

Mainstreaming Crèches to Reduce Malnutrition in Odisha

DATA ANALYSIS: October 2017 to February 2024

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I. Tracking of children with severe acutemalnutrition (SAM)

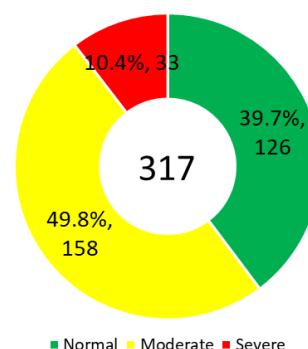
Status of SAM identified children at any point of time in the creches

Out of a total 7027 children served, a total of 397 individual children have been identified as severely wasted at any point of time during their stay in the creche between October 2017 and February 2024 in 125 creches. Of these, 7 were identified for the first time in February 2024. Additionally, nine children that were in the SAM category died during this same period. 317 children could complete at least 4 months in the creche [Table 1].

| Table 1: Status of 397 children ever identified as severely wasted in the crèche programme | | |
|--|----------|-------|
| Status | N | % |
| Children identified as Severely Wasted (Oct 2017 to Feb 2024) | 397/7027 | 5.6% |
| First time identified as SAM in February 2024 | 7/397 | 1.7% |
| Child deaths till February 2024 | 9/390 | 2.3% |
| Children who completed at least 4 months in creche | 317/381 | 83.2% |

Fig 1: Status of 308 children at the time of their last anthropometry

| | |
|--------------------------|------------------------------------|
| Change in Avg. Z score | 1.27(initial=-3.41; final=-2.14) |
| Change in median Z score | 1.06 (initial= -3.30; final=-2.24) |
| Significance | P<=0.0001 |



Among these 317 children, 89.6% showed improvement in grades. Approximately 39.7% had shifted from severely wasted to normal category, while 49.8% had shifted from severely wasted to moderately wasted category [Figure 1].

Table 2 shows the average shift in WHZ and duration of crèche enrollment for these 317 children. Those children that had shifted from severely wasted to normal category (39.7%, n = 126) had been enrolled in the crèche for an average of 18.0 months. The severely wasted children (49.8%, n=158) had shifted to moderate category with an average enrollment 16.8 months in the creche. Meanwhile, those children that had remained in severe category (10.4%, n = 33) had been enrolled in the crèche for 13.8 months. The average duration of crèche enrollment for the 317 children was 16.9 months. Important to note is that the shift in Z-scores in the group of children that shifted from severe to normal and severe to moderate were of high statistical significance (p < 0.0001).

Table 2: Average shift in WHZ and duration of crèche enrolment for 317 children ever identified as severely wasted

| Change in status | No. of children | Shift in z-score (Mean; Med) | p-value | Duration at Creche (months) | | |
|--|-----------------|------------------------------|----------|-----------------------------|-----|------|
| | | | | Average | Min | Max |
| To Normal | 126/317 | 2.06/1.81 | p<0.0001 | 18.0 | 4.0 | 33.3 |
| To Moderate | 158/317 | 0.89; 0.79 | p<0.0001 | 16.7 | 4.0 | 29.2 |
| Continue to be in severe in last anthropometry | 33/317 | 0.06; 0.03 | p<0.0001 | 13.8 | 4.0 | 24.9 |
| Overall (Irrespective of change) | 317 | 1.27; 1.06 | p<0.0001 | 16.9 | 4.0 | 33.3 |

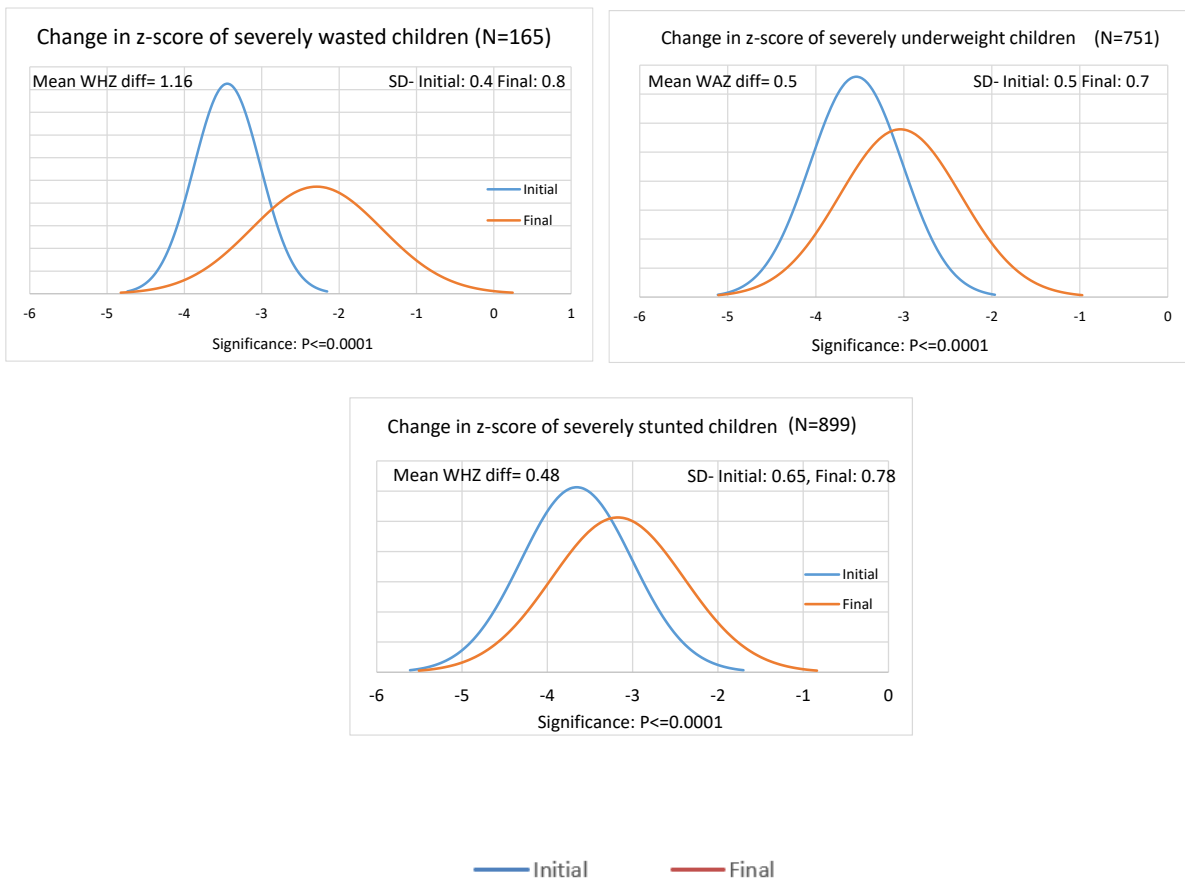
Table 3: Details of 9 SAM identified children who died

| Name | WHZ Status (Last) | Last Z-score (WAZ) | Date of death | Complications |
|---------------------------|--------------------------------------|--------------------|---------------|--|
| Deepika Kulesika (00112) | Severely wasted (-3.35) (Feb 2019) | -6.58 (Feb 2019) | 9 Mar 2019 | Respiratory illness and sickle cell anaemia. VLBW: 2.0Kg |
| Bhakti Mali (1136) | Severely wasted (-3.88) (Feb 2019) | -5.61 (Apr 2019) | 13 May 2019 | Congenital heart disease |
| Ritu Kondagiri (00514) | Severely wasted (-4.25) (Aug 2019) | -4.54 (Sep 2019) | 10 Nov 2019 | Respiratory illness and epilepsy. LBW: 2.4Kg |
| Mamali Bhatra (2445) | Moderately Wasted (-2.34) (Jun 2019) | -4.43 (Jul 2019) | 31-07-2019 | Cerebral Palsy, diarrhoea |
| Bhumika Majhi (04001) | Severely Wasted (-3.48) (Oct 2019) | -4.01 (Oct 2019) | 29-10-2019 | Gastrointestinal disorder |
| Bhaskar Kandhapan (06103) | Severely Wasted (-3.82) (June 2020) | -5.32 (Sep 2020) | 18-09-2020 | Swelling in both feet and face, breathing problem with cough |
| Kapilash Majhi (5633) | Severely Wasted (-3.81) (Jun 2019) | -4.32 (Sep 2019) | 20-09-2019 | Abdominal swelling and pain |
| Dushmantin Jani (5646) | Moderately Wasted (-2.63) (Jun 2021) | -4.37 (Jul 2021) | 18-08-2021 | Congenital heart disease. LBW: 2.0 Kg |
| Nageshwar Himirika (8159) | Severely Wasted (-4.22) (Oct 2021) | -3.86 (Oct 2021) | 09-10-2021 | Fever |

II. The shift in average Z-scores of children with any severe malnutrition (z-score less than -3)

The analysis looked at the statistical significance of the shift in average z-scores of children who were identified as severely malnourished (wasting, underweight, and stunting) at the time of admission and have been enrolled in the creche for at least four months.

Figures below show the shift in average z-scores of severely malnourished children. The shifts in average z-scores for severely malnourished (z-scores less than -3) children (for each of wasting, underweight and stunting) was statistically significant in the cohorts. Overall, this analysis indicates that the whole z-score curve has flattened as well as shifted to the right which is demonstrative of a positive and encouraging trend.

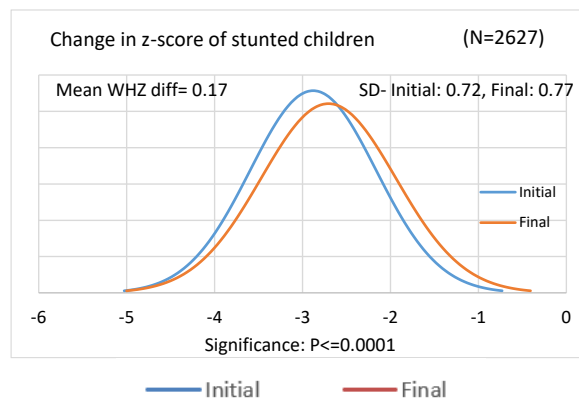
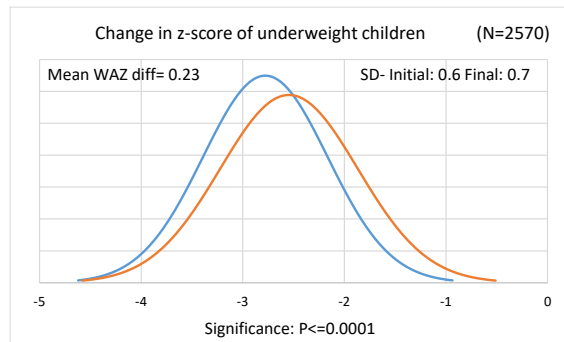
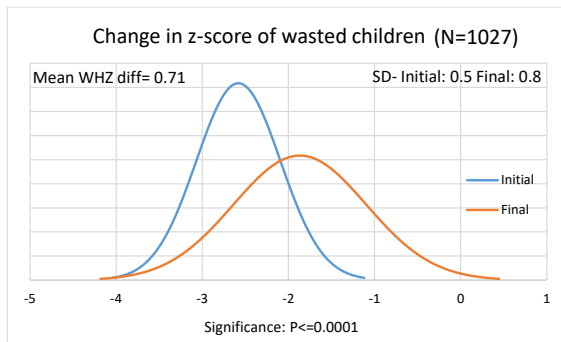


III. The shift in average Z-scores of children with malnutrition (z-score less than -2)

The analysis looked at the statistical significance of the shift in average z-scores of children who were identified as malnourished (wasting, underweight, and stunting) in each cohort. The cohort consists of children who were malnourished at the initial measurement and who were enrolled in the creche for at least four months.

Figures below show the shift in average z-scores of malnourished children. The shifts in average z-scores for malnourished (z-scores less than -2) children (for each of wasting, underweight and stunting) was statistically significant in the cohorts. Overall, this analysis indicates that the whole z-score curve

has shifted to the right which is again demonstrative of a positive and encouraging trend.

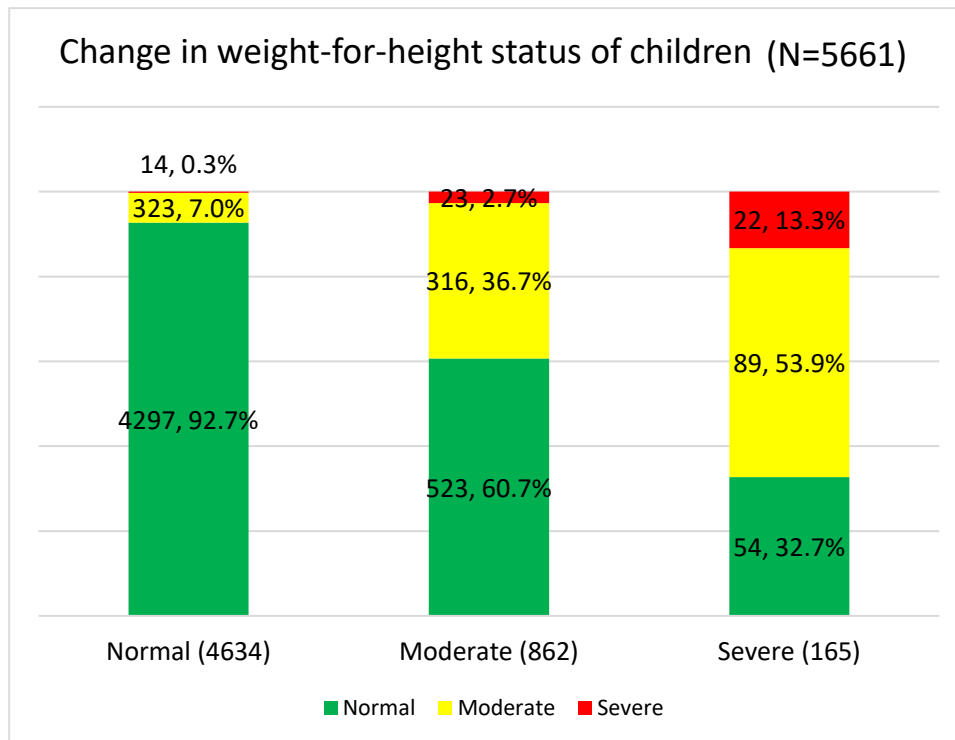


IV. Cohort analysis:

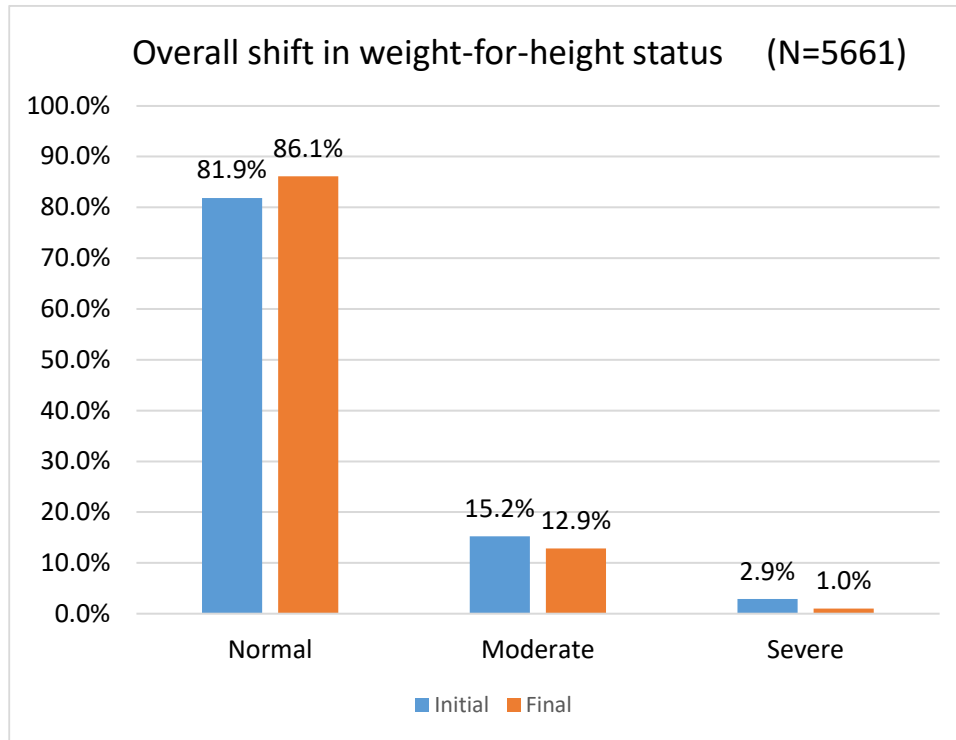
Duration Oct 2027-Feb 2024

Weight-for-Height: First Measurement vs Last Measurement

This cohort analysis examines the change in the nutritional status based on weight-for-height of 5661 children who attended the creche between October 2017 and February 2024 and have been in the creche for at least four months. The analysis highlights that 92.7% of 4634 children (4297) maintained normalcy, 56.2% of 1027 children (577) attained normalcy and 64.9% of 1027 children (666) improved grades.

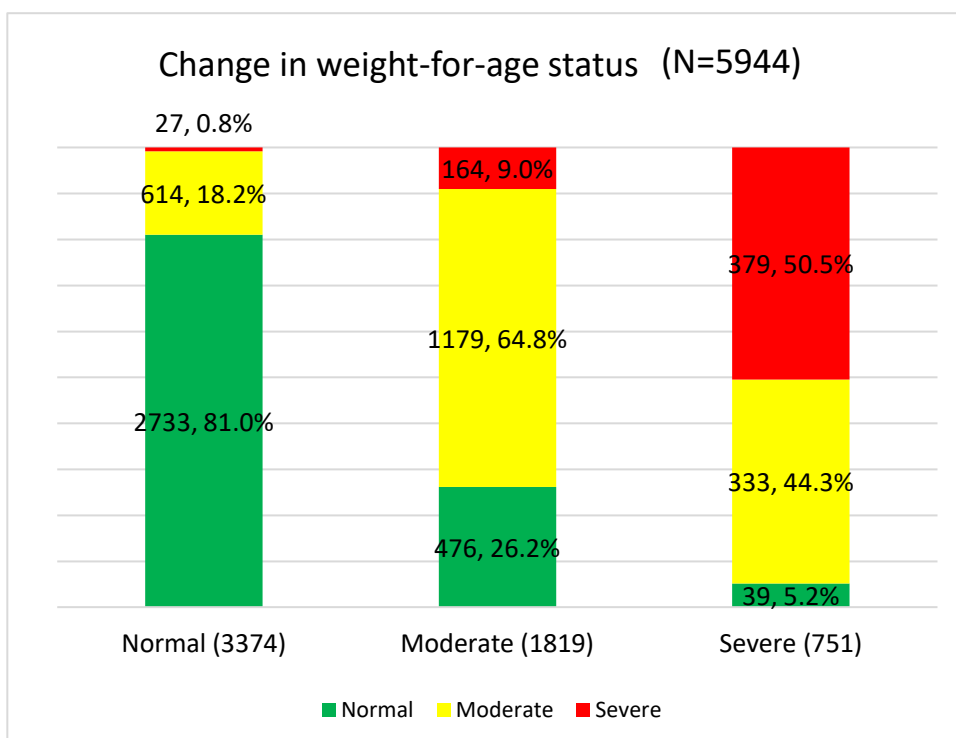


The figure below compares the first weight-for-height with the last available weight-for-height for children who have been in the creche for at least four months. The data shows that overall, the number of severely wasted children has reduced from 2.9% to 1.0%. The number of moderately wasted has also reduced from 15.2% to 12.9%, whereas the number of children with normal weight-for-height has increased from 81.9% to 86.1%.

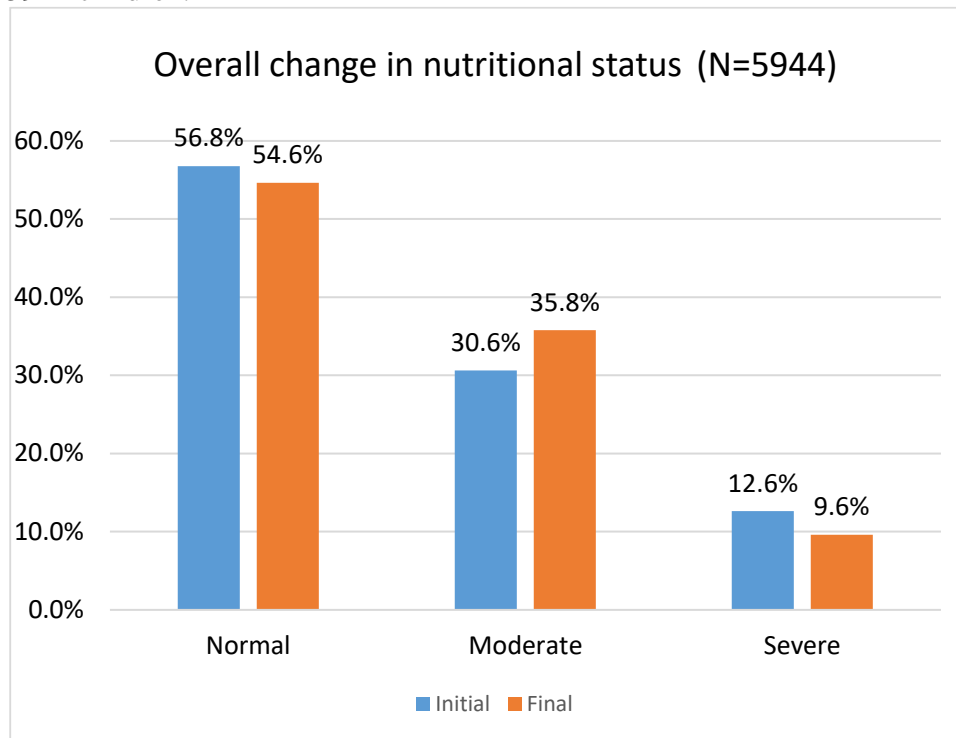


Weight-for-Age: First Measurement vs Last Measurement

This cohort analysis examines the change in the nutritional status based on weight-for-age of 5944 children who attended the creche between October 2017 and February 2024 and have been in the creche for at least four months. The analysis highlights that 81.0% of 3374 children (2733) maintained normalcy, 20.0% of 2570 children (515) attained normalcy and 33.0% of 2570 children (848) improved their grades.

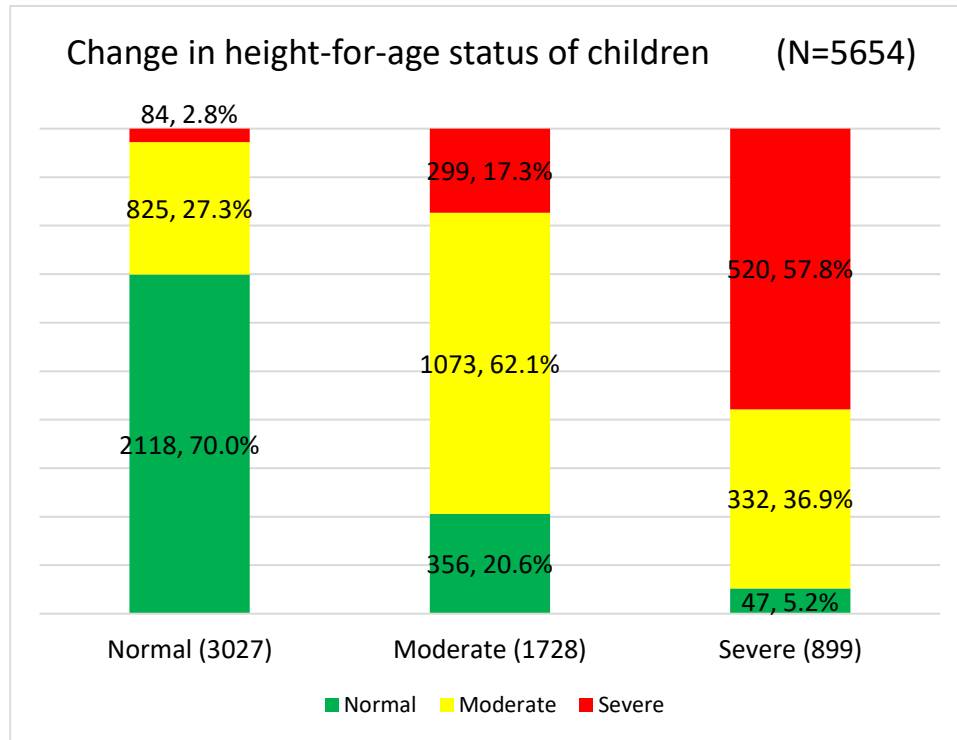


The figure below compares the first weight-for-age with the last available weight-for-age for children who have been in the creche for at least four months. The data shows that overall, the number of severely underweight children has reduced from 12.6% to 9.6%. Whereas the number of moderately underweight children has increased from 30.6% to 35.8%. The data also shows that overall, the number of children with normal weight-for-age has decreased from 56.8% to 54.6% during the period within the cohort of 5944 children.

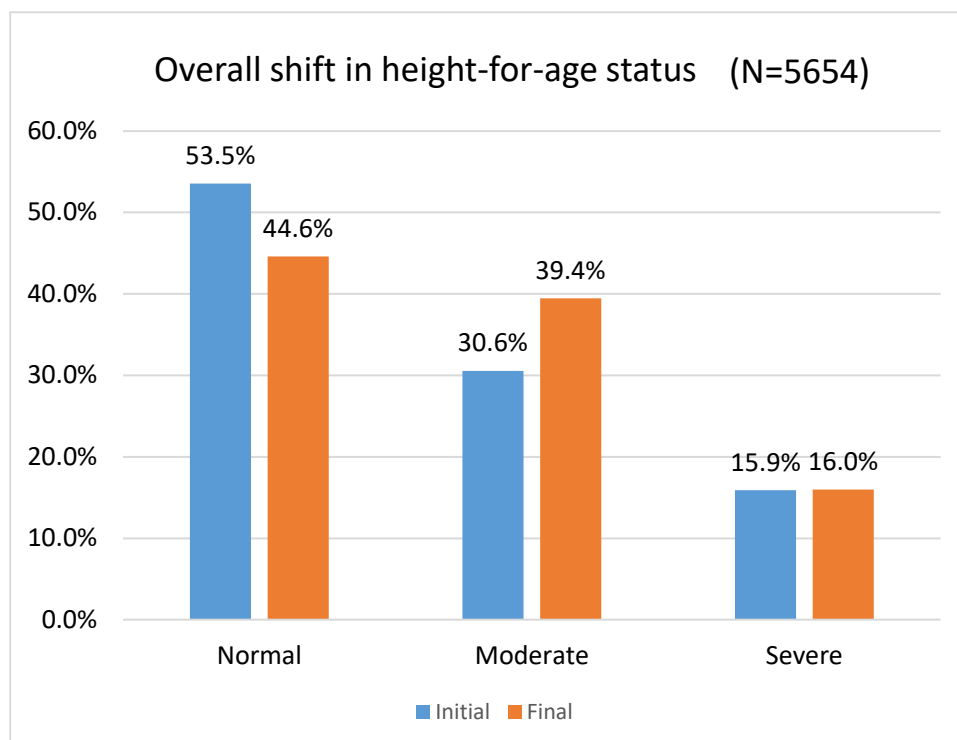


Height-for-Age: First Measurement vs Last Measurement

This cohort analysis examines the change in the nutritional status based on height-for-age of 5654 children who attended the creche between October 2017 and February 2024 and have been in the creche for at least four months. The analysis highlights that 70.0% of 3027 children (2118) maintained normalcy, 15.3% of 2627 children (403) attained normalcy and 28.0 % of 2627 children (735) improved grades.



The figure below compares the first weight-for-height with the last available weight-for-height for children who have been in the creche for at least four months. The data shows that overall, the number of severely stunted children has remained almost the same, whereas the number of moderately stunted children has increased from 30.6% to 39.4%. The number of children with normal height-for-age has reduced from 53.5% to 44.6% during their stay at creches for a cohort of 5654 children.



V. Normalcy and grade improvements among children attending creches

The creche programme demonstrated that creches helps attending children retain or attain normalcy. In table 5, maintained normalcy refers to those who had normal anthropometric indices at the first measurement and remained normal during the last measurement. Attained normalcy refers to those children who were in moderate or severe categories during the first measurement but were in normal category during the last measurement. ‘Improved grades’ refers to those children who shifted from severe to moderate or normal, or from moderate to normal. As can be seen, significant proportions of children attending the creche attained normalcy and improved grades across all three forms of undernutrition, most prominently in the case of wasting.

| S. No. | Status | Maintained normalcy, % (n), shift in z score | Attained normalcy, % (n), shift in z score | Improved grades (overall), % (n), shift in z score |
|--------|-------------------|--|--|--|
| 1 | Weight-for-height | 92.7% of 4634 (4297); Shift in WHZ= mean: -0.06; median: -0.03 (P<=0.0001) | 56.18% of 1027 (577); Shift in WHZ= mean: 1.11; median: 0.92 (P<=0.0001) | 64.85% of 1027 (666); Shift in WHZ= mean: 1.09; median: 0.89 (P<=0.0001) |
| 2 | Weight-for-age | 81% of 3374 (2733); Shift in WAZ= mean: -0.18; median: -0.15 (P<=0.0001) | 20.04% of 2570 (515); Shift in WAZ= mean: 0.76; median: 0.54 (P<=0.0001) | 33% of 2570 (848); Shift in WAZ= mean: 0.76; median: 0.79 (P<=0.0001) |
| 3 | Height-for-age | 70% of 3027 (2118); Shift in WAZ= mean: -0.32; median: -0.3 (P<=0.0001) | 15.34% of 2627 (403); Shift in WAZ= mean: 0.92; median: 0.63 (P<=0.0001) | 27.98% of 2627 (735); Shift in WAZ= mean: 0.86; median: 1.05 (P<=0.0001) |

However, this also implies that despite a running interventional programme, some children do continue to deteriorate from normalcy, and some do not improve grades. The shifts in Z scores further present a complex phenomenon of micro shifts even within grades. Clearly, there remain factors that the crèche programme; with its focus on immediate determinants of malnutrition, is not able to mitigate. Focus thus needs to be retained on underlying and basic causes alongside, necessitating interventions that mobilise communities (such as PLA processes) as well as shift basic socio-economic conditions by enabling better livelihood opportunities and overall empowerment.