

Interventions and Approaches that are Proven to Work in Reducing Child Malnutrition in Zambia

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Abstract The Positive Deviance/Hearth (PDH) approach, addressing underweight children (6–36 months), was piloted and rolled out in four communities in Mwinilunga, Zambia. The objective was to improve child growth by applying locally identified positive feeding, hygiene, health-seeking and caring practices. PDH was implemented by trained community volunteers. Weights of participating children were monitored for the first year after Hearth. Changes in weight and nutritional status were analysed in three sites. Two of the three sites showed significant improvement in children's nutritional status and good graduation rates. Behaviour change on feeding (e.g. using taboo 'round' foods) and caring practices (e.g. involving men in childcare) were observed within sites. PDH has the potential to improve growth of young children in rural Zambia. Increased technical support, collaboration with the Ministry of Community Development, Mother and Child Health and other sectors, and supervision for community volunteers may enhance rehabilitation and adoption of positive local behaviours to reduce child malnutrition.

1 Introduction

Child malnutrition is widespread in Zambia, and is compounded by cultural food perceptions which limit children's access to nutritious foods. The Positive Deviance/Hearth (PDH) approach is a home and community-based nutrition programme for children, 6–36 months old, who are at risk of being moderately and severely underweight. The programme mobilises community members to use the 'positive deviance' approach to identify positive behaviours practised by the mothers or caretakers of well-nourished children from poor families and to transfer such positive practices to others in the community with malnourished children.

World Vision is a Christian relief and development organisation working for the wellbeing of all people, especially children. Through emergency relief, education, health care, economic development and promotion of justice, World Vision helps communities help themselves. Through its health interventions, the organisation has prioritised PDH interventions as one way of promoting child nutrition.

PDH has three goals that it seeks to address:

- 1 To quickly rehabilitate malnourished children identified in the community;
- 2 To enable families to sustain the rehabilitation of these children at home on their own; and
- 3 To prevent future malnutrition among all children born in the community by changing community norms in child care, feeding, hygiene and health-seeking practices.

This approach, which leverages local wisdom to improve child nutrition, was piloted in a village within Mwinilunga District in February, 2012 by the Ministry of Health (MOH), World Vision Zambia and community members.

PDH implementation has since been rolled out to four more communities. The objective was to improve child growth by applying locally identified positive feeding, hygiene, health-seeking and caring practices. This study examines PDH's effectiveness in: (1) changing behaviours and practices of participant caregivers; and (2) rehabilitating and sustaining rehabilitation of young children. Furthermore, it seeks to provide recommendations to strengthen the implementation of PDH in the five communities in Zambia.

2 Methods

PDH was implemented by trained community volunteers in the pilot community and rolled out to four other communities. A 'positive deviance inquiry' (PDI) was performed in each community to identify local practices that positively impact child nutritional status, including child feeding, hygiene, health-seeking, and caring practices (see Box 1 for an example). These practices were transferred to families of malnourished children through experiential learning during 12 days of 'Hearth' sessions.

Weights of the participant children were assessed on Days 1, 12 and 30 and three months after the start of Hearth, and compared to established PDH standards for weight gain. Additional follow-up points of six and 12 months after the start of Hearth were available for two communities. Other than on Days 1 and 12 of Hearth, all other time points were measured during monthly growth monitoring and promotion programmes coordinated by the MOH and community volunteers. Where monitoring points did not follow the standard timelines, the actual date recorded was used. *Data of non-participant children were not collected and included in the analyses.*

The PDH monitoring forms were collected from the community volunteers from the pilot site and two roll-out

Box 1 Six key Hearth messages developed during PDI of pilot site**1 Recommended foods for children**

- Three categories of food (body building, protective and energy-giving foods) – diverse meal (colourful: include red/orange, green and white);
- Give examples of foods for each category that is available in the community (emphasise importance of eating ‘round’ foods – see Section 3.1); must give children all these foods starting at six months (do not wait until child is circumcised);
- Foods do not affect the testicles and whether a girl will have a child easily or not, delayed menses and so forth (all traditional beliefs); do a body mapping to show that there is no relationship between where the food goes in and the testicles;
- Sweet potatoes, sweet potato leaves, cassava leaves, caterpillars, tomatoes, etc.

2 Feeding practices

- We should feed children frequently at the right time and not leave them hungry – three meals and two snacks (important to give snacks in between meals). If you take the children with you in the field, take snacks for them; if children stay at home, leave a snack or meal for them to eat
- Introduce solid foods starting at six months, but continue breastfeeding frequently for children up to two years of age;
- Important to supervise and encourage children up to two years of age as they eat (active feeding);
- Each child should have their own plate because older children eat faster than the younger ones and the younger ones don’t get their full portion.

3 Water and sanitation

- Wash hands with soap or ash before preparing and eating meals, after going to the toilet or changing nappies;
- Pour new water onto hand when hand washing instead of using one basin;
- Cover or close water in 20 litre storage containers (especially drinking water) or other water containers;
- Boil drinking water and/or add chlorine to treat water;
- Get water from borehole or protected well.

4 Hygiene

- Bathe children twice a day (once in day and once in evening) and wash clothes regularly;
- Each household should have a dish rack to dry their bowls and dishes;
- Wash bowls and dishes immediately after eating;
- Mother should also bathe at least once a day and wear clean clothes;
- Each home should have their own latrine and it should be well covered when not in use.

5 Caring

- Fathers need to be involved in caring for children (e.g. giving them food when they are hungry while mother is in the field or busy);
- Mother and father should have play time with their children (giving them attention);
- Take the younger children to the field with you and do not leave them with siblings unless they are at least 13 years of age.

6 Health-seeking

- When your child has a temperature, diarrhoea, and/or coughing, you should quickly take them to the health centre (do not wait);
- If your child is having diarrhoea and you have Oral Rehydration Salt (ORS) packets, feed your child the ORS;
- When a child is sick, breastfeed him or her more frequently and give more foods and fluids (do not stop giving food);
- Sleep under mosquito nets all the year round to avoid malaria.

sites. The pilot site started Hearth sessions in February 2012, the first roll-out site in March 2012 and the other one in May 2012. Furthermore, the first roll-out site had data for two Hearth sessions, but the two groups have been combined for the analyses. The monitoring forms of the other two roll-out sites were not available for analysis, as the communities were a part of another Area Development Programme within World Vision Zambia.

Due to variability of data quality and various start dates during the pilot and roll-out, the different Hearth sites were analysed separately. Wilcoxon Sign Rank Tests for

related samples were run to compare the weight-for-age z-score (WAZ) at Day 1 compared to five time points: Day 12, Day 30, three months after Hearth, six months after Hearth and 12 months after Hearth (the latter two points if applicable). Additional comparisons using the same test between time points were used to identify when significant improvements in WAZ occurred. All statistical analyses were performed with IBM SPSS Statistics (v.16).

Observations of Hearth sessions from the three sites as well as reports of community volunteers of PDH implementation were also reviewed to identify behaviour

Table 1 Graduation rates in three sites

	Day 12 graduation		Day 30 graduation		3 months' graduation	
	n	%	n	%	n	%
Pilot site	8	89	9	100	9	100
First roll-out site	6	46	4	36	1	9
Second roll-out site	5	56	8	89	8	89

Source Author's own from World Vision Zambia/Lunga Area Development Programme (2013) *Positive Deviance Hearth Database*.

change in participant caregivers in PDH and additional recommendations to strengthen the PDH programme.

3 Results

3.1 Behaviour changes in pilot site

Traditional food taboos to exclude fruits and vegetables considered 'round' in shape were modified by giving such foods to children as snacks during Hearth sessions. Using indigenous foods in Hearth meals and witnessing the improvements in energy level, mood and weight of their children changed caregivers' perceived value of these foods. After 16 months, 'round' foods were still utilised by families, though adoption of other behaviours was limited. Scarcity of recommended foods during dry season and frequent malaria and diarrhoea episodes were reported by caregivers as main reasons for growth faltering beyond the six-month follow-up in the pilot site.

3.2 Behaviour change in two roll-out sites

PDH promoted child immunisations for age, in requiring complete immunisations for age before commencing Hearth sessions. The collaboration formed through PDH with the MOH and the community helped to scale up immunisation coverage for the District Medical Office in areas where previously Child Health Days were not conducted. Monthly growth monitoring and promotion programmes were also initiated as they were absent before mobilising the community and the MOH.

Additionally, community members reported that PDH promoted male involvement in childcare through inviting male caregivers to participate in certain Hearth sessions and on graduation days.

In terms of weight gain, a child having an illness was frequently cited as a reason by caregivers for poor weight gain.

3.3 Graduation rates in PDH

The standard for graduation weight gain at 12 days for PDH is greater than or equal to 200g. Eight out of nine children (89 per cent) in the pilot site gained at least 200g (see Table 1). The child who only gained 100g was reported by the caregiver as having diarrhoea for the past few days. Six out of 13 children (46 per cent) gained the 12-day graduation weight in the first roll-out site. For the second roll-out site, five out of nine (56 per cent) children made the graduation weight gain. One child lost 500g and two children did not gain any weight; one child gained 5,200g and another 1,400g. This is not characteristic weight gain for children of this age, indicating inaccuracy with the weighing of children. Also, one child had a weight-for-age

z-score (WAZ) below -5, which calls for attention and a verification of the child's nutritional status.

The standard for graduation weight gain at 30 days for PDH is 400g or greater. All children in the pilot site made the graduation weight gain at 30 days. In the first roll-out site, four out of 11 children (36 per cent) made the graduation weight gain. In the second roll-out site, only one child out of nine did not make the graduation weight gain, so the graduation rate was 89 per cent. However, five of the children did not gain weight between Day 12 and Day 30 in the second roll-out site. This may be a clerical error during data entry and should be verified.

Usually at Day 30 with rates of graduation lower than 50 per cent, the first roll-out site would be re-evaluated and provided with extra supervision and refresher trainings for volunteers.

The standard weight gain for three months after Hearth is 900g or greater. All children in the pilot site made the graduation weight gain. In the first roll-out site, only one child out of 11 was recorded as weighing 900g, making the graduation rate 9 per cent. In the second roll-out site, as the monitoring took place four months after Hearth, the standard weight gain was adjusted to 1,150g. Only one child out of nine did not make the graduation weight gain cut-off, making the graduation rate 89 per cent. This child, however, was still growing well and had improved in nutritional status since Day 1 of Hearth.

3.4 Changes in nutritional status (WAZ)

In the pilot site, catch-up growth was evident at home up to six months after Hearth. All except one child had a better growth trajectory 16 months after the start of Hearth. Mean WAZ rose from -2.8 ± 0.2 to -2.0 ± 0.3 ($p=0.008$) within 30 days. Follow-up at three and six months showed improved mean WAZ compared to graduation on Day 30 (-1.6 ± 0.3 ($p=0.021$) and -0.7 ± 0.4 ($p=0.011$), respectively) with five out of nine children of normal nutritional status by six months. Mean WAZ declined to -2.1 ± 0.4 in the following ten months. Overall, the change in WAZ from Day 1 to 16 months after Hearth was 0.70 ± 0.6 ($p=0.015$).

There were no significant improvements in the first roll-out site from Day 1 to 12 months after Hearth. Looking at individual children in this site, there were five children who made steady progress over the 12–14 months. Thus, some families were able to promote catch-up growth in their children. The monitoring data also show, however, a steady decline in the number of children who were

followed up as the months passed (from n=17 on Day 1 to n=9 in 12 months).

The nutritional status of children in the second roll-out site (n=9) improved from -1.9 +/- 0.5 on Day 1 to -0.77 +/- 0.7 on Day 30 ($p < 0.008$) and even further to -0.0058 +/- 0.5 at four months ($p < 0.008$).

4 Discussion

The implementation of PDH in the three sites has yielded variable outcomes across the sites. The pilot site and the second roll-out site appear to have considerably better improvements in child growth than the first roll-out site in terms of graduation rates and WAZ changes. It is clear that more supervision and support for the volunteers was required for the first roll-out site. It may have been that two Hearth sessions were initiated within a week of each other, in agreement with World Vision Zambia and the community members and leaders. Thus, the quality of the implementation may have been compromised; but there is evidence of strong community support, as they were eager to conduct more than one session to admit more caregivers and children into the Hearth sessions. The other sites would have also benefited from technical support. For instance, in the pilot site, another PDI during the dry season may have helped to continue good growth in children, as well as another menu of recommend foods in the dry season. This may, however, require the support of food security or livelihood interventions to access nutritious foods for young children and families. As illnesses were commonly reported as a reason for poor weight gain, increased community outreach for management of childhood illnesses or projects improving water, sanitation and hygiene may prevent growth faltering.

In terms of behaviour change, PDH has been helpful to reduce traditional food taboos surrounding 'round' fruits and vegetables in the pilot site, and this behaviour was sustained as of the last monitoring point at 16 months. PDH has also facilitated changes in perceptions in the role of men and childcare. In the situational assessment of all three communities, men were not typically involved in, for example, the cooking of meals for the family. However, the PDIs from the communities revealed it was a positive practice for fathers to be involved in childcare. The measures to practise this behaviour during the Hearth

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sessions included inviting male caregivers to join the Hearth sessions and engage by helping weigh the children on graduation days. The changes in behaviour may have been adopted more easily as a result of the community discovery process through the PDI and reinforcement during the Hearth sessions.

The implementation of Hearth in the two roll-out communities has also increased health services in terms of immunisation and growth monitoring and promotion by initiating them in areas where they were previously non-existent. The stakeholder meetings with the District Medical Office and inclusion of local MOH staff in the PDH training of facilitators may be instrumental in the increase in health services in those areas.

A limitation of this study is that non-participant children and families were not examined, so both child growth improvements and changes in behaviour cannot be solely attributed to PDH. Further examination would show a clearer impact of PDH on participants and non-participants alike.

5 Conclusion

PDH is a culturally sensitive and effective way to change traditional perceptions on feeding and childcare practices, which have the potential to improve the growth of young children in rural Zambia. The sites examined show variability in how well PDH rehabilitates and sustains rehabilitation, though positive improvements in child growth are possible in the community. However, strengthened coordination with community stakeholders with regard to complementary interventions may improve outcomes and sustainability of the programme. Although community ownership of PDH is fundamental to the approach, adequate technical support and management of the programme is required, especially when addressing programme quality. Increased follow-up support and supervision for community volunteers, including appropriate assessment and action based on monitoring data, more than one PDI per community and refresher trainings on PD practices for different seasons and prevention of illnesses, may better sustain rehabilitation and enhance adoption of positive local behaviours. *Further study is necessary to elucidate the full impact of PDH on the families in the community.*

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