Research Article

A Community-Based *Positive Deviance/Hearth* Infant and Young Child Nutrition Intervention in Ecuador Improved Diet and Reduced Underweight

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ABSTRACT

Objective: Underweight and stunting are serious problems in Ecuador that require interventions in the first 2 years of life. The researchers assessed the effectiveness of a *Positive Deviance (PD)/Hearth* community-based intervention using local foods to improve infant and young children's nutrition.

Design: A quasi-experimental nonrandomized study was conducted between March and October, 2009.

Setting: The intervention and study were implemented in the Ecuadorian highlands provinces of Chimborazo and Tungurahua.

Participants: Eighty mother–child pairs in 6 intervention communities and 184 mother–child pairs in 9 comparison communities.

Intervention: Mothers met in participatory peer-led *PD/Hearth* cooking and nutrition education sessions for 12 days.

Main Outcome Measures: Dietary intake and nutritional status were collected at baseline and 6-month follow-up.

Analysis: Multiple linear and logistic regression were used for growth outcomes, and ANCOVA for mean dietary intakes.

Results: Mothers in the intervention were 1.3–5.7 times more likely to feed their children the promoted foods ($P < .05$). Children in the intervention consumed a higher percentage of recommended intakes for iron, zinc, vitamin A, protein, and energy ($P < .05$) at follow-up and had improvements in weight-for-age z-score ($\beta = .17$; 95% confidence interval, 0.01–0.31). Likelihood of underweight was reduced for children in the intervention (odds ratio = 0.36; 95% confidence interval, 0.13–0.96)

Conclusions and Implications: The *PD/Hearth* interventions support mothers to improve infant and young children's nutrition practices and reduce underweight.

Key Words: nutrition intervention, child, complementary feeding, *Positive Deviance/Hearth*, underweight, local foods (*J Nutr Educ Behav*. 2016;■:1-8.)

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INTRODUCTION

Despite progress toward the millennium goals, like many developing countries, Ecuador fell short of meeting the nutrition millennium development goals. Underweight and stunting rates remain of public health concern. Additional strategic investments will be needed in Ecuador to achieve the nutrition targets of the sustainable development goals.[1] Identifying successful infant and young child feeding interventions is critical in Ecuador, because rates of underweight and stunting are among the highest in Latin America and reductions in malnutrition have not paralleled economic growth.[2] Although recent social assistance programs in Ecuador have been popular, they have neither included strong nutritional components nor resulted in nutritional improvements,[3]

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as seen in Mexico's *Oportunidades* program.[4,5] Although nutrient gaps may be addressed with supplements,[6] food-based approaches with local foods offer potential for acceptability and sustainable behavior change.[7,8] *Positive Deviance (PD)/Hearth* is a community-based participatory nutrition education approach rooted in the Health Belief Model. *Positive Deviance/Hearth* is designed to improve nutrition and a mother's self-efficacy for infant and young children's nutrition through practicing positive feeding, hygiene, and caring practices existing within communities and replicating these practices with mothers in cooking sessions led by their peers.[9] Although the *PD/Hearth* approach has been implemented across developing countries, evaluations of its effectiveness and conditions for success are limited.[10,11]

The objective of this study was to evaluate the effectiveness of a community-based *PD/Hearth* intervention to improve diet and growth and thus reduce underweight and stunting in infants and young children aged <2 years in the Ecuadorian Andes.

METHODS

Study Overview and Participants

A quasi-experimental, nonrandomized design and census-style recruitment enabled a comparison of malnutrition indices between infants and young children aged <2 years in rural communities who received the *PD/Hearth* intervention with those of the same age in similar comparison communities who did not receive the intervention. Community leaders selected comparison communities selected based on similar socioeconomic status (SES), wealth indices, health infrastructure, access to water, average ownership of small animals, distance from main roads, and occupations of males in the community, with consideration for the population to provide an approximate 1:2 ratio of intervention to comparison for mother–child pairs. Six intervention communities (3 in Tungurahua and 3 in Chimborazo) and 9 comparison communities (5 in Tungurahua and 4 in Chimborazo) were selected. Invited participants included all mothers and their infants and young children aged <24 months in each community. They were identified through birth registries, community lists, midwives, and community leaders. The intervention was implemented in communities in the Ecuadorian highlands, with 2-week peer cooking sessions followed by biweekly peer home visits. Measurements were taken at 2 time points: baseline before the intervention (March to April, 2009) and at 6-month follow-up to the peer cooking sessions (September to October, 2009).

Intervention

World Vision Ecuador implemented the *PD/Hearth* nutrition education intervention after conducting a PD inquiry (PDI) to identify local positive feeding, caring, and hygiene practices, by visiting and conducting household observations of 12 families of well-nourished children (weight-for-age z-score [WAZ] > –1) without extra resources.[9] Table 1 presents key positive deviant practices identified through the observations and interviews. The results of an initial nutrition assessment and PDI were presented at community meetings. Community leaders nominated *madre guias* (volunteer peer-educators) who had the respect of peers in their community, ≥2 children, and healthy-weight children (WAZ > –1 and WAZ <2). Participatory training included basic nutrition and healthy recipe preparation using local foods identified in the PDI, interpretation of weight gain and growth curves, food hygiene, responsive feeding, and group organization and facilitation. Mothers of children aged <2 years brought their child to the house of the closest *madre guia* for 12 consecutive days, where they met with 8–12 mother–child pairs for 2 hours to prepare a healthy meal at a time of day agreed upon by the group. In each community, 3–4 menus were repeated throughout the 12-day *Hearth* sessions, including boiled broad beans with cheese and colored potatoes (pureed for younger children); eggs, nettle, and cheese omelet; blackberry and oat purée; nettle, tuna, and flour tortillas (pureed for younger children); and thick quinoa soup with nettle and tuna/chicken/liver/guinea pig or mixed beans. Snacks were large broad beans, lupin seeds, cheese, blackberries, and bananas. Mothers were encouraged to add available nutritious, commonly eaten foods such as carrots, onions, leafy greens, and peas. Each mother contributed an ingredient to the cooking session, as was agreed upon by the group on the previous day. Preparing thick purees (hand-mashed with a fork or spoon) for infants and younger children (aged 6–12 months), rather than the customary watery soups or broths, and increasing consistency for children aged 12–24 months was emphasized. Hand washing, kitchen hygiene, and healthy food preparation were taught through practice. For example, a *madre guia* ensured that each mother washed her own hands and her child's hands and face with warm water before eating (taking from the cooking pots). Participants and the guide mother ensured that animals did not enter the kitchen. Mothers were encouraged to sit with their children and feed them the meal as part of contextualized responsive feeding messages. After feeding, guide mothers discussed 1–2 key messages with the group; the *madre guias* had the use of a flip chart with 12 images designed by a local artist. For mothers of children aged <6 months, the *madre guias* recommended exclusive breastfeeding;

Table 1. Key Intervention Positive Deviance Practices and Messages

Dietary diversity
I give my child a variety of local foods daily
Together we are making new recipes with local foods
Timely introduction and consistency
At 6 mo I start to feed my baby *papillas (purees)*, not just broth
Responsive feeding
I sit with my child when she eats and feed with love and affection
Hygiene
We wash our hands and my child's hands and face with warm water before cooking and eating
We keep animals out of the kitchen
Exclusive breastfeeding
Breast milk is everything my baby needs until 6 mo