

## Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

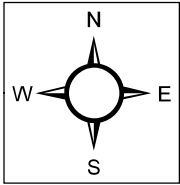
Supplement to: Di Cesare M, Bhatti Z, Soofi SB, Fortunato L, Ezzati M, Bhutta ZA. Geographical and socioeconomic inequalities in women and children's nutritional status in Pakistan in 2011: an analysis of data from a nationally representative survey. *Lancet Glob Health* 2015; **3**: e229–39.

## **Appendix**

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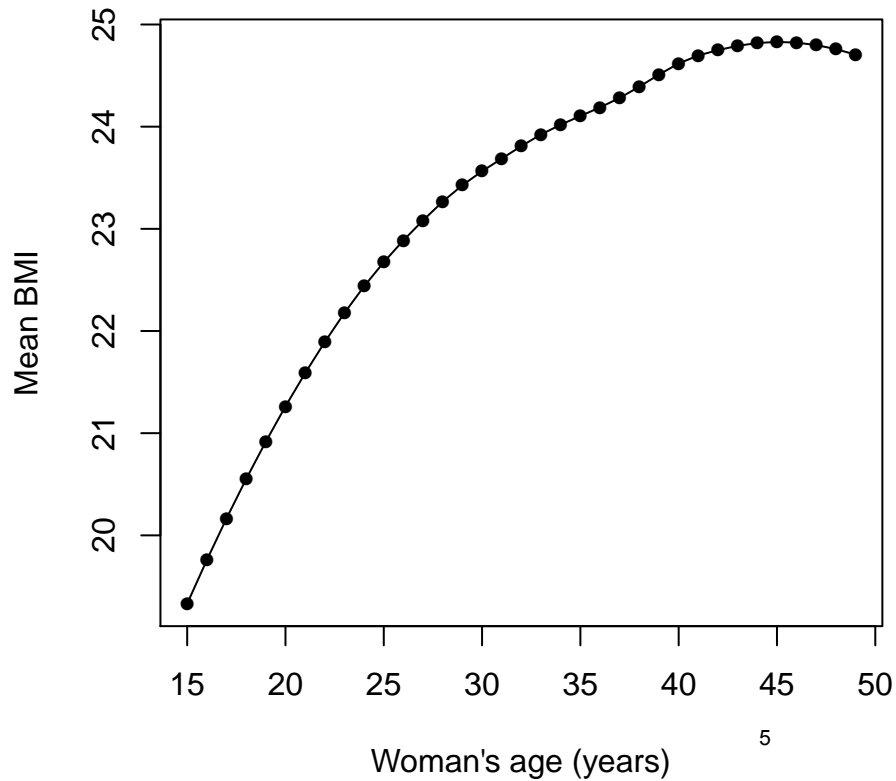
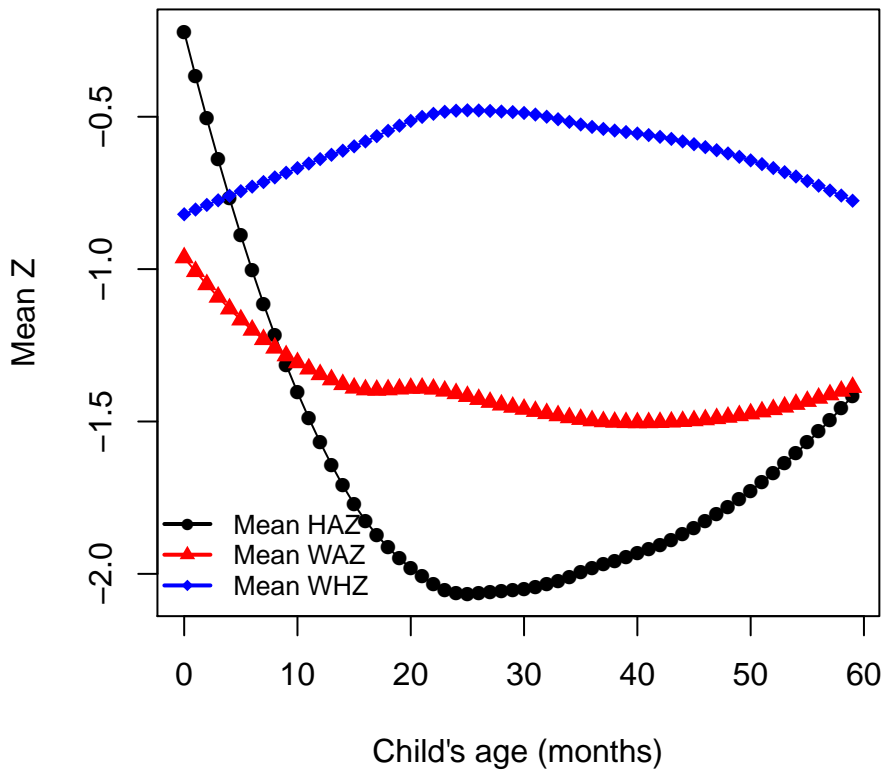
**Appendix Figure 1: Map of Pakistan**



**Legend**

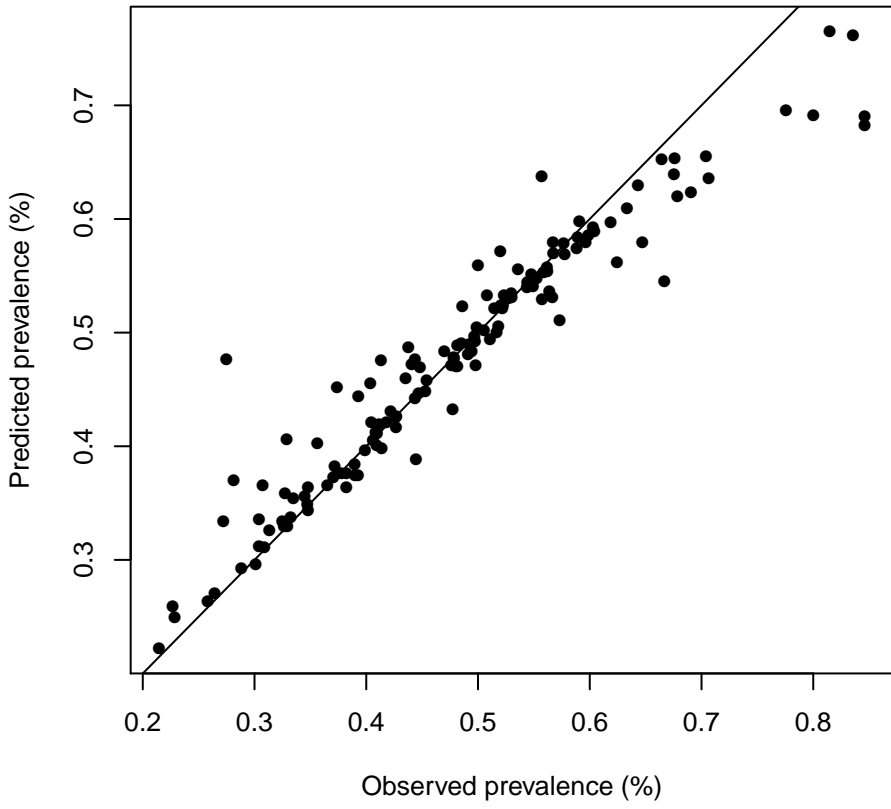
- Province Boundary
- Indus River
- District Boundary

**Appendix Figure 2:** Association between age and anthropometric variables for children (left panel) and women (right panel)

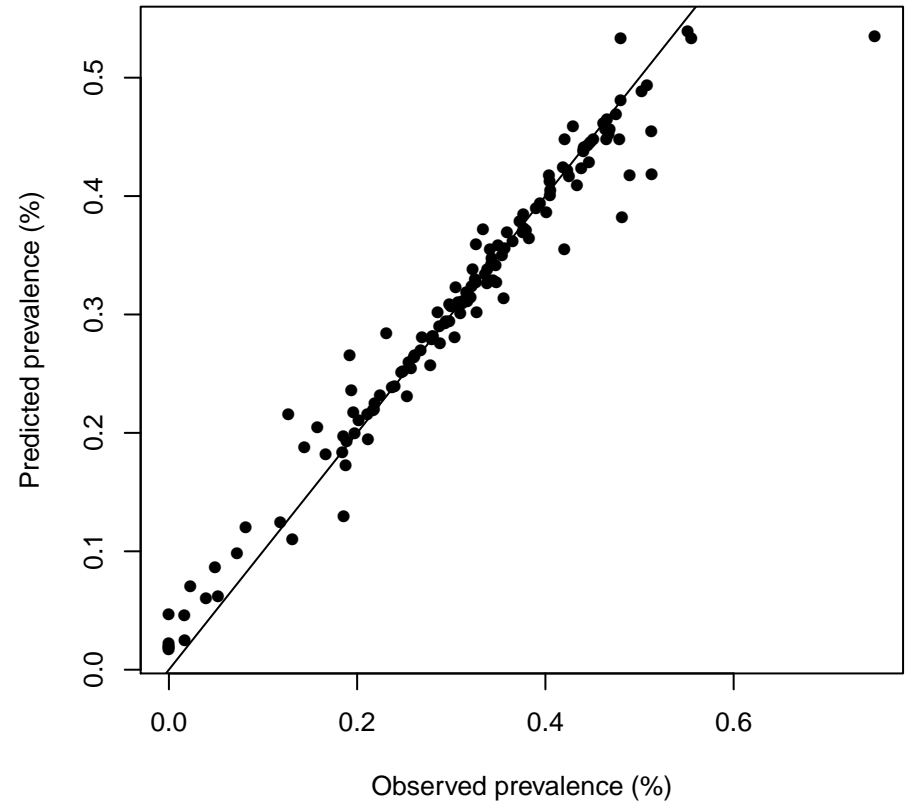


**Appendix Figure 3:** (A) Observed and predicted prevalences of stunting, underweight, wasting, and overweight among under-five children by district and (B) observed and predicted prevalences of underweight, normal and overweight, and obesity among women by district

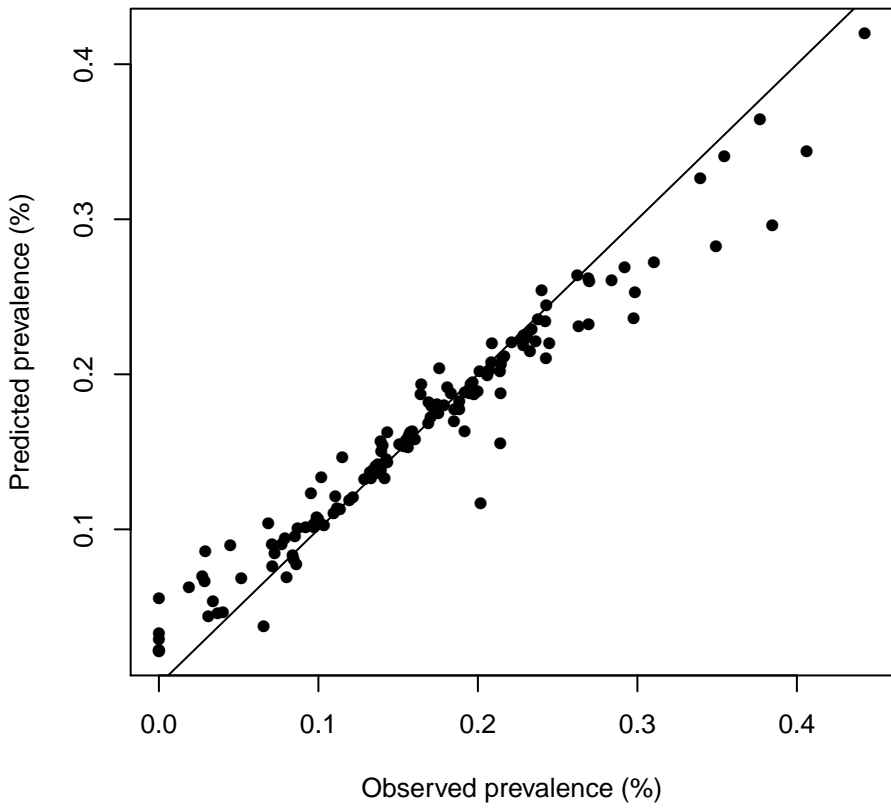
**Stunting**



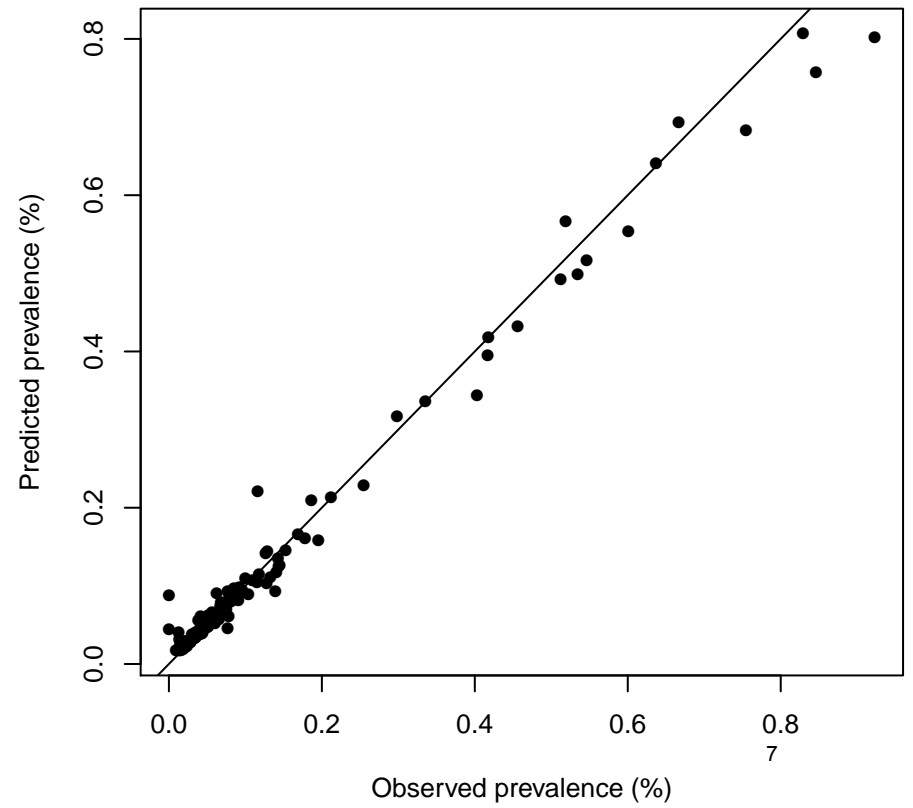
**Underweight**



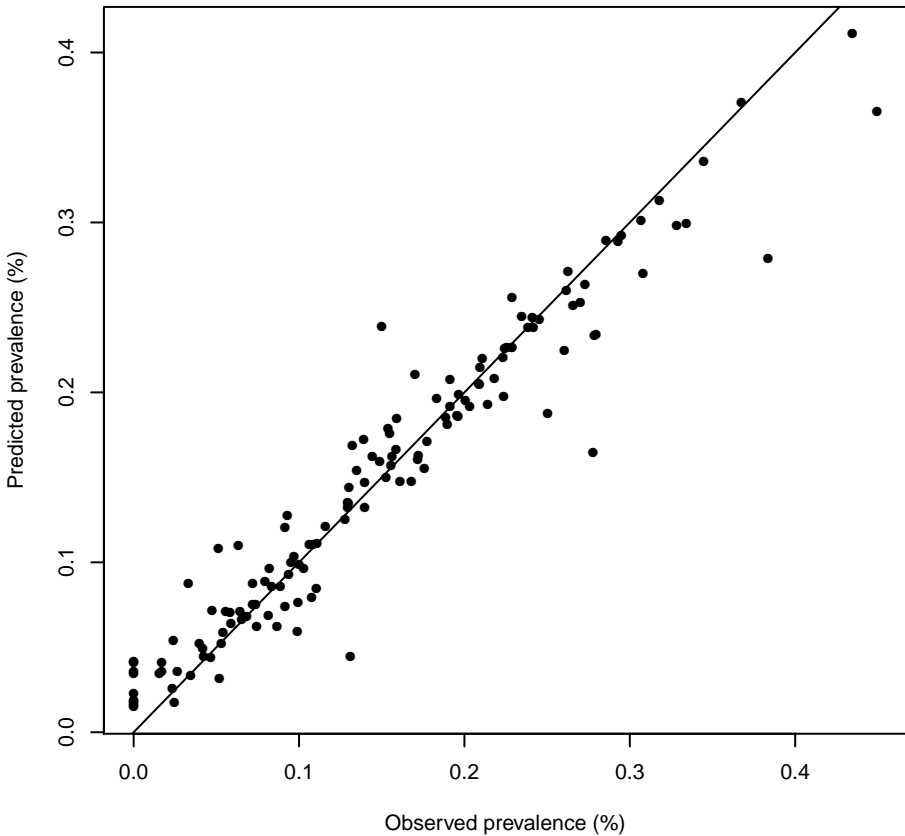
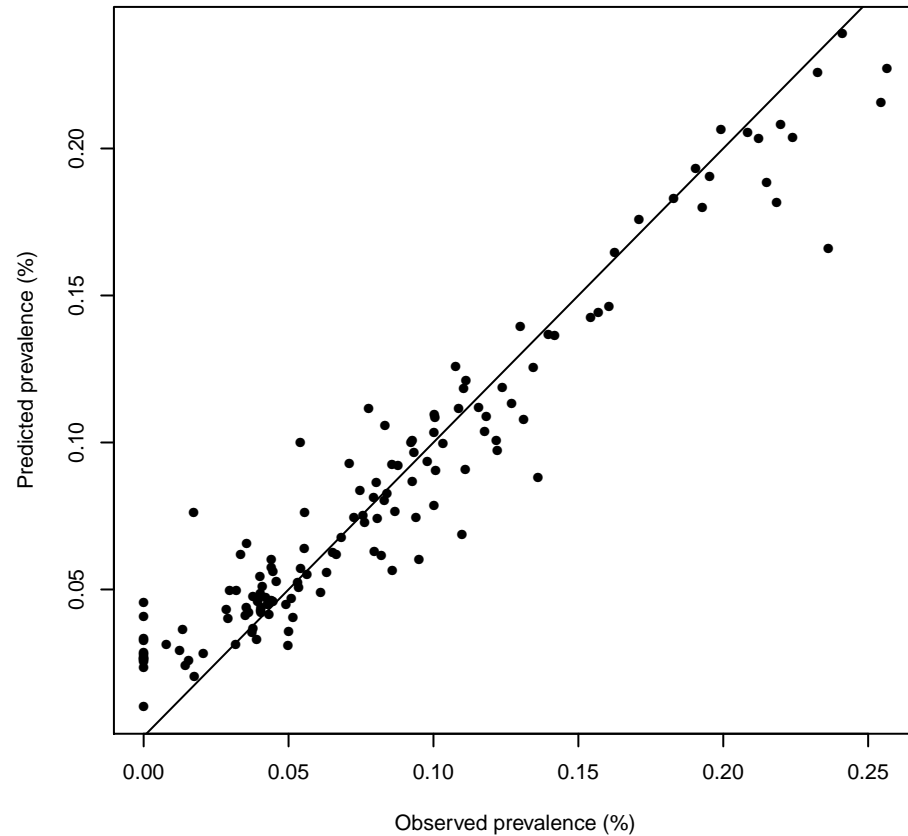
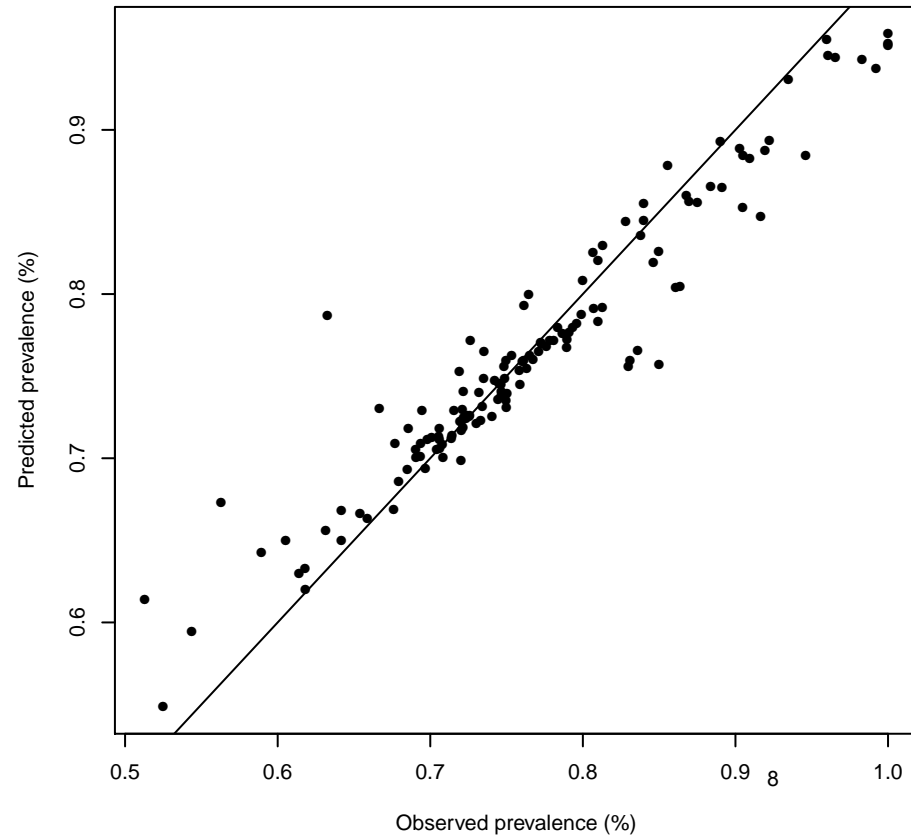
**Wasting**



**Overweight**





**Underweight****Obese****Normal or overweight**

**Appendix Table 1:** Crude and multivariable associations between anthropometric status of children and their individual and household determinants

	Dependent Variable: HAZ				Dependent Variable: WAZ				Dependent Variable: WHZ			
	Crude		Multivariable-adjusted		Crude		Multivariable-adjusted		Crude		Multivariable-adjusted	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Intercept			-8.79 (-9.6 to -7.98)	<0.001			-7.12 (-7.75 to -6.49)	<0.001			-2.65 (-3.46 to -1.83)	<0.001
Place of residence												
Urban	0		0		0		0		0		0	
Rural	-0.34 (-0.44 to -0.24)	<0.001	-0.04 (-0.15 to 0.07)	0.45	-0.21 (-0.29 to -0.13)	<0.001	0.08 (-0.01 to 0.17)	0.08	-0.03 (-0.14 to 0.08)	0.57	0.12 (-0.01 to 0.24)	0.06
Mother's education												
Illiterate	0		0		0		0		0		0	
Primary (1-5)	0.19 (0.09 to 0.29)	<0.001	0.06 (-0.04 to 0.15)	0.24	0.11 (0.03 to 0.19)	0.004	0 (-0.07 to 0.08)	0.99	-0.01 (-0.1 to 0.09)	0.89	-0.05 (-0.15 to 0.04)	0.26
Middle(6-9)	0.29 (0.18 to 0.41)	<0.001	0.04 (-0.07 to 0.15)	0.49	0.23 (0.14 to 0.32)	<0.001	0.04 (-0.05 to 0.13)	0.34	0.09 (-0.02 to 0.2)	0.1	0.02 (-0.09 to 0.13)	0.71
High (>=10)	0.69 (0.6 to 0.78)	<0.001	0.28 (0.18 to 0.38)	<0.001	0.5 (0.43 to 0.57)	<0.001	0.17 (0.1 to 0.25)	<0.001	0.15 (0.06 to 0.24)	<0.001	0.02 (-0.08 to 0.12)	0.74
Mother's height	0.05 (0.05 to 0.06)	<0.001	0.05 (0.04 to 0.05)	<0.001	0.03 (0.03 to 0.04)	<0.001	0.03 (0.03 to 0.04)	<0.001	0.01 (0 to 0.01)	0.02	0.01 (0 to 0.01)	0.03
Mother's BMI	0.02 (0.01 to 0.03)	<0.001	0.02 (0.01 to 0.03)	<0.001	0.04 (0.04 to 0.05)	<0.001	0.04 (0.03 to 0.04)	<0.001	0.04 (0.04 to 0.05)	<0.001	0.04 (0.03 to 0.04)	<0.001
Wealth index	0.34 (0.3 to 0.38)	<0.001	0.16 (0.11 to 0.2)	<0.001	0.29 (0.26 to 0.32)	<0.001	0.13 (0.09 to 0.17)	<0.001	0.13 (0.09 to 0.17)	<0.001	0.06 (0.01 to 0.11)	0.01
Food security												
Food secure	0		0		0		0		0		0	
Food insecure without hunger	-0.29 (-0.37 to -0.21)	<0.001	-0.09 (-0.17 to -0.01)	0.03	-0.26 (-0.32 to -0.2)	<0.001	-0.1 (-0.16 to -0.04)	0.002	-0.1 (-0.18 to -0.03)	0.08	-0.04 (-0.12 to 0.04)	0.28
Food insecure without hunger moderate	-0.49 (-0.58 to -0.4)	<0.001	-0.16 (-0.26 to -0.07)	<0.001	-0.43 (-0.49 to -0.36)	<0.001	-0.16 (-0.23 to -0.08)	<0.001	-0.18 (-0.27 to -0.1)	<0.001	-0.06 (-0.16 to 0.03)	0.17
Food insecure without hunger severe	-0.55 (-0.66 to -0.43)	<0.001	-0.15 (-0.27 to -0.03)	<0.001	-0.59 (-0.68 to -0.5)	<0.001	-0.28 (-0.37 to -0.18)	<0.001	-0.31 (-0.42 to -0.2)	<0.001	-0.18 (-0.3 to -0.06)	0.003
Type of fuel												
Liquid	0		0		0		0		0		0	
Solid	-0.37 (-0.45 to -0.29)	<0.001	-0.04 (-0.13 to 0.05)	0.41	-0.29 (-0.36 to -0.23)	<0.001	-0.01 (-0.09 to 0.06)	0.79	-0.09 (-0.18 to -0.01)	0.03	0.04 (-0.06 to 0.14)	0.45
Water quality												
Unimproved	0		0		0		0		0		0	
Improved	0.17 (0.09 to 0.24)	<0.001	0.02 (-0.05 to 0.09)	0.6	0.2 (0.14 to 0.26)	<0.001	0.08 (0.02 to 0.13)	<0.001	0.12 (0.05 to 0.2)	0.002	0.07 (-0.01 to 0.14)	0.09
Sanitation												
Unimproved	0		0		0		0		0		0	
Improved	0.36 (0.27 to 0.46)	<0.001	0.05 (-0.05 to 0.15)	0.33	0.39 (0.31 to 0.46)	<0.001	0.1 (0.02 to 0.18)	<0.001	0.2 (0.1 to 0.29)	<0.001	0.05 (-0.05 to 0.16)	0.3
Child's age												
0-5 months	0		0		0		0		0		0	
6-11 months	-0.37 (-0.5 to -0.25)	<0.001	-0.34 (-0.46 to -0.22)	<0.001	-0.17 (-0.27 to -0.08)	<0.001	-0.14 (-0.24 to -0.05)	0.003	0 (-0.12 to 0.12)	0.99	0.02 (-0.1 to 0.14)	0.79
12-17 months	-0.91 (-1.05 to -0.78)	<0.001	-0.89 (-1.02 to -0.76)	<0.001	-0.09 (-0.2 to 0.01)	0.09	-0.06 (-0.16 to 0.04)	0.26	0.27 (0.14 to 0.4)	<0.001	0.29 (0.16 to 0.42)	<0.001
18-23 months	-1.34 (-1.48 to -1.21)	<0.001	-1.33 (-1.47 to -1.2)	<0.001	-0.33 (-0.43 to -0.22)	<0.001	-0.31 (-0.42 to -0.21)	<0.001	0.21 (0.07 to 0.34)	0.002	0.22 (0.09 to 0.35)	<0.001
24+ months	-1.15 (-1.25 to -1.04)	<0.001	-1.14 (-1.24 to -1.04)	<0.001	-0.24 (-0.32 to -0.16)	<0.001	-0.25 (-0.33 to -0.16)	<0.001	0.28 (0.17 to 0.38)	<0.001	0.25 (0.15 to 0.35)	<0.001
Child sex												
Boy	0		0		0		0		0		0	
Girl	0.12 (0.06 to 0.18)	<0.001	0.1 (0.04 to 0.16)	<0.001	0.07 (0.02 to 0.12)	<0.001	0.06 (0.01 to 0.11)	0.01	0.04 (-0.02 to 0.1)	0.22	0.04 (-0.02 to 0.1)	0.22
Sample weight			0 (0 to 0)	0.81			0 (0 to 0)	0.25			0 (0 to 0)	0.41
Sample size	13041				13182				12828			

**Appendix Table 2:** Crude and multivariable associations between anthropometric status of women and their individual and household determinants

	Dependent Variable: Height				Dependent Variable: BMI			
	Crude		Multivariable-adjusted		Crude		Multivariable-adjusted	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Intercept			153.84 (153.29 to 154.39)		0 (0 to 0)		23.43 (23.03 to 23.83)	
Area of residence								
Urban								
Rural	0.4 (0.07 to 0.74)	0.02	1.02 (0.64 to 1.41)	<0.001	-2.38 (-2.63 to -2.12)	<0.001	-0.82 (-1.09 to -0.55)	<0.001
Mother's education								
Illiterate	0		0		0		0	
Primary (1-5)	0.15 (-0.17 to 0.47)	0.36	-0.08 (-0.40 to 0.25)	0.63	0.58 (0.34 to 0.83)	<0.001	-0.03 (-0.28 to 0.21)	0.78
Middle(6-9)	0.40 (0.03 to 0.78)	0.03	-0.01 (-0.40 to 0.37)	0.94	0.92 (0.63 to 1.21)	<0.001	-0.08 (-0.37 to 0.2)	0.57
High (>=10)	1.16 (0.87 to 1.45)	<0.001	0.43 (0.10 to 0.76)	0.01	1.57 (1.34 to 1.79)	<0.001	-0.01 (-0.26 to 0.23)	0.92
Wealth index	0.77 (0.65 to 0.89)	<0.001	0.61 (0.45 to 0.77)	<0.001	1.31 (1.22 to 1.40)	<0.001	0.77 (0.65 to 0.9)	<0.001
Food security								
Food secure	0		0		0		0	
Food insecure without hunger	-0.95 (-1.21 to -0.69)	<0.001	-0.55 (-0.82 to -0.28)	<0.001	-0.63 (-0.83 to -0.44)	<0.001	-0.06 (-0.26 to 0.14)	0.58
Food insecure without hunger moderate	-1.54 (-1.82 to -1.25)	<0.001	-0.90 (-1.21 to -0.59)	<0.001	-1.44 (-1.66 to -1.22)	<0.001	-0.50 (-0.74 to -0.27)	<0.001
Food insecure without hunger severe	-1.71 (-2.08 to -1.33)	<0.001	-0.98 (-1.38 to -0.58)	<0.001	-1.71 (-2.00 to -1.43)	<0.001	-0.61 (-0.91 to -0.31)	<0.001
Type of fuel								
Liquid	0		0		0		0	
Solid	-0.12 (-0.39 to 0.15)	0.38	0.46 (0.13 to 0.78)	0.01	-2.21 (-2.41 to -2.01)	<0.001	-0.86 (-1.1 to -0.62)	<0.001
Water quality								
Unimproved	0		0		0		0	
Improved	0.94 (0.69 to 1.20)	<0.001	0.77 (0.52 to 1.03)	<0.001	0.92 (0.72 to 1.12)	<0.001	0.50 (0.31 to 0.69)	<0.001
Sanitation								
Unimproved	0		0		0		0	
Improved	0.86 (0.54 to 1.18)	<0.001	0.23 (-0.11 to 0.57)	0.19	2.2 (1.95 to 2.44)	<0.001	0.98 (0.72 to 1.23)	<0.001
Sample weight			0 (0 to 0)	0.63			0 (0 to 0)	0.08
Sample size			14198				14198	