Developmental delay in the Amazon: The social determinants and prevalence among rural communities in Peru

MSFPD2022: 57

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Background

Child development refers to the ordered emergence of interdependent skills of sensorimotor, cognitive language, and social-emotional functioning. The importance of child development is becoming more recognized and prioritized in developing countries around the world. Many developing countries have promoted infant stimulation programs, preschool programs, and effective parenting programs (1).

It is known that there is a need to prioritize good child development because poor development has several long-term consequences, such as poor school performance, low wages, and high fertility rates . However, there are limited local, regional, or even national statistics that display the burden of developmental delay in Peru (2).

The burden of poor child development can be estimated based on exposure to risk factors, such as poverty, stunting, inadequate cognitive stimulation, iodine deficiency, iron deficiency anemia, intrauterine growth restriction, and others. One study analyzed the global statistics of stunting and extreme poverty to estimate the worldwide burden of poor child development to be over 200 million children (3)

Objective

1. To assess prevalence of development delay in the Amazonian basin of Peru
2. To explore significant social determinants of health in studied communities
3. To identify associations between social determinants and developmental delay

Methods

- The study took place in the Amazonian departments of Loreto and Ucayali, Peru.
- The region is home to a large diversity of indigenous groups.
- For the study sites, 15 communities were included, 8 in Ucayali and 7 in Loreto.
- The communities were chosen by the mayors of each district, and had to satisfy the inclusion criteria of previously implementing the program, Community Center for Outreach and Surveillance (Centro de Promocion y Vigilancia Comunal)
- Inclusion criteria included living within the community, family with a child less than 5 years of age, not having a chronic illness and consenting to participate
- The study participants were children between ages of 8 months to 38 months, and their caretakers.

ASQ-3™ Ages & Stages Questionnaires® THIRD EDITION

- Ages and stages-3 questionnaire was in spanish
- It was edited to be culturally appropriate then re-validated
- The study focused on assessing communication and gross motor
- The interviewer first conducted a social determinants questionnaire
- The questionnaire included questions regarding demographics, home conditions, brief medical history, health related behavior for caretaker and child, and use of health services
- The wealth index was created to estimate the wealth of the family based on the presence of desired amenities.

Results

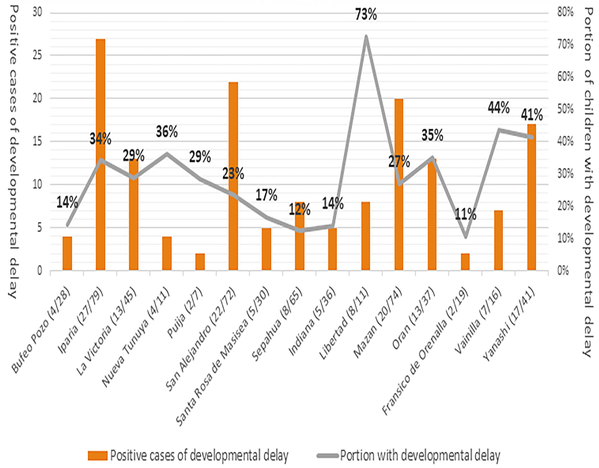

Figure 1. Prevalence proportion of child development delay in every participating community.

Table 2. Descriptive statistics of study population, by department.

Characteristics	Loreto (N = 236)		Ucayali (N = 360)		Total (N = 596)	
	Mean (SD)	Percent	Mean (SD)	Percent	Mean (SD)	Percent
Child has developmental delay	-	30.5% (N = 72)	-	24.2% (N = 87)	-	26.7% (N = 159)
Child has no developmental delay	-	69.5% (N = 164)	-	75.8% (N = 273)	-	73.3% (N = 437)
Child is male	-	50.8%	-	53.9%	-	53.0%
Child's age (mo)	22.9 (8.8)	-	24.5 (9.23)	-	23.9 (9.1)	-
Number of Children in family	3.1 (1.8)	-	2.8 (1.9)	-	3.0 (2.2)	-
Mother's age at child's birth	25.8 (7.6)	-	24.9 (7.5)	-	25.2 (7.5)	-
Mother's age at first birth before 17 years old	-	39.6%		38.9%	-	39.2%
Mother completed her education before 12 years old	-	62.2%	-	46.5%	-	52.4%
Gave birth at home	-	29.9%	-	29.5%	-	29.7%
Mother took maternal vitamins during pregnancy	-	91.7%	-	72.2%	-	80.0%
The mother had Malaria during pregnancy	-	4.6%	-	0.0%	-	1.8%
Wealth Index [a]	-	17.4%	-	32.8%	-	26.7%
Fed with breast milk for 6 months or less	-	6.9%	-	17.6%	-	13.2%
Goes to child growth monitoring checkup	-	93.8%	-	76.3%	-	83.4%
Child was given micronutrients	-	90.1%	-	66.4%	-	75.9%
Duration of micronutrients	13.8 (9.8)	-	7.7 (9.1)	-	9.5 (9.7)	N/A
Child has taken a deworming pill [b]	-	43.5%	-	36.9%	-	40.0%
Child has received their vaccines	-	86.3%	-	82.8%	-	84.3%
Child had diarrhea in the last month	-	50.8%	-	47.9%	-	50.9%
Spoke with a Community Health Agent in the last month	-	63.6%	-	43.0%	-	51.3%
Visited the Community Center for Outreach and Surveillance	-	48.0%	-	16.0%	-	28.7%
Home has Sanitary Toilet [c]	-	19.8%	-	23.3%	-	22.1%
Water source is the River	-	46.7%	-	0.0%	-	18.7%

[a] Has television, radio, and cell phone

[b] Only Children over 18 months old included

[c] Bathroom with running water, latrine with septic tank, or decomposing toilet system

Results

Table 3. Logit regression: Association and odds ratio between developmental delay and each social determinant.

Characteristics	Full Analysis (N = 329)			Restricted Analysis (N = 589)		
	OR	P	95% CI	OR	P	95% CI
Sex (male)	1.46	0.181	0.83 2.54	1.46	0.181	0.83 2.54
Level of Education	0.56	0.012*	0.44, 2.49	0.65	0.009*	0.48, 0.89
Age of mother at birth of child	0.95	0.007*	0.91, 0.98	0.96	0.002*	0.93, 0.99
Gave birth in home	0.73	0.37	0.38, 1.41	0.88	0.588	0.56, 1.39
Took maternal vitamin, months	0.99	0.91	0.89, 1.11	0.94	0.078	0.87, 1.01
Goes to growth monitoring checkups	0.49	0.053	0.25, 1.01	0.63	0.073	0.37, 1.05
Community health agent visits	0.83	0.34	0.56, 1.22	0.73	0.013*	0.56, 0.94
Child with diarrhea, days	1.12	0.006*	1.03, 1.21	1.04	0.154	0.98, 1.10
Breast fed child, months	0.98	0.357	0.93, 1.03	-	-	-
Gave child micronutrient powder, months	1.02	0.338	0.99, 1.05	-	-	-
Wealth Index						
-0 devices	1	-	-	1	-	-
-1 device	1.61	0.252	0.71, 3.67	1.77	0.070	0.96, 3.29
-2 devices	1.11	0.811	0.46, 2.68	1.58	0.151	0.85, 2.95
-3 devices	0.53	0.19	0.20, 1.39	1.09	0.810	0.55, 2.15
Bathroom						
-In House Plumbing	1	-	-	1	-	-
-Latrine	1.05	0.917	0.44, 2.49	0.76	0.347	0.43, 1.35
-Open Defecation	1.45	0.506	0.49, 4.27	1.03	0.942	0.51, 2.08
Water Source						
-Home Tap System	1	-	-	1	-	-
-Well Water	2.17	0.105	0.85, 5.35	1.36	0.376	0.69, 2.69
-River Water	2.39	0.029*	1.09, 5.25	2.79	0.000*	1.63, 4.79

*p<0.05

Conclusions

- The prevalence of developmental delay in the Amazon region obtained in the current study is more elevated than the prevalence obtained in the prior study in urban slum communities in Peru
- The impact of education, age of mother at birth of the child, community health agents, and access to clean drinking water were important findings
- To prevent child development delay in the rural Amazon communities, we need to empower women and invest in clean water

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Acknowledgement

The authors would love to thank all the mayors of the included communities and local community health workers.