MYANMAR

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Stunting and Wasting Rates Among Pre-School Age Children in Yangon and Ayeyarwady, October–November 2023

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Summary

The outbreak of COVID-19 in 2020 and the military takeover of the democratically elected government in early 2021 has largely prevented the implementation of in-person surveys necessary for the collection of anthropometric data. To redress this knowledge gap, we implemented an in-person survey of mothers (caregivers) and young children in urban and peri-urban Yangon and rural Ayeyarwady in October and November 2023. This in-person 11th round of the Rural-Urban Food Security Survey (RUFSS) involved data collection on a wide range of socioeconomic indicators, but also child anthropometric outcomes such as length and weight. In this study, we report results for height-for-age z scores (HAZ) and weight-for-height z scores (WHZ) relative to international reference standards, as well as stunting (HAZ < -2) and wasting (WHZ < -2). Because of high and rising rates of overweight/obesity among adults in the RUFSS survey, we also examined the number of children were overweight (WHZ > +2) and mildly overweight (+1 <WHZ< +2).

Around 18 percent of children in the sample were stunted, and around 8 percent were wasted, while only 1 percent were overweight. Although the RUFSS data are not truly representative of Yangon because of oversampling of poorer peri-urban households (who we expected to have high rates of stunting and wasting than the general population of under-5 children), we find that stunting rates in the RUFSS sample are substantially lower than in the DHS 2015–16 Yangon sub-sample, suggesting significant improvement in a number of underlying determinants of malnutrition. However, 26 percent of the sample reported moderate or severe food insecurity, and food insecurity was strongly associated with both stunting and wasting. Moreover, the sub-sample of children from extremely food-insecure households had exceptionally high rates of both stunting (38 percent) and wasting (18 percent).

A key programmatic implication is that nutrition-sensitive social protection transfers should consider targeting resources using the food insecurity experience scale (FIES), as well as other easily identifiable poverty indicators such as household assets.

Introduction

In this paper, we report results on maternal and child anthropometric measures using data collected in Yangon and Ayeyarwady as part of the Rural-Urban Food Security Survey (RUFSS). This in-person study, conducted between October–November 2023, follows households that were previously part of a series of 10 rounds of high-frequency telephone surveys conducted between June 2020 and December 2021 (Headey et al., 2022). The initial sample for the survey consisted of pregnant mothers who were registered from antenatal clinics in peri-urban Yangon in early 2020. In this latest survey round, we revisited this sample of mother-child pairs to gather anthropometric data (along with other nutrition-relevant indicators) with the objective of estimating the prevalence of stunting, wasting, and maternal body mass (BMI). We successfully followed up with 702 mother-child pairs located in peri-urban Yangon and townships in Ayeyarwady.

Since COVID-19 and the military takeover in February 2021, Myanmar has faced a period of falling real income, rising poverty, increased food insecurity, and declining dietary quality. At the national level these concerning trends have been amply documented by IFPRI's Myanmar Household Welfare Survey (MHWS) and associated food vendor surveys. Nationally, the increase in the percentage of the population living in income-poor households increased from 62 percent in February–June 2023 to 72 in August–November 2023 (MAPSA, 2024a). Unsurprisingly, rising poverty has led to increased food insecurity and declining dietary diversity, most notably among adults, and adult women especially. Specifically, inadequate diet diversity among adults rose from 20.6 percent to 30.9 percent over December 2021–February 2022 to October–December 2022, although the increase was larger for women (12.1 percentage points) compared to men (8.4 percentage points). However, we the MHWS has not yet indicated clear signs of reduced dietary diversity in young children.

Although MHWS phone surveys have been able to track trends in both the immediate and underlying determinants of malnutrition, the challenges of reaching vulnerable Myanmar households in person has precluded assessment of anthropometric outcomes. However, in October and November 2023, IFPRI and its research partners were able to conduct collect anthropometric data from children and their caregivers (mothers) in urban and peri-urban Yangon and rural Ayeyarwady. While the survey is not strictly representative even of Yangon, we show below that caregiver (mother) education levels in the Demographic Health Survey (DHS) of 2015–16 and the RUFSS 2023 Yangon sub-samples are quite similar, suggesting the two surveys are at least broadly comparable.

Sample characteristics

The data used in this research note come from an in-person survey, conducted between October–November 2023, sampling 702 households that were previously part of a series of 10 rounds of high-frequency telephone surveys conducted between June 2020 and December 2021 (Headey et al. 2022). Full details of the in-person follow-up is provided in a separate MAPSA project note (MAPSA, 2024b).

The original RUFSS sample consisted of pregnant mothers who were registered in antenatal clinics in peri-urban Yangon in early 2020. As a result, most children in the sample were born in 2020 and hence have an average age of 37 months (Table 1), and most fall in the range of 35–41 months (Figure 1). For the purpose of this analysis, the small sample of children under 18 months old are excluded to improve comparability. Most were first born children (60 percent). Overall, the total number of children within the selected age range (18–48 months old) was 693 (see Table 1).

Table 1. Profile of Index child: Distribution of index child's age (in months), Gender, Birth order and having a birth certificate, and vaccination card, and attend ECE program, based on the current residence of respondents (state/region)

	Residence		All sample (N=702)	Total Sample (Number of children)
	Yangon (N=671)	Ayeyarwady (N=31)		
	Percentage (%)			
Age of index child				
Mean age (in months) (Min – Max)	37 (0.8–48)	38 (9–42)	37 (1–48)	702
Gender of index child				
Girl	49.5	41.9	49.1	345
Boy	50.5	58.1	50.9	357
Birth order				
First birth	60.1	74.2	60.7	426
2–3	34.7	25.8	34.3	241
4–5	4.8	0	4.6	32
6+	0.5	0	0.4	3
Child has a birth certificate	92.3	96.8	92.5	649

Source: RUFSS follow-up survey, October–November 2023.

Figure 1. Age distribution of Index Child (in months) (N=702 households)
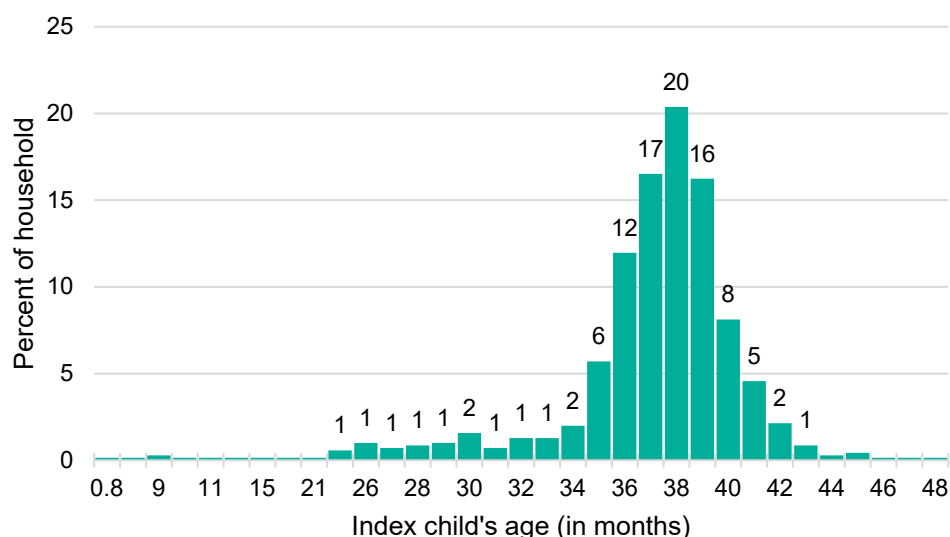
Source: RUFSS Follow-up In-person Survey, October –November 2023. Observations: 702

Table 2 provides some descriptive data on some selected maternal and household characteristics. 96 percent of the sample resides in Yangon, mostly in peri-urban households, although relatively few households cite farming as the principal income source. Around one quarter of mothers have primary or incomplete and another 30 percent have some secondary education without completing high school, while 27 percent went to high school and 17 percent have at least some tertiary education. The sample of households is quite poor. We collected information on 10 key assets and classified households as asset-poor if they had 0–3 assets, asset-low with 4–7 assets and asset-rich with 8–10 assets. 44 percent of the sample were asset poor and 46 percent asset low. For parental livelihood situations, the majority of households relied on salary work (38 percent), followed by unskilled labor (29 percent), trade (27 percent) and farming (5 percent). Finally, different

kinds of food insecurity experiences in the past month were used to classified households as severely, moderately, and mildly insecure (Cafiero, Viviani and Nord, 2018). 44 percent of households reported some form of food insecurity, including 13 percent who were moderately insecure and 7 percent who were severely food insecure.

Table 2. Maternal and household characteristics of the sample

	Share of sampled households (%)
Current residence	
Yangon	96
Ayeyarwady	4
Mother's education	
Primary or lower	26
Secondary	30
High school	27
More than high school	17
Asset class	
Asset-poor (0–3 assets)	44
Asset-low (4–7 assets)	46
Asset-rich (8–10 assets)	10
Livelihood	
Farming	5
Other livelihoods	1
Salary	38
Trade	27
Unskilled labor	29
Food insecurity (FIES)	
Severe FIES	7
Moderate FIES	13
Mild FIES	24
No food insecurity	56

Source: RUFSS Follow-up In-person Survey, October–November 2023. Observations: 702 Note: Asset categories are defined from a list of 10 assets separated into three groups, namely, asset poor (0-3 assets), Asset-low (4-6 assets), and Asset-rich (7-10 assets).

Figure 2 compares education status of caregivers between the DHS 2015–16 and RUFSS 2023 Yangon sub-samples. Education status is a relatively good indicator to compare over time, because it only changes relatively slowly across cohorts of mothers. On the one hand, the RUFSS sample is drawn from relatively poor parts of Yangon, especially peri-urban Yangon, but on the other hand all mothers of these children at least attended antenatal clinics, such that these two factors may balance each other out somewhat. Interestingly, education levels across the two samples are quite similar, although there are more mothers in RUFSS with no education (6 percent vs 2 percent), and somewhat fewer mothers with secondary and tertiary education.

Figure 2. Comparisons of education status of caregivers in the DHS 2015–16 and RUFSS 2023 Yangon sub-samples
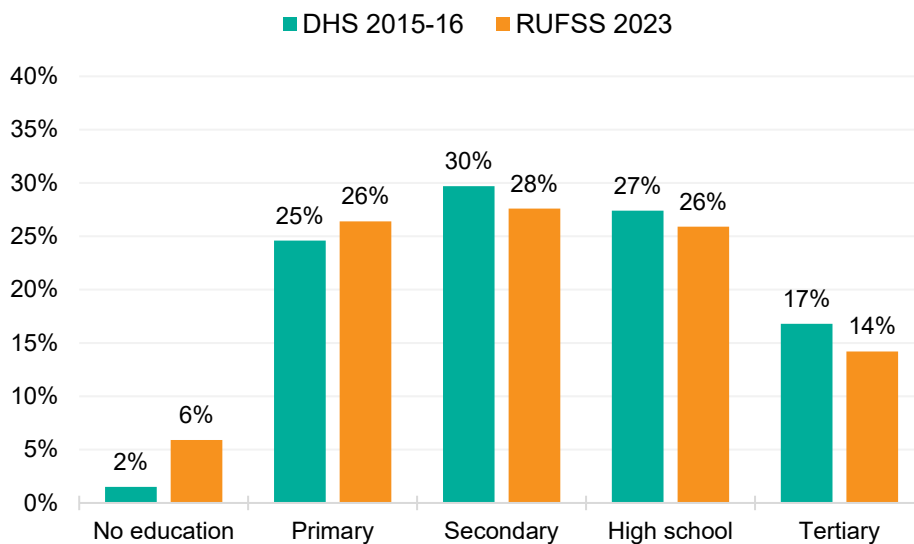

Source: Authors' estimates from DHS 2015–16 (MOHS and ICF-International, 2017) and RUFSS 2023.

## Nutrition status of children

Figures 3 and 4 report distributions of height for age z-scores (HAZ) and weight-for-height z-scores (WHZ) respectively. HAZ and WHZ distributions are approximately normal, but with the bulk of the sample distributed below 0 (the international growth reference standard) (WHO, 2006). Vertical dashed lines show various cut-offs, including the -2 standard deviation cut-off used to define moderate/severe stunting or wasting.

Figure 3. Kernel density plot for height for age z-score (HAZ)
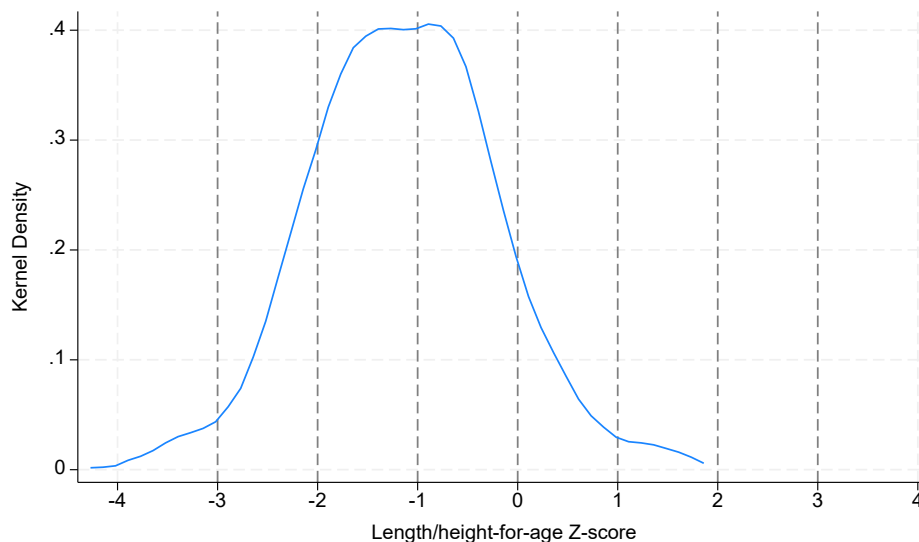
Source: RUFSS Follow-up In-person Survey, October–November 2023. Observations: 702

Figure 4. Kernel density plot for weight for height z-score (WHZ)
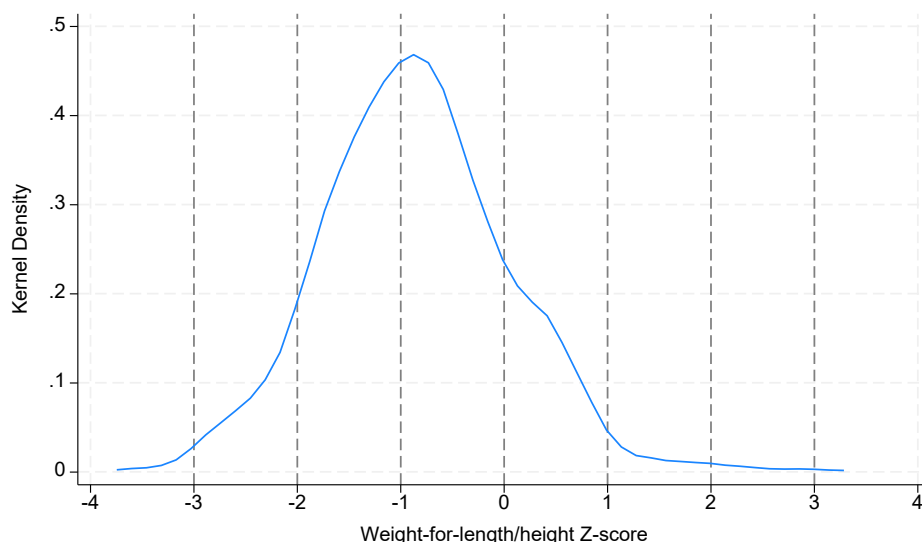
Source: RUFSS Follow-up in-person Survey, October–November 2023. Observations:702

17.7 percent of children in the sample were stunted and 2.3 percent were severely stunted, indicating chronic undernourishment (Table 3), while 8.7 percent were wasted (indicating acute undernutrition), though just 0.4 percent were severely wasted. We also collected data on low middle upper arm circumference (MUAC), but this was very rare (<2 percent). MUAC results are reported in the Appendix.

When we explore stunting and wasting patterns by background characteristics (Table 3), we find that these conditions become more prevalent as children grow older. Boys have a higher prevalence of stunting and wasting - which is typical in LMIC populations (Alderman and Headey, 2018) - while prevalence also increases when the child is of a higher birth order. The proportion of children who are stunted or wasted is much higher for mothers with low BMI (31 percent) compared to mothers with normal or above normal BMI (<20 percent), suggesting either a causal effect of poor maternal nutrition on child nutrition, or common household-level nutritional insults affecting both mother and child (e.g. poor food security, poor dietary practices, poor WASH conditions, etc.).

The percentages of children who are stunted declines with more maternal education (though somewhat modestly), but declines more sharply with increasing household wealth: 22.6 percent of children in the poorest asset group are stunted compared to just 9.2 percent in the wealthiest asset group. Consistent with results for maternal BMI and household wealth, there is a very strong association between household food insecurity and child stunting: children of mothers who reported severe food insecurity had a stunting rate of 37.8 percent, compared to 22.2 percent for moderately food insecure households and 11.3 percent for mildly food insecure households.

Table 3. Stunting prevalence and mean height-for-age Z scores by background characteristics

| Background characteristics | Height-for-age | | | |
	Severe Stunted (Percentage below -3 SD)	Stunted (Percentage below -2 SD) [2]	Mean HAZ-score (SD)	Sample Share (%)
Child's age groups				
18-35 months	1.7	14.5	-1.0	17
36-48 months	2.4	18.3	-1.2	83
Child's sex				
Male	2.9	19.1	-1.2	51
Female	1.8	16.2	-1.1	49
Birth order				
First birth	1.9	16.1	-1.1	61
2-3	2.1	17.5	-1.1	34
4+	9.4	40.6	-1.5	5
Maternal BMI				
Underweight (BMI < 18.5)	4.8	31.0	-1.4	6
Normal (BMI 18.5 – 23)	3.8	19.9	-1.3	31
Overweight (BMI 23 – 27.5)	0.8	17.5	-1.0	35
Obese (BMI > 27.5)	2.8	13.4	-1.0	21
Current Residence				
Yangon	2.4	17.1	-1.1	96
Ayeyarwady	0	30.0	-1.5	4
Mother's education				
Primary or lower	2.9	20.7	-1.3	27
Secondary	2.5	18.1	-1.2	30
High school	2.1	17.5	-1.1	27
More than high school	1.8	12.4	-0.9	16
Asset class				
Asset-poor	3.9	22.6	-1.3	44
Asset-low	0.9	14.7	-1.1	46
Asset-rich	1.5	9.2	-0.7	9
Food insecurity (FIES)				
Severe FIES	13.3	37.8	-1.7	7
Moderate FIES	1.1	22.2	-1.2	13
Mild FIES	0.6	11.3	-0.9	24
No food insecurity	2.1	17.1	-1.1	56
Total	2.3	17.7	-1.1	100

Source: RUFSS follow-up survey, October –November 2023. Note: Asset categories are defined from a list of 10 assets separated into three groups, namely, asset poor (0-3 assets), Asset-low (4-6 assets), and Asset-rich (7-10 assets).

Wasting follows broadly similar patterns. Unsurprisingly, there is a very strong association between wasting status and maternal BMI status since both capture underweight/thinness: children of underweight mothers have a wasting prevalence of 16.7 percent, which is very high. Children from

more food-insecure households are also much more likely to be wasted than children from less insecure or food-secure households. Specifically, children of mother's who reported severe food insecurity had a wasting rate (below -2 SD) of 11.1 percent, compared to 7.8 percent for moderately food insecure households and 6.6 percent for mildly food insecure households.

Table 4. Wasting prevalence and mean weight-for-height Z scores by background characteristics

| Background characteristics | Sample Share (%) | Severely wasted (<-3 SD) (%) | Weight-for-height | | | |
			Wasted (< -2 SD) [2] (%)	Mild Wasted (< -1 SD) [3] (%)	Mildly Overweight (1-2 SD) (%)	Mean WHZ (SDs)
Child age						
18–35 months	17	0.9	7.7	41.0	0.9	-0.8
36–48 months	83	0.4	8.9	43.9	1.6	-0.9
Child's sex						
Male	51	0.3	10.0	44.3	1.7	-0.9
Female	49	0.6	7.4	42.5	1.2	-0.8
Birth order						
First birth	61	0.7	8.5	44.3	1.4	-0.8
2-3	34	0.0	8.9	42.1	1.7	-0.9
4+	5	0.0	9.4	40.6	0.0	-0.9
Maternal BMI status						
Underweight (BMI < 18.5)	6	0.0	16.7	69.1	0.0	-1.3
Normal (BMI 18.5 – 23)	31	1.0	8.5	45.5	1.9	-0.9
Overweight (BMI 23 – 27.5)	35	0.4	7.9	42.9	1.3	-0.9
Obese (BMI > 27.5)	20	0.0	8.5	36.9	2.1	-0.6
Current residence						
Yangon	96	0.5	8.7	43.4	1.4	-0.8
Ayeyarwady	4	0.0	10.0	43.3	3.3	-0.9
Mother's education						
Primary or lower	27	0.0	6.6	39.9	2.2	-0.8
Secondary	30	0.5	10.3	49.5	2.0	-1.0
High school	27	0.5	9.5	43.9	0.0	-0.9
More than high school	16	0.9	8.0	37.2	1.8	-0.7
Asset class						
Asset-poor	44	0.3	7.5	44.4	1.6	-0.9
Asset-low	46	0.3	10.4	43.1	1.3	-0.9
Asset-rich	9	1.5	6.2	40.0	1.5	-0.7
Food insecurity (FIES)						
Severe FIES	7	0.0	11.1	46.7	0.0	-1.0
Moderate FIES	13	1.1	7.8	46.7	1.1	-0.8
Mild FIES	24	0.0	6.6	42.9	1.8	-0.9
No food insecurity	56	0.5	9.6	42.5	1.6	-0.8
Total	100	0.4	8.7	43.4	1.5	-0.9

Source: RUFSS follow-up survey, October–November 2023. Note: Asset categories are defined from a list of 10 assets separated into three groups, namely, asset poor (0–3 assets), Asset-low (4–6 assets), and Asset-rich (7–10 assets).

We examined mild wasting also, defined as WHZ<-1, as these children could be considered vulnerable to become moderately or severely wasted given additional nutritional insults. Around 40 percent of the sampled children have WHZ scores of less than -1, but there is not marked variation across demographic or socioeconomic characteristics, except low maternal BMI.

We also looked at children who might be classed as mildly overweight, having WHZ>+1 and less than +2, but less than 2 percent of children fell into this category, and typically overweight/obesity emerges much later in childhood or during adolescence.

Comparisons between the DHS 2015–16 and RUFSS 2023 Yangon sub-samples

As noted above, the RUFSS is not strictly representative of Yangon (and certainly not Ayeyarwady) because it oversamples peri-urban areas, which tend to be poorer than urban Yangon. That said, a comparison of maternal education levels between RUFSS 2023 and the DHS 2015–16 shows that they are quite similar (MAPSA, 2024b). Bearing that important caveat in mind, it is still insightful to compare anthropometric results in RUFSS to stunting and wasting rates from the Yangon sub-samples of the Myanmar Demographic and Health Survey 2015–16 for Yangon. Note, also, that because of the specific age range in RUFSS, we restrict the DHS Yangon sub-samples to children of similar ages to the RUFSS sample.

When we do so (Figure 5), we find what appear to be significant improvements in the prevalence of stunting, which is 28.9 percent in the DHS 2015–16 but just 17.7 percent in the relatively poor RUFSS 2023 sample. Severe stunting fell at a similar rate. For wasting, inferring trends is much more difficult because there are often strong seasonal variations in wasting in Asia (Bloem, Moench-Pfanner and Panagides, 2003), with wasting rates often higher in the wet monsoon months when waterborne diseases are more prevalent. Keeping that caveat in mind, we that wasting is somewhat more prevalent in the RUFSS 2023 Yangon sample than in the DHS 2015–16 Yangon sample: 8.7 percent compared to 7.9 percent.

Figure 5. Comparisons of the prevalence of stunting, wasting and underweight in Yangon across different surveys
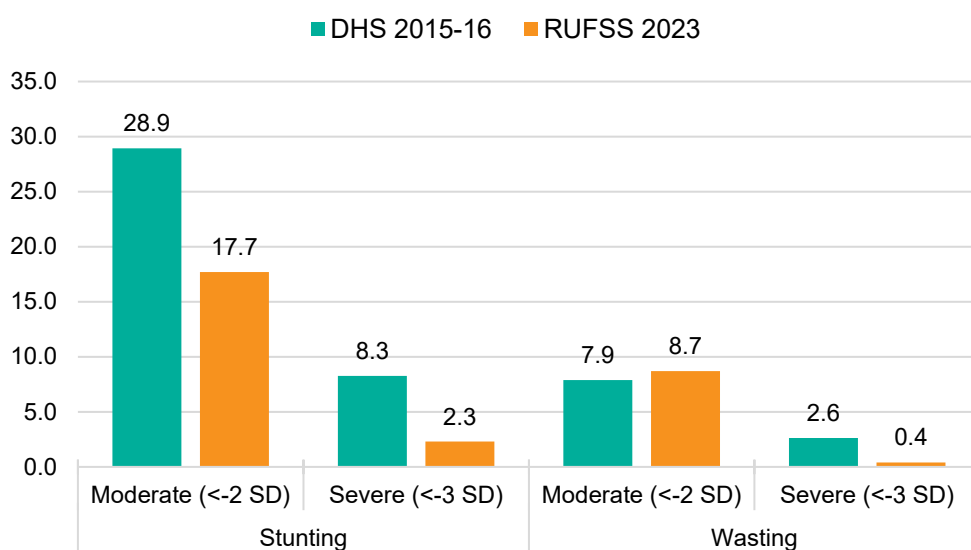

Source: Authors' estimates from DHS 2015–16 (MOHS and IC-International, 2017) and RUFSS 2023.
Note: Sample restricted for children aged 18 to 48 months in Yangon. DHS results use survey weights.

## Regression results explaining stunting and wasting risks

We estimated linear probability models to explore the predictors of stunting and wasting risks, after examining correlations between explanatory variables. The results are reported in Figures 6 and 7. Controlling for other factors, children in Ayeyarwady are more likely to be stunted, while there are also positive associations with higher birth order, open defecation among children, and severe household food insecurity and stunting. In contrast, mother/child pairs who receive health services in the past 2 years had a slightly lower risk of stunting. Finally, two maternal factors are strongly predictive of stunting: caregivers reporting difficulties engaging in everyday tasks because of depression symptoms, and mothers with low BMI. As is often the case, wasting is more difficult to explain, but children engaged in open defecation are more likely to be wasted, along with children of low BMI mothers.

Figure 6. Predictors of stunting risks among children aged 18–48 months, with 95 percent confidence intervals
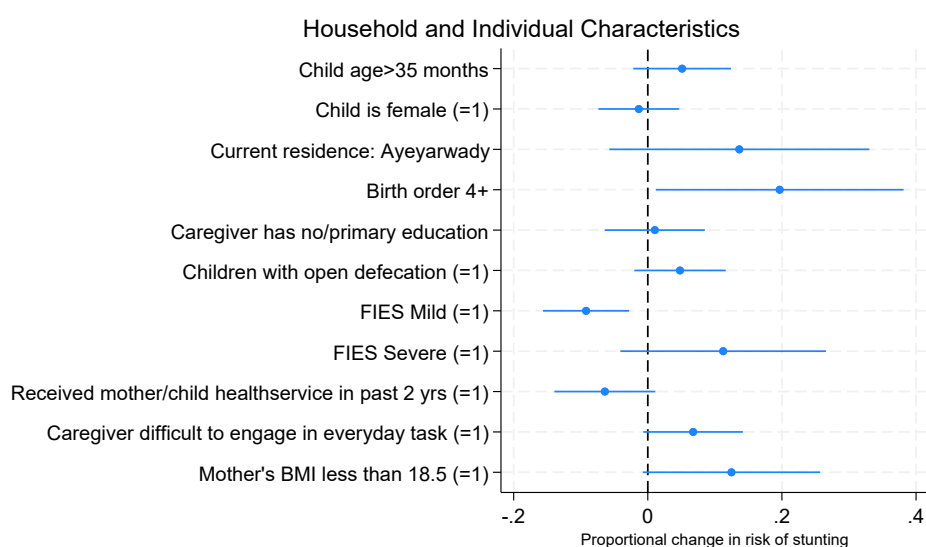
Note: Sample restricted for children aged 18 to 48 months. Results are based on linear probability models.

Figure 7. Predictors of wasting risks among children 18–48 months, with 95 percent confidence intervals
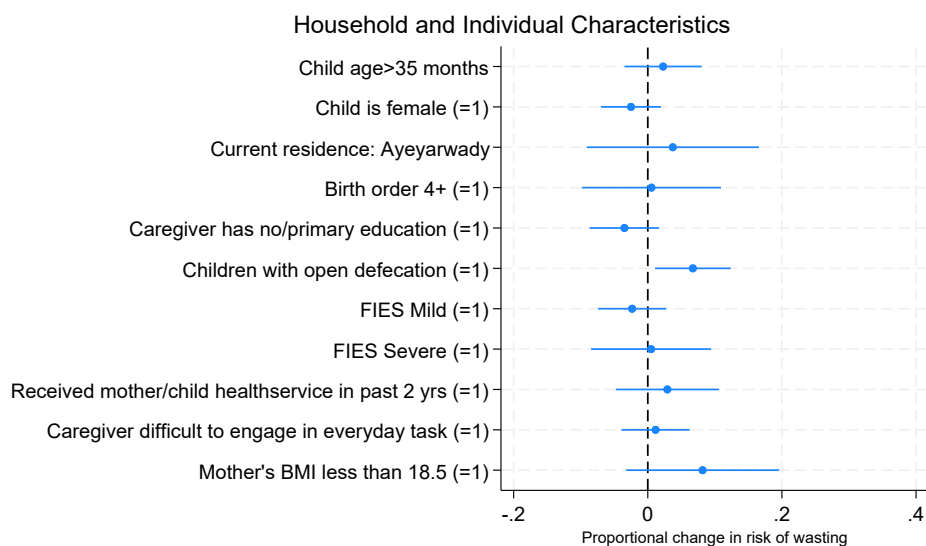
Note: Sample restricted for children aged 18 to 48 months. Results are based on linear probability models.

Conclusion

The in-person RUFSS survey has allows reporting of timely and high-quality anthropometric data for a relatively large sample of children in urban and peri urban Yangon, and a smaller sample of children in rural Ayeyarwady. These data show that stunting rates – though still high – may well have fallen since 2015–16. Severe stunting has declined especially quickly.

For wasting, results are less clear because wasting is often found to be highly seasonal in Asia, typically peaking during monsoons. In a national nutrition surveillance system implemented for over a decade in Bangladesh, wasting rates doubled from pre-monsoon to monsoon months (Bloem et al., 2003). More information is needed on whether wasting is similarly seasonally affected by the monsoon in Myanmar. We note that the RUFSS survey took place after the monsoon, in October–November.

One of the most striking findings for both child stunting and wasting is the very strong association between household food insecurity and risks of child malnutrition. Stunting rates in severely food-insecure households are twice as high as they are among mild insecure households, for example. This suggests a need for social protection programs and livelihood interventions to target food-insecure households on nutritional grounds. Examples include nutrition sensitive maternal and child cash transfers, where cash transfers to mothers are complemented by social behavioral change communications (SBCC) to improve nutrition knowledge and care practices and empower women to make act on their improved knowledge and economic capacities. Previous evaluation studies in Myanmar have shown these programs to significant benefits for child growth and dietary diversity (Field and Maffioli, 2024), but also lasting benefits for child dietary diversity and household food security several years after the interventions ceased (Maffioli et al., 2023). Extending these programs in the current crisis should be a priority objective for development agencies.

We also recommend integrating maternal health components into nutrition-sensitive social protection schemes in Myanmar. The RUFSS survey found that 20 percent of mothers reported symptoms of depression, which is unsurprising given economic stresses and heightened fears of both crime and conflict. Maternal mental health is important in its own right, but also important in terms of broader family wellbeing, including the healthy development of young children.

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Appendix

Table A.1. Profile of index child based on the current residence of respondents

Results	Residence		All sample (N=702)
	Yangon (N=671)	Ayeyarwady (N=31)	
	Percentage (%)		
Age of index child			
0–11 months	0.8	3.2	0.9
12–23 months	0.6	0.0	0.6
24–35 months	17.3	3.2	16.7
36–47 months	81.2	93.6	81.8
48–59 months	0.2	0.0	0.1
Total	100.0	100.0	100.0
Mean age (in months) (Min – Max)	37 (0.8–48)	38 (9–42)	37 (1–48)
Gender of index child			
Girl	49.5	41.9	49.1
Boy	50.5	58.1	50.9
Birth order			
First birth	60.1	74.2	60.7
2–3	34.7	25.8	34.3
4–5	4.8	0.0	4.6
6+	0.5	0.0	0.4
Proportion of index child having a birth certificate	92.3	96.8	92.5
Proportion of index child having a vaccination card	87.2	90.3	87.3
Proportion of index child attend any Early Childhood Education program	8.6	0.0	8.3

Source: RUFSS follow-up survey, October–November 2023.

Table A.2. Comparison of rate of stunting, wasting and underweight in Yangon region between different surveys

		DHS 2015-16	RUFSS 2023
Stunting	Moderate (<-2 SD)	28.93	17.7
	Severe (<-3 SD)	8.26	2.3
Wasting	Moderate (<-2 SD)	7.44	8.7
	Severe (<-3 SD)	1.65	0.4

Note: Sample restricted for children aged 18 to 48 months in Yangon.

Table A.3. Prevalence of malnourishment by MUAC-for-age, by background characteristics

Background characteristics	Sample Share (%)	MUAC-for-age		
		Severe Malnourished (< -3 SD) (%)	Malnourished (< -2 SD)[1] (%)	Mean Z-score (SD)
Index child's age (in months)				
18–35 months	17	0.0	0.9	-0.4
36–59 months	83	0.2	1.9	-0.5
Child's sex				
Male	51	0.0	2.3	-0.5
Female	49	0.3	1.2	-0.5
Birth order				
First birth	61	0.2	1.4	-0.5
2–3	34	0.0	2.6	-0.5
4+	5	0.0	0.0	-0.6
Mother's nutritional status (ASIAN)				
Underweight (BMI < 18.5)	6	0.0	4.7	-0.8
Normal (BMI 18.5 – 23)	30	0.5	1.4	-0.6
Overweight (BMI 23 – 27.5)	35	0.0	1.2	-0.5
Obese (BMI > 27.5)	20	0.0	2.1	-0.4
Current residence				
Yangon	96	0.2	1.5	-0.5
Ayeyarwady	4	0.0	6.7	-0.6
Mother's education				
Primary or lower	27	0.0	2.2	-0.5
Secondary	29	0.0	1.5	-0.6
High school	27	0.5	2.6	-0.5
More than high school	16	0.0	0.0	-0.4
Asset class				
Asset-poor	44	0.3	1.3	-0.6
Asset-low	46	0.0	2.2	-0.5
Asset-rich	9	0.0	1.5	-0.4
Food insecurity (FIES)				
Severe FIES	7	0.0	4.3	-0.7
Moderate FIES	13	0.0	0	-0.5
Mild FIES	24	0.0	1.8	-0.5
No Food Insecurity	56	0.3	1.8	-0.5
Total	100	0.1	1.7	-0.5

Source: RUFSS follow-up survey, October–November 2023.

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