

AND MIDDLE INCOME COUNTRIES FROM 1999 TO 2009^{1,2}

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PURPOSE

To describe the trends of stunting and thinness/underweight among female youth (15-24 years old) in low and middle income countries (LMICs) by country income level by wave, country income class and demographic characteristics from 1999 to 2009.

METHODS

- We use 56 cross-sectional Demographic and Health Surveys (DHS) from 23 countries and group them into three waves based on data collection years: wave 1999 (1998-2000), wave 2004 (2003-2005) and wave 2009 (2008-2010).
- The WHO Child Growth Standards 2007 are used to generate indicators of stunting of thinness for the 15-18 years old group and the WHO BMI Standard is used to generate underweight indicator for the 19-24 years old group.
- Prevalence rates for each country are estimated by weighted proportion analysis. "Integrated Food Security Phase Classification (IPC)" is used as a reference to determine relatively high prevalence of undernutrition.
- The trends are analyzed using tabulations of countries with increased/decreased prevalence and box plots of the percentage of each nutritional indicator by wave, age (15-19/20-24), residence (urban/rural), wealth quintile, and the World Bank country income class (low/middle)
- In addition, fixed effect models on each nutritional outcome (except for that by wealth quintile due to lack of data in wave 1999) to test the period/wave effect.

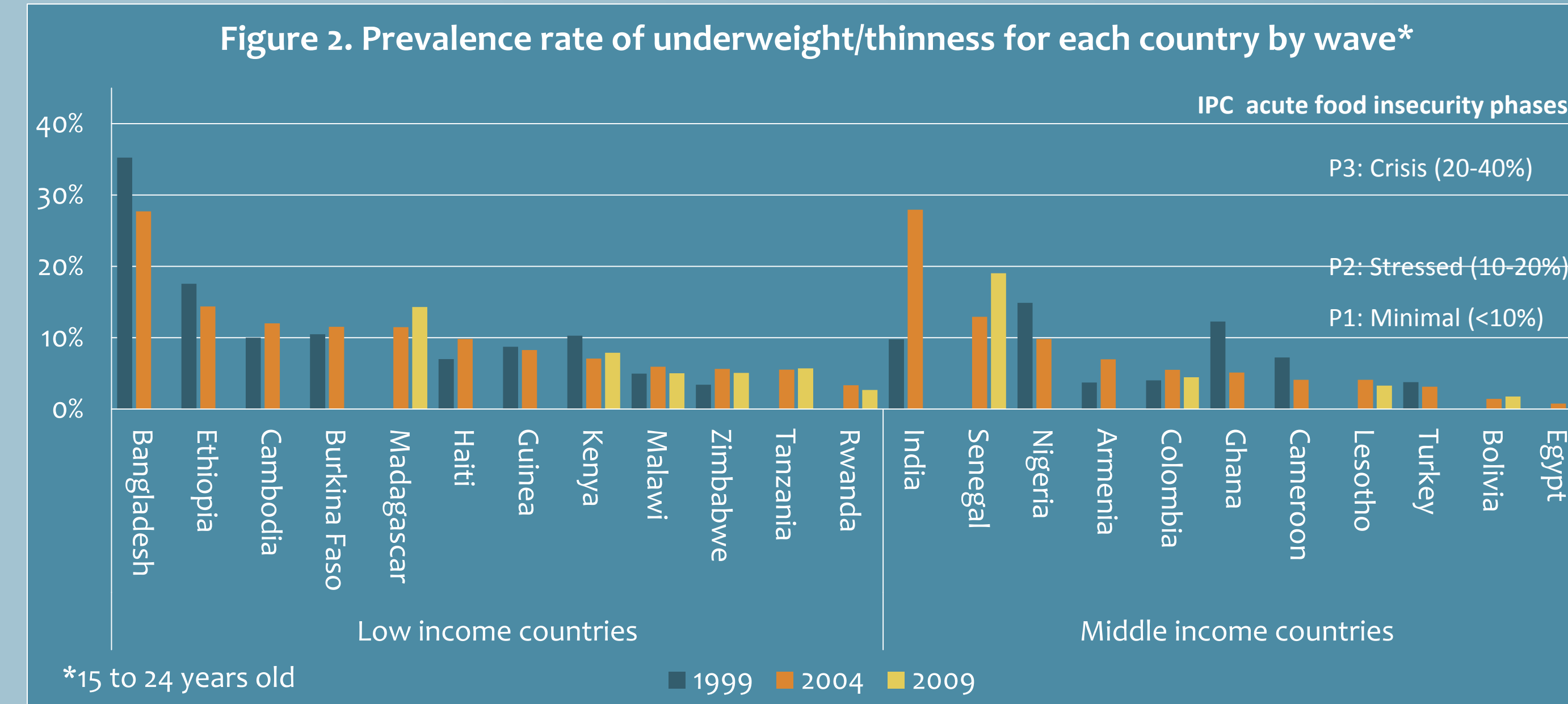
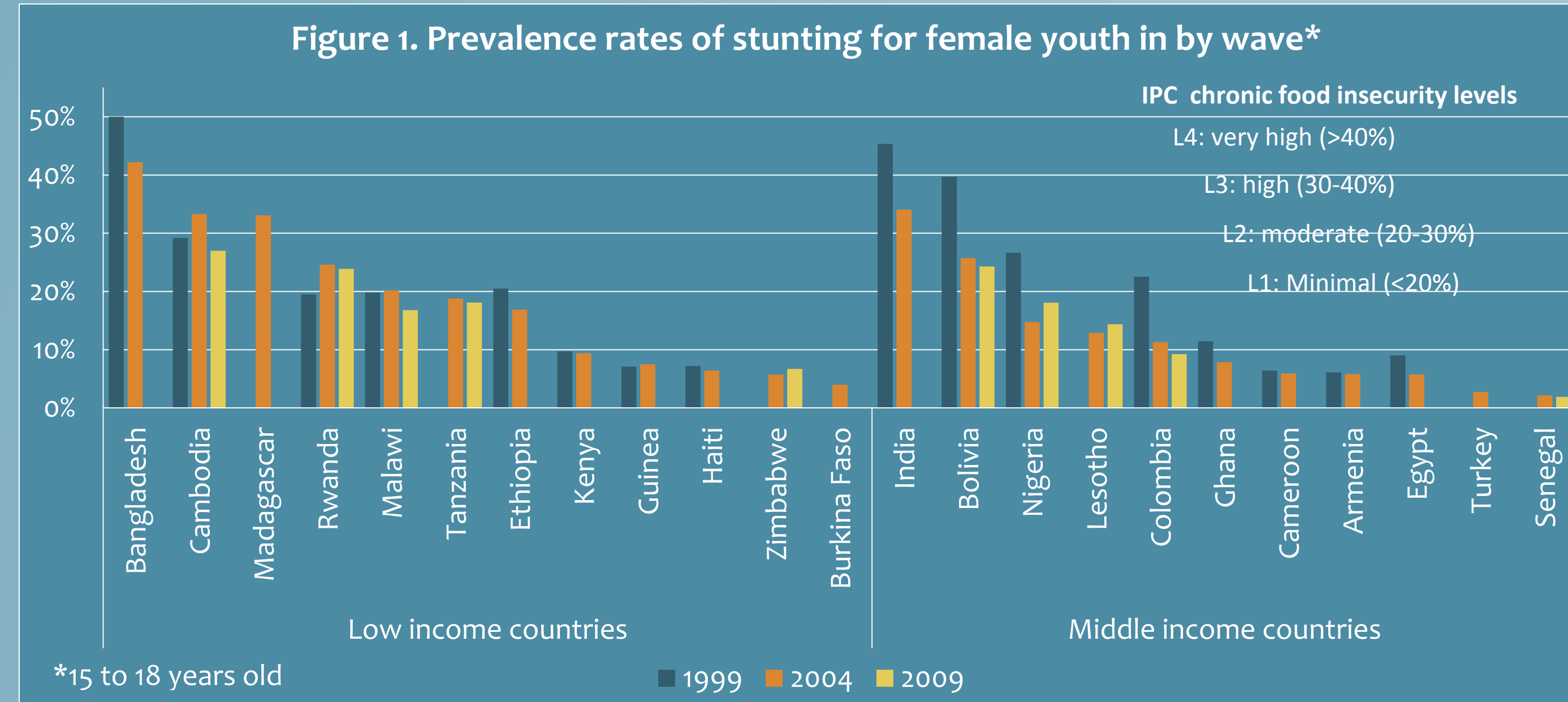


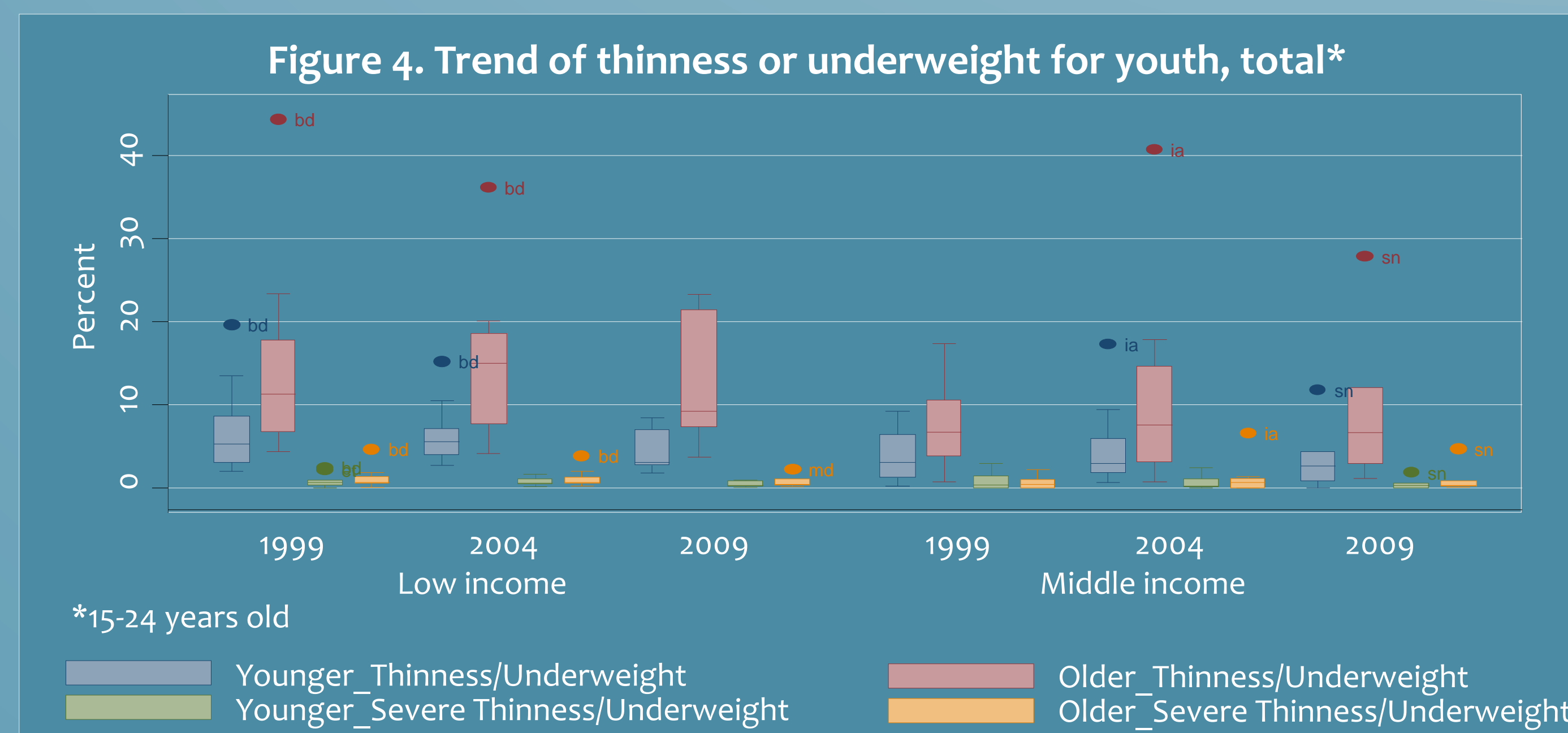
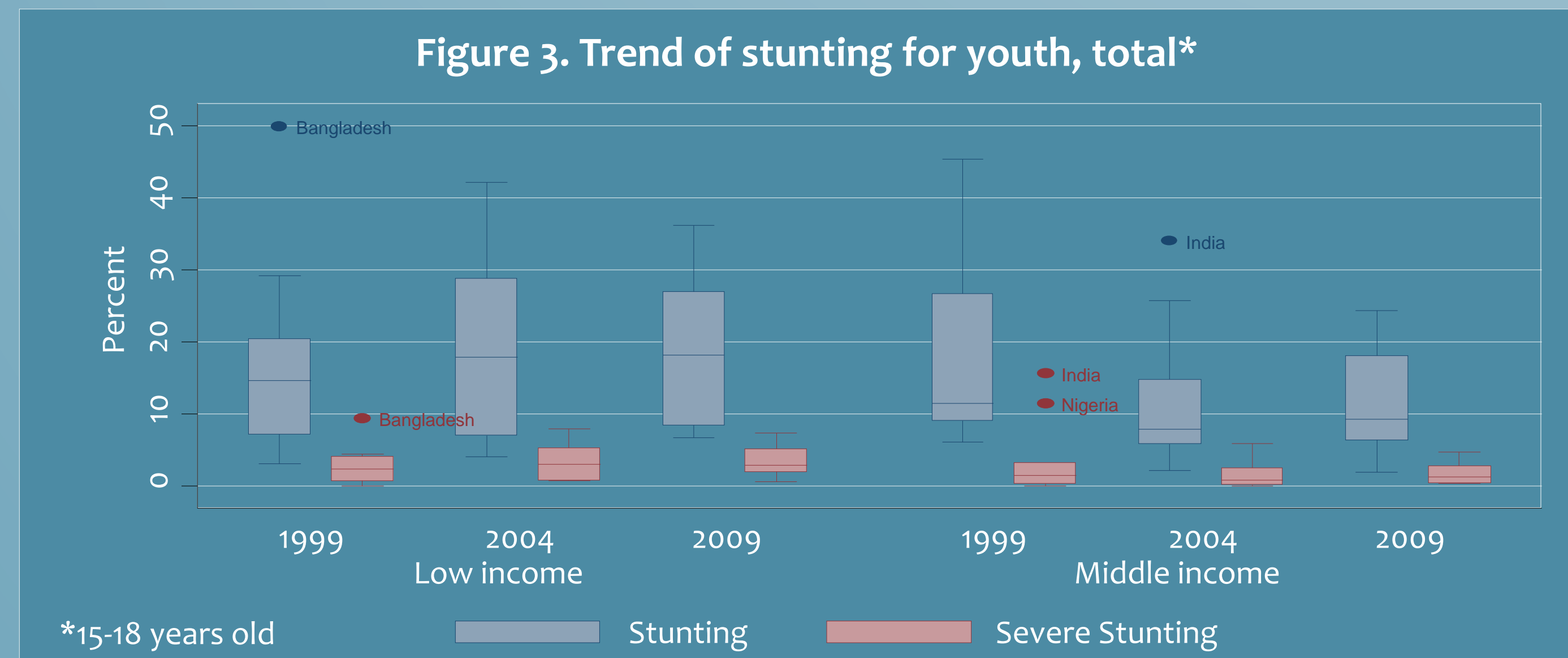
Table 1. Changes of stunting rates among low and middle income countries, 1999-2009 *

		2004-1999				x ² test p-values	2009-2004				x ² test p-values
		decreased	increased	Same	total		decreased	increased	total	p-values	
Stunting	Low income	5	5	0	10	p<0.05	5	2	7	ns**	
	Middle income	9	0	0	9		4	3	7		
	total	14	5	0	19		9	5	14		
Severe Stunting	Low income	4	6	0	10	p=0.057	5	2	7	ns**	
	Middle income	7	1	1	9		2	5	7		
	total	11	7	1	19		7	7	14		

Note: *: 15-18 years old; **:ns: p-values>0.05, same in the following context

Table 2. Changes of thinness/underweight rates among low and middle income countries, 1999-2009

		2004-1999				x ² test p-values	2009-2004				x ² test p-values
		decreased	increased	total	p-values		decreased	increased	total	p-values	
Thinness/Underweight	Low income	5	5	10	ns	3	4	7	ns		
	Middle income	5	4	9		4	3	7			
	total	10	9	19		7	7	14			
Severe Thinness/Underweight	Low income	5	5	10	ns	5	2	7	ns		
	Middle income	4	5	9		4	3	7			
	total	9	10	19		9	5	14			



Note for country names: bd=Bangladesh; bf=Burkina; et=Cambodia; gn=Ethiopia; ht=Guinea; e=Haiti; kh=Kenya; md=Madagascar; mw=Malawi; rw=Rwanda; tz=Tanzania; zw=Zimbabwe; am=Armenia; bo=Bolivia; cm=Cameroon; co=Colombia; eg=Egypt; gh=Ghana; ia=India; ls=Lesotho; ng=Nigeria; sn=Senegal; tr=Turkey

FINDINGS

- About 1/3 and 1/4 low and middle income DHS countries in our analysis suffered from relatively high prevalence of stunting or thinness/underweight problem among female youth according to IPC acute and chronic food insecurity standards.
- The nutritional trends for the female youth in low and middle income DHS countries differ over waves: more countries had decreased undernutrition prevalence in 2004-2009 as compared to 1999-2004.
- The trends also differ over country income levels: more middle income countries showed improvement on stunting rates as compared to the low income countries.
- The trends differ by indicators: the improvement of stunting rates is more prevalent as compared to that of thinness/underweight rates.
- In terms of individuals with different demographics characteristics, living in urban and poorer family might suffer more from stunting, while older group might suffer more from thinness/underweight.

ACKNOWLEDGEMENTS

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Table 3. Fixed effect models of wave effects on stunting rates and thinness/underweight rates

Indicators	Income Class	1999 - 2004		2009 - 2004		
		coefficient	p	coefficient	p	
Stunting	Rural total	2.87	<0.01	-0.50	ns	
	low income	0.85	ns	-0.74	ns	
	middle income	5.12	<0.001	-0.18	ns	
	Urban total	3.55	<0.05	-1.19	ns	
	low income	0.16	ns	-0.70	ns	
	middle income	7.74	<0.01	-1.37	ns	
Younger/All	total	3.70	<0.01	-0.58	ns	
	low income	0.63	ns	-0.60	ns	
	middle income	7.09	<0.001	-0.43	ns	
	Thinness/Underweight	ALL total	0.12	ns	-0.01	ns
		low income	0.64	ns	0.73	ns
		middle income	-0.44	ns	-0.76	ns
Rural total		0.10	ns	0.00	ns	
low income		0.43	ns	0.40	ns	
middle income		-0.27	ns	-0.42	ns	
Urban	total	-0.53	ns	0.13	ns	
	low income	0.60	ns	1.70	ns	
	middle income	-1.77	ns	-1.48	ns	
	Younger total	0.17	ns	-0.44	ns	
	low income	0.41	ns	-0.22	ns	
	middle income	-0.09	ns	-0.68	ns	
Older	total	-1.35	ns	0.38	ns	
	low income	-0.20	ns	1.61	ns	
middle income	-2.61	ns	-0.90	ns		