World Vision

SUCCESS IN ACTION: TACKLING ACUTE MALNUTRITION WITH POSITIVE DEVIANCE/HEARTH

1. Overview of acute malnutrition

Acute malnutrition, or wasting, is a preventable and treatable condition that poses an immediate threat to children's survival, significantly increasing their risk of illness and death (1). Without timely intervention, millions of children suffer irreversible consequences. It results from rapid weight loss or failure to gain weight, often due to insufficient food intake and/or disease and as a result, the child is too thin for their length/height. Children under 5 years, especially infants, are especially vulnerable due to their high nutrient needs. Acute malnutrition in children under 5 years is defined by a weight-for-height (WHZ) or weight-for length z-score (WLZ) below -2 standard deviations (SD) on the World Health Organization (WHO) growth chart, a mid-upper-arm circumference (MUAC) of less than 125 mm, or nutritional oedema, a bilateral pitting oedema that starts in the feet and can progress up the legs, face, and body (1).

Recent global events, including pandemics, conflicts, and climate change, have exacerbated the alarming rates of acute malnutrition. In 2022, an estimated 6.8% (45 million) of children suffered from acute malnutrition, which includes both moderate acute malnutrition (MAM)[1] and severe acute malnutrition (SAM).[2] Of these, 31.7 million children under 5 had MAM and 13.3 million had SAM. Children with SAM are nearly 12 times more likely to die than well-nourished children (2), and those who survive are more susceptible to infections and long-term health and development risks. SAM causes more than one million child deaths annually, yet treatment remains inaccessible to most children. Only 30% of children with SAM receive the necessary treatment (3). MAM coverage figures are likely even lower, as it is often perceived as less urgent than SAM (4).

[1] MAM is defined as WHZ<-2SD and ≥-3SD or MUAC<125 mm and ≥110 mm
[2] SAM is defined as WHZ<-3SD or MUAC<110 mm

Although acute malnutrition is often regarded as a humanitarian concern, three-quarters of affected children live outside humanitarian contexts, underscoring the need for sustainable, long-term solutions for MAM where food security exists. Approximately 70% of children with acute malnutrition live in Asia with relative food security, followed by Africa (27%) (5). The 2023 Joint Malnutrition Estimates indicate that progress has been achieved in only half of the assessed countries (5), while in one-third, malnutrition remains unchanged or is worsening.

2. WHO guideline on management of acute malnutrition and evidence from recent studies

Recognising this, in 2023, WHO introduced new guidelines on preventing and managing acute malnutrition in infants and children under five (1). In many settings, programmes for treating MAM and SAM are separate, using different protocols and specially formulated foods (SFFs), such as ready-to-use therapeutic food (RUTF). Uncomplicated SAM is treated with RUTF in outpatient therapeutic programmes, while uncomplicated MAM is treated with ready-to-use supplementary food (RUSF), or fortified corn-soya blended flour (CSB+, CSB++) in supplementary feeding programmes (4). SFF programmes face several challenges, including:

- frequent stockouts due to complex logistics
- high production and distribution costs (4,6)
- prioritisation of SAM treatment over MAM, leaving MAM children untreated until they deteriorate to SAM, even when MAM treatment requires less resources (4).

Although simplified guidelines for treating acute malnutrition improves the complex logistics of treating children with acute malnutrition, it still heavily relies on SFFs. Children with SAM may require SFFs because normal food cannot be digested and may even lead to mortality, but children with MAM do not have difficulty consuming regular food. While SFFs have shown some benefits for treating MAM in Bangladesh, Burkina Faso, Iran, and Sierra Leone (7–11), they are costly, may have undesirable effects, and are less sustainable than supplementary non-SFFs using locally available nutrient-dense foods (12).

A Sierra Leone study found that RUSF had the lowest point estimate at $163 per child recovered, while CSB+ with oil had the lowest programme-only cost at $90.10 (6). Traditional therapeutic feeding programmes rely on costly imported foods, creating financial and logistical barriers. While SFFs are necessary in some settings, more sustainable low-cost approaches need to be explored.

3. Positive Deviance/Hearth (PDH), a food-based approach

3.1 Overview of Positive Deviance/Hearth (PDH)

PDH is an innovative, community-driven solution that harnesses locally available nutrient-dense foods to rehabilitate malnourished children without reliance on expensive imported products or even processed local foods.[3] Unlike traditional approaches, PDH empowers caregivers with practical, long-term skills, ensuring impact beyond programme interventions. PDH is used to treat underweight children without complications and those with MAM and SAM who pass the appetite test, while promoting caregiver behaviour change.

PDH identifies 'Positive Deviants' – families with low income but positive practices that enable their children to be well-nourished without external interventions. World Vision's PDH programmes admit children with WAZ<-1 and/or uncomplicated MAM or SAM who pass the appetite test and discharge them when they are no longer underweight or wasted (13).

Formative research, including 24-hour recall, observation walks, market surveys, and seasonal calendars, identifies locally available, low-cost, nutrient-dense foods for PDH menus. Caregivers participate in 10- to 12-day education sessions (called 'Hearth'), contributing local ingredients (such as blackjack, a nutrient-rich wild leafy plant in Zambia) or resources (such as firewood or drinking water). PDH menus include a snack and a supplementary meal designed with locally available nutrient-dense foods that are culturally appropriate, easy to consume, small in volume and meet specific nutrient, caloric, and protein requirements – identified in the initial formative research. Volunteers conduct two weeks of home follow-up visits to reinforce behaviour changes (13). PDH supports sustainability by strengthening food systems, promoting behaviour change at household and community levels and developing local therapeutic recipes that can be prepared at home or in the community.

[3] For more information on PDH, refer to https://www.wvi.org/nutrition/positive-deviancehearth

World Vision has implemented PDH in 40+ countries across Asia, Africa, and Latin America since 1999. World Vision's sample menus, used to rehabilitate acutely malnourished and underweight children in 20 countries across Asia and Africa, were recently published to demonstrate that local foods can effectively rehabilitate undernourished children (14). World Vision, in partnership with Emory University, also conducted a cluster randomised control trial in Cambodia assessing the effectiveness of replacing >60% of caregiver-volunteer face-to-face interactions with phone calls for PDH. The study on the innovation found the mobile phone call group to be just as or more effective in reducing underweight in 3 months and had a protective effect during food-insecure periods for PDH participant children compared with the standard of care group (15). These insights were used to effectively adapt PDH during the pandemic and can be adapted in fragile contexts with relative food security, where reducing face-to-face interactions may be necessary.

3.2 Suitability of PDH

PDH is recommended where homes are close in proximity and there is minimum six months of food security per year (13). Positive Deviant households use coping strategies that serve as key messages for other caregivers during months of food insecurity. In fragile contexts, PDH can be integrated with supplementary feeding programmes, using food aid to design Hearth menus during the months without food security (6,16).

3.3 Effectiveness of PDH

A 2023 systematic review and meta-analysis of PDH included three recent studies showing that PDH significantly improved underweight (15,17) and acute malnutrition rates (18). Thus, PDH could be a leading treatment for undernutrition (19). World Vision's PDH programme in Burundi showed that MAM prevalence (MUAC<125 mm and ≥115 mm) significantly reduced from 17.9% to 8.3% among 1,727 PDH participants in just 12 days ($p<0.001$) (16). It is worth investigating PDH's potential to address uncomplicated MAM and reduce relapse with a revised definition for recovery to include acute malnutrition for effective scale-up.

World Vision's monitoring data for 2022–2023 in two fragile countries – Democratic Republic of the Congo and Niger – showed a 62% recovery rate in 12 days and 92% in 3 months among 255 children, and a 94% recovery rate in 12 days and 96% in 3 months among 177 children, respectively. These results indicate the effectiveness of PDH programming in recovery of children with uncomplicated MAM and SAM. **There were almost no relapse cases in either programme.**

Larger PDH programmes prevent underweight as well as acute malnutrition. Figure 1 presents data from World Vision Mali's 2024 PDH programme, showing the significant rehabilitation of underweight PDH participant children within three months.

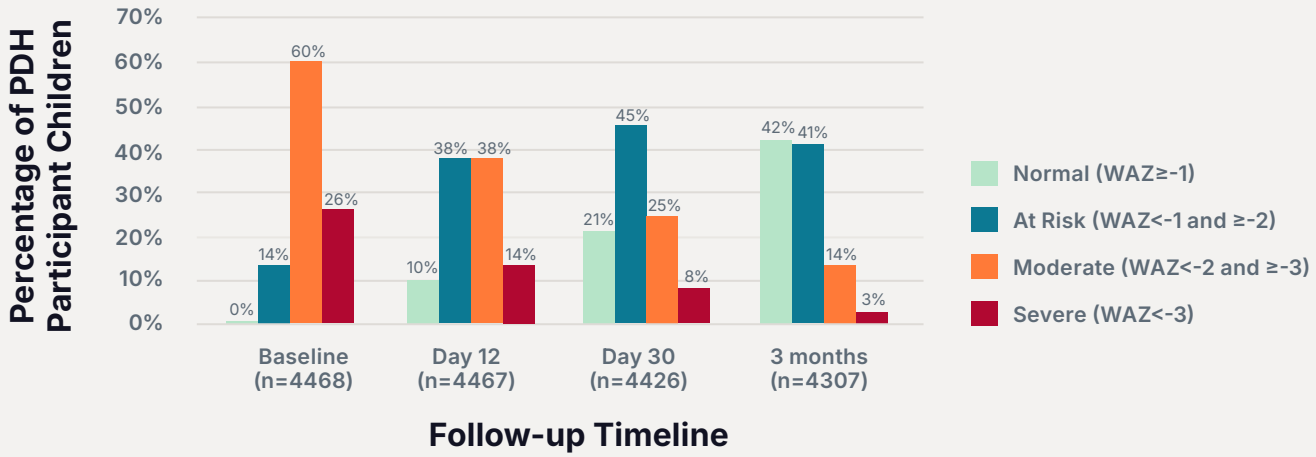

Figure 1. PDH participant children who improved in underweight (WAZ) status at different time points up to 3-month follow-up in Mali (2024)

3.4 Cost of PDH

PDH is low-cost and operates at approximately $5 per child admitted in India (20), $4 in Mali, and $2 in Viet Nam (21), with early start-up implementation (e.g. training, human resources) accounting for approximately 90% of costs, excluding opportunity costs for participating caregivers (16). The average cost per child dropped from $17 (750 children) to $8 (1,400 children) as scale increased in Bangladesh. In Burundi, PDH programmes integrating food security cost up to $100 per child annually, still lower than the cost of RUSF and comparable to food aid programmes (e.g. CSB+) (16).

4. Conclusion

PDH is not just a model or programme – it is a movement toward sustainable, community-led nutrition solutions. Empowering communities to leverage their local knowledge and foods can not only treat but also prevent malnutrition sustainably. Investing in PDH means:

- treating malnourished children at a fraction of the cost
- empowering families with lasting knowledge and skills
- reducing reliance on costly imported therapeutic foods
- advocating for improved food quality and nutrition literacy
- reducing consumption of ultra-processed foods and sugar-sweetened beverages.

The time to act is now. World Vision is leading the charge by launching a groundbreaking cluster randomised control trial in partnership with the London School of Hygiene & Tropical Medicine to further validate PDH's effectiveness in preventing and treating acute malnutrition. We invite partners, policymakers, and donors to join us in scaling this proven approach – because no child should suffer from preventable malnutrition.

References

1. WHO. WHO guideline on the prevention and management of wasting and nutritional oedema (acute malnutrition) in infants and children under 5 years. Geneva: WHO; 2023.
2. Bhutta ZA, Berkley JA, Bandsma RHJ, Kerac M, Trehan I, Briend A. Severe childhood malnutrition. Nat Rev Dis Primer. 2017;3(1):17067.
3. UNICEF. No time to waste: Improving diets, services and practices for the prevention, early detection and treatment of wasting in early childhood. New York: UNICEF; 2021.
4. Bailey J, Lelijveld N, Marron B, Onyoo P, Ho LS, Manary M, et al. Combined Protocol for Acute Malnutrition Study (ComPAS) in rural South Sudan and urban Kenya: study protocol for a randomized controlled trial. Trials. 2018 Apr 24;19(1):251.
5. UNICEF/WHO. Levels and trends in child malnutrition: key findings of the 2021 edition of the joint child malnutrition estimates. Geneva: WHO; 2021.
6. Griswold SP, Langlois BK, Shen Y, Cliffer IR, Suri DJ, Walton S, et al. Effectiveness and cost-effectiveness of 4 supplementary foods for treating moderate acute malnutrition: results from a cluster-randomized intervention trial in Sierra Leone. Am J Clin Nutr. 2021 Sep 1;114(3):973–85.
7. Hossain MI, Nahar B, Hamadani JD, Ahmed T, Brown KH. Effects of community-based follow-up care in managing severely underweight children. J Pediatr Gastroenterol Nutr. 2011 Sep;53(3):310–9.
8. Javan R, Kooshki A, Afzalaghaee M, Aldaghi M, Yousefi M. Effectiveness of supplementary blended flour based on chickpea and cereals for the treatment of infants with moderate acute malnutrition in Iran: A randomized clinical trial. Electron Physician. 2017;9(12):6078–86.
9. Nikièma L, Huybregts L, Kolsteren P, Lanou H, Tiendrebeogo S, Bouckaert K, et al. Treating moderate acute malnutrition in first-line health services: an effectiveness cluster-randomized trial in Burkina Faso. Am J Clin Nutr. 2014;100(1):241–9.
10. Vanelli M, Virdis R, Contini S, Corradi M, Cremonini G, Marchesi M, et al. A hand-made supplementary food for malnourished children. Acta Biomed. 2014;85(3):236–42.
11. Padhani ZAO, Cichon BAO, Das JK, Salam RAO, Stobaugh HC, Mughal MAO, et al. Systematic Review of Management of Moderate Wasting in Children over 6 Months of Age. LID - 10.3390/nu15173781 [doi] LID - 3781. (2072-6643 (Electronic)).
12. Peter Rohloff, Subodh Gupta, Waleska López Canu, Wendy Rodríguez Gómez, Shela Sridhar, Anahi Venzor. New WHO guideline on the prevention and management of acute malnutrition in infants and young children: remaining challenges. BMJ Paediatr Open. 2024 May 7;8(1):e002471.
13. Baik D, Klaas N. World Vision's Positive Deviance/Hearth Training of Facilitators Manual and Handouts [Internet]. Toronto: World Vision International; 2021 [cited 2025 Feb 10]. Available from: https://figshare.com/articles/book/World_Vision_s_Positive_Deviance_Hearth_Training_of_Facilitators_Manual_and_Handouts/13615310
14. Baik D, Ndolo R. Nourishing Children: Menus for Recovery [Internet]. London: WVI; 2023 [cited 2025 Mar 6]. Available from: https://www.wvi.org/sites/default/files/2023-10/Nourishing%20Children_Menus%20for%20Recovery%202023_0.pdf
15. Young MF, Baik D, Reinsma K, Gosdin L, Rogers HP, Oy S, et al. Evaluation of mobile phone-based Positive Deviance/Hearth child undernutrition program in Cambodia. Matern Child Nutr. 2021 Oct;17(4):e13224.
16. Baik D. World Vision's Positive Deviance/Hearth programme: multi-country experiences. FEX [Internet]. 2019 Jul [cited 2025 Feb 20];(60). Available from: https://www.ennonline.net/sites/default/files/FEX-60-Web_final_11-14.pdf
17. Anino OC, Were GM, Khamasi JW. Impact evaluation of positive deviance hearth in Migori County, Kenya. Afr J Food Agric Nutr Dev. 2015;15(5):10578–96.
18. Kang Y, Kim S, Sinamo S, Christian P. Effectiveness of a community-based nutrition programme to improve child growth in rural Ethiopia: a cluster randomized trial. Matern Child Nutr. 2017 Jan;13(1).
19. Triatmaja NT, Mahmudiono T, Mamun AA, Abdullah NA. Effectiveness of Positive Deviance Approach to Reduce Malnutrition among under Five Children: A Systematic Review and Meta-Analysis of Interventional Studies. Nutrients. 2023 Apr 19;15(8).
20. World Vision International. Nutrition Marketplace [Internet]. Toronto: WVI; 2010 [cited 2025 Mar 6]. Available from: https://www.wvi.org/sites/default/files/Nutrition_MarketplaceV3.pdf
21. Nutrition Working Group, Child Survival Collaborations and Resources Group (CORE). Positive Deviance/Hearth: A resource guide for sustainably rehabilitating malnourished children [Internet]. Washington, D.C.; 2002 [cited 2025 Mar 6]. Available from: https://coregroup.org/wp-content/uploads/2017/09/Positive-Deviance-Hearth-Resource-Guide.pdf

For more information, please contact Diane Baik, Senior Technical Advisor, Health and Nutrition, World Vision International

diane_baik@wvi.org or health@wvi.org