

〈共同研究〉

「途上国における乳幼児期の子どもの発達支援に関する実証研究」

# Parents' Disciplinary Practices and Child Nutritional Status in Lao People's Democratic Republic

Yusuke Kamiya\* · Natsumi Noji\*\*

## 1. Introduction

Parents' disciplinary practices are critically important for children's development process. In particular, child maltreatment is a major threat to early childhood development, but little is known about child maltreatment at home and its effects on child development in developing countries. Among various aspects relating to early childhood development, child nutrition is a major issue in many developing countries with large rural populations and significant poverty issues. However, the relationship between child maltreatment and child nutrition has not been examined in many of these societies.

Child maltreatment is defined as act or series of acts by parents or caregivers that harm, potentially harm, or threaten to harm a child. These acts might have physical, sexual, and/or psychological effects. Child maltreatment includes acts of omission, which are acts of physical, emotional, and/or educational neglect, inadequate supervision, and exposing a child to a violent home environment<sup>1)</sup>. Child maltreatment poses a significant threat to early childhood development and wellbeing, and about 300 million children in the world aged two to four years are regularly subjected to violent discipline that includes physical punishment and/or psychological aggression, with 176 million children under age five exposed to indirect violence, such as witnessing parental violence at home<sup>2)</sup>.

One long-term cost of toxic stress during childhood is the learning, behavioral, and health problems that influence societal economic outcomes<sup>3)</sup>. Currie and Wisdom confirmed that American adults with histories of childhood maltreatment suffered from enduring educational and financial problems, such as relatively low educational attainment, occupational rank, income, and wealth<sup>4)</sup>. The financial burden of child maltreatment in the United States is substantial and the estimated average lifetime per capita cost among victims was USD 210,012 and the average lifetime cost per death in 2008 was USD 1,272,900<sup>5)</sup>. A study conducted in other developed countries (including Japan) reported that child maltreatment markedly increased the risks of psychopathology and negative psychological outcomes, such as depression, post-traumatic stress disorder, and reduced cognitive abilities associated with brain development<sup>6, 7)</sup>.

---

\* 龍谷大学経済学部 准教授

\*\* アクセンチュア株式会社 リサーチシニアアナリスト

Although child maltreatment has harmful effects on individuals and societies, it often is considered a necessary or inevitable behavior, and about 1.1 billion caregivers indicated that physical punishment is a necessary aspect of childrearing or educating children<sup>2)</sup>. However, corporal punishment, such as spanking, did not improve child educational outcomes<sup>8)</sup>, and children who experienced this type of punishment were relatively less likely to reach appropriate socio-emotional developmental milestones<sup>1)</sup>.

During the past three decades, there has been a change in the way that many societies are trying to mitigate child maltreatment. In September 1990, the Convention on the Rights of the Child came into force. In 1990, just four countries had prohibited physical punishment in all settings. By 2019, 58 countries had fully prohibited all corporal punishment in all settings<sup>9)</sup>. Child maltreatment also was addressed by three targets of the United Nations' Sustainable Development Goals (SDGs) that concern violence against children: 1) Target 5.2 concerns eliminating all violence against women and girls in public and in private, including human trafficking and exploitation (sexual and otherwise); 2) Target 16.1 is about significantly decreasing all types of violence and violence-related deaths; and 3) Target 16.2 includes publicity to end abuse, exploitation, trafficking, torture, and all other violence against children<sup>2)</sup>.

Turning to the issue of child nutrition, "undernutrition" occurs when the quantity or quality of the regular diet is insufficient for growth and health at a given age<sup>10)</sup>. According to UNICEF, there might be too little food ingested or the food does not contain the essential vitamins and minerals for growth. Undernourished children are hungry, prone to infectious diseases, underweight, and under height relative to age<sup>10)</sup>. Child undernutrition is a serious problem because it increases the risks of mortality, mobility, illness, infection, developmental delay, cognitive deficit, and low learning capacities in later life. Lao People's Democratic Republic (Lao PDR) has the highest prevalence of child undernutrition in Mainland Southeast Asia. Although Lao PDR's average GDP per capita during 2010–2018 (USD 2,423) exceeded those of Cambodia (USD 1,385) and Myanmar (USD 1,250), its child health and nutrition were inferior<sup>11)</sup>.

The determinants of child undernutrition are diverse, multidimensional, and interrelated. UNICEF categorized the causes as immediate, underlying, or basic, defining immediate causes as inadequate dietary intake or illness; underlying causes as insufficient access to food at home, inadequate health services or an unhealthy environment (e.g., poor sanitation), and inadequate care for children and women at home; and basic causes as insufficient resources at hand or potential<sup>12)</sup>.

Many previous studies have investigated the immediate, underlying, and basic causes of child undernutrition<sup>13)</sup>. However, although child maltreatment might negatively influence child nutrition, few studies set in developing countries have considered this possible connection. One exception is Morales and Prakarsh, who found that physical maltreatment had a significant negative effect on Peruvian children's short-term nutritional outcomes, although they found no long-term effects<sup>14)</sup>. The present study investigated the effects of child discipline types on child undernutrition in Lao PDR. The findings are expected to help policymakers tackle child maltreatment and its influences on children's growth and development in Lao PDR by guiding effective policies and programs for vulnerable children.

## 2. Methods

### 2.1. Setting and social context

Lao PDR is a lower-middle income country, with a Gross National Income (GNI) in 2016 of USD

2,450<sup>15</sup>). The country's population in 2018 was estimated at 7.1 million, which was an increase of 5.0 million compared to 1960<sup>15</sup>). Lao PDR also has one of the youngest populations in Asia, with a median age of 22.8 years in 2015<sup>16</sup>). Lao PDR had recognized 149 ethnic subgroups within 47 ethnic groups, although most of the population was 54.6% Lao, 10.9% Khmu, and 8.0% Hmong; about 26.5% of the population was comprised of other ethnic groups in 2005<sup>17</sup>). Historically, Buddhism has been an important social force, and 64.7% of the population is Buddhist, 1.7% is Christian, and the other 33.6% believed the other religious faith or no religion in 2015<sup>17</sup>).

## 2.2. Child undernutrition and maltreatment in Lao PDR

Child undernutrition in Lao PDR remains high despite the country's rapid economic growth and declines in poverty conditions during the past decade. The burden of undernutrition in Lao PDR is estimated as at least USD 200 million annually (about 2.4% of GDP)<sup>18</sup>). If this problem continues, it will be difficult to sustain the current annual GDP growth rate. In addition, Lao PDR's lost future productivity caused by stunting was estimated as USD 51.4 million annually, which included 26% of the 10 indicators of the undernutrition burden on the national economy<sup>18</sup>). Lao PDR became obligated to comply with the "right to adequate food" by ratifying the International Covenant on Economic, Social and Cultural Rights in 2007, which committed it to take steps to ensure that all Laotians would be free from hunger<sup>19</sup>). In 2008, the country promulgated the National Nutrition Policy to conform the national policy to its international obligations and focused on accelerating the decrease in undernutrition and the associated morbidity and mortality risks for all ethnic groups<sup>20</sup>).

Child maltreatment is common in Lao PDR; in 2017, about 69% of children aged 1–14 years experienced at least one type of violent (psychological or physical) discipline at home<sup>21</sup>). Of them, about 50% experienced physical punishment, and this percentage increased as the educational attainments and wealth quintiles of the household heads decreased<sup>21</sup>). Anecdotal evidence suggested that cultural norms, such as the acceptability of intimate partner violence, might be contributing to the violence against children<sup>22</sup>). In 2017, 25.3% of mothers or caregivers believed that physical punishment was necessary to properly raise children<sup>21</sup>). The 2014 Law on Preventing and Combatting Violence against Woman and Children and the National Plan of Action on Prevention and Elimination of Violence Against Woman and Violence Against Children in Lao PDR, 2014–2020 were established in response to the issue<sup>23</sup>).

## 2.3. Design

Cross-sectional survey data were derived from the Lao Social Indicator Survey (LSIS 2011–12), a nationally representative household survey of Lao PDR conducted by its Ministry of Health and Ministry of Planning and Investment (Lao Statistics Bureau) in collaboration with other ministries. The goal was to assess progress toward the achieving the Millennium Development Goals (MDGs) and to serve as a baseline for the 7th National Socio-Economic Development Plan<sup>21</sup>). This complex survey was designed to obtain as much analyzable nationally representative data as possible and the details of the sampling procedure are available online at The World Bank Group<sup>21</sup>). Individuals in 18,843 households were interviewed, and the mean household size was 5.2 persons. Altogether, there were 97,421 household members (47,820 males and 49,601 females), and there were 11,067 eligible children aged zero to five years reported by the respondents. The subsample of parents (respondents) who reported one or more children aged zero to five years was used for this study ( $n = 11,067$ )<sup>21</sup>).

#### 2.4. Purpose

The purpose of this study was to determine the extent to which type of child discipline related to child nutritional outcomes in Lao PDR.

#### 2.5. Child nutritional outcomes

At the time of the household interviews, all children aged zero to five were supposed to be weighted and measured using anthropometric equipment following international standards for household surveys. However, some of the children were not weighed and measured. Altogether, about 97% of the eligible children had weight and height data (10,734), about 2% of the 10,734 children were excluded from the weight-for-age calculation, and about 4% of them were excluded from the height-for-age calculation. Then, about 4% of the children were excluded from the weight-to-height calculation because of incomplete dates of birth, implausible measurements, or missing weight and/or height data.

To assess the children's nutritional outcomes, three anthropometric z-scores following the World Health Organization (WHO) standards were calculated. These z-scores corresponded to the standard deviations of the medians of the reference population. These z-scores are commonly used to measure child nutritional outcomes in developing countries. First, the Weight-for-Age z-score (WAZ) is an index of acute and chronic undernutrition indicating the extent of underweight at a given age. Underweight children might be stunted, wasted, or both. Second, the Height-for-Age z-score (HAZ) is an index of linear growth that focuses on chronic undernutrition, which is indicated by height stunting reflecting accumulated nutritional deficits. Stunting refers to children who are too short for their age. The Weight-for-Height z-score (WHZ) indicates acute undernutrition or wasting measured by the child's weight relative to height, and it often is caused by rapid weight loss or failure to gain weight. Wasting usually is associated with current nutritional deficiencies and might significantly vary by the seasonal availability of food or disease prevalence. Children aged zero to 59 months (up to five years old) were identified as stunted, underweight, or wasted when their WAZ, HAZ, or WHZ values, respectively, were more than two standard deviations below the median WHO Child Growth Standards.

#### 2.6. Child discipline

The parent respondent in households with children aged two through four years and children aged five through 14 were interviewed. Among other things, the questionnaires asked about types of discipline. When more than one child aged two through 14 years lived in a household, a focal child of the respondent was randomly selected from the children in that household. The parents indicated "Yes," "No," or "I don't know/no opinion" to the questions about discipline. Three types of discipline were assessed: 1) physical punishment, 2) psychological aggression, and 3) non-violent discipline. Physical punishment was assessed using the mean of the responses to five questions, psychological aggression was assessed using the mean of the responses to two questions, and non-violent discipline was assessed using the mean of the responses to three questions.

##### 1) Questions for Physical punishment

1.1. Shook her/him.

1.2. Spanked, hit or slapped him/her on the bottom with bare hand.

1.3. Hit him/her on the bottom or elsewhere on the body with something like a belt, hairbrush, stick or

*other hard object.*

*1.4. Hit or slapped him/her on the face, head or ears.*

*1.5. Hit or slapped him/her on the hand, arm or leg.*

## *2) Questions for Psychological aggression*

*2.1. Shouted, yelled at or screamed at him/her.*

*2.2. Called him/her dumb, lazy or another name like that.*

## *3) Questions for Non-violent discipline*

*3.1. Took away privileges, forbade something him/her liked or did not allow him/her to leave house.*

*3.2. Explained why his/her behavior was wrong.*

*3.3. Gave him/her something else to do.*

## **2.7. Control variables**

Child, maternal, household, and community characteristics were included as control variables: (1) child gender, (2) child age (zero–59 months), (3) maternal age, (4) maternal educational attainment, (5) head of household's ethnic background, (6) wealth index quintile, and (7) residential region.

## **2.8. Analytical methods**

First, three linear regression analyses were performed to assess the influences of the three types of discipline on the WAZ, HAZ, and WHZ. Then, three logistic regression analyses were performed to assess the effects of type of discipline on the likelihoods of underweight, stunted, and wasted as dichotomous dependent indicators.

## **3. Results**

### **3.1. Respondents' children's characteristics**

Table 1 shows that about 39.2% of the sample children aged 0–4 years were stunted, 32.6% of the children were underweight and 5.3% were wasted. Regarding discipline, among the children, 48.4% experienced physical punishment and 68.4% experienced psychological aggression in the home, respectively.

### **3.2. Linear and logistic regression results**

Tables 2 presents the results of the linear regression analyses of the relationship between type of discipline and child nutritional outcomes. In Table 2, the effect of physical punishment on HAZ and WAZ statistically significant and negative, but its effect on WHZ was not significant. Moreover, neither psychological aggression nor non-violent discipline was associated with any child nutritional outcome.

Table 3 presents the results of the logistic regression analysis on undernutrition. It shows physical punishment was significantly related to a higher likelihood of stunting (odds ratio (OR) = 1.308,  $p < 0.01$ ), but it had no significant influence on the likelihood of underweight or wasting. In contrast to the linear regression results, non-violent discipline significantly increased the likelihood of wasting ( $p < 0.05$ ). Regarding the control variables, most of them were significantly related to the nutritional z-scores and the likelihood of child undernutrition. These results were consistent with the previous studies on the

determinants of child nutritional outcomes in Lao PDR<sup>24)</sup>.

Table 1. Descriptive characteristics

| Variable                                          | Obs.  | Mean  | S.D.  | Min   | Max  |
|---------------------------------------------------|-------|-------|-------|-------|------|
| <b>Outcome variable</b>                           |       |       |       |       |      |
| HAZ (height-for-age)                              | 10613 | -1.68 | 1.43  | -6.01 | 5.17 |
| WAZ (weight-for-age)                              | 10814 | -1.49 | 1.12  | -5.54 | 5.84 |
| WHZ (weight-for-height)                           | 10609 | -0.59 | 0.98  | -4.76 | 5.63 |
| Stunting                                          | 10613 | 0.406 | 0.491 | 0     | 1    |
| Underweight                                       | 10814 | 0.336 | 0.472 | 0     | 1    |
| Wasting                                           | 10609 | 0.052 | 0.222 | 0     | 1    |
| <b>Independent variable</b>                       |       |       |       |       |      |
| Physical punishment                               | 10354 | 0.190 | 0.250 | 0     | 1    |
| Psychological aggression                          | 10363 | 0.506 | 0.403 | 0     | 1    |
| Non-violent discipline                            | 10398 | 0.464 | 0.291 | 0     | 1    |
| <b>Individual &amp; household characteristics</b> |       |       |       |       |      |
| Child sex                                         |       |       |       |       |      |
| Girl                                              | 11258 | 0.495 | 0.500 | 0     | 1    |
| Child age (month)                                 |       |       |       |       |      |
| 0-11                                              | 11067 | 0.180 | 0.384 | 0     | 1    |
| 12-23                                             | 11067 | 0.175 | 0.380 | 0     | 1    |
| 24-35                                             | 11067 | 0.210 | 0.407 | 0     | 1    |
| 36-47                                             | 11067 | 0.225 | 0.418 | 0     | 1    |
| 48-59                                             | 11067 | 0.210 | 0.408 | 0     | 1    |
| Mother's age                                      | 11258 | 28.8  | 7.0   | 13    | 98   |
| Educational attainment of mother                  |       |       |       |       |      |
| None                                              | 11257 | 0.351 | 0.477 | 0     | 1    |
| Primary                                           | 11257 | 0.409 | 0.492 | 0     | 1    |
| Secondary                                         | 11257 | 0.223 | 0.416 | 0     | 1    |
| Higher                                            | 11257 | 0.017 | 0.129 | 0     | 1    |
| Father's age                                      | 10184 | 32.5  | 8.1   | 15    | 86   |
| Educational attainment of father                  |       |       |       |       |      |
| None                                              | 10175 | 0.160 | 0.367 | 0     | 1    |
| Primary                                           | 10175 | 0.455 | 0.498 | 0     | 1    |
| Secondary                                         | 10175 | 0.335 | 0.472 | 0     | 1    |
| Higher                                            |       |       |       |       |      |
| Ethnicity                                         | 10175 | 0.049 | 0.217 | 0     | 1    |
| Lao-Tai                                           | 11237 | 0.423 | 0.494 | 0     | 1    |
| Mon-Khmer                                         | 11237 | 0.131 | 0.338 | 0     | 1    |
| Hmong-Mien                                        | 11237 | 0.145 | 0.352 | 0     | 1    |
| Other                                             | 11237 | 0.301 | 0.459 | 0     | 1    |
| Wealth quintile                                   |       |       |       |       |      |
| Lowest                                            | 11067 | 0.329 | 0.470 | 0     | 1    |
| Lower middle                                      | 11067 | 0.221 | 0.415 | 0     | 1    |
| Middle                                            | 11067 | 0.176 | 0.381 | 0     | 1    |
| Upper middle                                      | 11067 | 0.146 | 0.354 | 0     | 1    |
| Higher                                            | 11067 | 0.127 | 0.333 | 0     | 1    |
| Region                                            |       |       |       |       |      |
| Central                                           | 11258 | 0.446 | 0.497 | 0     | 1    |
| North                                             | 11258 | 0.342 | 0.474 | 0     | 1    |
| South                                             | 11258 | 0.213 | 0.409 | 0     | 1    |

Table 2. Results from linear regressions

| Variable                                | HAZ        |            |            | WAZ        |            |            | WHZ        |            |            |
|-----------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Independent variable                    |            |            |            |            |            |            |            |            |            |
| Physical punishment                     | - 0.188*** |            |            | - 0.086*   |            |            | 0.04       |            |            |
| Psychological aggression                |            | 0.01       |            |            | 0.03       |            |            | 0.03       |            |
| Non-violent discipline                  |            |            | - 0.04     |            |            | - 0.06     |            |            | - 0.07     |
| Control variable                        |            |            |            |            |            |            |            |            |            |
| Girl                                    | 0.027      | 0.029      | 0.029      | - 0.020    | - 0.018    | - 0.016    | - 0.025    | - 0.022    | - 0.022    |
| Child age (0-11 months)                 |            |            |            |            |            |            |            |            |            |
| 12-23                                   | - 0.959*** | - 0.953*** | - 0.952*** | - 1.113*** | - 1.101*** | - 1.108*** | - 0.803*** | - 0.802*** | - 0.801*** |
| 24-35                                   | - 0.855*** | - 0.854*** | - 0.852*** | - 1.073*** | - 1.064*** | - 1.072*** | - 0.711*** | - 0.712*** | - 0.715*** |
| 36-47                                   | - 1.120*** | - 1.120*** | - 1.121*** | - 1.046*** | - 1.040*** | - 1.043*** | - 0.615*** | - 0.615*** | - 0.614*** |
| 48-59                                   | - 1.232*** | - 1.229*** | - 1.226*** | - 1.051*** | - 1.043*** | - 1.044*** | - 0.538*** | - 0.541*** | - 0.537*** |
| Mother's age                            | 0.011***   | 0.011***   | 0.011***   | 0.007***   | 0.007**    | 0.007**    | 0.00       | 0.00       | 0.00       |
| Educational attainment of mother (None) |            |            |            |            |            |            |            |            |            |
| Primary                                 | 0.091**    | 0.092**    | 0.090**    | 0.049      | 0.051      | 0.049      | 0.006      | 0.003      | 0.005      |
| Secondary                               | 0.163***   | 0.163***   | 0.163***   | 0.120***   | 0.121***   | 0.121***   | 0.013      | 0.011      | 0.017      |
| Higher                                  | 0.194      | 0.206      | 0.210      | 0.252**    | 0.280**    | 0.265**    | 0.134      | 0.147      | 0.137      |
| Father's age                            | - 0.001    | - 0.001    | - 0.001    | 0.000      | - 0.001    | 0.000      | - 0.002    | - 0.002    | - 0.002    |
| Educational attainment of father (None) |            |            |            |            |            |            |            |            |            |
| Primary                                 | 0.069      | 0.064      | 0.067      | 0.013      | 0.005      | 0.012      | - 0.049    | - 0.052    | - 0.048    |
| Secondary                               | 0.157**    | 0.150**    | 0.155**    | 0.111**    | 0.104**    | 0.108**    | 0.00       | 0.00       | 0.00       |
| Higher                                  | 0.308***   | 0.304***   | 0.302***   | 0.232***   | 0.224***   | 0.237***   | 0.03       | 0.03       | 0.04       |
| Ethnicity (Lao-Tai)                     |            |            |            |            |            |            |            |            |            |
| Mon-Khmer                               | - 0.274*** | - 0.270*** | - 0.272*** | - 0.006    | - 0.011    | - 0.010    | 0.173***   | 0.163***   | 0.170***   |
| Hmong-Mien                              | - 0.433*** | - 0.440*** | - 0.441*** | 0.177***   | 0.172***   | 0.167***   | 0.557***   | 0.560***   | 0.553***   |
| Other                                   | - 0.356*** | - 0.358*** | - 0.360*** | - 0.182*** | - 0.185*** | - 0.189*** | 0.047      | 0.044      | 0.045      |
| Wealth quintile (Lowest)                |            |            |            |            |            |            |            |            |            |
| Lower middle                            | 0.195***   | 0.201***   | 0.201***   | 0.142***   | 0.143***   | 0.147***   | 0.071**    | 0.072**    | 0.072**    |
| Middle                                  | 0.294***   | 0.311***   | 0.306***   | 0.220***   | 0.227***   | 0.223***   | 0.070*     | 0.065*     | 0.065*     |
| Upper middle                            | 0.449***   | 0.456***   | 0.463***   | 0.300***   | 0.301***   | 0.304***   | 0.090**    | 0.088**    | 0.092**    |
| Higher                                  | 0.700***   | 0.709***   | 0.706***   | 0.551***   | 0.552***   | 0.554***   | 0.196***   | 0.202***   | 0.200***   |
| Region (Central)                        |            |            |            |            |            |            |            |            |            |
| North                                   | - 0.041    | - 0.035    | - 0.038    | 0.018      | 0.019      | 0.012      | 0.082**    | 0.078**    | 0.071**    |
| South                                   | - 0.137*** | - 0.141*** | - 0.146*** | - 0.148*** | - 0.144*** | - 0.158*** | - 0.105*** | - 0.098*** | - 0.114*** |
| Constant                                | - 1.303*** | - 1.333*** | - 1.316*** | - 1.032*** | - 1.052*** | - 1.010*** | - 0.190*** | - 0.183*** | - 0.146*   |
| N                                       | 8843       | 8859       | 8887       | 9019       | 9032       | 9064       | 8849       | 8864       | 8894       |
| R2                                      | 0.18       | 0.18       | 0.18       | 0.20       | 0.20       | 0.20       | 0.12       | 0.12       | 0.12       |

\*\*\*p&lt;0.01, \*\*p&lt;0.05, \*p&lt;0.1

Table 3. Results from logistics regressions

| Variable                                | Stunting |          |          | Underweight |          |          | Wasting  |          |          |
|-----------------------------------------|----------|----------|----------|-------------|----------|----------|----------|----------|----------|
| Independent variable                    |          |          |          |             |          |          |          |          |          |
| Physical punishment                     | 1.308*** |          |          | 1.066       |          |          | 1.109    |          |          |
| Psychological aggression                |          | 1.007    |          |             | 0.906    |          |          | 0.892    |          |
| Non-violent discipline                  |          |          | 0.962    |             |          | 1.007    |          |          | 1.603**  |
| Control variable                        |          |          |          |             |          |          |          |          |          |
| Girl                                    | 1.004    | 1.005    | 1.005    | 1.079*      | 1.077    | 1.070    | 1.040    | 1.062    | 1.030    |
| Child age (0-11 months)                 |          |          |          |             |          |          |          |          |          |
| 12-23                                   | 4.336*** | 4.321*** | 4.326*** | 5.553***    | 5.438*** | 5.492*** | 2.690*** | 2.706*** | 2.692*** |
| 24-35                                   | 3.752*** | 3.745*** | 3.722*** | 4.666***    | 4.589*** | 4.622*** | 1.890*** | 1.895*** | 1.927*** |
| 36-47                                   | 4.976*** | 4.986*** | 4.996*** | 4.319***    | 4.274*** | 4.307*** | 1.15     | 1.18     | 1.16     |
| 48-59                                   | 6.160*** | 6.167*** | 6.154*** | 4.259***    | 4.224*** | 4.245*** | 0.87     | 0.88     | 0.87     |
| Mother's age                            | 0.990*   | 0.990*   | 0.990*   | 0.99        | 0.99     | 0.99     | 1.01     | 1.01     | 1.01     |
| Educational attainment of mother (None) |          |          |          |             |          |          |          |          |          |
| Primary                                 | 0.861**  | 0.858**  | 0.863**  | 0.888*      | 0.887*   | 0.884*   | 0.84     | 0.86     | 0.84     |
| Secondary                               | 0.798**  | 0.794**  | 0.798**  | 0.821**     | 0.824**  | 0.820**  | 0.96     | 1.00     | 0.98     |
| Higher                                  | 0.649    | 0.668    | 0.648    | 0.430***    | 0.441*** | 0.434*** | 0.495    | 0.522    | 0.508    |
| Father's age                            | 0.998    | 0.998    | 0.998    | 0.999       | 1.000    | 0.999    | 1.000    | 1.000    | 0.998    |
| Educational attainment of father (None) |          |          |          |             |          |          |          |          |          |
| Primary                                 | 1.028    | 1.033    | 1.023    | 0.984       | 1.006    | 0.992    | 1.129    | 1.127    | 1.111    |
| Secondary                               | 0.840*   | 0.847*   | 0.833*   | 0.840*      | 0.848*   | 0.842*   | 1.127    | 1.111    | 1.084    |
| Higher                                  | 0.624*** | 0.623*** | 0.625*** | 0.736*      | 0.721*   | 0.730*   | 1.121    | 1.053    | 1.071    |
| Ethnicity (Lao-Tai)                     |          |          |          |             |          |          |          |          |          |
| Mon-Khmer                               | 1.520*** | 1.509*** | 1.509*** | 1.059       | 1.087    | 1.064    | 0.504*** | 0.520*** | 0.488*** |
| Hmong-Mien                              | 2.136*** | 2.166*** | 2.158*** | 0.763**     | 0.773**  | 0.772**  | 0.239*** | 0.205*** | 0.236*** |
| Other                                   | 1.663*** | 1.663*** | 1.670*** | 1.438***    | 1.459*** | 1.453*** | 0.965    | 0.971    | 0.947    |
| Wealth quintile (Lowest)                |          |          |          |             |          |          |          |          |          |
| Lower middle                            | 0.749*** | 0.749*** | 0.748*** | 0.793***    | 0.790*** | 0.789*** | 0.944    | 0.916    | 0.931    |
| Middle                                  | 0.621*** | 0.609*** | 0.615*** | 0.623***    | 0.614*** | 0.622*** | 0.878    | 0.878    | 0.876    |
| Upper middle                            | 0.479*** | 0.473*** | 0.471*** | 0.528***    | 0.525*** | 0.520*** | 0.725    | 0.712    | 0.690*   |
| Higher                                  | 0.324*** | 0.320*** | 0.323*** | 0.384***    | 0.387*** | 0.384*** | 0.639*   | 0.639*   | 0.607**  |
| Region (Central)                        |          |          |          |             |          |          |          |          |          |
| North                                   | 1.041    | 1.033    | 1.022    | 0.860**     | 0.854**  | 0.856**  | 1.220    | 1.186    | 1.320*   |
| South                                   | 1.149*   | 1.161*   | 1.15     | 1.283***    | 1.265*** | 1.283*** | 1.131    | 1.096    | 1.241    |
| N                                       | 8843     | 8859     | 8887     | 9019        | 9032     | 9064     | 8849     | 8864     | 8894     |
| Log likelihood                          | -5338.8  | -5348.6  | -5366.4  | -5351.7     | -5360.3  | -5376.4  | -1808.5  | -1800.4  | -1806.4  |

Odds ratios are reported, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1

#### 4. Discussion

This study investigated the influences of child discipline on child nutritional outcomes in Lao PDR. Physical punishment negatively affected long-term child nutritional outcomes: height-for-age (z-score), which indicates chronic undernutrition reflecting accumulated nutritional deficits, and stunting. However, the other types of discipline (psychological aggression and non-violent discipline) did not significantly relate to the child nutritional outcomes.

The study's results have several important policy implications. Despite the confirmed importance of nutritional interventions, such as micronutrient supplements, exclusive breastfeeding, and healthcare programs, for improving childhood nutrition in developing countries<sup>25)</sup>, the influences of type of child

discipline on child nutritional outcomes are not clear. Based on this study's findings, reducing the use of physical punishment to discipline children might improve long-term child nutritional outcomes. For example, home-based or community-based education about disciplinary options for children up to five years old might help parents to find effective disciplinary alternatives. Because child maltreatment in Lao PDR is relatively high in Asia, investing in parenting programs might strengthen the country's social and economic development.

## 5. Limitations

This study has several caveats to consider when interpreting the results. First, the causal direction of the relationships between type of discipline and child nutritional outcomes could not be determined because of the study's cross-sectional design. Second, it is not clear why physical punishment was the only statistically significant predictor. Detailed data on discipline and parent-child relationships collected via focused interview surveys are needed. Despite its limitations, this is the first empirical study to investigate the influences of types of discipline on child nutritional outcomes in Lao PDR, and it can serve as a reference and foundation for future research.

## 6. Conclusions

Physical punishment negatively influenced long-term child nutritional outcomes in Lao PDR. The country and non-governmental organizations should not ignore the importance of parenting practices, such as types of discipline, on child nutrition in policies and programs for children's health, safety, and wellbeing.

### List of abbreviations

1. Sustainable Development Goals (SDGs)
2. Lao People's Democratic Republic (Lao PDR)
3. United Nations Children's Fund (UNICEF)
4. Gross National Income (GNI)
5. Gross Domestic Product (GDP)
6. Social Indicator Survey 2011-2012, Lao PDR (LSIS)
7. Millennium Development Goals (MDGs)
8. World Health Organization (WHO)
9. Weight-for-Age z-score (WAZ)
10. Height-for-Age z-score (HAZ)
11. Weight-for-Height z-score (WHZ)

### References

- 1) Arias, I., Leeb, R. T., Melanson, C., Paulozzi, L. J., Simon, T. R. Child maltreatment surveillance; uniform definitions for public health and recommended data elements [Internet]. (U.S.) NC for IP and C, editor. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; Available from: <https://stacks.cdc.gov/view/cdc/11493>
- 2) UNICEF. A Familiar Face: Violence in the lives of children and adolescents. New York; 2017.
- 3) Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., Garner, A. S., et al. The Lifelong Effects of Early Childhood Adversity and Toxic Stress. *Pediatrics* [Internet]. 2012 Jan 1; 129(1): e232 LP-e246. Available from: <http://pediatrics.aappublications.org/content/129/1/e232.abstract>

- 4) Currie, J., Spatz Widom C. Long-Term Consequences of Child Abuse and Neglect on Adult Economic Well-Being. *Child Maltreat* [Internet]. 2010 Apr 20; 15 (2): 111-120. Available from: <https://doi.org/10.1177/1077559509355316>
- 5) Fang, X., Brown, D. S., Florence, C. S., Mercy, J. A. The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse Negl* [Internet]. 2012; 36 (2): 156-165. Available from: <http://www.sciencedirect.com/science/article/pii/S0145213411003140>
- 6) Tomoda, A., Takiguchi, S., Shimada, K., Fujisawa, T. X. Structural and Functional Changes of Brain Due to Childhood Maltreatment and Adversity BT - Memory in a Social Context: Brain, Mind, and Society. In: Tsukiura, T., Umeda, S., editors. Tokyo: Springer Japan; 2017. pp. 251-266. Available from: [https://doi.org/10.1007/978-4-431-56591-8\\_14](https://doi.org/10.1007/978-4-431-56591-8_14)
- 7) Andersen, S. L., Tomada, A., Vincow, E. S., Valente, E., Polcari, A., Teicher, MH. Preliminary Evidence for Sensitive Periods in the Effect of Childhood Sexual Abuse on Regional Brain Development. *J Neuropsychiatry Clin Neurosci* [Internet]. 2008 Jul 1; 20 (3): 292-301. Available from: <https://neuro.psychiatryonline.org/doi/abs/10.1176/jnp.2008.20.3.292>
- 8) Gershoff, E. T., Grogan-Kaylor A. Spanking and child outcomes: Old controversies and new meta-analyses. Vol. 30, *Journal of Family Psychology*. Gershoff, Elizabeth T.: Department of Human Development and Family Sciences, University of Texas at Austin, 108 E. Dean Keeton St., Stop A2702, Austin, TX, US, 78712, [liz.gershoff@austin.utexas.edu](mailto:liz.gershoff@austin.utexas.edu); American Psychological Association; 2016. pp. 453-469.
- 9) Global report 2019: Progress towards ending corporal punishment of children. London; 2020.
- 10) UNICEF. Progress For Children. A report card on nutrition: Number 4. New York; 2006.
- 11) UNICEF. The State of the World's Children 2019: Children, food and nutrition; Growing well in a changing world. New York; 2019.
- 12) UNICEF. The State of the World's Children 1998: Focus on nutrition. New York; 1998.
- 13) Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis M., et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013; 382 (9890): 427-451.
- 14) Morales, A., Singh, P. The Effects of Child Physical Maltreatment on Nutritional Outcomes: Evidence from Peru. *J Dev Stud* [Internet]. 2015 Jul 3; 51 (7): 826-850. Available from: <https://doi.org/10.1080/00220388.2015.1034110>
- 15) World development indicators. Available from: <https://search.library.wisc.edu/catalog/999829583602121>
- 16) United Nations, Department of Economic and Social Affairs PD. World Population Prospects 2019 [Internet]. 2019 [cited 2020 Mar 12]. Available from: <https://population.un.org/wpp/>
- 17) United Nations Statistics Division. Demographic Yearbook. 2020.
- 18) Bagriansky, J., Voladet, S. The Economic Consequences of Malnutrition in Lao PDR: a Damage Assessment Report. SMERU Research Institute. SMERU Research Institute; 2013.
- 19) OHCHR. International Covenant on Economic, Social and Cultural Rights, Lao People's Democratic Republic, Office of the United Nations High Commissioner for Human Rights [Internet]. 2020 [cited 2020 Mar 9]. Available from: <https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/LAIndex.aspx>
- 20) Ministry of Health. National Nutrition Policy. Vientiane; 2008.
- 21) Ministry of Health, Lao Statistics Bureau. Lao PDR Lao Social Indicator Survey II (LSIS II) 2017. 2018.
- 22) UNICEF. National Violence against Children Survey in Lao PDR: A multi-sectoral response to the national Violence against Children Survey. New York; 2018.
- 23) Children, N. C. for M. and. National Plan of Action on Prevention and Elimination of Violence Against Woman and Violence Against Children in Lao PDR, 2014-2020. Vientiane; 2014.
- 24) Kamiya, Y. Socioeconomic determinants of nutritional status of children in Lao PDR: Effects of household and community factors. *J Heal Popul Nutr*. 2011; 29 (4): 339-348.
- 25) Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., et al. What works? Interventions for maternal and child undernutrition and survival. *Lancet* [Internet]. 2008; 371 (9610): 417-40. Available from: <http://www.sciencedirect.com/science/article/pii/S0140673607616936>