Determinants of stunting and severe stunting among under-fives: Evidence from the 2011 Nepal Demographic and Health Survey

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Background

Stunting is one of the leading causes of the global burden of disease in childhood and 80% of this burden is in developing countries [1, 2]. Stunting remains a major public health concern in Nepal as it increases the risk of illness, irreversible body damage and mortality in children. The causes of childhood under-nutrition in Nepal are complex, multidimensional, and interrelated, ranging from fundamental factors such as slow economic growth, to specific factors such as respiratory infection and diarrhoeal diseases [3, 4].

Objectives:

- To find the determinants of stunting among children under-five in Nepal
- To provide this information to policy makers and program designers to facilitate effective interventions to reduce stunting in Nepal.

Methods:

Data source: Nepal Demographic and Health Survey (NDHS) 2011

Sample size: 2380 children aged 0 to 59 months with complete anthropometric measurements

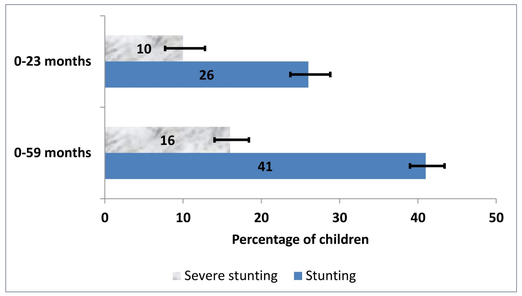
Height-for-age z-scores were used to assess the chronic nutritional status of children under-5 years by adapting the Child Growth Standards of the World Health Organization (WHO) [5].

Statistical analyses

Analyses were performed using Stata version 12.0 (StataCorp, College Station, TX, USA). 'Svy' commands were used to allow for adjustments for the cluster sampling design, weights and the calculation of standard errors. Simple and multiple logistic regression analyses were used to examine stunting and severe stunting against a set of variables including attributes of parental, child , household and community level factors. A stepwise backward elimination approach was applied and colinearity was tested in the final model and reported. The odds ratios with 95% CIs were calculated to assess the adjusted risk of independent variables, and those with $P < 0.05$ were retained in the final model.

Results

As shown in Figure 1, the prevalence of stunted children aged 0-23 months was 26% and a higher 41% for children aged 0-59 months. The overall prevalence of severely stunted children aged 0-23 months and 0-59 months were 10% and 16%, respectively.



Multivariate analyses

Figure 2 shows the adjusted ORs for the association between stunted and severely stunted children by parental-, child-, household- and community-level characteristics of children aged 0-23 and aged 0-59 months.

Adjusted odds ratios (OR) (95% CI) for stunted and severely stunted children aged 0-23 and 0-59 months

Characteristic	Stunted 0-23 months		Stunted 0-59 months		Severely Stunted 0-23 months		Severely Stunted 0-59 months	
	Adjusted Odd Ratio (AOR) [95%CI]	*P*	Adjusted Odd Ratio (AOR) [95%CI]	*P*	Adjusted Odd Ratio (AOR) [95%CI]	*p*	Adjusted Odd Ratio (AOR) [95%CI]	*p*
Parental factors								
Mother's age at birth								
< 20 years	1.00							
20-29 years	1.02 (0.58, 1.80)	0.955						
30-39 years	0.95 (0.48, 1.87)	0.877						
40 and above	7.31 (2.12, 25.22)	0.002						
Preceding birth interval								
No previous birth					1.00			
< 24 months					2.38 (1.12, 5.03)	0.024		
> 24 months					1.54 (0.80, 2.99)	0.195		
Type of delivery assistance								
Health professional					1.00		1.00	
Traditional birth attendant					1.58 (0.19, 13.14)	0.670	0.65 (0.14, 3.11)	0.589
Relatives or other					2.15 (0.98, 4.72)	0.056	1.55 (1.05, 2.31)	0.029
No one					3.69 (1.14, 11.93)	0.029	2.88 (1.47, 5.67)	0.002
Combined Place and mode of delivery								
Home delivery	1.00		1.00					
Health facility with non-caesarean	0.54 (0.33, 0.90)	0.018	0.65 (0.51, 0.84)	0.001				
Health facility with caesarean	0.53 (0.16, 1.75)	0.298	0.53 (0.29, 0.95)	0.033				
Currently breastfeeding								
Yes			1.00				1.00	
No			0.70 (0.53, 0.94)	0.017			0.49 (0.34, 0.69)	<0.001
Duration of breastfeeding								
Upto 12 months	1.00		1.00		1.00		1.00	
> 12 months	2.60 (1.87, 4.02)	<0.001	3.54 (2.41, 5.19)	<0.001	2.87 (1.54, 5.34)	0.001	4.15 (2.49, 6.93)	<0.001
Mother's literacy								
Can't read at all							1.00	
Can read							0.61 (0.43, 0.86)	0.005
Child level factors								
Sex of baby								
Male					1.00			
Female					0.44 (0.28, 0.71)	0.001		
Perceived size of baby at birth								
Small	1.00		1.00				1.00	
Average	0.61 (0.36, 1.04)	0.070	0.68 (0.51, 0.90)	0.008			0.81 (0.57, 1.16)	0.243
Large	0.42 (0.36, 0.83)	0.013	0.47 (0.33, 0.67)	<0.001			0.47 (0.29, 0.74)	0.001
Household level factors								
Wealth Index								
poorest	1.00		1.00		1.00		1.00	
poorer	0.93 (0.58, 1.50)	0.711	0.67 (0.48, 0.94)	0.020	0.81 (0.40, 1.66)	0.566	0.91 (0.61, 1.36)	0.638
middle	0.59 (0.36, 0.97)	0.039	0.47 (0.33, 0.68)	<0.001	0.49 (0.22, 1.05)	0.067	0.60 (0.40, 0.91)	0.016
richer	0.31 (0.16, 0.59)	<0.001	0.38 (0.25, 0.56)	<0.001	0.36 (0.14, 0.93)	0.034	0.49 (0.30, 0.82)	0.007
richest	0.29 (0.12, 0.67)	0.004	0.37 (0.25, 0.55)	<0.001	0.33 (0.10, 1.15)	0.081	0.40 (0.20, 0.80)	0.009
Community level factors								
Ecological Zone								
Mountain			1.00					
Hill			0.68 (0.50, 0.93)	0.015				
Terai			0.80 (0.57, 1.12)	0.193				

Conclusions

The factors associated with stunting and severe stunting among children 0-59 months in Nepal revealed that the common increased risk factors for stunting were combined place and mode of delivery (home delivery), prolonged breastfeeding (more than 12 months), perceived size of baby (small babies), household wealth (poorest households) while types of delivery assistance (mothers delivered by no one), prolonged breastfeeding (more than 12 months), perceived size of baby (small babies), household wealth (poorest households) reported consistenthigh risk factors for severe stunting. Our findings highlight the need for early community-based educational interventions aimed at improving the nutritional status of children underfive years of age in order to achieve optimal brain development and reduce mortality triggered by malnutrition.

References

1. World Food Program, *Fighting hunger worldwide*, World Food Program.
2. Ezzati M, Lopez AD, Rodgers A, Vander Hoorn S & Murray CJ:**Selected major risk factors and global and regional burden of disease**. The Lancet, 2002. **360**: p. 1347-1360.
3. Ministry of Health and Population (MOHP) [Nepal], *Annual report: Department of Health Services2066/67 (2009/2010). Kathmandu, Nepal*, 2011, Ministry of Health and Population.
4. Paudel R, Pradhan B, Wagle RR, Pahari DP, Onta SR:**Risk Factors for Stunting Among Children: A Community Based Case Control Study in Nepal**. Kathmandu University Medical Journal, 2013. **10**(3): p. 18-24.
5. WHO, *Child Growth Standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development.*, World Health Organization, Editor 2006, World Health Organization: Geneva.

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