Peruvian Government Importance to Eradicate Anemia in Peru 2012-2018

Luisa Janeth Vicente Perez
Public Management, Hohai University, No. 8 Focheng West Road, Jiangning District, Nanjing City, Jiangsu Province, China, 211100, Nanjing, Jiangsu, China

* Corresponding Author: **Luisa Janeth Vicente Perez**

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Abstract
Introduction: Peru is one of the countries most affected by anemia in South America. Despite declining poverty rates, approximately 57.0% of children under one year and 46.4% of those between 6-35 months have anemia, producing long-term harmful effects on intellectual and psychological development.
Objective: To describe the importance of government intervention through legislation to favor anemia eradication and identify relationships between selected factors and anemia prevalence in children under 3 years.
Methodology: A review of the legal framework in public policies and commitments assumed by Peruvian state entities. Data integration from geographic and descriptive information sources (2012-2018) utilized ArcGIS and SPSS. Correlation analysis and multiple linear regression examined eight factors.
Results: Negative correlation: Iron supplement (-0.648), Growth and development control (-0.739), Treated water (-0.461), Basic sanitization (-0.478), Total Budget (-0.691), Monitoring budget (-0.578). Positive correlation: Breastfeeding (0.641), Teenage Mother (0.757*).

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1. Introduction
1.1. Background
Peru is disproportionately affected by anemia among South American nations. Despite economic growth and poverty reduction, anemia prevalence remains persistently high, affecting 34.0% of children under five years. The condition is more severe among young children, with approximately 57.0% of infants under one year and 46.4% of those between 6-35 months presenting with anemia (Velásquez *et al*., 2016) [1]. Poor nutrition during critical growth phases produces irreversible detrimental effects on intellectual and psychological development, representing an unacceptable waste of human potential (Irwin, Siddiqi, & Hertzman, 2007) [2].
The Peruvian State has consequently focused intervention efforts on children under 36 months. The Ministry of Health and Ministry of Development and Social Inclusion have approved specific regulations for anemia reduction; however, prevalence has not reversed substantially. The Multisectoral Plan to Fight against Anemia (Supreme Decree No. 068-2018-PCM) represents an opportunity to articulate interventions across all ministries (Villegas & Arevalo, 2018) [3].

1.2. Statement of the Problem
The Peruvian Political Constitution (1993) [5], Title I, Chapter II, Article 9 establishes the National Health Policy, mandating that the Executive Power design, conduct, rule, and supervise its application in a plural and decentralized manner to provide equal access to health services. Despite this constitutional mandate and continuous governmental efforts, high anemia levels in children under 3 years persist.
This investigation examines the importance of Peruvian Government intervention through legislative enactments favoring anemia eradication, analyzing how laws are applied and the role of authorities in ensuring policies are designed and conducted

to provide equal health service access.

1.3. Research Objectives
General Objectives:
1. Describe the importance of Government Intervention through legislative enactments favoring anemia eradication in Peru
2. Establish factors that favor anemia prevalence in children under 3 years in Peru
3. Identify relationships between selected factors and anemia prevalence in children under 3 years

Factors Evaluated:
- **AP:** Anemia Prevalence
- **IS:** Iron Supplement (Factor 1)
- **BR:** Breastfeeding (Factor 2)
- **GDC:** Growth and Development Control (Factor 3)
- **TW:** Treated Water (Factor 4)
- **BS:** Basic Sanitization (Factor 5)
- **TM:** Teenage Mother (Factor 6)
- **TBPC:** Total Budget in millions Peruvian currency (Factor 7)
- **MTBPC:** Monitoring total budget in millions Peruvian currency (Factor 8)

1.4. Research Methodology
1.4.1. Study Design
A review of the legal framework in Public Policies and commitments assumed by Peruvian state entities in their fight to eradicate childhood anemia was conducted. An observational, cross-sectional, descriptive, and analytical study of secondary databases from the Demographic and Family Health Survey (ENDES), National Household Survey (ENAHO), National Institute of Statistics and Informatics (INEI), and Ministry of Economy and Finance (MEF) was carried out, corresponding to all years between 2012 and 2018.

1.4.2. Data Analysis
ArcGIS program integrated and synthesized layers of geographic and descriptive information from various sources corresponding to Peruvian regions (2012-2018). SPSS program analyzed statistical data, with logistic regression (95% confidence interval) applied to evaluate risk factors associated with anemia. Variables with statistically significant association ($p < 0.05$) were separated.

1.4.3. Multiple Linear Regression
The sample multiple regression equation is:

$$Y=b0+b1X1+b2X2+...+bpXp+\varepsilon Y=b0+b1X1+b2X2+...+bpXp+\varepsilon$$

2. Literature Review
2.1. Introduction
Anemia is defined as an abnormal low level of red blood cells or healthy hemoglobin (Ailinger *et al.*, 2009) [6] and as decreased hemoglobin concentration (Donato & Piazza, 2017) [7]. One-third of the global population suffers from anemia, representing a transcendental global health risk factor requiring early diagnosis and treatment (Soundarya & Suganthi, 2016) [9].
Peru struggles with childhood anemia, with 2018 statistics indicating 43.5% of children aged 6-35 months affected. The Ministry of Health is implementing the National Plan for the Reduction of Anemia 2017-2021 (Santillana, Tantalean, & Velazquez, 2019) [12]. Approximately 620,000 children under three years suffer from anemia among 1.6 million nationwide (Zavaleta & Astete, 2017) [13]. Anemia carries an economic impact of approximately 2,777 million soles, representing 0.62% of national GDP (Arroyo, 2017) [14].

2.2. Factors Considered
Iron Supplement: Iron supplementation effectively reduces anemia in children aged 4-23 months (Pasricha *et al.*, 2013) [22]. Iron deficiency in children under 36 months has serious health consequences due to their rapidly developing brains (Eussen *et al.*, 2015) [23].

Exclusive Breastfeeding: Although human milk contains low iron amounts, breastfed babies are rarely iron deficient (Wambach & Spencer, 2021) [24]. Full-term children fed exclusively with breast milk during their first six months have lower anemia risk.

Growth and Development Control: GDC evaluates child growth and development at short intervals (30 days) from birth to prevent high malnutrition prevalence, anemia, and other health problems (Gonzales *et al.*, 2016) [25].

Treated Water and Basic Sanitation: Sanitation significantly contributes to anemia prevention; children exposed to better community sanitation develop higher hemoglobin levels (Coffey, Geruso, & Spears, 2018) [26].

Teenage Mothers: Anemia in pregnancy increases maternal and fetal-neonatal morbidity, with teenage pregnancy considered a public health problem in developing countries (Munares & Gómez, 2014) [27].

Budget Evolution: Anemia costs Peruvian society approximately S/2,777 million, representing nearly 0.62% of GDP (Alcazar, 2012) [28].

2.3. Political Constitution of Peru Regarding Health
The Political Constitution of Peru (Article 7) recognizes all people's right to health protection. **Article 119** entrusts direction and management of public services to the Council of Ministers. **Article 128** establishes ministers are individually responsible for their own acts and presidential acts they endorse.

2.4. Summary of Key Legislation
- **Law No. 26842, General Health Law**
- **Law No. 27867, Organic Law of Regional Governments**
- **Law No. 29792** – Creation, Organization and Functions Law of MIDIS
- **Supreme Decree N° 008-2015-MINAGRI** – National Plan of Food and Nutrition Security 2015-2021
- **Ministerial Resolution No. 249-2017/MINSA** – National Plan for the Reduction and Control of Anemia 2017-2021
- **Supreme Decree N° 068-2018-MC** – Multisectoral Plan to Combat Anemia

3. Results: Data Presentation (2012-2018)

3.1. Prevalence of Anemia in Children Under 3 Years

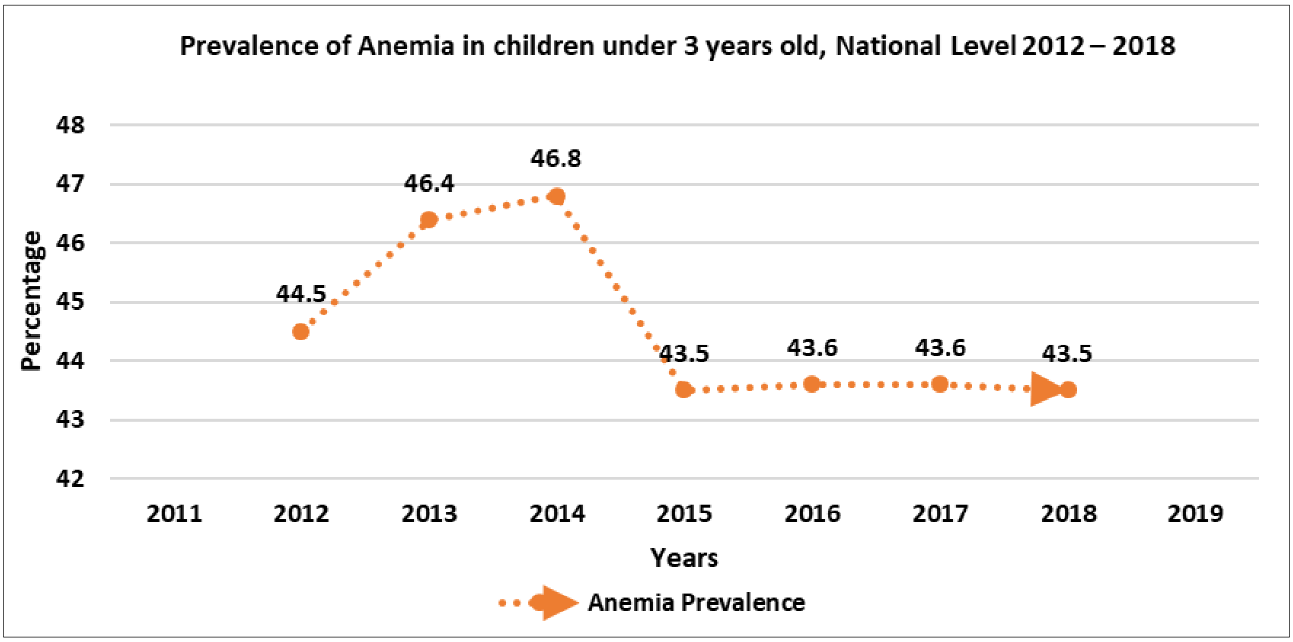


Fig 1: Prevalence of anemia in children under 3 years old at the National Level in Peru 2012-2018]

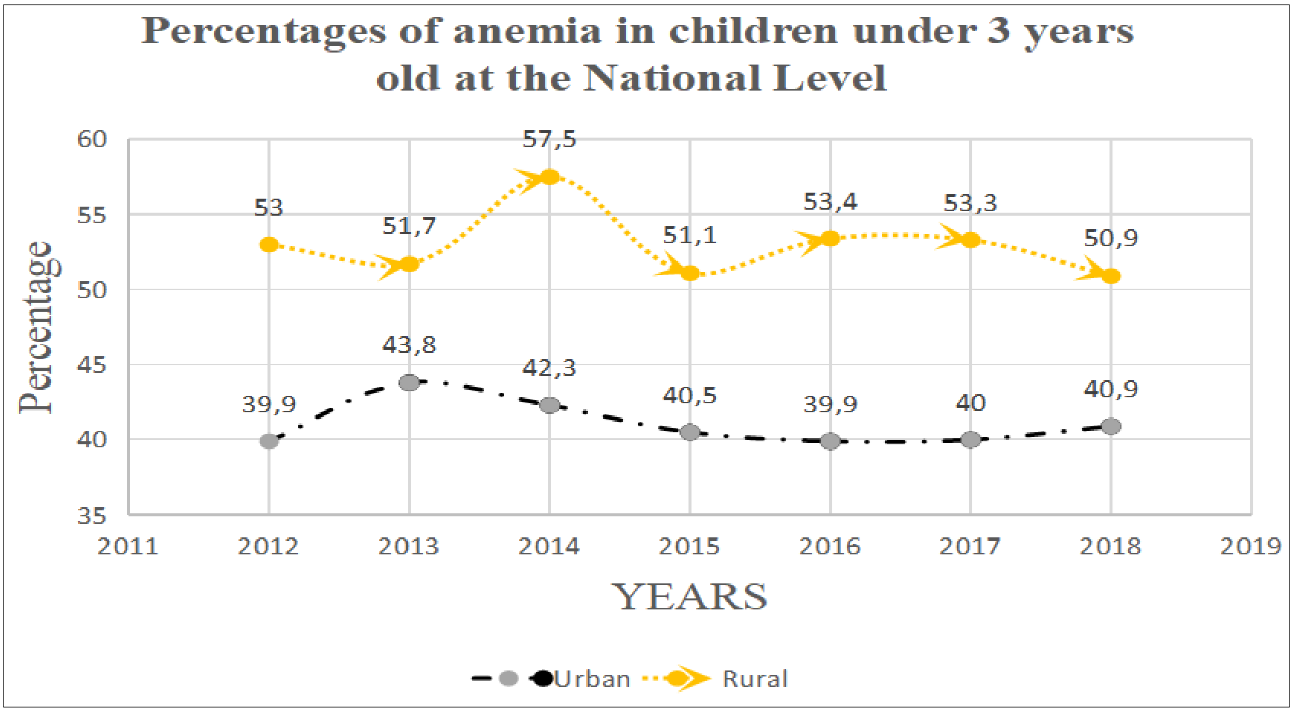
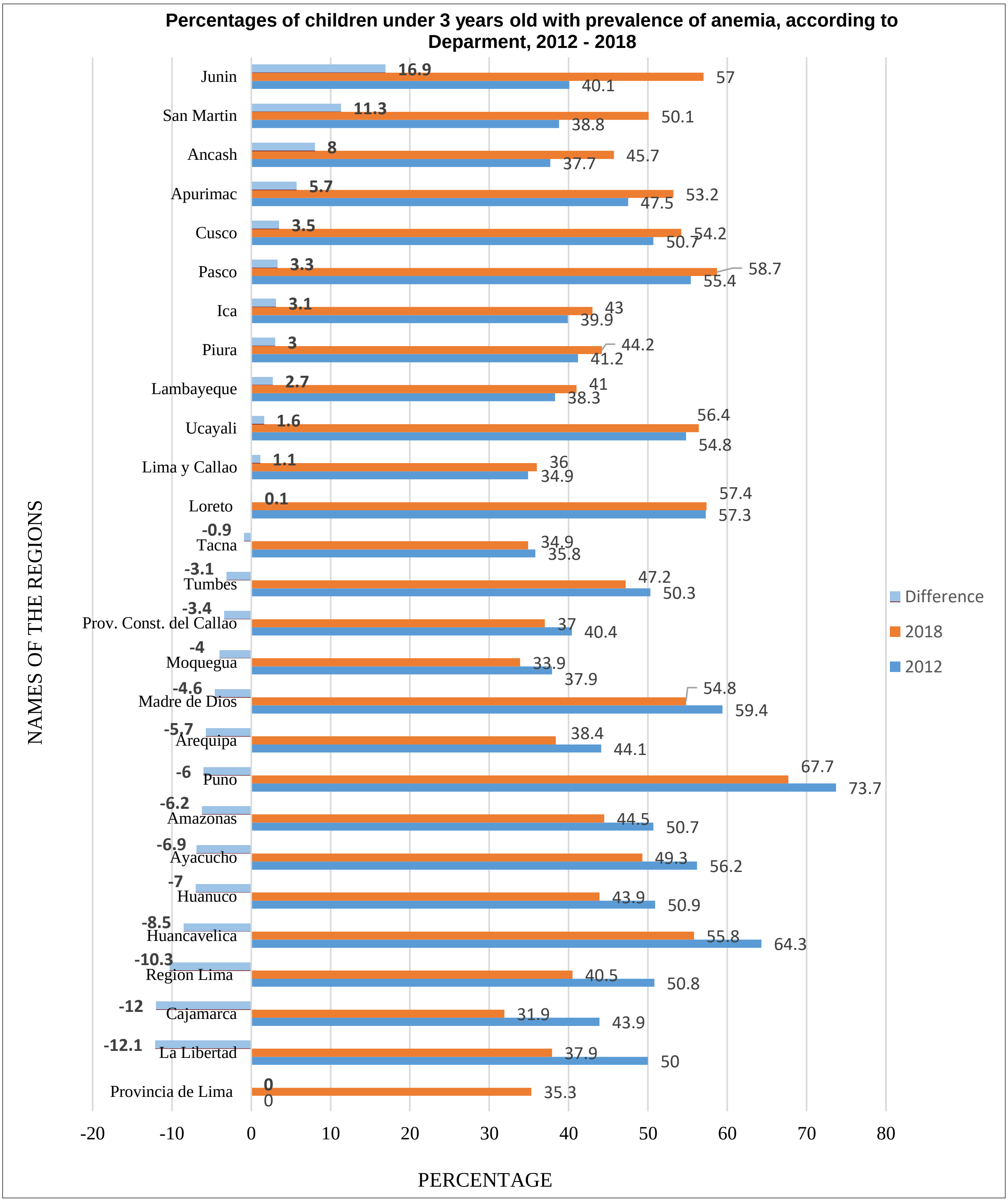


Fig 2: Prevalence of anemia in children under 3 years old, according to Residence Area Urban-Rural 2012-2018]

By Region: Puno had the highest prevalence (73.3% in 2012; 67.7% in 2018). Pasco increased 4% (55.4% to 58.7%). Junín increased 15%. Cajamarca had the lowest 2018 percentage (31.9%).


Percentages of children under 3 years old with prevalence of anemia, according to Deparment, 2012 - 2018
NAMES OF THE REGIONS
Junin 16.9 57 40.1
San Martin 11.3 50.1 38.8
Ancash 8 45.7 37.7
Apurimac 5.7 53.2 47.5
Cusco 3.5 54.2 50.7
Pasco 3.3 58.7 55.4
Ica 3.1 43 39.9
Piura 3 44.2 41.2
Lambayeque 2.7 41 38.3
Ucayali 1.6 56.4 54.8
Lima y Callao 1.1 36 34.9
Loreto 0.1 57.4 57.3
Tacna -0.9 34.9 35.8
Tumbes -3.1 47.2 50.3
Prov. Const. del Callao -3.4 37 40.4
Moquegua -4 33.9 37.9
Madre de Dios -4.6 54.8 59.4
Arequipa -5.7 38.4 44.1
Puno -6 67.7 73.7
Amazonas -6.2 44.5 50.7
Ayacucho -6.9 49.3 56.2
Huanuco -7 43.9 50.9
Huancavelica -8.5 55.8 64.3
Region Lima -10.3 40.5 50.8
Cajamarca -12 31.9 43.9
La Libertad -12.1 37.9 50
Provincia de Lima 0 35.3 0
Difference
2018
2012
-20 -10 0 10 20 30 40 50 60 70 80
PERCENTAGE

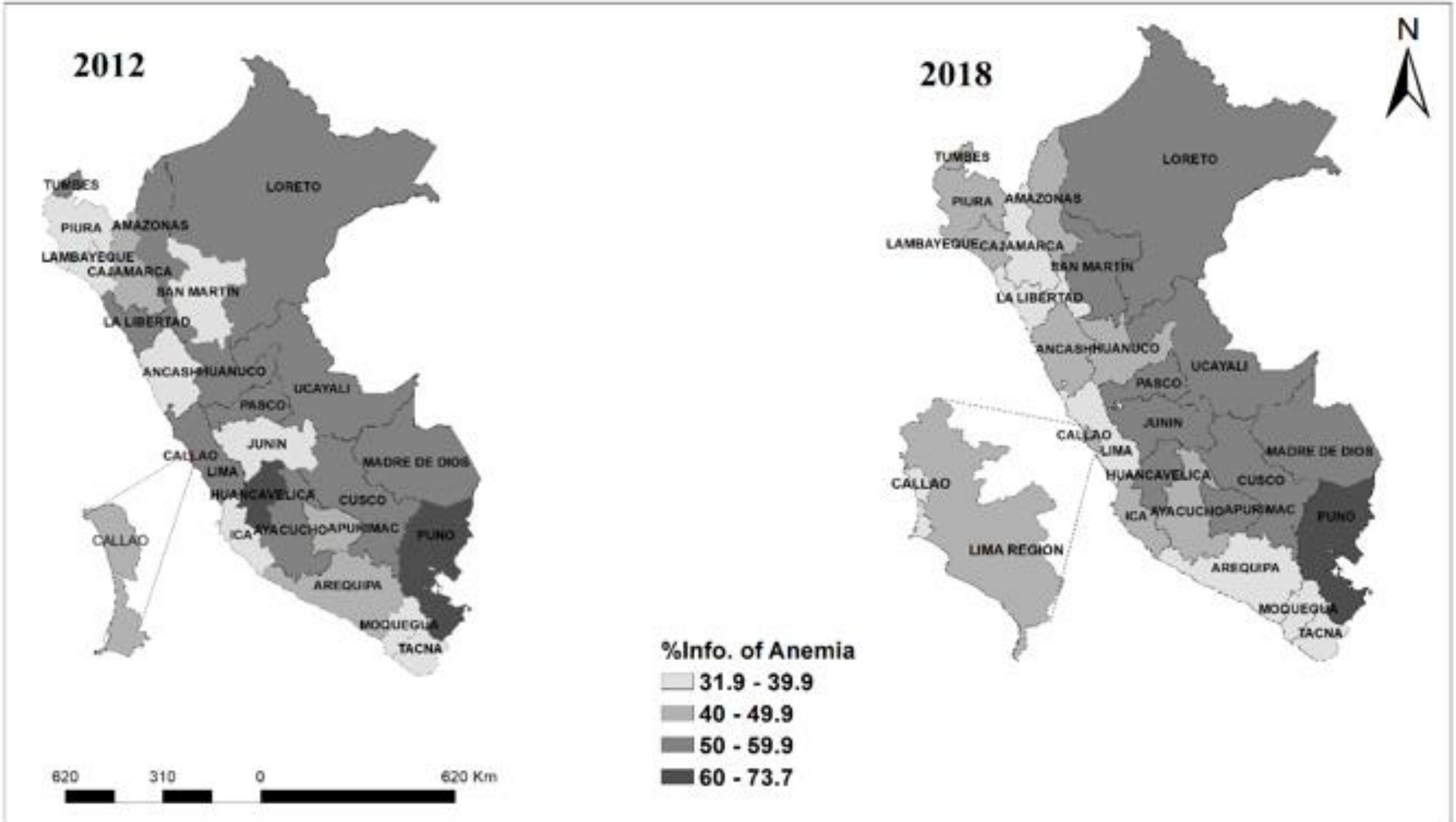


Figure 3: Prevalence of Anemia in children under 3 years old, according to Region (Department) 2012 – 2018
Source: National Institute of Statistics and Informatics - Encuesta Demográfica y de Salud Familiar 2012 - 2018. (Own elaboration).

3.2. Iron Supplement Consumption

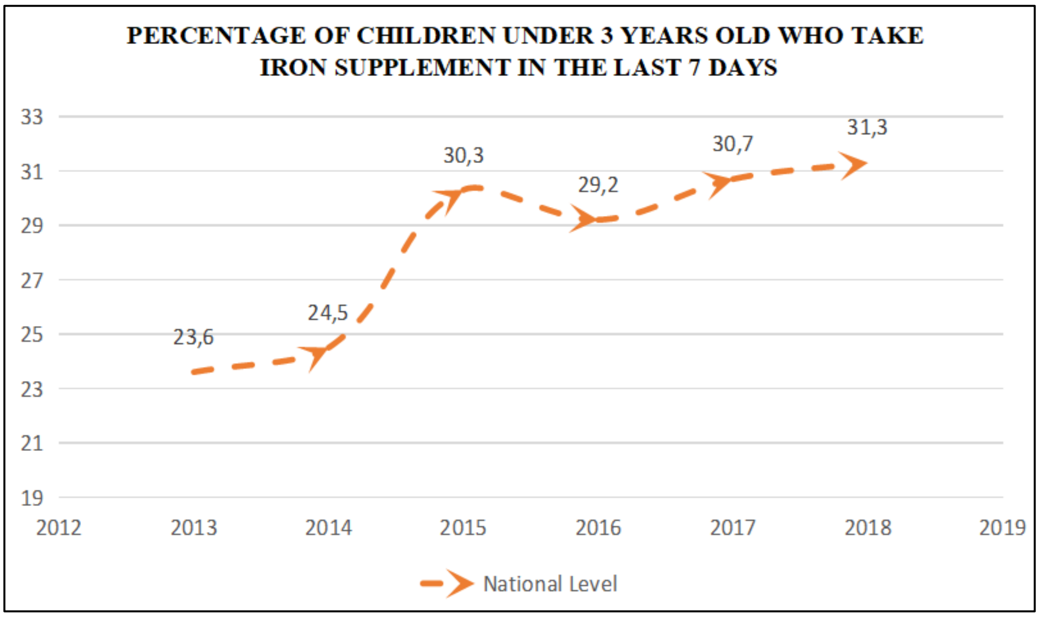


Fig 4: Percentage of children under 3 years old who took iron supplement in the last 7 days, National Level 2013-2018]

National Level 2013-2018: 22.2% (2013) to 31.1% (2018).

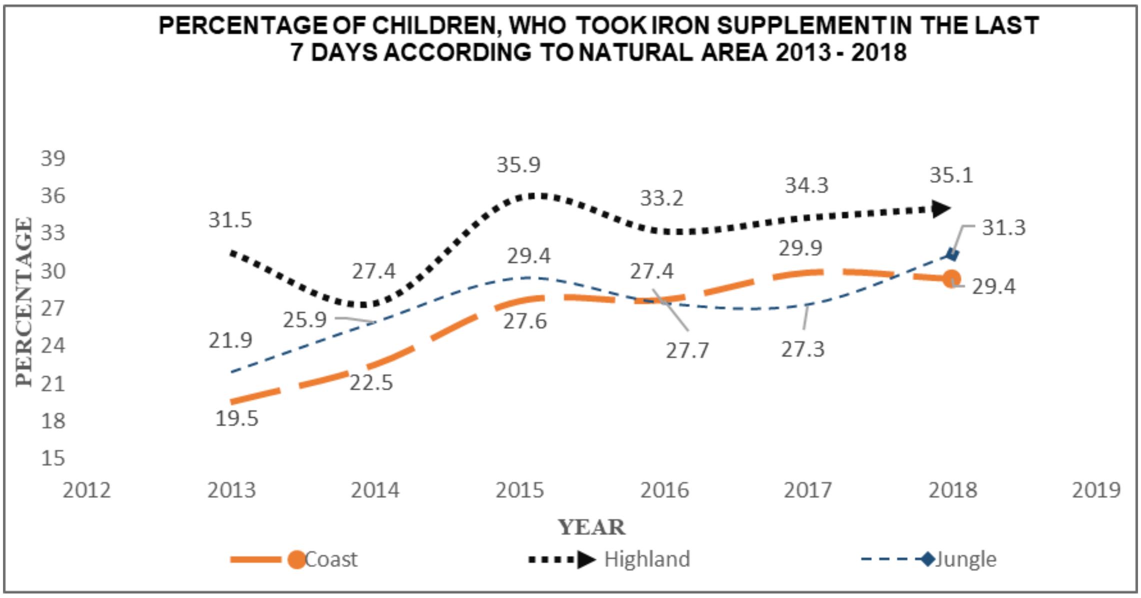


Fig 5: Percentage of children under 3 years old who took iron supplement according to Natural Area 2013-2018]

By Natural Area: Coast: 19.5% to 29.4%. Highland: 31.5% to 35.1%. Jungle: 21.9% to 31.3%.

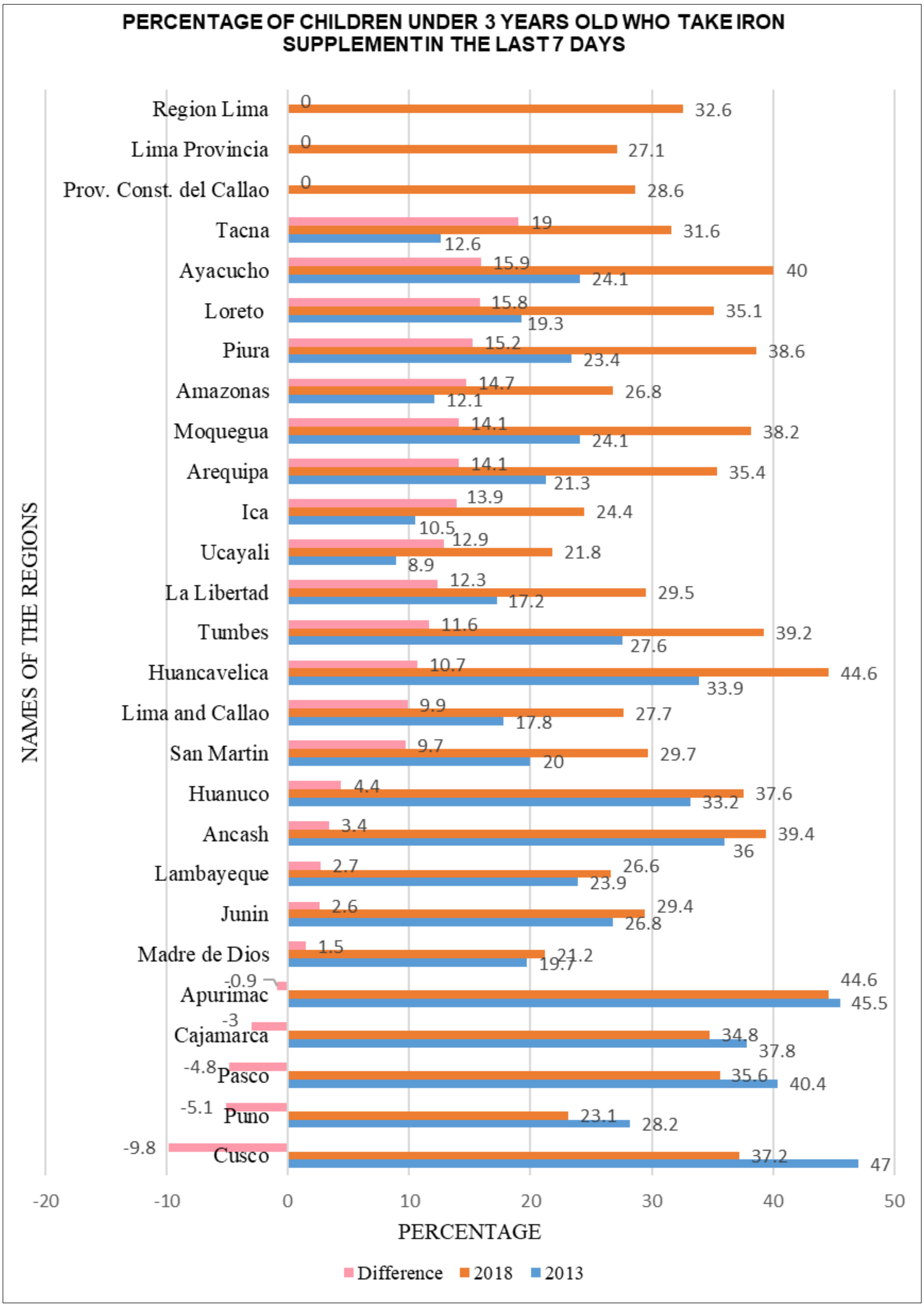
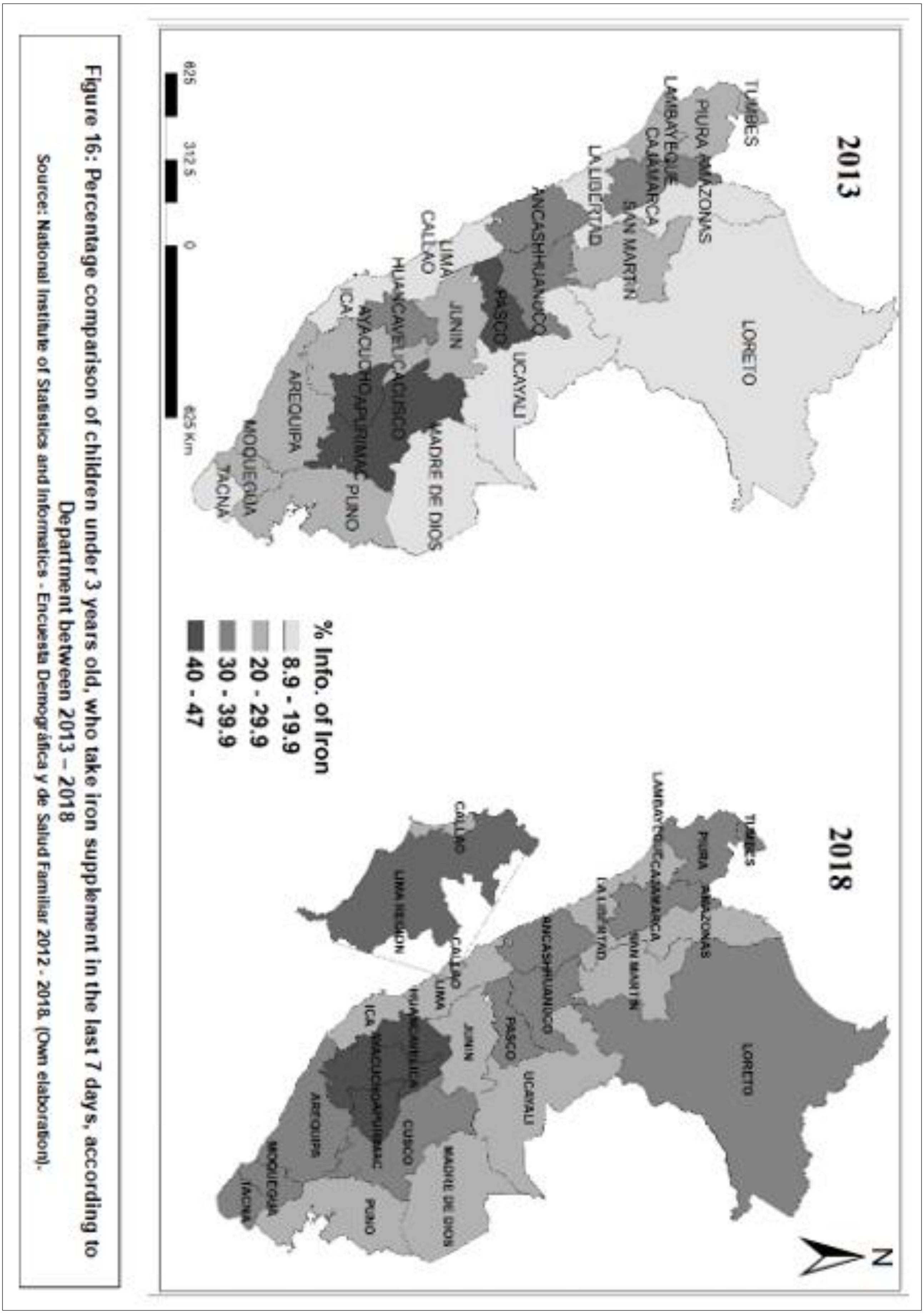


Fig 6: Percentage comparison of children under 3 years old who took iron supplement,



***Source:** National Department between 2013 – 2018
Institute of Statistics and Informatics - ENDES 2012-2018. (Own elaboration). *

Department 2013-2018 - Comparative Map

4. Statistical Analysis and Results
4.1. Correlation Analysis

Table 1: Impact of Selected Factors on Anemia Prevalence in Peru, National Level 2012-2017

Factor	Pearson Correlation	Sig.(2tailed)	N	Relationship
Iron Supplement (IS)	-0.648	0.116	7	Negative
Breastfeeding (BR)	0.641	0.121	7	Positive
Growth & Development Control (GDC)	-0.739	0.058	7	Negative
Treated Water (TW)	-0.461	0.298	7	Negative
Basic Sanitization (BS)	-0.478	0.277	7	Negative
Teenage Mother (TM)	0.757*	0.049	7	Positive
Total Budget (TBPC)	-0.691	0.197	5	Negative
Monitoring Budget (MTBPC)	-0.578	0.174	7	Negative

**Correlation is significant at the 0.05 level (2-tailed). *

Source: SPSS Analysis of ENDES and MEF Data 2012-2018. (Own elaboration) *

4.2. Multiple Linear Regression Analysis

Table 2: Model Summary for Significant Predictors of Anemia Prevalence

Factor	R	R^2	Adjusted R^2	F	Sig.	Regression Equation
GDC	0.739	0.546	0.455	6.008	0.058	$Y = 57.982 - 0.242X_3$
TM	0.757	0.573	0.487	6.700	0.049*	$Y = 19.469 + 1.849X_6$
TBPC	0.781	0.609	0.531	7.800	0.038*	$Y = 51.100 - 4.155E\text{-}9X_7$

**Significant at $p < 0.05$ level.

Source: SPSS Analysis of ENDES and MEF Data 2012-2018. (Own elaboration). *

Table 3: Model Summary for Additional Factors

Factor	R	R^2	Adjusted R^2	F	Sig.	Regression Equation
IS	0.648	0.419	0.303	3.613	0.116	$Y = 50.195 - 0.209X_1$
BR	0.641	0.411	0.293	3.486	0.121	$Y = 22.005 + 0.333X_2$
TW	0.461	0.212	0.055	1.348	0.298	$Y = 103.263 - 0.613X_4$
BS	0.478	0.229	0.075	1.484	0.277	$Y = 76.892 - 0.353X_5$
MTBPC	0.578	0.334	0.201	2.510	0.174	$Y = 45.832 - 2.263E\text{-}8X_8$

Source: SPSS Analysis of ENDES and MEF Data 2012-2018. (Own elaboration). *

4.3. Detailed Regression Outputs

Table 4: Regression Coefficients - Iron Supplement (Factor 1)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	50.195	3.001		16.727	0.000
IS	-0.209	0.110	-0.648	-1.901	0.116

Dependent Variable: Anemia Prevalence

Table 5: Regression Coefficients - Breastfeeding (Factor 2)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	22.005	12.088		1.820	0.128
BR	0.333	0.178	0.641	1.867	0.121

Dependent Variable: Anemia Prevalence

Table 6: Regression Coefficients - Growth and Development Control (Factor 3)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	57.982	5.492		10.558	0.000
GDC	-0.242	0.099	-0.739	-2.451	0.058

Dependent Variable: Anemia Prevalence

Table 7: Regression Coefficients - Treated Water (Factor 4)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	103.263	50.573		2.042	0.097
TW	-0.613	0.528	-0.461	-1.161	0.298

Dependent Variable: Anemia Prevalence

Table 8: Regression Coefficients - Basic Sanitization (Factor 5)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	76.892	26.547		2.896	0.034
BS	-0.353	0.290	-0.478	-1.218	0.277

Dependent Variable: Anemia Prevalence

Table 9: Regression Coefficients - Teenage Mother (Factor 6)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	19.469	9.700		2.007	0.101
TM	1.849	0.714	0.757	2.588	0.049*

*Dependent Variable: Anemia Prevalence. *Significant at $p < 0.05$.*

Table 10: Regression Coefficients - Total Budget (Factor 7)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	51.100	2.372		21.540	0.000
TBPC	-4.155E-9	0.000	-0.781	-2.793	0.038*

*Dependent Variable: Anemia Prevalence. Significant at $p < 0.05$.

Table 11: Regression Coefficients - Monitoring Budget (Factor 8)

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	45.832	0.941		48.708	0.000
MTBPC	-2.263E-8	0.000	-0.578	-1.584	0.174

*Dependent Variable: Anemia Prevalence

4.4 Summary of Regression Equations

Iron Supplement:
YAP=50.195−0.209XIS*YAP*=50.195−0.209*XIS*

Breastfeeding:
YAP=22.005+0.333XBR*YAP*=22.005+0.333*XBR*

Growth and Development Control:
YAP=57.982−0.242XGDC*YAP*=57.982−0.242*XGDC*

Treated Water:
YAP=103.263−0.613XTW*YAP*=103.263−0.613*XTW*

Basic Sanitization:
YAP=76.892−0.353XBS*YAP*=76.892−0.353*XBS*

Teenage Mother:
YAP=19.469+1.849XTM*YAP*=19.469+1.849*XTM*

Total Budget:
YAP=51.100−4.155×10−9XTBPC*YAP*
=51.100−4.155×10−9*XTBPC*

Monitoring Budget:
YAP=45.832−2.263×10−8XMTBPC*YAP*=45.832−2.263×1
0−8*XMTBPC*

5. Discussion

5.1. Interpretation of Negative Correlations

Iron Supplement (-0.648): Increased iron supplementation is associated with decreased anemia prevalence. This aligns with established biomedical understanding that iron deficiency constitutes a primary anemia cause. Each unit increase in iron supplementation corresponds to a 0.209 decrease in anemia prevalence. The model explains 41.9% of anemia prevalence variability ($R^2 = 0.419$).

Growth and Development Control (-0.739): The strongest negative correlation among all factors. Comprehensive pediatric monitoring—including physical examination, anthropometric assessment, developmental evaluation, vaccine scheduling, iron supplement delivery, anemia screening, parasitological evaluation, and parental counseling—significantly reduces anemia risk. GDC explains 54.6% of anemia prevalence variability ($R^2 = 0.546$).

Treated Water (-0.461): Access to treated water reduces pathogenic microorganism exposure that could impair iron absorption and cause diarrheal diseases leading to micronutrient losses. The model explains 21.2% of anemia variability.

Basic Sanitization (-0.478): Similar protective mechanism to treated water, preventing infectious diseases that compromise iron status in pregnant mothers and infants. Model explains 22.9% of anemia variability.

Total Budget (-0.691): Increased financial allocation to anemia programs correlates with reduced prevalence. Model explains 60.9% of variability ($R^2 = 0.609$). The relationship achieved statistical significance ($p = 0.038$).

Monitoring Budget (-0.578): Resources dedicated to supervision, evaluation, and control demonstrate significant protective association, validating results-based budgeting approaches. Model explains 33.4% of anemia variability.

5.2. Interpretation of Positive Correlations

Breastfeeding (0.641): This counterintuitive finding requires careful interpretation. Recent research demonstrates correlation between maternal hemoglobin and exclusively breastfed infant hemoglobin at 6 months (Marques *et al*., 2016) [29]. Infants deplete iron stores by approximately six months (Svarch, 2015) [30]; if breastfeeding mothers have iron deficiency or other pathologies preventing adequate infant iron absorption, anemia may persist despite exclusive breastfeeding. This finding does not diminish breastfeeding promotion importance but highlights critical importance of maternal nutritional status during preconception, pregnancy, and lactation.

Teenage Mother (0.757*): Statistically significant positive correlation ($p = 0.049 < 0.05$). Adolescent pregnancy demonstrates the strongest association magnitude among all factors. Pregnant adolescents must meet both their own nutritional requirements and those of pregnancy while potentially having incomplete physical growth. This dual demand increases maternal anemia risk, with consequent fetal and neonatal implications. Each percentage-point increase in teenage pregnancy corresponds to 1.849 unit increase in childhood anemia prevalence. This finding carries substantial policy significance.

5.3. Comparison with Previous Research

The negative correlation for iron supplementation (-0.648) supports established literature identifying iron deficiency as the primary cause of childhood anemia (Zavaleta & Astete, 2017) [13]. The national supplementation program expansion from 22.2% (2013) to 31.1% (2018) represents progress, yet coverage remains suboptimal. Regional disparities—notably Cusco, Pasco, Cajamarca, and Puno showing decreasing supplementation rates—require targeted intervention.

The positive breastfeeding correlation (0.641) contradicts earlier assumptions (Murray *et al*., 1978; Shashiraj *et al*., 2006) [32, 33] but aligns with recent evidence on maternal-infant hemoglobin correlation (Marques *et al*., 2016; Teixeira *et al*., 2010) [29, 31]. Peruvian policy should strengthen iron supplementation for pregnant and lactating women, not solely infants.

The strong negative correlation for growth and development control (-0.739) confirms this comprehensive intervention's critical importance. Persistent urban-rural and regional disparities require addressing geographic and cultural access barriers.

The negative correlations for treated water (-0.461) and basic sanitation (-0.478) support sanitation's role in anemia prevention. National progress (treated water: 93.9% to 97.1%; basic sanitation: 88.3% to 94.2%) masks persistent urban-rural and regional inequities requiring continued investment.

The statistically significant positive correlation for teenage pregnancy (0.757*, $p = 0.049$) identifies adolescent pregnancy as a critical anemia determinant. Peru's 12.6% national teenage pregnancy rate, with rural areas (20.5%) and Loreto (28.2%) substantially higher, represents a public health crisis requiring comprehensive sexual education, contraceptive access, and social support interventions.

The negative correlations for total budget (-0.691) and monitoring budget (-0.578) validate results-based budgeting approaches. However, some regions experienced monitoring budget decreases (Loreto, Madre de Dios, Huancavelica, Ayacucho), requiring correction.

6. Conclusions and Recommendations

6.1. Conclusions

1. Central Role of Government Intervention: Peruvian Government intervention constitutes the vital central axis for childhood anemia eradication. State intervention facilitates communication and information exchange, enabling articulation of diverse actors in pursuit of a single common goal. This is formally reflected through legislative promulgation, regulatory establishment, and budget allocation for anemia-related projects. Supreme Decree No. 068-2018-MC (Multisectoral Plan to Combat Anemia) exemplifies this approach, mandating participation from all ministries.

2. Multifactorial Nature of Anemia: All eight evaluated factors influence anemia prevalence in children under 3 years in Peru. However, influence magnitude and direction vary substantially.

3. Differential Factor Impacts: Six factors demonstrate negative correlation with anemia prevalence: Iron Supplement (-0.648), Growth and Development Control (-0.739), Treated Water (-0.461), Basic Sanitization (-0.478), Total Budget (-0.691), and Monitoring Budget (-0.578). Two factors demonstrate positive correlation: Breastfeeding (0.641) and Teenage Mother (0.757). Teenage Mother correlation achieved statistical significance ($p < 0.05$), representing a priority intervention target.

4. Breastfeeding Paradox: The positive breastfeeding correlation does not indicate breastfeeding causes anemia. Rather, it reflects that breastfed infants of anemic mothers remain at risk. This underscores the necessity of addressing maternal nutritional status throughout preconception, pregnancy, and lactation—not solely infant supplementation.

5. Data Infrastructure Value: Secondary data sources—ENDES, ENAHO, INEI, and MEF—are essential Peruvian State entities providing nationally representative, reliable information widely utilized for public policy implementation. This infrastructure enables evidence-based policymaking and program evaluation.

6. Alignment with Existing Research: Results align with previous Peruvian research. The absence of perfect positive or negative correlations validates the Government's comprehensive approach; focusing on single factors would be insufficient. Coordinated, simultaneous intervention across multiple domains is necessary for efficient anemia eradication.

6.2. Recommendations

1. Sustain and Strengthen Government Leadership: The Peruvian State must continue as the central axis in the frontal fight against anemia eradication, promulgating additional legislation and regulations committing all ministries. Multisectoral coordination mechanisms should be institutionalized beyond specific decree implementation periods.

2. Ensure Adequate and Sustained Financing: Sufficient budget allocation for public policy implementation must continue and expand. Given demonstrated negative correlation between budget and anemia prevalence, financing should be protected from political cycles and economic fluctuations. Results-based budgeting with robust monitoring should be strengthened, particularly in regions experiencing monitoring budget decreases (Loreto, Madre de Dios, Huancavelica, Ayacucho).

3. Prioritize Teenage Pregnancy Prevention: A comprehensive, in-depth study of adolescent pregnancy's impact on childhood anemia prevalence should be urgently commissioned. Given the statistically significant positive correlation with >95% confidence interval, immediate policy action is warranted: comprehensive sexual education in all schools, improved access to adolescent-friendly contraceptive services, social protection for pregnant adolescents, and nutritional support programs for pregnant and lactating adolescents.

4. Expand Research Scope: Future studies should incorporate additional factors beyond the eight examined here, including dietary diversity, food fortification coverage, maternal education, household food security, altitude effects, and health system quality indicators. Extended time ranges (pre-2012, post-2018) would provide greater spatial and temporal information on factor influences.

5. Focus on the Critical Window (0-36 Months): Promote increased research on anemia prevalence in children under 36 months, as this developmental stage requires maximal iron and fundamentally shapes long-term cognitive and physical development. Research should specifically examine the period around six months when infants deplete iron stores, evaluating optimal weaning practices and complementary feeding strategies.

6. Address the Breastfeeding Paradox: Develop and implement integrated maternal-child nutrition strategies that address maternal anemia prevention and treatment alongside breastfeeding promotion. Antenatal iron-folic acid supplementation should be strengthened; postpartum continuation should be considered. Maternal hemoglobin monitoring should extend through lactation.

7. Close Implementation Gaps: Address persistent geographic and socioeconomic disparities in intervention coverage. Regions with decreasing iron supplementation rates (Cusco, Pasco, Cajamarca, Puno) require targeted quality improvement. Cultural relevance of interventions—particularly in Jungle and Highland regions—should be enhanced through community engagement and intercultural health approaches.

8. Update and Refine Evidence Base: Conduct more in-depth studies with updated information (post-2018) to improve accuracy in identifying critical factors requiring priority attention. Given Peru's persistently elevated anemia rates despite two decades of concerted effort, fundamental reassessment of intervention strategies may be warranted.

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