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SECTION H: Nutrition

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Section Highlights

- Stunting (low height for age) was the most prevalent indicator of malnutrition, with 43% of the under-five population categorized in the moderate to severe range.
- Less than 17% children under the age of five were reported to be underweight (low weight for age).
- Boys under the age of five were more likely to experience stunting and be underweight than girls in this age group.
- A higher proportion of children in female-headed households experienced stunting (46% versus 42% in male-headed households) and were underweight (19% versus 16% in male-headed households).
- Children under the age of five in agricultural households were more likely to experience stunting and be underweight than children in non-agricultural households in the same age group.
- The proportion of under-five children suffering malnutrition differed by zone, with the proportion of stunted children ranging from 31% in Zanzibar to 52% in the Southern Highlands.

Nutrition: Malnutrition

Measures of malnutrition for children under-five were calculated using LSMS data on sex, age, weight, and height and the World Health Organization (WHO) Child growth standards. *Table 1* shows the proportion of the population across Tanzania under-five years old who suffered from stunting, were underweight, wasting, had low body mass index (BMI) for age, and who were overweight. [1]

Table 1: **Proportion of Children under Five Years Old Suffering from Malnutrition**

Indicator	Definition	Proportion of under-five population, moderate to severe *	Proportion of under-five population, severe**
Stunting	Low height for age	43%	17.4%
Underweight	Low weight for age	16.4%	3.6%
Wasting	Low weight for height	2.8%	0.8%
Low BMI for age		2.7%	0.8%
Overweight	High weight for height	4.6%***	1.0%***

*Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population
***Proportion above +2 and +3 standard deviations of the NCHS/ WHO international reference population

Stunting was the most prevalent indicator of malnutrition, affecting over 40% of the under-five population. Wasting and low BMI for age were the least prevalent, observed in less than 3% of the under-five population. About 0.8% of the under-five population suffered from severe acute malnutrition (SAM), using the recommended cut-off of the WHO.[2] These figures differ slightly from the numbers reported in Tanzania's Millennium Development Goals (MDG) Progress Report in 2008. That report estimated the proportion of under-five underweight to be higher than LSMS observations (22% compared to 16.4%) and the proportion of under-five stunted to be lower (38% compared to 43%). One possible explanation for these differences is the MDG calculations only include figures for mainland Tanzania, whereas the LSMS data additionally include observations for Zanzibar.[3]

Figure 1 shows the proportion of children from newborns to 60 months that suffered from each of the five key malnutrition indicators. Estimations are presented across six age categories measured in months: 0 to 5, 6 to 11, 12 to 23, 24 to 35, 36 to 47, and 48 to 60. Most indicators of malnutrition were less prevalent among infants (defined as children 0 to 5 months old). For example, only 30% of the population of infants suffered from moderate to severe stunting, compared to 53% of children aged 24 to 35 months. An estimated 8% of infants were underweight compared to 19% of children aged 36 to 47 months. One exception, however, was that a greater proportion of infants were overweight (27%) compared to all other age categories. The next highest proportion was among 6 to 11 month olds (7%). The high prevalence of overweight infants seems unlikely and will be investigated in future LSMS analysis.

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[1] See de Onis et al., 2004 for a full description of the methodology for estimating child malnutrition.
[2] The WHO recommends a cut-off for weight-for-height of below-3 standard deviations, one of the reasons being "In a well-nourished population there are virtually no children below -3 SD (<1%)" (WHO and UNICEF, 2009).
[3] Tanzania Ministry of Finance & Economic Affairs, 2008.

See *Appendix A* for greater detail on the proportion of children, by age category, who suffered severe and moderate to severe malnutrition symptoms.

Figure 1: **Proportion of Under-five Population Suffering from Moderate to Severe Malnutrition by Age**
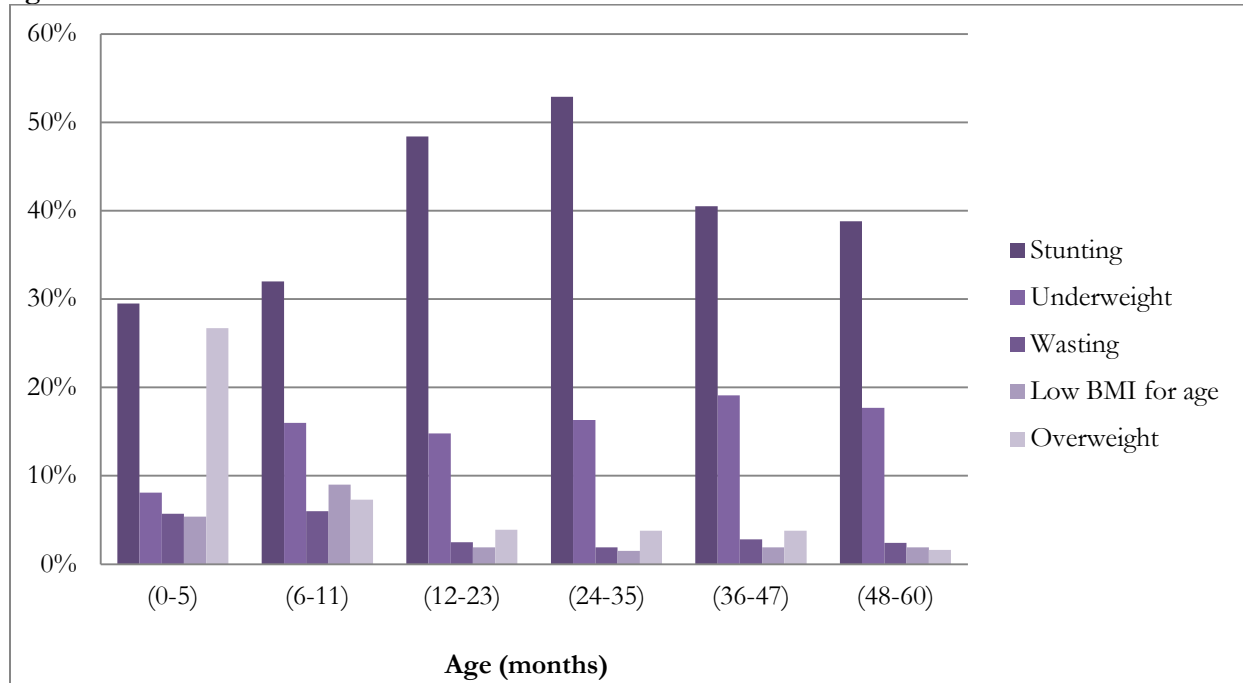
Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6

Nutrition: Variation across Agricultural and Non-Agricultural Households

A higher proportion of children from agricultural households suffered from stunting and were underweight than children from non-agricultural households, as illustrated in *Figure 2* below. They also were slightly more likely to have a low BMI for age, although the difference was not statistically significant. A slightly higher proportion of children from non-agricultural households were overweight, although this difference was also not statistically significant. *Appendix B* includes confidence intervals and Wald test results for the comparison of agricultural and non-agricultural households.

Figure 2: **Proportion of Under-five Population Suffering from Malnutrition, by Agricultural and Non-Agricultural Households**
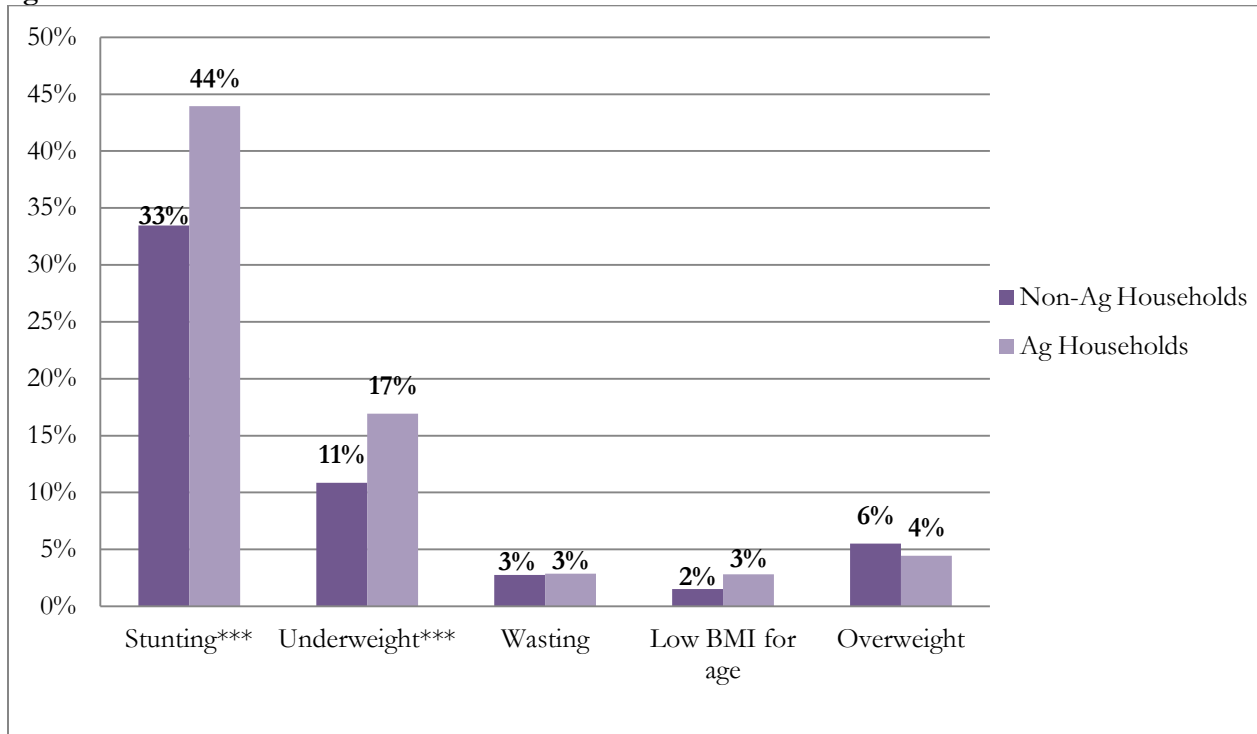
***Statistically significant at the .01 level   *Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6*

Figure 3 shows the proportion of boys and girls under five years old that suffered from each of the malnutrition indicators. Boys were slightly more likely to experience stunting and be underweight compared to girls. See *Appendix C* for a detailed overview of differences by gender of child and age category.

Figure 3: **Proportion of Under-five Population Suffering from Malnutrition, by Gender of Child**
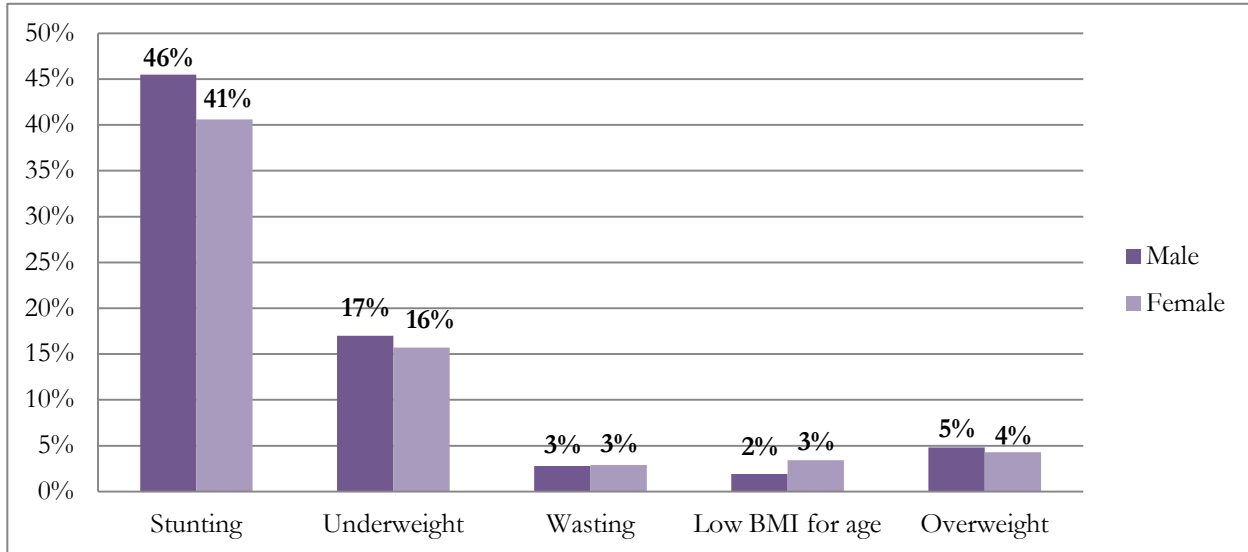
Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6

As shown in *Figure 4* a higher proportion of children from female-headed households exhibited each of the indicators of malnutrition as compared to male-headed households. However, none of these differences were statistically significant.

Figure 4: **Proportion of Under-five Population Suffering from Malnutrition, by Gender of Household Head**

Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6
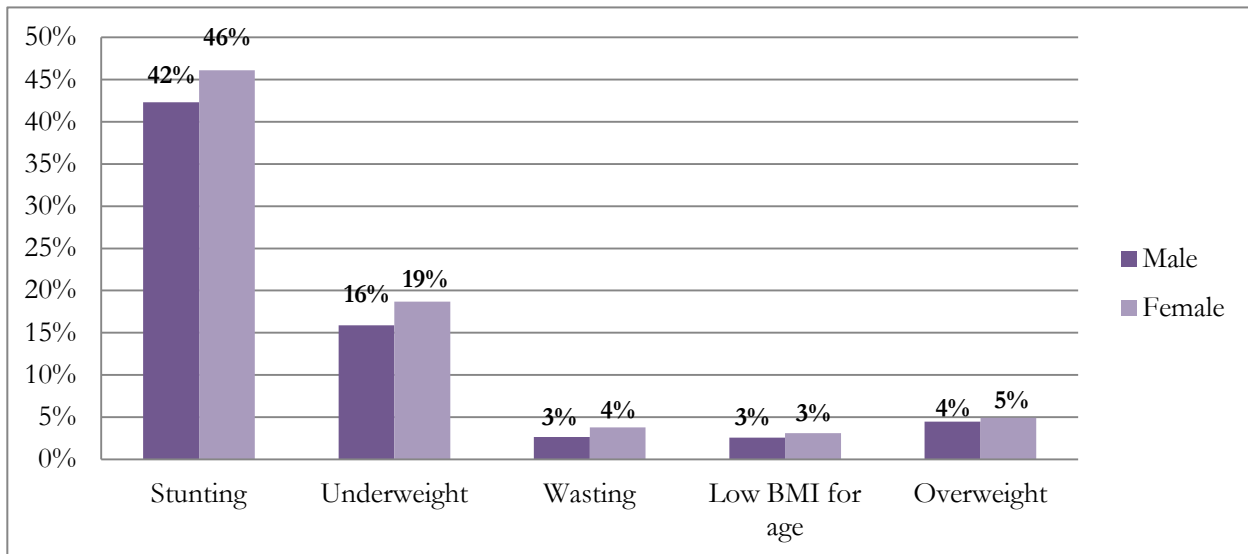
Figures 5 through *9* show the proportion of children under-five that exhibited each of the five key indicators of malnutrition. Proportions are based on observations from both agricultural and non-agricultural households. See *Appendix D* for sample sizes, confidence intervals, and Wald test p-values for each indicator by zone.

As shown in **Figure 5** the proportion of children under-five who suffered from moderate to severe stunting varied greatly by zone, ranging from 31% in Zanzibar (n=223) to 52% in the Southern Highlands (n=240). These differences were statistically significant.[4]

Figure 5: **Proportion of Under-five Population Suffering Moderate to Severe Stunting by Zone*****
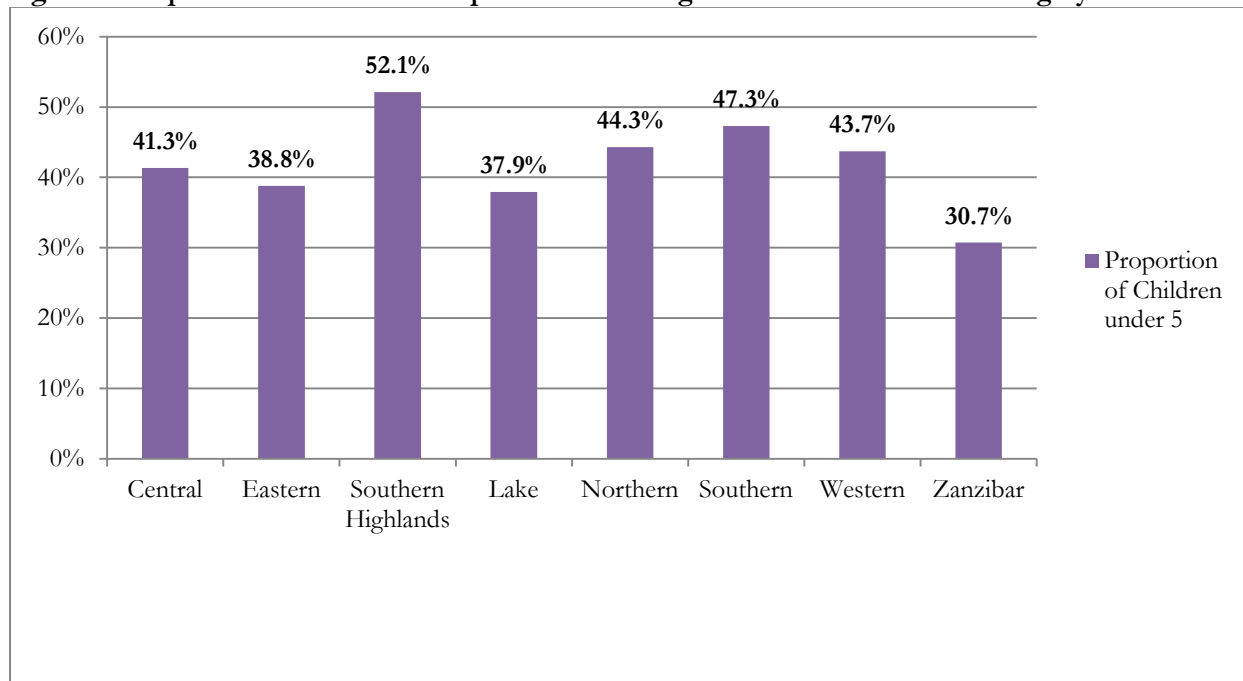
*** F-test shows statistically significant variation between zones at the .01 level   Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6

Differences in the proportion of children who were moderately to severely underweight were not statistically significant across administrative zones, as evidenced in *Figure 6*. The proportion of children suffering from low weight for age was highest in the Southern zone (21%, 47 out of 232). The Western zone had the lowest proportion of children under-five who were moderately to severely underweight (56 out of 368, or 15%).

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[4] Significant at the .01 level, p>0.0057.

Figure 6: Proportion of Under-five Population Moderately to Severely Underweight, by Zone
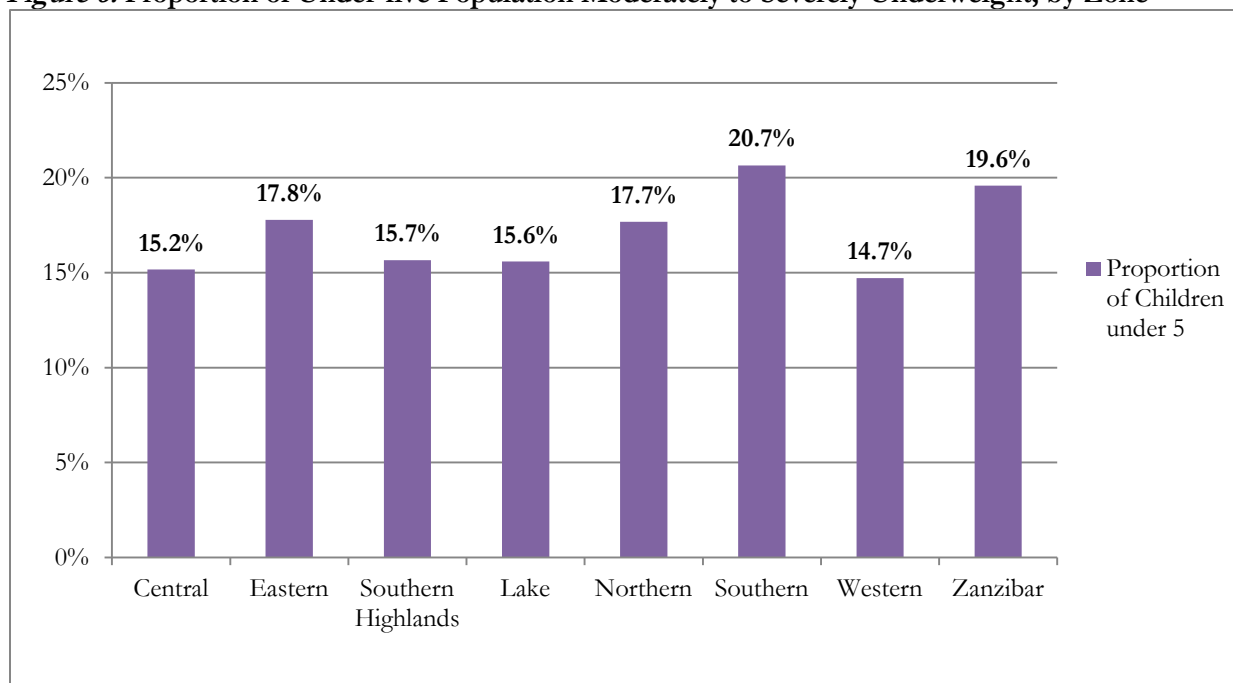
Children in Zanzibar were more likely to suffer from wasting compared to other zones (25 out of 370, or 7%), as shown in *Figure 7*. Very few observations of wasting existed among children living in the Central zone (2 out of 124, or 1%).

Figure 7: Proportion of Under-five Population Suffering from Moderate to Severe Wasting, by Zone
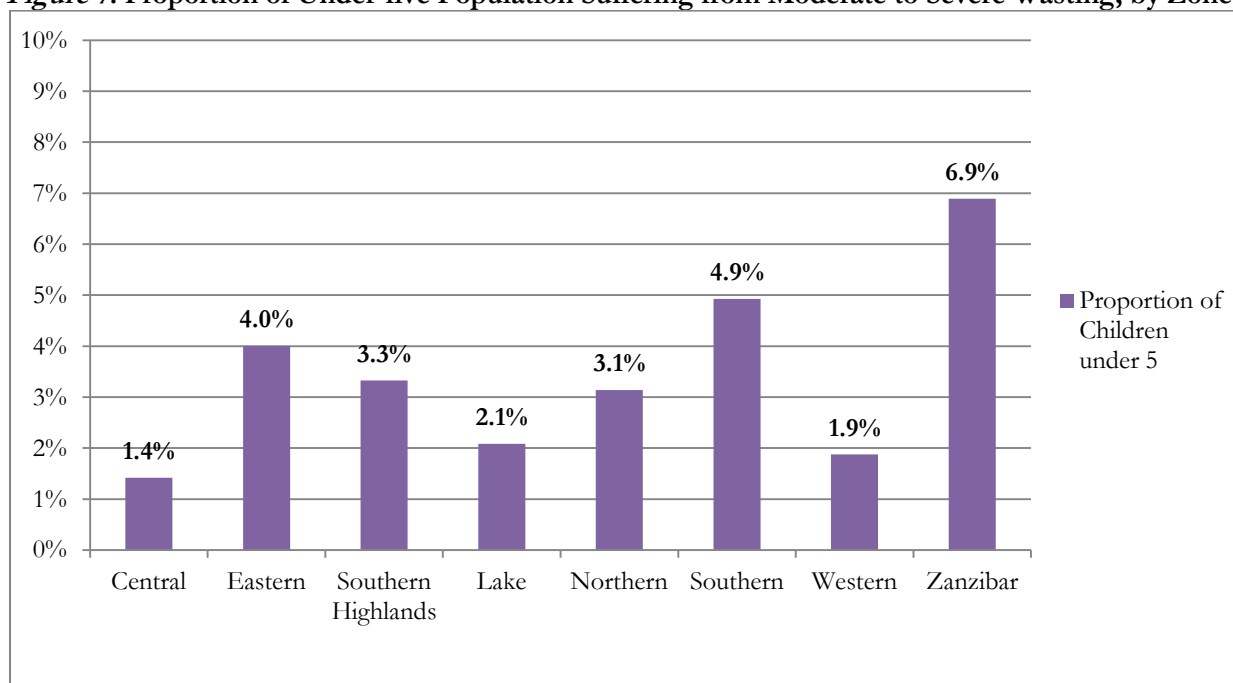
Each administrative zone had less than 20 observations of children with moderate to severely low BMI for their age; however, the difference in proportions across administrative zones was statistically significant (*Figure 8*). Additional details on confidence intervals and Wald test p-values are provided in *Appendix D*.

Figure 8:* Proportion of Under-five Population with Moderate to Severely Low BMI for Age, by Zone
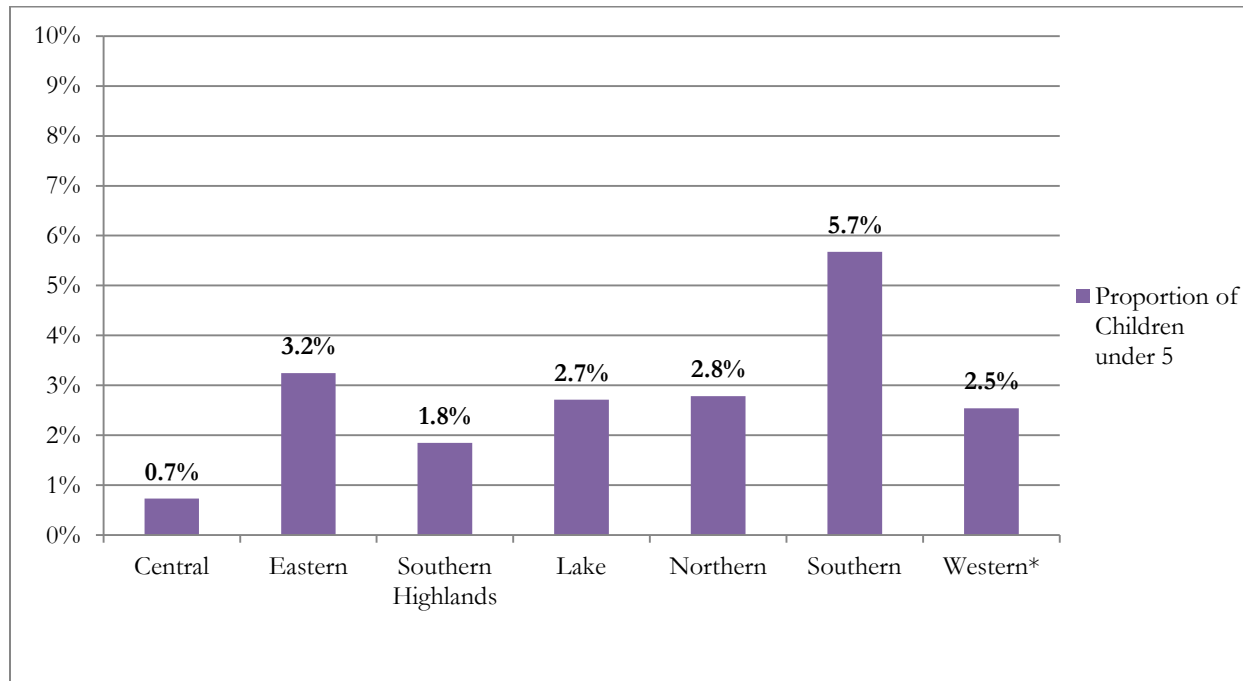
* F-test shows statistically significant variation between zones at the .10 level   *Questions sbq2, sbq4, suq1, suq2, suq4, suq5, suq6*

The estimated proportion of the under-five population that was moderately to severely overweight was less than 10% within each administrative zone, as displayed in *Figure 9*. Despite the low proportions, the difference in proportions was significant. The Southern Highlands had the greatest proportion of children who were overweight (7%, 17 out of 262) compared to the Central zone, which had the lowest overall proportion (2%, 2 out of 124).

Figure 9: Proportion of Under-five Population Moderately to Severely Overweight, by Zone*

The zonal variation may capture differences in the urban and rural make-up of each zone as well as geographical variation. Therefore future analysis could examine malnutrition by zone of only children in agricultural households.

References

de Onis M, Blossner M, Borghi E, Morris R, Frongillo EA. (2004). "Methodology for estimating regional and global trends of child malnutrition." *International Journal of Epidemiology*. 33:1260–70. Retrieved from http://ije.oxfordjournals.org/content/early/2004/11/12/ije.dyh202.full.pdf+html?ijkey=jY4FtBlsxVxWA&keytype=ref&siteid=intjepid

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Proportion of Under-five Population Suffering Moderate to Severe Stunting

Age (months)	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-60)	17.4%	[17.4%, 17.4%]	43%	[42.9%, 43%]	5,218,678
(0-5)	17.1%	[17%, 17.3%]	29.5%	[29.4%, 29.7%]	304,769
(6-11)	16.1%	[16%, 16.2%]	32%	[31.9%, 32.2%]	487,845
(12-23)	20.3%	[20.2%, 20.4%]	48.4%	[48.3%, 48.5%]	1,029,537
(24-35)	20.7%	[20.6%, 20.7%]	52.9%	[52.8%, 53%]	1,142,541
(36-47)	17.6%	[17.5%, 17.7%]	40.5%	[40.4%, 40.6%]	1,103,129
(48-60)	11.9%	[11.9%, 12%]	38.8%	[38.7%, 38.9%]	1,150,858

Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population*

Proportion of Under-five Population Moderately to Severely Underweight

Age (months)	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-60)	3.6%	[3.6%, 3.6%]	16.4%	[16.3%, 16.4%]	5,295,794
(0-5)	3.6%	[3.5%, 3.6%]	8.1%	[8%, 8.2%]	319,498
(6-11)	3.8%	[3.8%, 3.9%]	16%	[15.9%, 16.1%]	502,403
(12-23)	3.6%	[3.5%, 3.6%]	14.8%	[14.7%, 14.8%]	1,043,170
(24-35)	2.5%	[2.5%, 2.6%]	16.3%	[16.2%, 16.4%]	1,151,046
(36-47)	3.7%	[3.7%, 3.8%]	19.1%	[19%, 19.1%]	1,110,127
(48-60)	4.6%	[4.6%, 4.6%]	17.7%	[17.6%, 17.7%]	1,169,550

Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population*

Proportion of Under-five Population Suffering from Moderate to Severe Wasting

Age (months)	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-60)	0.8%	[0.8%, 0.8%]	2.8%	[2.8%, 2.9%]	5,801,818
(0-5)	2.9%	[2.8%, 2.9%]	5.7%	[5.6%, 5.8%]	299,283
(6-11)	2.5%	[2.4%, 2.5%]	6.0%	[6%, 6.1%]	484,883
(12-23)	1.0%	[1%, 1.1%]	2.5%	[2.5%, 2.5%]	1,032,834
(24-35)	0.1%	[0.1%, 0.1%]	1.9%	[1.8%, 1.9%]	1,145,310
(36-47)	0.6%	[0.6%, 0.6%]	2.8%	[2.7%, 2.8%]	1,101,295
(48-60)	0.4%	[0.4%, 0.4%]	2.4%	[2.4%, 2.4%]	1,161,551

Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population*

Proportion of Under-five Population Suffering from Moderate to Severely Low BMI for Age

Age (months)	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-60)	0.8%	[0.8%, 0.8%]	2.7%	[2.7%, 2.7%]	5,254,144
(0-5)	3.8%	[3.8%, 3.9%]	5.4%	[5.3%, 5.5%]	305,588
(6-11)	2.4%	[2.4%, 2.5%]	9%	[8.9%, 9.1%]	493,209
(12-23)	0.8%	[0.7%, 0.8%]	1.9%	[1.9%, 1.9%]	1,037,834
(24-35)	0%	[0%, 0.1%]	1.5%	[1.4%, 1.5%]	1,142,542
(36-47)	0.6%	[0.5%, 0.6%]	1.9%	[1.9%, 2%]	1,110,052
(48-60)	0.3%	[0.3%, 0.3%]	1.9%	[1.8%, 1.9%]	1,164,919

Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population*

Proportion of Under-five Population Moderately to Severely Overweight

Age (months)	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-60)	1%	[1%, 1.1%]	4.6%	[4.5%, 4.6%]	5,801,818
(0-5)	6.2%	[6.1%, 6.3%]	26.5%	[26.3%, 26.7%]	299,283
(6-11)	3.3%	[3.2%, 3.3%]	7.2%	[7.1%, 7.3%]	484,883
(12-23)	0.8%	[0.8%, 0.9%]	3.8%	[3.8%, 3.9%]	1,032,834
(24-35)	0.7%	[0.7%, 0.7%]	3.8%	[3.7%, 3.8%]	1,145,310
(36-47)	0.3%	[0.3%, 0.3%]	3.8%	[3.8%, 3.8%]	1,101,295
(48-60)	0.2%	[0.2%, 0.2%]	1.6%	[1.6%, 1.6%]	1,161,551

**Proportion above +3 standard deviations of the NCHS/ WHO international reference population*
Proportion above +2 and +3 standard deviations of the NCHS/ WHO international reference population

Appendix B   Malnutrition by Gender and Agricultural versus Non-Agricultural Household

Proportion of Under-five Population Suffering from Malnutrition by Male- and Female-Headed Households

	Household Head	Estimated Proportion	95% C.I.	Observations	Wald test P-value
Stunting	Male	42%	[39%, 46%]	712	0.301
	Female	46%	[39%, 53%]	152	
Underweight	Male	16%	[14%, 18%]	284	0.3523
	Female	19%	[13%, 24%]	63	
Wasting	Male	3%	[2%, 3%]	62	0.3465
	Female	4%	[2%, 6%]	19	
Low BMI for age	Male	3%	[2%, 3%]	48	0.6446
	Female	3%	[1%, 5%]	14	
Overweight	Male	4%	[3%, 6%]	87	0.7025
	Female	5%	[3%, 7%]	20	

Proportion of Under-five Population Suffering from Malnutrition by Non-Ag and Agricultural Households

		Estimated Proportion	95% C.I.	Observations	Wald test P-value
Stunting	Non-Ag Households	33%	[27%, 40%]	114	0.0048
	Ag Households	44%	[41%, 47%]	750	
Underweight	Non-Ag Households	11%	[7%, 15%]	48	0.0077
	Ag Households	17%	[15%, 19%]	299	
Wasting	Non-Ag Households	3%	[1%, 5%]	13	0.9232
	Ag Households	3%	[2%, 4%]	68	
Low BMI for age	Non-Ag Households	2%	[0%, 3%]	9	0.1678
	Ag Households	3%	[2%, 4%]	53	
Overweight	Non-Ag Households	6%	[3%, 8%]	22	0.4346
	Ag Households	4%	[3%, 6%]	85	

Appendix C   Malnutrition by Gender of Child

Proportion of Under-five Population Suffering from Moderate to Severe Stunting, by Gender of Child and Age Category

Age (months)	Gender of Child	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-5)	Boys	22.2%	[22%, 22.4%]	32.1%	[31.8%, 32.3%]	142,918
	Girls	12.7%	[12.5%, 12.8%]	27.3%	[27.1%, 27.6%]	161,851
(6-11)	Boys	23.7%	[23.5%, 23.9%]	42.4%	[42.2%, 42.6%]	241,023
	Girls	8.7%	[8.6%, 8.8%]	22%	[21.8%, 22.1%]	246,821
(12-23)	Boys	23.9%	[23.8%, 24%]	53.5%	[53.4%, 53.6%]	496,310
	Girls	17%	[16.9%, 17.1%]	43.7%	[43.5%, 43.8%]	533,227
(24-35)	Boys	20%	[19.9%, 20.1%]	52.1%	[51.9%, 52.2%]	552,082
	Girls	21.3%	[21.2%, 21.4%]	53.7%	[53.5%, 53.8%]	590,459
(36-47)	Boys	17.8%	[17.7%, 17.9%]	43.6%	[43.5%, 43.7%]	507,944
	Girls	17.4%	[17.3%, 17.5%]	37.9%	[37.7%, 38%]	595,185
(48-60)	Boys	12.8%	[12.7%, 12.8%]	38.5%	[38.4%, 38.7%]	566,032
	Girls	11.2%	[11.1%, 11.2%]	39%	[38.9%, 39.1%]	584,826
(0-60)	Boys	19.2%	[19.1%, 19.2%]	45.5%	[45.4%, 45.6%]	2,506,309
	Girls	15.7%	[15.7%, 15.8%]	40.6%	[40.6%, 40.7%]	2,712,369

*Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population

Proportion of Under-five Population Moderately to Severely Underweight, by Gender of Child and Age Category

Age (months)	Gender of Child	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-5)	Boys	2.5%	[2.5%, 2.6%]	4%	[3.9%, 4.1%]	147,385
	Girls	4.4%	[4.3%, 4.5%]	11.6%	[11.4%, 11.7%]	172,113
(6-11)	Boys	7.3%	[7.2%, 7.4%]	14.8%	[14.6%, 14.9%]	247,817
	Girls	0.4%	[0.4%, 0.4%]	17.2%	[17.1%, 17.4%]	254,586
(12-23)	Boys	4.7%	[4.7%, 4.8%]	17.6%	[17.5%, 17.7%]	505,866
	Girls	2.5%	[2.4%, 2.5%]	12.1%	[12%, 12.2%]	537,304
(24-35)	Boys	2.4%	[2.4%, 2.4%]	16.5%	[16.4%, 16.6%]	557,670
	Girls	2.7%	[2.6%, 2.7%]	16.1%	[16%, 16.2%]	593,376
(36-47)	Boys	5.1%	[5%, 5.2%]	19.9%	[19.8%, 20%]	508,598
	Girls	2.6%	[2.6%, 2.6%]	18.3%	[18.2%, 18.4%]	601,529
(48-60)	Boys	4.6%	[4.5%, 4.6%]	18.9%	[18.8%, 19%]	575,421
	Girls	4.6%	[4.5%, 4.7%]	16.5%	[16.4%, 16.6%]	594,129
(0-60)	Boys	4.4%	[4.4%, 4.4%]	17%	[17%, 17.1%]	2,542,756
	Girls	2.9%	[2.9%, 3%]	15.7%	[15.7%, 15.8%]	2,753,037

Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population*

Proportion of Under-five Population Moderately to Severely Wasting, by Gender of Child and Age Category

Age (months)	Gender of Child	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-5)	Boys	2.8%	[2.7%, 2.9%]	2.8%	[2.7%, 2.9%]	134,816
	Girls	2.9%	[2.8%, 3%]	8.1%	[8%, 8.3%]	164,467
(6-11)	Boys	1.7%	[1.7%, 1.8%]	7.5%	[7.4%, 7.6%]	237,246
	Girls	3.2%	[3.1%, 3.2%]	4.6%	[4.6%, 4.7%]	247,637
(12-23)	Boys	0.6%	[0.6%, 0.6%]	2.1%	[2%, 2.1%]	496,668
	Girls	1.5%	[1.4%, 1.5%]	2.9%	[2.9%, 2.9%]	536,165
(24-35)	Boys	0%	[0%, 0%]	2.5%	[2.5%, 2.6%]	554,851
	Girls	0.2%	[0.2%, 0.2%]	1.3%	[1.2%, 1.3%]	590,459
(36-47)	Boys	0.9%	[0.9%, 0.9%]	2.8%	[2.8%, 2.9%]	506,110
	Girls	0.3%	[0.3%, 0.3%]	2.7%	[2.7%, 2.8%]	595,185
(48-60)	Boys	0.5%	[0.5%, 0.6%]	1.5%	[1.5%, 1.6%]	571,810
	Girls	0.3%	[0.3%, 0.4%]	3.2%	[3.2%, 3.3%]	589,741
(0-60)	Boys	0.7%	[0.7%, 0.7%]	2.8%	[2.7%, 2.8%]	2,770,114
	Girls	0.9%	[0.9%, 0.9%]	2.9%	[2.9%, 2.9%]	3,031,704

*Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population

Proportion of Under-five Population with Moderately to Severely Low BMI for Age, by Gender of Child and Age Category

Age (months)	Gender of Child	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-5)	Boys	0%	[0%, 0%]	0%	[0%, 0%]	133,908
	Girls	6.8%	[6.7%, 7%]	9.7%	[9.5%, 9.8%]	171,680
(6-11)	Boys	0.5%	[0.5%, 0.5%]	1.9%	[1.8%, 1.9%]	2,513,031
	Girls	1.1%	[1.1%, 1.1%]	3.4%	[3.4%, 3.4%]	2,741,113
(12-23)	Boys	0%	[0%, 0%]	0.7%	[0.7%, 0.7%]	497,809
	Girls	1.5%	[1.4%, 1.5%]	3%	[3%, 3.1%]	540,025
(24-35)	Boys	0%	[0%, 0%]	1.3%	[1.3%, 1.3%]	553,221
	Girls	0.1%	[0.1%, 0.1%]	1.6%	[1.6%, 1.7%]	589,320
(36-47)	Boys	0.9%	[0.9%, 0.9%]	1%	[1%, 1.1%]	508,523
	Girls	0.3%	[0.3%, 0.3%]	2.7%	[2.7%, 2.8%]	601,529
(48-60)	Boys	0.5%	[0.5%, 0.5%]	0.5%	[0.5%, 0.5%]	575,178
	Girls	0%	[0%, 0%]	3.2%	[3.1%, 3.2%]	589,741
(0-60)	Boys	1.7%	[1.6%, 1.7%]	11.5%	[11.4%, 11.6%]	244,392
	Girls	3.1%	[3.1%, 3.2%]	6.6%	[6.5%, 6.7%]	248,818

*Below -2 standard deviations of the NCHS/WHO international reference population
**Below -3 standard deviations of the NCHS/ WHO international reference population

Proportion of Under-five Population Moderately to Severely Overweight, by Gender of Child and Age Category

Age (months)	Gender of Child	Proportion Severe**	95% C.I.	Proportion Moderate to Severe *	95% C.I.	Estimated Population Size
(0-5)	Boys	13.7%	[13.5%, 13.9%]	36%	[36%, 36.5%]	134,816
	Girls	0.0%	[0%, 0%]	19%	[18.3%, 18.7%]	164,467
(6-11)	Boys	2.9%	[2.9%, 3%]	8%	[7.7%, 7.9%]	237,246
	Girls	3.6%	[3.6%, 3.7%]	7%	[6.5%, 6.7%]	247,637
(12-23)	Boys	0.9%	[0.9%, 0.9%]	4%	[3.6%, 3.7%]	496,668
	Girls	0.8%	[0.8%, 0.8%]	4%	[3.9%, 4%]	536,165
(24-35)	Boys	0.8%	[0.7%, 0.8%]	4%	[3.6%, 3.7%]	554,851
	Girls	0.6%	[0.6%, 0.6%]	4%	[3.8%, 3.9%]	590,459
(36-47)	Boys	0.4%	[0.4%, 0.4%]	4%	[3.9%, 4.1%]	506,110
	Girls	0.2%	[0.1%, 0.2%]	4%	[3.6%, 3.7%]	595,185
(48-60)	Boys	0.2%	[0.2%, 0.2%]	1%	[0.7%, 0.7%]	571,810
	Girls	0.2%	[0.2%, 0.2%]	3%	[2.4%, 2.5%]	589,741
(0-60)	Boys	1.4%	[1.4%, 1.4%]	5%	[4.8%, 4.8%]	2,770,114
	Girls	0.7%	[0.7%, 0.7%]	4%	[4.3%, 4.3%]	3,031,704

**Proportion above +3 standard deviations of the NCHS/ WHO international reference population
*Proportion above +2 and +3 standard deviations of the NCHS/ WHO international reference population

Appendix D   Malnutrition by Zone

Indicators of Malnutrition by Zone		Estimated Proportion	95% C.I.	Observations	Wald test P-value
Stunting	Southern Highlands	52.1%	[44.7%, 59.6%]	123 out of 240	0.0057
	Southern	47.3%	[39.6%, 55%]	108 out of 226	
	Northern	44.3%	[37.1%, 51.4%]	124 out of 281	
	Western	43.7%	[37.3%, 50.1%]	154 out of 358	
	Central	41.3%	[31.3%, 51.4%]	49 out of 119	
	Eastern	38.8%	[31.3%, 46.3%]	131 out of 348	
	Lake	37.9%	[30%, 45.9%]	106 out of 269	
	Zanzibar	30.7%	[23.4%, 38%]	69 out of 223	
Underweight	Southern	20.7%	[14.6%, 26.7%]	47 out of 232	0.7325
	Zanzibar	19.6%	[13.6%, 25.6%]	47 out of 232	
	Eastern	17.8%	[11.3%, 24.2%]	48 out of 353	
	Northern	17.7%	[11.8%, 23.6%]	51 out of 285	
	Southern Highlands	15.7%	[11.5%, 19.8%]	38 out of 245	
	Lake	15.6%	[10.7%, 20.5%]	42 out of 270	
	Central	15.2%	[7.8%, 22.5%]	18 out of 120	
	Western	14.7%	[11%, 18.4%]	56 out of 368	
Wasting	Zanzibar	6.9%	[3.3%, 10.5%]	25 out of 370	0.1248
	Southern	4.9%	[2%, 7.9%]	11 out of 254	
	Eastern	4.0%	[1.8%, 6.2%]	11 out of 385	
	Southern Highlands	3.3%	[0.9%, 5.7%]	9 out of 262	
	Northern	3.1%	[1.1%, 5.2%]	10 out of 309	
	Lake	2.1%	[0.6%, 3.6%]	6 out of 301	
	Western	1.9%	[0.3%, 3.5%]	7 out of 411	
	Central	1.4%	[-1.4%, 4.2%]	2 out of 124	
Low BMI for age	Southern	5.7%	[2.4%, 9%]	12 out of 228	0.0725
	Zanzibar	5.6%	[1.9%, 9.4%]	14 out of 220	
	Eastern	3.2%	[1%, 5.5%]	6 out of 349	
	Northern	2.8%	[0.9%, 4.7%]	8 out of 283	
	Lake	2.7%	[0.9%, 4.5%]	7 out of 270	
	Western	2.5%	[1%, 4.1%]	9 out of 365	
	Southern Highlands	1.8%	[0.3%, 3.4%]	5 out of 241	
	Central	0.7%	[-0.7%, 2.2%]	1 out of 120	

Overweight	Southern Highlands	6.9%	[3.1%, 10.7%]	17 out of 262	0.0617
	Northern	5.6%	[3.2%, 8.1%]	17 out of 309	
	Lake	4.8%	[2.1%, 7.6%]	16 out of 301	
	Southern	4.8%	[2.1%, 7.4%]	12 out of 254	
	Western	4.3%	[2.1%, 6.5%]	18 out of 411	
	Eastern	3.2%	[1.6%, 4.9%]	16 out of 385	
	Zanzibar	2.1%	[0.4%, 3.7%]	9 out of 370	
	Central	1.6%	[-0.6%, 3.9%]	2 out of 124	