause for concern.

Currently, available statistics gathered by UNICEF show that 4 out of 5 children are exposed to violent discipline (including verbal violent discipline) (3). Unfortunately, it is still embedded within cultural practices to think that children "deserve" to be disciplined, including violent discipline, when they misbehave. While UNICEF's statistic does not clarify if 4 out of 5 children did something to "deserve" this form of discipline, this is not the relevant question. Children's misbehaviors can be disciplined in positive ways: Parents can limit their children's pleasurable

outdoor activities for a short period of time ("to be grounded"), take privileges away for a period of time (no permission to play with a preferred toy), have a serious conversation with the child about their misbehavior, explaining why this behavior cannot be tolerated, and the consequences of the misbehavior, expect the child to repair anything he or she destroyed and expect him or her to apologize to anybody they hurt. Children have a right to be protected from violence the same way that women have a right to be protected from partner violence. If we follow the "earned physical discipline" logic, then do women also "earn to be assaulted" by their husbands if they didn't behave as expected, damaged something or hurt somebody? Of course not. Another common cultural belief is that early aggression in children is an early precursor of a "conduct disorder" (Attention Deficit Hyperactive Disorder/ADHD, oppositional defiant disorder, evolving later into conduct disorder in older children). However, these "conduct disorders" have a developmental basis. Children have "developmental difficulties" with their impulse control, and many times have not well developed verbal abilities to sustain verbal arguments, therefore they tend to "act out" their intense aggressive emotions and cannot yet control their behaviors. They are "developmentally immature" in their capacities to self-regulate. Most of these "developmentally immature" children who are "misbehaving" are even more vulnerable victims of physical violence at young ages. The problem is the lack of healthy, positive discipline among parents/caregivers, especially with emotionally immature children who might "misbehave" more. Physical violent discipline perpetuates a negative, vicious cycle where children's rights are not only violated, but they are also neglected by parents not helping them to learn an alternative, better way to handle conflict than a violent approach.

The analytic analysis revealed that there was a strong association between both a mother's belief in physical punishment and violent discipline and aggressive behavior in 4-5 year olds. Within both the belief and the violent discipline modules, there was an association between a mother's education and a child getting into fights with a mother's belief playing a significant role in her child's frequency to get into fights. This was particularly significant within the secondary and university education stratification of the belief model. Among women with a higher education, it appeared that it really made a difference if a mother believed in physical punishment, but did not make a difference among women with a primary education or not. This could be due to the fact

that women with a primary education or less are more likely to have children who get into fights for some other underlying reason.

We found similar results when looking at the association of violent discipline and aggressive behavior among female children. Females who experienced violent discipline had almost two times higher odds of getting into fights, compared to females who did not experience violent discipline. Among the male children, there was no significance. We wonder if culturally parents/caregivers do not discipline their daughters as violently as their sons, making the violent discipline have a deeper negative, long-lasting impact on the female children. Living in the Pacific region was also strongly associated within both stratification modules. The Pacific regions contains the country's capital, Managua and León (Nicaragua's second most populous city) both of which contain universities making the Pacific region more urban than the Central and Atlantic region.

Limitations:

The study has some limitations that have to be considered for the interpretation of results. Response bias may affect some of the predictors in this study. In particular, misreporting and underreporting of violent discipline and a mother's belief in physical punishment may be present. Violent discipline is prohibited by law in schools and in the home in Nicaragua (17), so a mother may not feel comfortable in saying she practices violent disciplinary against her child for fear that she will face punishment.

Another limitation in this analysis is the wording of the questions asked to the mother. The wording of the questions asked to the mother regarding different disciplinary practices were vague. For example, regarding isolation "leaving enclosed or isolated" the questionnaire does not distinguish between putting the child in isolation in his/her room as a "time out", or leaving the child enclosed in a locked closet: two polar opposite forms of punishment and two different interpretations of the term "isolation".

Finally, because this is a cross-sectional analysis, we cannot claim causality between both a mother's belief in physical punishment and violent discipline with aggressive behavior in children ages 4-5 years old. Further research is also needed to confirm these findings in other contexts.

Recommendations and Conclusions:

As under-5 mortality continues to decline in Nicaragua, Nicaragua has the opportunity to target child maltreatment. UNICEF Nicaragua, among 21 countries, met in Cuba in March 2016 to discuss child protection against violent discipline (18), as well as marked ending violence against children as their number one recommendation on their agenda for EveryChild in 2015 (19).

Among promoting healthy parenting practices and advocacy against violent discipline, different sectors would benefit from incorporating interventions targeted towards parents and caregivers on positive discipline. We recommend these results be disseminated among sectors within Nicaragua, particularly Programa Amor within the Ministry of Family, Adolescent and Children (Ministerio de la Familia, Adolescencia y Niñez). Interventions improving a child's ability to verbalize conflict are important among children of early primary age, as well as having interventions for parents/caregivers for at-risk children will be essential in prevention aggressive behavior among children.

Understanding the potential associations with early aggressive behaviors in early childhood is essential for the holistic development of the child. With almost half of children showing frequent aggressive behavior right before primary school, this behavior can further prevent academic success among children in Nicaragua.

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Appendix 1:

Tables

Table 1. Primary school participation, Survival rate to last primary grade (%), 2008-2012

Primary school participation, Survival rate to last primary grade (%), 2008-2012	
Country	(%)
Nicaragua	55.8
Guatemala	68
Panama	81.2
El Salvador	84
Haiti	85.2
Costa Rica	91.2
Peru	94.9
Mexico	95

Table 2. Prevalence of 4-5 year olds that frequently get into fights with other children (hit, bite, kick)

Prevalence of 4-5 year olds frequently getting into fights (hit, bite, kick)			
	Yes (%)	No (%)	Total (%)

Males	371 (28)	349 (26)	720 (53)
Females	285 (21)	342 (25)	627 (47)
Total	656 (49)	691 (51)	1347 (100)

Table 3. Descriptive statistics of study sample

Demographic descriptive										
Characteristic	N	%	Believe*	%	Don't Believe	%	Violent Discipline	%	Non-Violent	%
Total Women	1347		226		1120		348		999	
Residence										
Urban	680	50	92	40.7	587.00	52.4	161	46.3	519.00	52.0
Rural	667	50	133	58.8	533.00	47.6	188	54.0	480.00	48.0
Region										
Pacific	717	53	113	50.0	603.00	53.8	189	54.3	529	53.0
Central	430	32	71	31.4	360.00	32.1	104	29.9	326	32.6
Atlantic	200	15	42	18.6	158.00	14.1	55	15.8	144	14.4
Age										
25 years and under	394	29	70	31.0	321	28.7	111	31.9	283	28.3
26-35 years	602	45	97	42.9	505	45.1	144	41.4	458	45.8
36 years and older	281	21	48	21.2	233	20.8	69	19.8	212	21.2
Miss.	70	5								
Gender of Child										
Male	720	53	123	54.4	596	53.2	192	55.2	529	53.0
Female	627	47	104	46.0	524	46.8	157	45.1	470	47.0
Education level										
Primary	551	41	102	45.1	448.00	40.00	166	47.7	385.00	38.5
Secondary or technical	505	37	66	29.2	439.00	39.20	110	31.6	396.00	39.6
University or more	147	11	31	13.7	116.00	10.4	33	9.5	115.00	11.5
Miss	144	11								

^Percentages in this table are weighted and therefore may vary from non-weighted n's.

*Believes that physical punishment is necessary to educate their child

Table 4. Odds ratios for 4-5 year olds frequency to get into fights analyzed with multivariate logistic regression and adjusted by all covariates in the model[^]

Children that frequently get into fights with other kids (kicking, biting, hitting)	Crude OR (95% CI)	Belief Model AOR (95% CI)	Violent Discipline Model AOR (95% CI)
Does Not Believe (n=1121)	1.0	1.0	-
Beliefs* (n=226)	1.52 (1.04-2.22)	1.60 (1.06-2.42)	-
Type of Punishment:			
Non-Violent (n=999)	1.0	-	1.0
Violent** (n=348)	1.62 (1.12-2.34)	-	1.60 (1.07-2.38)
Gender of Child			
Female (n=627)		1.0	1.0
Male (n=720)		1.24 (0.88 -1.76)	1.25 (0.89 - 1.75)
Mother's Education			
Primary and under (n=550)	1.0	1.0	1.0
Secondary/Technical School (n=505)	0.83 (0.58-1.18)	0.95 (0.64-1.40)	0.97 (0.66-1.42)
University and above (n=147)	0.37 (0.22-0.61)	0.43 (0.25-0.72)	0.45 (0.27-0.76)
Maternal Age (years)	1.00 (0.97-1.02)	1.01 (0.98-1.04)	1.01 (0.98-1.04)
Residence			
Rural (n=667)	1.0	1.0	1.0
Urban (n=680)	0.63 (0.46-0.85)	0.76 (0.52-1.10)	0.73 (0.51-1.06)

[^] Adjusted odds ratios adjusted for: maternal age, maternal education, urban/rural residence, and gender of the child

n = 1,347

Table 5. Odds ratios for 4-5 year olds frequency to get into fights for specific levels of mother's education, residence, region and maternal age. Each individual strata analyzed with multivariate logistic regression and adjusted by all covariates listed[^]

Children that frequently get into fights with other children (hit, bite, kick)	Belief Module, AOR (95% CI)	Violent Discipline, AOR (95% CI)
Mother's Education		
Primary and below (n=550)	0.93 (0.54-1.62)	1.64 (0.90-2.98)
Secondary/Technical (n=505)	3.32 (1.62-6.79)	1.56 (0.83-2.93)
University and above (n=147)	3.23 (1.11-9.36)	1.89 (0.72-5.00)
Residence		
Urban (n=680)	1.74 (0.99-3.06)	1.74 (1.02-2.97)
Rural (n=667)	1.54 (0.87-2.72)	1.48 (0.83-2.64)
Regions		
Pacifico (n=717)	1.64 (1.09-2.48)	1.59 (1.07-2.37)
Atlantico (n=430)	0.79 (0.24-2.66)	0.62 (0.24-1.59)
Central (n=200)	1.26 (0.71-2.22)	1.30 (0.79-2.15)
Maternal Age		
25 and under (n=394)	0.87 (0.36-2.10)	1.15 (0.52-2.57)
26-35 (n=602)	1.82 (1.04-3.18)	1.97 (1.08- 3.57)
36 and older (n=281)	3.08 (1.17-8.07)	2.04 (0.81-5.18)

[^] Adjusted odds ratios adjusted for: maternal age, maternal education, urban/rural residence, and gender of the child
n=1,347

Appendix 2:

Questions for main Predictors of Interest:
Question 464A: “¿[...] se mete frecuentemente en peleas con otros niños(as), pegándoles, mordiéndoles o pateándoles?/ [...] frequently gets into fights with other children, by hitting, biting, or kicking?
Question 801: “¿Cree usted que para educar a los hijos es necesario el castigo físico, como por ejemplo darles bofetadas, palmadas o golpes? // Do you believe that in order to educate your children that physical punishment is necessary, for example slapping, spanking, punching? ” Si o No
Question 802: “¿En este hogar como se corrigen a los niños cuando se portan mal? // In this home how are children corrected when they misbehave? ” <ul style="list-style-type: none">• Regaños/Reprimendas verbales // Scolding/verbal reprimands• Prohibir algo que le gusta // Prohibit something they like• Bofetadas/palmadas // Slaps/Spankings**• Golpeándolos con la mano o el puño // Hitting with the hand or fist**• Golpeándolos con faja, regla, mecate, palo u otro objeto // Beating with a belt, ruler, rope, stick or other object**• Dejándole encerrado o aislado // Leaving enclosed or isolated**• Poniéndole más trabajo // Giving them more work• Dejándole fuera de casa // Making them leave the house**• No se corrigen a los niños // I do not correct my kids• Otro: _____ // Other: _____

**Discipline techniques we defined as “Violent Discipline”

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