D4N 2024
DELIVERING FOR NUTRITION IN SOUTH ASIA
CONNECTING THE DOTS ACROSS SYSTEMS
December 5, 2024 • Colombo, Sri Lanka

Double burden of malnutrition and its determinants among adolescent boys and girls (10-19 years): Evidence from a nationwide longitudinal survey in Bangladesh

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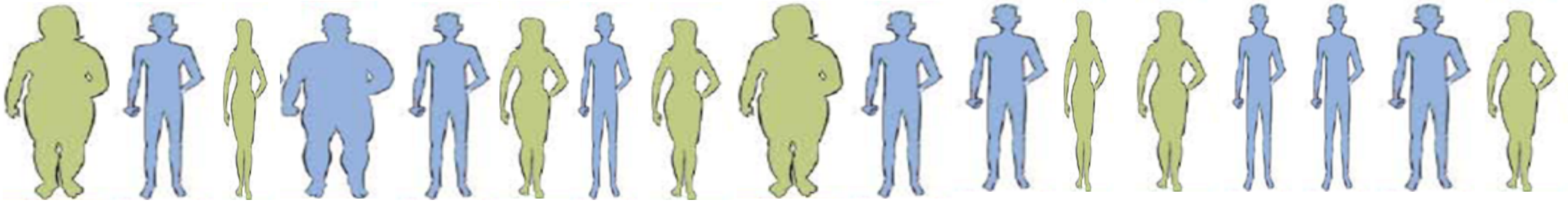
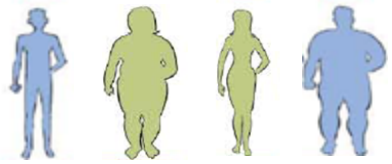
Rationale/objectives

- Like other South Asian countries, Bangladesh is experiencing the **double burden of malnutrition (DBM)** across all age groups, including **adolescents**
- However, there is a **lack of nationally representative data** on nutritional status, particularly among boys
- We aimed to **assess the level of DBM and its determinants** among adolescent **boys and girls**





Methods

Study design and area: The second wave of a longitudinal study conducted in 90 (rural:64, non-slum urban:16, and slum:10) sentinel sites in Bangladesh

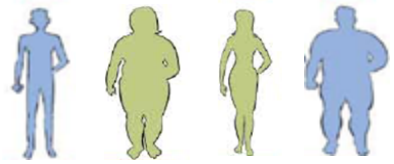
Sampling procedure: Multistage cluster sampling (separately for rural, non-slum urban, and slum areas

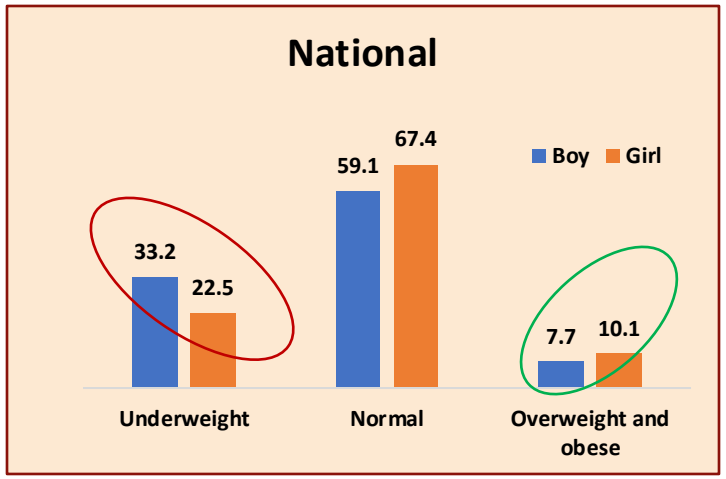
Sample size: 11,240 adolescents (5,600 boys and 5,640 girls)

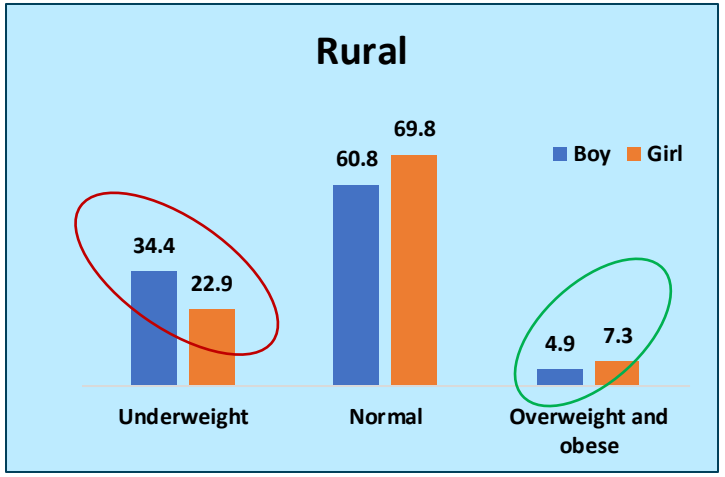
Outcome variable: DBM (underweight, normal, and overweight/obese) was assessed using body mass index (BMI) for age z-score (BAZ)

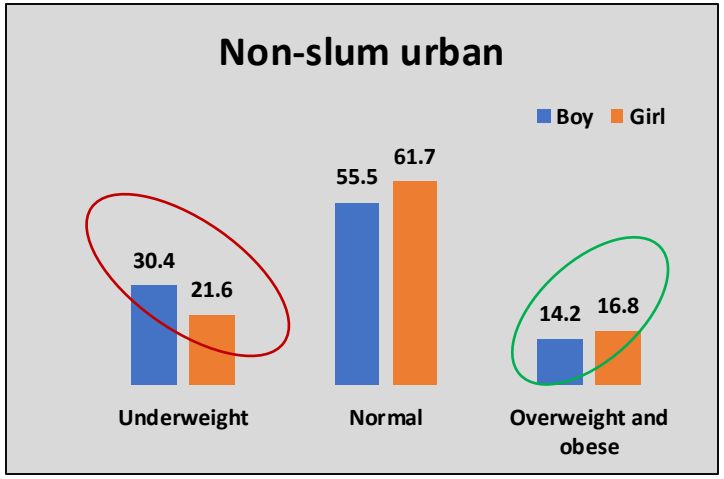
Data analysis: Weighted prevalence of DBM and multinomial logistic regression, separately for adolescent boys and girls

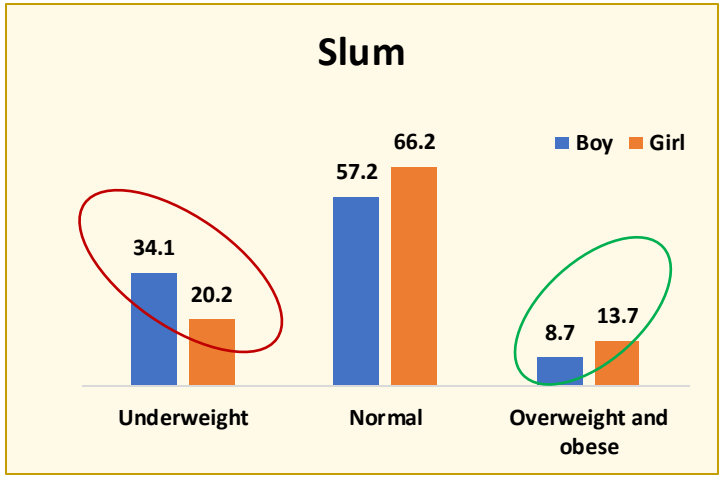
Results: The prevalence of DBM





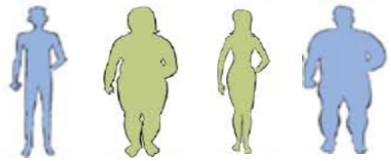






- Boys are more undernourished than girls (33.2% vs. 22.5%)
- Overweight/obesity are more prevalent among girls than boys
- These patters are consistent across rural, non-slum urban, and slum areas
- Overweight/obesity prevalence is the highest in non-slum urban areas

Results: Associated factors of DBM



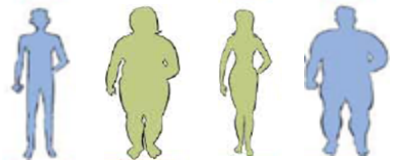
Multinomial logistic regression of DBM, separately for boys and girls

	Indicators	Boy Underweight	Boy Overweight /obesity	Girl Underweight	Girl Overweight /obesity
Individual	**Age in years (ref: 10-14y)**				
	15-19y	**0.76**	**0.62**	**0.84**	0.86
	Adolescent occupation (ref: student)				
	Others	0.98	0.84	0.83	1.24
	Marital status (ref: married)				
	Others	--	--	**1.66**	0.75
Parental	**Maternal education (ref: grade 0-4)**				
	Grade 5-9	0.97	1.21	0.98	1.18
	Grade 10 and above	0.91	**1.48**	**0.71**	1.40
	Paternal education (ref: grade 0-4)				
	Grade 5-9	**0.83**	1.21	0.91	1.23
	Grade 10 and above	**0.78**	**1.69**	1.00	**1.91**
Household	**Religion (ref: Islam)**				
	Other than Islam	1.07	1.09	1.20	1.05
	Household size (ref: 1-3 members)				
	4-5 members	**1.23**	0.92	1.06	1.00
	≥6 members	**1.45**	0.83	1.08	0.97
	HH food security (ref: food secure)				
	Mild food insecure	**1.19**	0.82	**1.24**	**0.72**
	Moderate to severe food insecure	**1.18**	0.79	**1.45**	**0.70**
	Area of residence (ref: rural)				
	Non-slum urban	**0.79**	**3.22**	1.00	**2.65**
	Slum	0.95	**2.06**	1.04	**1.99**
	Wealth index (ref: richest)				
	Poorest	0.80	1.00	1.06	1.02
	Poorer	0.90	1.16	1.04	1.15
	Middle	0.90	0.94	1.00	1.01
	Richer	0.89	0.97	**0.80**	1.07

	Indicators	Boy Underweight	Boy Overweight /obesity	Girl Underweight	Girl Overweight /obesity
Behavioral	**Any animal source food (ref: no)**				
	Yes	0.98	1.07	0.87	1.12
	Dietary diversity (ref: ≥5 food groups)				
	<5 food groups	0.94	0.86	0.87	0.98
	Fruits & vegetables consumption (ref: ≥5 servings)				
	<5 servings	1.31	**0.54**	0.86	**0.46**
	Depression (ref: no depression)				
	Depression	**1.22**	**0.73**	0.98	**0.75**
	Television time (ref: 0 min)				
	≤60 min	0.94	0.86	0.88	1.03
	>60 to ≤120 min	0.97	0.98	**0.76**	0.95
	>120 min	0.95	0.78	**0.78**	1.16
	Sedentary time (ref: ≤6h)				
	>6h	0.99	**1.28**	0.90	**1.31**
	Sugar-sweetened beverage consumption (ref: no)				
	1-3 times	**0.82**	0.90	0.91	0.93
	4-6 times	**0.76**	1.35	0.86	1.20
	7 or more times	0.96	1.00	0.92	1.04

Bold indicates the Relative Risk Ratio (RRR) at 95% CI is statistically significant (p<0.05), Blue color indicates decreased the RRR & Red color indicates increased the RRR.

Results: Summary of associated factors



	Boys	Girls
Underweight	• HH food insecurity • Larger HH size • Depression • Older boys (15-19y) • Paternal higher education • Residence in non-slum urban area • Sugar sweetened beverage intake	• HH food insecurity • Marital status: no • Older girls (15-19y) • Maternal higher education • Higher HH wealth (richer) • Higher television time
Overweight/obesity	• Paternal higher education • Maternal higher education • Residence in non-slum urban area • Residence in slum area • More sedentary time • Consumption of <5 servings of fruits & vegetables • Depression • Older boys (15-19y)	• Paternal higher education • Residence in non-slum urban area • Residence in slum area • More sedentary time • Consumption of <5 servings of fruits and vegetables • Depression

Implications: Way forward

- Boys are more malnourished than girls
- Overweight/obesity is higher among girls

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- Need to target adolescent boys in nutrition initiatives across rural, non-slum urban and slum areas
- Overweight/obesity prevention and control intervention should be prioritized nationwide

- Age
- Marital status
- Paternal education
- Maternal education
- Larger HH size

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- These variables can be taken into consideration for targeting adolescent boys and girls

- Residence in non-slum urban & slum areas

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- Non-slum urban and slum areas should be prioritized to prevent overweight and obesity

- HH food insecurity
- HH wealth

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- Need nutrition sensitive social safety net and income generating interventions to improve economic resilience at the HH level

- Consumption of <5 servings of F&V
- Sugar sweetened beverage intake
- Higher screen time
- More sedentary time
- Depression

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- Strengthening and continuation of norm-responsive SBCC interventions for better dietary practices
- Ensure enabling environment for translating desired behavior into practice
- Integrated mental health services in primary health care

Thank you ☺