

ORIGINAL ARTICLE

Association between maternal depressive symptoms and physical punishment of children under five by sex: a secondary analysis of a national study in Peru

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ABSTRACT

There is limited evidence regarding the relationship between mothers' depressive symptoms and the physical punishment of their children. This study aimed to evaluate the association between mothers' depressive symptoms and physical punishment of children under five years in Peru, using secondary data from the 2021 and 2022 Demographic and Family Health Surveys. Generalized linear models with the Poisson family and log link function were employed. The models were adjusted for child sex and other sociodemographic variables. The results were reported as prevalence ratios (PR). An association was found between moderate to severe depressive symptoms in mothers and the use of physical punishment on children of either sex (PRA = 1.24; 95 % CI = 1.08-1.43, $p = 0.002$). Additionally, the prevalence of physical punishment was higher in girls whose mothers exhibited moderate to severe depressive symptoms compared to girls whose mothers did not (APR = 1.46; 95 % CI = 1.19-1.79, $p < 0.001$). This prevalence was not observed in boys (APR = 1.10; 95 % CI = 0.91-1.32; $p = 0.337$). These findings underscore the need to strengthen mental health policies in Peru to foster a healthier home environment, benefiting both mothers and their children.

Keywords: Depression; Punishment; Child (Source: MeSH)




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Asociación entre los síntomas depresivos de la madre con el castigo físico hacia los hijos menores de cinco años según sexo: análisis secundario de un estudio nacional en Perú

RESUMEN

Existe evidencia limitada acerca de la relación entre los síntomas depresivos de las madres y el castigo físico de sus hijos. El objetivo del estudio fue evaluar la asociación entre la presencia de síntomas depresivos de las madres con el castigo físico hacia los hijos menores de cinco años en el Perú, mediante un análisis de datos secundarios de la Encuesta Demográfica y de Salud Familiar 2021 y 2022. Se utilizaron modelos lineales generalizados de la familia Poisson y función de enlace logarítmica. Los modelos se ajustaron por el sexo del niño y otras variables sociodemográficas. Los resultados se presentaron en razones de prevalencia (RP). Se observó una asociación entre la presencia de síntomas depresivos moderados a más en las madres con la aplicación de castigo físico en los hijos (de cualquier sexo) (RPa = 1,24; IC 95 % = 1,08-1,43, $p = 0,002$). Asimismo, la prevalencia de castigo físico fue mayor en niñas de madres que presentaron síntomas depresivos de moderados a más en comparación con niñas de madres que no los presentaron (RPa = 1,46; IC 95 % = 1,19-1,79; $p < 0,001$). Esta tendencia no se observó en el grupo de niños (RPa = 1,10; IC 95 % = 0,91-1,32; $p = 0,337$). Los hallazgos de este estudio resaltan la necesidad de fortalecer las políticas actuales de salud mental en el Perú a favor de un ambiente saludable en el hogar en beneficio tanto de las madres como de sus hijos.

Palabras clave: Depresión; Castigo; Niño (Fuente: DeCS)

INTRODUCTION

According to the World Health Organization, depression is a prevalent mental disorder worldwide, affecting approximately 300 million people. It is estimated that 5% of the global population suffers from depression. There is a notable difference in the prevalence of this condition by sex, as it affects more than 5% of women and only 3.6% of men (1). In Peru, it has been reported that 27.4% of the population suffers from some mental disorder, with depressive traits observed in 14% (2). This percentage may be extrapolated to other urban and rural areas, as similar values were found in various regions of the country (2). In 2021, 300,000 people with depression were treated in Peru, reflecting a 12% increase in cases compared to the years before the COVID-19 pandemic (3).

Depression is more common from the third decade of life onwards (4), a period that often coincides with motherhood. During this stage, it has been shown that a mother's ability to care for herself and her children may be affected, leading to significant emotional distress and risks to the health and development of young children (5).

Depression can have serious consequences in various areas of life, as it significantly impacts quality of life and social functioning, affecting not only physical and mental health but also autonomy, interpersonal relationships, enjoyment, and more (5). This emotional condition has been shown to result in significantly elevated rates of unemployment and job abandonment compared to physical illnesses, such as diabetes and hypertension. Additionally, it is correlated with diminished interpersonal relationships and a notable decline in both performance and concentration (6,7).

Physical punishment is legal in over 130 countries (8), and globally, 63% of children aged two to four years are subjected to this type of punishment by their caregivers (9). Physical punishment is a common aspect of parenting style in many families. It can be defined as the use of physical force intended to cause pain, discomfort, or distress to the child in order to correct behavior. However, the frequency and severity of this practice can vary, ranging from mild forms, such as spanking, to more severe forms, such as burning. There is no clearly defined boundary between what may be considered "reasonable" or "legal" physical punishment, making the distinction between socially acceptable and unacceptable practices a matter of ongoing debate in many countries (7).

In Spain, studies have shown that mothers are more likely to discipline their children, including the use of physical punishment. Furthermore, male children are more frequently subjected to disciplinary actions compared to female children. It has also been observed that mothers are more likely to use psychological aggression with girls, and both parents tend to correct or punish boys more often (10). Additionally, research has shown that compared to fathers, mothers are more likely to use physical punishment on children under five, with a prevalence of 55.2% among mothers who experience higher stress levels and have previously "spanked" their children (11).

Spanking has been associated with internalizing and externalizing behavioral problems in children (8). Maternal

use of physical punishment has also been linked to impaired behavior and development in children (12,13). Moreover, maternal depressive symptoms have been associated with an increased use of physical punishment. However, these studies have been conducted in populations with varying characteristics, and differences based on the child's sex have not been specifically investigated.

Given the gap in the literature, this study aimed to evaluate the association between maternal depressive symptoms and the use of physical punishment toward children under five years of age in Peru.

METHODS

Study design

An analytical cross-sectional study was conducted using secondary data from the Encuesta Demográfica y de Salud Familiar (ENDES) 2021 and 2022. The sample was randomized, balanced, stratified, and independent. The sampling unit was the private household. In urban areas, the sampling unit was based on the cluster, while in rural areas, it was based on a reference area. The selection of sampling units was based on information obtained from the 2017 National Population and Housing Census (14,15).

Population and statistical power calculation

The study included children aged 12 to 59 months whose mothers were of reproductive age, responded to the individual health questionnaire, and provided information regarding methods of child discipline. Children with permanent disabilities, mothers with permanent cognitive impairments, and those who did not provide information about depressive symptoms were excluded. Statistical power was calculated using the OpenEpi software, considering a 95% confidence level and data on the prevalence of moderate to severe depressive symptoms in mothers from a previous study and a nationally representative study from the United States (16). The resulting power was above 80%.

Variables

The primary independent variable was the presence of moderate to severe depressive symptoms in the mother. This variable was measured through questions equivalent to those included in the Patient Health Questionnaire (PHQ-9) (17,18), previously validated in the Peruvian population (19).

Scores ranging from 0 to 9 on the PHQ-9 indicated an absence of depressive symptoms. In contrast, scores of 10 or higher reflected the presence of symptoms that could be categorized as moderate, moderately severe, or severe.

Another independent variable included in the study was the presence of moderate to severe depressive symptoms in the last 12 months and/or 14 days. A value of 0 was assigned when the mother did not present symptoms at either time point; 1, when symptoms were present only in the last 14 days; 2, when symptoms were present only in the last 12 months; and 3, when symptoms were present at both time points.

The dependent variable was the use of physical punishment by the mother. Data were collected from questions regarding disciplinary methods used with the child, including physical punishment. The variable was coded as 1 when the mother reported using physical punishment such as slapping or hitting. When the mother reported using another disciplinary method, the variable was coded as 0.

Other covariates included in the analysis were maternal age (15-20 years; 20-30 years; 30-40 years; 40-49 years), educational level, number of children, marital status, native language, child's sex (female or male), geographic region (coast, highlands, jungle), socioeconomic status, parental history of violence, and intimate partner violence against the mother (in the child's presence or absence).

Data analysis

Statistical analysis was performed using STATA SE v17 (StataCorp, Texas, USA). The study design, clusters, strata, and individual weighting factor were specified using the `svyset` command in Stata, with cluster: `hv001`, stratum: `hv022`, and sampling weight: `weight`. The `subpop` option was used to analyze the subpopulation that met the study's inclusion criteria.

Categorical variables were described using frequencies and weighted percentages. For bivariate analysis, Pearson's chi-squared test with Rao-Scott correction was used. For multivariate analysis, a generalized linear model from the Poisson family with a log link function was employed. Results were presented as prevalence ratios with 95% confidence intervals. Multicollinearity was assessed using the variance inflation factor (VIF), with a threshold of 10. The Wald test was used to identify variables that significantly contributed to the model.

In addition to the crude model, an adjusted model was implemented, controlling for maternal education level, geographic region, child's sex and age (in months), number of children, and maternal marital status. Furthermore, an additional analysis was conducted to account for the presence of moderate to severe depressive symptoms over the past 12 months and the last 14 days.

Ethical considerations

ENDES data were collected with informed consent. Interviewers ensured that mothers were interviewed alone to allow them to respond freely and without judgment. The researchers did not have access to personal identifiers, ensuring anonymity and confidentiality. The study was reviewed and approved by the Ethics Committee of the Universidad Peruana de Ciencias Aplicadas (Code: FCS-SCEI/527-08-23).

RESULTS

A total of 12,366 children met the inclusion criteria for the study (Figure 1). Of these, 52.4% were between 12 and 35 months old, with males being the most frequent (51.9%). Approximately half of the participants resided in Metropolitan

Lima or other coastal regions (49.7%). Regarding maternal characteristics, more than half were aged between 25 and 34 years (51.5%), and the majority were married or cohabiting (78.2%). A total of 27.2% of mothers reported experiencing partner violence, and 6.5% presented moderate to severe depressive symptoms. Physical punishment was reported as a disciplinary method by 25.8% of mothers (Table 1). The proportion of physical punishment was 27.9% for boys and 23.5% for girls (Table 2).

Mothers residing in the jungle region reported higher rates of physical punishment compared to those in the highlands, Metropolitan Lima, and other coastal areas (36.2% vs. 22.9%, 26.4%, and 20.9%, respectively; $p < 0.001$). A higher child age (in months) was associated with a greater likelihood of physical punishment by the mother ($p < 0.001$). Physical punishment was more prevalent among children whose mothers reported experiencing partner violence compared to children whose mothers did not report such violence (34.6%, 31.9%, vs. 23.2%, respectively; $p < 0.001$). Children of Quechua-speaking mothers were less likely to experience physical punishment compared to those of Spanish-speaking or foreign-language-speaking mothers (19.0% vs. 27.0%; $p < 0.001$).

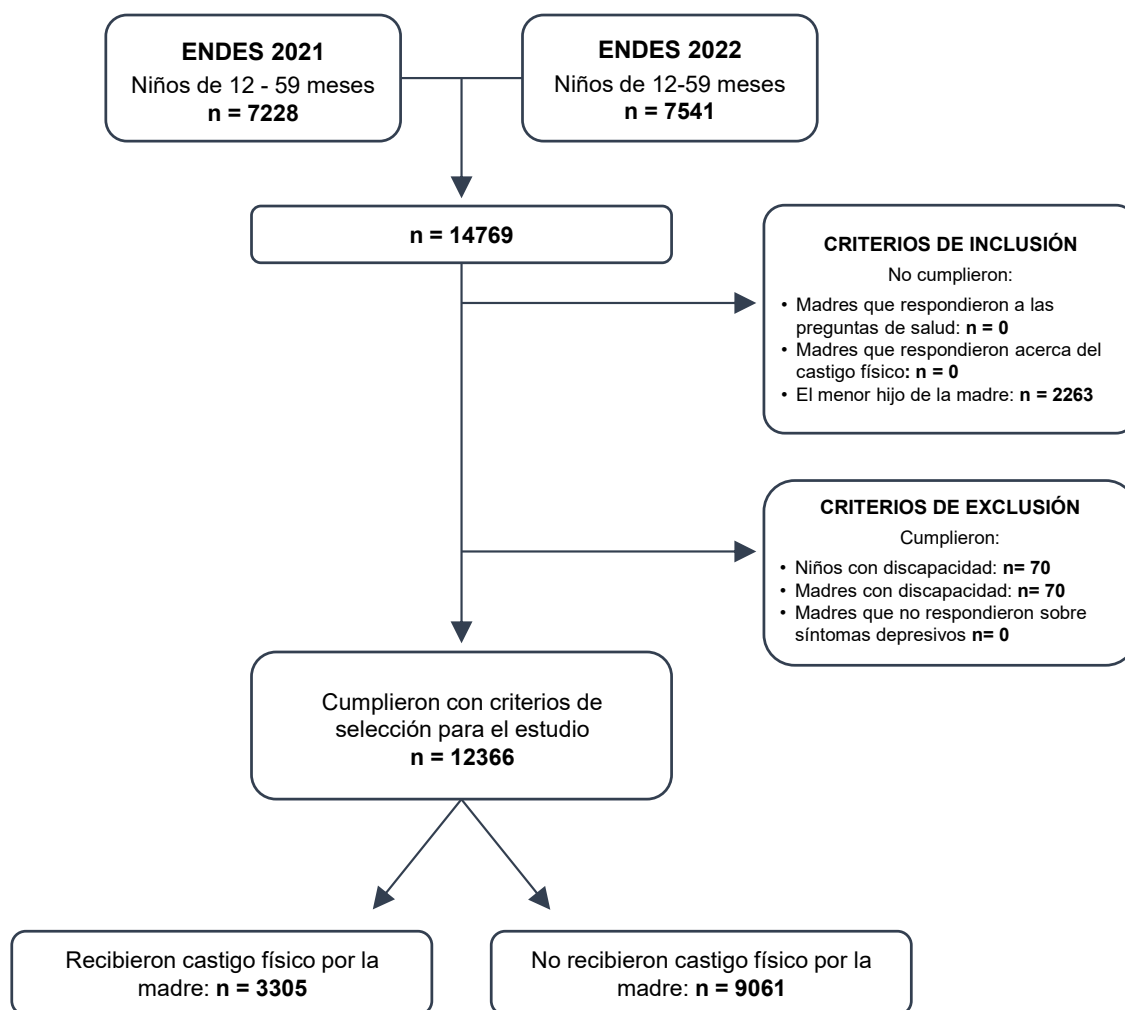
Mothers with moderate to severe depressive symptoms were more likely to physically punish their children (regardless of sex) compared to mothers without such symptoms (31.1% vs. 25.4%; $p = 0.007$) (Table 2). A higher prevalence of physical punishment was observed among children from households in the second poverty quintile compared to those in the highest quintile (31.8% vs. 22.2%; $p = 0.003$). No significant differences were found in poverty level among girls ($p = 0.132$).

Significant differences in the proportion of physical punishment were found among different maternal age groups in boys ($p = 0.010$) but not in girls ($p = 0.213$). The lowest prevalence of physical punishment was observed in the youngest maternal age group (15-19 years) and the oldest (45-49 years) ($p = 0.010$). Among girls, mothers with moderate to severe depressive symptoms were more likely to use physical punishment compared to mothers without such symptoms (32.1% vs. 23.0%, $p = 0.003$) (Table 2). This pattern was not observed among boys (30.3% vs. 27.8%, $p = 0.372$).

The crude analysis revealed an association between moderate to severe depressive symptoms and physical punishment of children (regardless of sex) (cPR = 1.22; 95% CI: 1.06-1.41; $p = 0.005$). After adjusting for maternal education, region of origin, child's sex and age, number of children, and maternal marital status, the prevalence of physical punishment remained higher among mothers with depressive symptoms (aPR = 1.24; 95% CI: 1.08-1.43, $p = 0.002$), confirming the association.

In boys, no significant differences were found in the prevalence of physical punishment between children of mothers with and without depressive symptoms, both in the crude model (cPR = 1.09; 95% CI: 0.90-1.32; $p = 0.365$) and the adjusted model (aPR = 1.10; 95% CI: 0.91-1.32; $p = 0.337$).

In contrast, among girls, the prevalence of physical punishment was higher in children of mothers with depressive symptoms,



Se cruzaron variables para poder encontrar la lógica con los datos faltantes

Figure 1. Flowchart of study population selection.

both in the crude model (cPR = 1.40; 95% CI: 1.13-1.73; p = 0.002) and the adjusted model (aPR = 1.46; 95% CI: 1.19-1.79; p < 0.001) (Table 3).

Additionally, the prevalence of physical punishment among girls was 39% higher among daughters of mothers who presented depressive symptoms in both the last 14 days and 12 months compared to daughters of mothers without such symptoms (Annex 1).

DISCUSSION

This study found an association between moderate to severe maternal depressive symptoms and the use of physical punishment on children aged 12 to 59 months. When stratified by sex, maternal depressive symptoms were associated only

with the use of physical punishment on daughters but not on sons. The depressive symptoms associated with physical punishment of girls were present during the last 14 days, as well as during both the last 14 days and the past 12 months. The prevalence of moderate to severe depressive symptoms among the mothers included was 6.5%, while the prevalence of physical punishment was 27.9% for boys and 23.5% for girls.

In line with our findings, a longitudinal study reported a higher risk of physical punishment among mothers with depressive symptoms, suggesting that these symptoms are particularly related to the use of physical punishment as a disciplinary method (20). Another longitudinal study found that maternal depressive symptoms and stress during the child's first 36 months were associated with a higher risk of physical punishment at age 10 (21).

Table 1. Characteristics of the study population (n = 12,366)

Characteristics	n	(%) ^a
Area of residence		
Urban	8,398	(72.5)
Rural	3,968	(27.4)
Natural region		
Lima Metropolitan area	1,265	(22.7)
Rest of the Coast	3,509	(27.0)
Highlands (Sierra)	4,493	(31.9)
Jungle (Selva)	3,099	(18.2)
Poverty level		
Lowest quintile	3,718	(26.4)
Second quintile	3,591	(26.1)
Third quintile	2,416	(20.1)
Fourth quintile	1,617	(15.4)
Highest quintile	1,024	(11.7)
Sex		
Male	6,318	(51.9)
Female	6,048	(48.1)
Child's age (months)		
12-23	3,363	(26.9)
24-35	3,157	(25.5)
36-47	3,100	(25.0)
48-59	2,746	(22.5)
Intimate partner violence (father to mother)		
No report of physical violence from father toward mother	8,864	(72.7)
Intimate partner violence, but child was not a witness	1,035	(8.1)
Child witnessed intimate partner violence	2,467	(19.1)
Mother's age (years)		
15-19	272	(2.2)
20-24	1,872	(15.0)
25-29	3,157	(24.8)
30-34	3,338	(26.7)
35-39	2,328	(19.4)
40-44	1,156	(9.7)
45-49	243	(2.0)
Mother's educational level attained		
Primary or less	2,203	(17.3)
Secondary	8,294	(67.2)
Higher	1,833	(15.5)
Mother's marital status		
Single	552	(4.4)
In union: cohabiting or married	9,671	(78.2)
Separated: separated, divorced, or widowed	2,143	(17.2)
Native language		
Quechua	2,276	(14.6)
Aymara and other native languages	530	(2.7)
Spanish and other foreign languages	9,560	(82.7)
Number of children		
One	3,566	(29.9)
Two	4,497	(36.7)
Three or more	4,303	(33.4)
Moderate to severe depressive symptoms in the mother^b		
No	11,632	(93.4)
Yes	734	(6.5)
Physical punishment by the mother		
No	9,061	(74.2)
Yes	3,305	(25.8)

^a Weighted percentages.

^b Based on the validated screening scale for depressive symptoms.

Table 2. Association between sociodemographic characteristics and physical punishment in the study population (n = 12,366)

Characteristics	Male (n=6,318)			p	Female (n=6,048)			p	Total: boys and girls (n=12,366)				
	Physical punishment		n (%) ^a		Physical punishment		n (%) ^a		Physical punishment		n (%) ^a	n (%) ^a	p
	No	Yes			No	Yes			No	Yes			
Area of residence				0.082				0.506				0.090	
Urbano	2,993 (71.3)	1,271 (28.7)			3,094 (76.2)	1,040 (23.8)			6,087 (73.7)	2,311 (26.3)			
Rural	1,497 (74.0)	557 (26.0)			1,477 (77.2)	437 (22.8)			2,974 (75.5)	994 (24.5)			
Geographical region				<0.001				<0.001				<0.001	
Lima Metropolitan area	507 (76.7)	154 (23.3)			488 (82.0)	116 (18.0)			995 (79.2)	270 (20.9)			
Rest of the Coast	1,285 (72.7)	496 (27.3)			1,291 (74.5)	437 (25.5)			2,576 (73.6)	933 (26.4)			
Highlands (Sierra)	1,743 (74.6)	570 (25.4)			1,744 (79.8)	436 (20.2)			3,487 (77.1)	1,006 (22.9)			
Jungle (Selva)	955 (60.5)	608 (39.5)			1,048 (67.2)	488 (32.8)			2,003 (63.8)	1,096 (36.2)			
Poverty level				0.003				0.132				<0.001	
Lowest quintile	1,392 (73.7)	573 (26.3)			1,378 (77.0)	415 (23.0)			2,770 (75.3)	948 (24.7)			
Second quintile	1,231 (68.2)	573 (31.8)			1,343 (75.3)	444 (24.7)			2,574 (71.7)	1,017 (28.3)			
Third quintile	872 (70.8)	375 (29.2)			855 (74.0)	314 (26.0)			1,727 (72.3)	689 (27.7)			
Fourth quintile	596 (72.8)	220 (27.2)			611 (78.3)	190 (21.7)			1,207 (75.5)	410 (24.5)			
Highest quintile	399 (77.8)	127 (22.2)			384 (80.0)	114 (20.0)			783 (78.7)	241 (21.3)			
Child's age (months)				<0.001				<0.001				<0.001	
12 a 23	1,446 (86.1)	245 (13.9)			1,477 (89.1)	195 (10.9)			2,923 (87.6)	440 (12.4)			
24 a 35	1,152 (71.1)	500 (28.9)			1,101 (73.1)	404 (26.9)			2,253 (72.1)	904 (27.9)			
36 a 47	993 (65.0)	576 (35.0)			1,057 (70.9)	474 (29.1)			2,050 (67.8)	1,050 (32.2)			
48 a 59	899 (64.5)	507 (35.5)			936 (71.2)	404 (28.8)			1,835 (67.7)	911 (32.3)			
Intimate partner violence (father to mother)				<0.001				<0.001				<0.001	
No report of violence in the household	3,336 (74.9)	1,190 (25.1)			3,372 (78.8)	966 (21.2)			6,708 (76.8)	2,156 (23.2)			
Intimate partner violence, but child was not a witness	323 (62.2)	193 (37.8)			350 (68.6)	169 (31.4)			673 (65.4)	362 (34.6)			
Child witnessed intimate partner violence	831 (65.4)	445 (34.6)			849 (71.3)	342 (28.7)			1,680 (68.1)	787 (31.9)			
Mother's age (years)				0.010				0.213				0.006	
15-19	112 (78.9)	32 (21.1)			92 (69.0)	36 (31.0)			204 (74.4)	68 (25.6)			
20-24	657 (70.6)	284 (29.4)			693 (75.1)	238 (24.9)			1,350 (72.8)	522 (27.2)			
25-29	1,123 (68.7)	510 (31.3)			1,148 (75.1)	376 (24.9)			2,271 (71.8)	886 (28.2)			
30-34	1,235 (74.4)	457 (25.6)			1,260 (78.0)	386 (21.9)			2,495 (76.2)	843 (23.8)			
35-39	875 (74.1)	331 (25.9)			863 (78.7)	259 (21.3)			1,738 (76.2)	590 (23.8)			
40-44	388 (69.3)	182 (30.7)			428 (75.0)	158 (25.0)			816 (72.1)	340 (27.9)			
45-49	100 (78)	32 (22)			87 (77.4)	24 (22.6)			187 (77.7)	56 (22.3)			
Mother's educational level attained				0.0005				0.092				0.0004	
Primary or less	825 (75.4)	302 (24.6)			799 (75.4)	277 (24.6)			1,624 (75.4)	579 (24.6)			
Secondary	2,971 (70.1)	1,280 (29.9)			3,055 (76.0)	988 (24.0)			6,026 (72.9)	2,268 (27.1)			
Higher	681 (76.6)	242 (23.4)			700 (79.7)	210 (20.3)			1,381 (78.1)	452 (21.9)			
Mother's marital status				0.568				0.023				0.033	
Single	214 (71.8)	77 (28.2)			197 (74.1)	64 (25.9)			411 (72.8)	141 (27.2)			
Married or cohabiting	3,521 (72.5)	1,297 (27.5)			3,626 (77.4)	1,127 (22.6)			7,147 (74.9)	2,524 (25.1)			
Widowed, divorced, or separated	755 (70.4)	354 (29.6)			748 (72.7)	286 (27.3)			1,503 (71.5)	640 (28.5)			
Native language				<0.001				0.003				<0.001	
Quechua	907 (80.9)	246 (19.1)			903 (81.2)	220 (18.8)			1,810 (81.0)	466 (19.0)			
Aymara and other native languages	199 (72.3)	83 (27.7)			199 (78.3)	49 (21.7)			398 (75.0)	132 (25.0)			
Spanish and other foreign languages	3,384 (70.1)	1,499 (29.5)			3,469 (75.6)	1,208 (24.4)			6,853 (73.0)	2,707 (27.0)			
Number of children				0.457				0.096				0.133	
One	1,277 (71.5)	539 (28.5)			1,278 (74.3)	472 (25.7)			2,555 (72.9)	1,011 (27.1)			
Two	1,614 (71.4)	672 (28.6)			1,691 (77.2)	520 (22.8)			3,305 (74.2)	1,192 (25.8)			
Three or more	1,599 (73.3)	617 (26.7)			1,602 (77.7)	485 (22.3)			3,201 (75.3)	1,102 (24.7)			
Moderate to severe depressive symptoms in the mother¹				0.372				0.003				0.007	
No	4,227 (72.2)	1,701 (27.8)			4,346 (77.0)	1,358 (23.0)			8,573 (74.6)	3,059 (25.4)			
Yes	263 (69.7)	127 (30.3)			225 (67.9)	119 (32.1)			488 (68.9)	246 (31.1)			

^a Weighted percentages

¹ Based on the validated screening scale for depressive symptoms

Table 3. Association between moderate to severe maternal depressive symptoms and physical punishment in the study population (n = 12,366)

Physical punishment by the mother	General model for boys and girls ¹ (n=12,366)							Male sex ² (n=6,318)						Female sex ² (n= 6,048)					
	Crude model			Adjusted model				Crude model*			Adjusted model**			Crude model*			Adjusted model**		
	PRc	95% CI	p	PRa	95% CI	p	PRc	95% CI	p	PRa	95% CI	p	PRc	95% CI	p	PRa	95% CI	p	
Moderate to severe depressive symptoms in the mother^a																			
No	Ref.			Ref.			Ref.			Ref.			Ref.			Ref.			
Yes	1,22	1,06-1,41	0,005	1,24	1,08-1,43	0,003	1,09	0,90-1,32	0,365	1,09	0,90-1,31	0,383	1,40	1,13-1,73	0,002	1,46	1,19-1,79	<0,001	

PR = prevalence ratio (c = crude, a = adjusted); 95% CI = confidence interval.

*Generalized linear family model, Log Poisson link option. Results are presented as prevalence ratios (PRc).

**Generalized linear family model adjusted, Log Poisson link option. Results are presented as adjusted prevalence ratios (PRa).

All analyses considered the complex sampling design of the study using the survey (svy) commands.

1. The general model was adjusted for the mother's educational level, region, child's sex, child's age in months, number of children, and mother's marital status.

2. The male and female models were adjusted for the mother's educational level, region, child's age in months, number of children, and mother's marital status.

a = Instrument: PHQ-9; criterion: score ≥ 10.

Annex 1. Association between moderate to severe maternal depressive symptoms in the past 14 days and 12 months and physical punishment in the study population (n = 12,366)

Physical punishment by the mother	General model for boys and girls ¹ (n=12,366)							Male sex ² (n=6,318)						Female sex ² (n= 6,048)					
	Crude model			Adjusted model				Crude model*			Adjusted model**			Crude model*			Adjusted model**		
	PRc	95% CI	p	PRa	95% CI	p	PRc	95% CI	p	PRa	95% CI	p	PRc	95% CI	p	PRa	95% CI	p	
Moderate to severe depressive symptoms in the mother^a																			
No depressive symptoms	Ref.			Ref.			Ref.			Ref.			Ref.			Ref.			
Depressive symptoms only in the last 12 months	1.08	0.94-1.25	0.250	1.11	0.97-1.27	0.143	1.17	0.97-1.41	0.096	1.18	0.98-1.41	0.076	0.99	0.79-1.24	0.935	1.02	0.82-1.26	0.900	
Depressive symptoms only in the last 14 days	1.20	0.95-1.50	0.110	1.23	0.98-1.53	0.068	1.05	0.77-1.41	0.769	1.05	0.79-1.39	0.728	1.42	1.02-1.98	0.038	1.54	1.11-2.14	0.010	
Depressive symptoms in the last 12 months and in the last 14 days	1.25	1.05-1.49	0.011	1.27	1.07-1.51	0.007	1.15	0.90-1.46	0.255	1.14	0.89-1.46	0.287	1.39	1.09-1.77	0.008	1.41	1.12-1.78	0.003	

PR = prevalence ratio (c = crude, a = adjusted); 95% CI = confidence interval.

*Generalized linear family model, Log Poisson link option. Results are presented as prevalence ratios (PRc).

**Generalized linear family model adjusted, Log Poisson link option. Results are presented as adjusted prevalence ratios (PRa).

All analyses considered the complex sampling design of the study using the survey (svy) commands.

1. The general model was adjusted for the mother's educational level, region, child's sex, child's age in months, number of children, and mother's marital status.

2. The male and female models were adjusted for the mother's educational level, region, child's age in months, number of children, and mother's marital status.

a = Instrument: PHQ-9; criterion: score ≥ 10.

This study adds to existing evidence by identifying an association between maternal depressive symptoms and the use of physical punishment, including slapping or hitting, as a form of discipline for children aged 12 to 59 months. In one study, maternal depression was strongly associated with negative parenting behaviors, such as physical punishment, which is consistent with our findings (22). Likewise, maternal depression has been moderately associated with disengaged behaviors, such as ignoring, withdrawing, or remaining silent when avoiding eye contact (22).

Regarding the significant association between physical punishment and the child's sex, our results can be contrasted with previous studies showing that boys aged 3 to 4 were more likely to receive physical punishment compared to girls (23). Compared to girls, boys are more likely to display externalizing behaviors, such as aggression or defiance, during early childhood. In contrast, girls are more prone to internalizing behaviors such as anxiety or depressive symptoms (23). Externalizing behaviors are more visible and may prompt a more immediate reaction from the mother (23). Furthermore, maternal depressive symptoms may exacerbate reactions to these behaviors in boys, possibly explaining the increased use of physical punishment. However, our study revealed a higher prevalence of physical punishment among girls whose mothers had depressive symptoms, highlighting the need for further research into related factors, such as cultural expectations, differing perceptions of problematic behaviors, and time spent between mothers and children, among others. Future studies should also focus on the developmental consequences of physical punishment in children.

The additional analysis considering depressive symptoms during the past 14 days and 12 months showed a 39% higher prevalence of physical punishment among girls whose mothers had symptoms at both time points. These results suggest that mothers who experienced depressive symptoms both in the past 12 months and the past 14 days applied physical punishment only to their daughters. It is important to note that responses regarding disciplinary methods were given spontaneously by the mothers, which may have introduced recall or social desirability bias. Additionally, no information was available on the severity or frequency of physical punishment among the study population.

A 2022 cross-sectional study found that both intimate partner physical violence and maternal depressive symptoms were associated with lower socioemotional development scores in children aged 18 to 36 months. Although the outcomes differ from those of the present study, the findings support the notion that sociodemographic variables such as domestic violence and maternal mental health significantly impact children's overall health and development (24).

While the results of this study are nationally representative, several limitations should be acknowledged. Given the cross-sectional design, it was only possible to identify associations without establishing causality or directionality. Additionally, maternal stress, an important variable, was not measured.

Prioritizing mental health is crucial for the formulation of public policies that support mothers and encourage

non-violent child-rearing practices, thereby fostering environments beneficial to healthy child development. In this context, we recommend implementing a national mental health screening strategy for mothers during prenatal visits and postnatal well-child check-ups to offer timely treatment for those diagnosed with depression. We also emphasize the need to promote workshops at the primary level of healthcare and in preschool education centers that provide tools to strengthen parent-child relationships and teach non-violent discipline strategies.

Future research should include longitudinal and qualitative studies to explore further the associations identified in this study.

Author contributions

EHG contributed to the conceptualization, data management, data analysis, drafting of the original manuscript, interpretation of the results, and writing and revision of the final version.

MFP contributed to the conceptualization, data management, data analysis, drafting of the original manuscript, interpretation of the results, and writing and revision of the final version.

DBW was responsible for data management, data analysis, drafting of the original manuscript, interpretation of the results, and writing and revision of the final version.

All authors are responsible for the content presented in this manuscript.

Conflicts of interest

The authors declare no conflict of interest related to the content of this manuscript.

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Ethical considerations

The information from the ENDES was collected with informed consent. Interviewers ensured that mothers were alone during the interview to allow them to respond freely and without judgment. The researchers had no access to personal identifiers, thus maintaining anonymity and confidentiality. Prior to its execution, this study was reviewed and approved by the Ethics Committee of the Universidad Peruana de Ciencias Aplicadas (Code: FCS-SCEI/527-08-23).

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