Preventing Malnutrition in Children under Two (PM2A): A Case Study in the Food Insecure Context of South Sudan

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Abstract

Prevention of malnutrition for children under two (PM2A) is a new approach being used by the United States Agency for International Development (USAID). Since 2010, PM2A has been adopted on a widespread basis in food assistance programs with the aim of preventing chronic malnutrition (stunting) in non-emergency settings. This case study uses mixed methods to document household food sources, insecurity and ration receipt within the context of a multi-year health and nutrition program implemented in South Sudan. Evidence from the program, which included a PM2A component in addition to health, empowerment and household agricultural interventions, indicates that household food security remained poor despite ration receipt. While PM2A is a relatively new strategy and efforts are under way to evaluate outcomes, more evidence is needed to determine the appropriateness of the PM2A approach in highly food insecure contexts and to establish the range of contexts in which PM2A is a choice approach for food assistance programs.

Introduction

The Preventing Malnutrition in Children Under 2 Approach (PM2A) integrates maternal and child health and nutrition programming with food assistance, and is a central component of many Title II non-emergency food aid programs.[1] Core components of PM2A include conditional food rations (based on participation in behaviour change interventions) for pregnant and nursing women and children under two years of age, behaviour change communication, and preventive and curative health and nutrition services for women and children according to national protocols. In addition, the PM2A package often includes a household ration to supplement the household food supply, prevent sharing of targeted rations, and/or incentivize participation in preventive program activities such as clinic visits and growth monitoring. PM2A is implemented in areas with chronic food insecurity and malnutrition, and targets pregnant and breastfeeding women and children zero to twenty-three months of age because they are the most nutritionally vulnerable (Food and Nutrition Technical Assistance II Project [FANTA-2] 2010).

Targeted nutrition education and food supplementation programs for children of six to twenty-three months and their caregivers have been shown to improve child nutrition status both as individual and combined interventions in food secure contexts (Bandhari et al. 2004; Dewey and Adu-Afarwuah 2008; Roy et al. 2005). The PM2A intervention package was shown to be more effective in reducing the prevalence of stunting, underweight and wasting than recuperative nutrition interventions alone (e.g., therapeutic feeding for acutely malnourished children) within the context of a Title II food aid program in Haiti. (Ruel et al. 2008). However, several shortcomings in this study have been noted, including lack of a control group, failure to examine implementation differences as a potential explanation for underperformance of the recuperative model, and that the ongoing debate on the relative importance of behaviour change, and communication and food assistance as means of reducing child undernutrition, was unaddressed (White 2008). Additional studies of PM2A in Guatemala and Burundi are currently ongoing (Bergeron 2011; Swindale 2010).

The Haiti study, which served as the basis for widespread adoption of PM2A in USAID food aid programming, was conducted in the context of moderate stunting (37%) and low levels of acute malnutrition (4–5%); food security was not assessed. Although the US Office of Food for Peace has specified PM2A as the preferred maternal and child health and nutrition approach for its development programs in food insecure environments (Webb et al. 2011), there is a paucity of evidence suggesting the approach is effective in acutely and chronically food insecure environments.[2] Furthermore, little guidance is available on how to determine the appropriateness of PM2A in a given context, or where and why other program models may be a preferred approach. This case study describes household food sources, including rations, and program implementation challenges in South Sudan to inform policy makers and health program practitioners about the potential advantages and disadvantages of the PM2A approach in the food insecure context.

Methods

A concurrent exploratory mixed methods study was conducted in January 2012 as part of the first USAID-funded Title II Food Aid Multi-Year Assistance Program (MYAP) implemented in South Sudan. The South Sudan Health, Nutrition and Empowerment (SSHiNE) program was implemented by the Adventist Development and Relief Agency, Concern Worldwide, Food for the Hungry and Malaria Consortium in Northern Bahr El Ghazal and Warrap states of the newly independent Republic of South Sudan, including distribution of PM2A food rations beginning in mid-2011 (Figure 1). Data collection methods included structured interviews with 80 mothers of children aged six to twenty-three months who had benefited from SSHiNE food ration distributions, and ten focus group discussions with SSHiNE program staff and beneficiaries. Sample sizes were identified based on anticipated saturation (i.e., no new information being discovered), length of the questionnaire and logistical considerations. Data collection was conducted six months after the initiation of ration distribution and within the month following the final

distribution of the full ration package. Data collection was timed so that beneficiaries had the maximum exposure to the PM2A intervention; consequently, the study was conducted during a period of relative food security, where the typical lean season begins in May and continues through August.

Figure 1. Map of South Sudan project and assessment areas

Communities in each state that were designated as PM2A areas (as compared to locations that were benefiting from other SSHiNE activities or where food distribution was not occurring) were selected for inclusion in the sampling frame based on security and access considerations and similarities to communities benefiting from the SSHiNE project. Of the communities in the sample, the research team randomly selected four (two in each state) for the final sample. The selected communities were in the payams (roughly equivalent to sub-districts) of Kuach North (Gogrial West county) and Toch East (Gogrial East county) in Warrap State and in Ariath (Aweil North county) and Gojuer Centre (Aweil West county) in Northern Bahr el Ghazal State. Community selection was conducted without involvement of program staff to eliminate potential selection bias (where SSHiNE staff may have recommended communities in which program performance was perceived as especially good).

In each of the four study areas, 20 adult female beneficiaries (pregnant women and/or mothers of children under two years of age) were interviewed using a structured questionnaire that incorporated validated and widely used instruments to assess household food sources, ration receipt and ration use (Bilinsky and Swindale 2010; Coates et al. 2007; WHO 2010). Communities were segmented to ensure geographic distribution of the sample, and within each area potential respondents were sampled by convenience. Approximately half of the mothers were recruited from the centre and half from the outskirts of the community. Beneficiary status was assessed by visual confirmation of the mother's ration card. In addition, two focus groups were conducted in each study area with six to ten mothers of children six to twenty-four months of age who received SSHiNE food rations (a total of eight focus groups). There was no overlap between interview respondents and focus group participants. Finally, two focus groups were conducted with six to ten SSHiNE program staff to gain a more qualitative understanding of available food sources, ration use and the challenges faced during program implementation.

All interviews and focus groups with community members were conducted in Dinka by SSHiNE program staff; interviewers were selected who did not have regular contact with project beneficiaries to reduce the risk of reporting bias. Interviewers were trained on interview techniques, focus group facilitation and the data collection tools, and participated in pilot testing and finalizing the questionnaire. Focus group discussions were conducted by two program staff: one facilitator (facilitating in Dinka) and one note-taker (writing notes in English). Immediately following the focus group, the facilitator and note-taker wrote detailed summaries of responses to questions to ensure reliability and confirmability of results. Focus groups with SSHiNE program staff were conducted in English by members of the research team from Johns Hopkins School of Public Health. Focus group data were analyzed using qualitative techniques of content analysis and close readings of summary texts to understand main themes or participant responses. Structured questionnaires were analyzed using descriptive statistics with STATA 11. Oral informed consent was obtained from each participant prior to initiation of the interview or focus group. Permission to conduct the interviews was obtained from the South Sudan Ministry of Health and local authorities and/or community leaders. The study was approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health.

Results

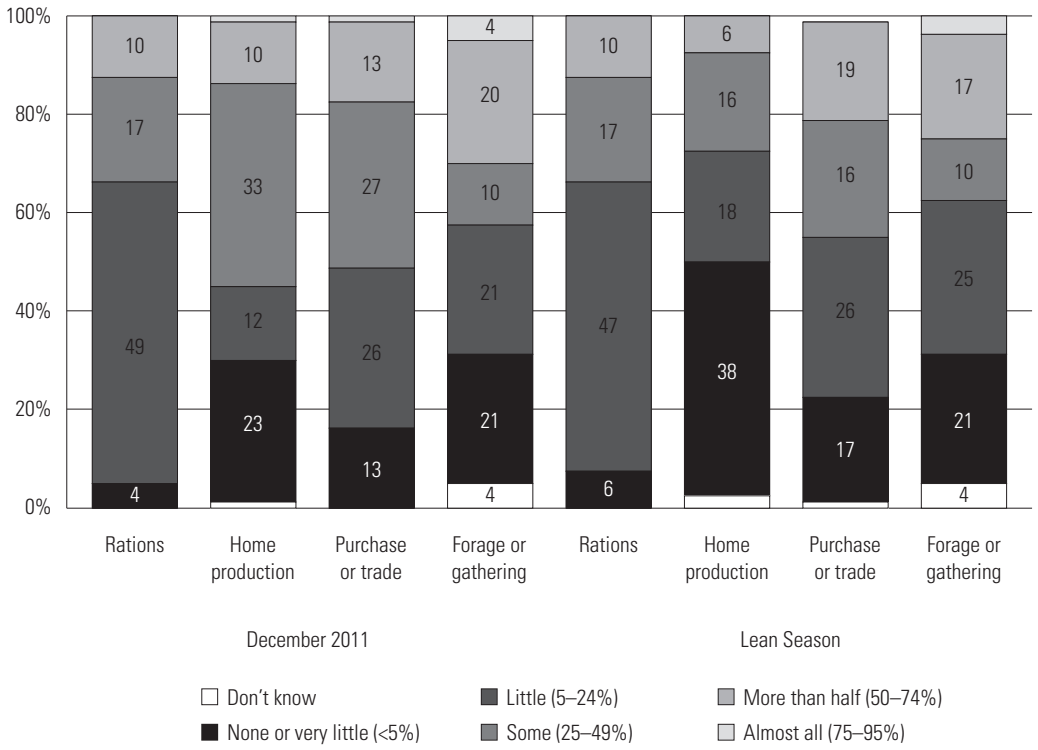
Interviews were completed in 80 households in four communities in the states of Warrap and Northern Bahr el Ghazal. Among households surveyed, household size was larger in Warrap (mean 11.2, median 10, range 6–20) than in Northern Bahr el Ghazal (mean 8.7, median 8, range 5–17). Children under two years of age, the primary target group for PM2A programs, were present in 73% of households; older children in the two-to-five- and five-to-seventeen-year age groups were present in 83% and 96% of households, respectively. The average household had 2.3 children under five years of age and 3.1 children five to seventeen years of age, with similar composition in terms of number of children among households in both states. The average number of children aged the two to five and five to seventeen was greater in Warrap than in Northern Bahr el Ghazal.

In December 2011, the month preceding the study, the primary sources of food included home production, purchase or trade, and foraging or gathering (Figure 2). Home food production was nearly ubiquitous (95%), and the most common foods produced included vegetables (79%) and grains (75%); gathering, foraging or fishing (69%) and animal husbandry (53%) were also common (Table 1). Crops grown were primarily sorghum and maize, as well as beans, okra, pumpkin and millet. The extent to which communities relied on home agriculture varied, and differences were attributed to 2011 drought conditions and lack of established community ties and land for growing. During the 2011 lean season, which was April through August, there was a noticeable decline in home production; in the lean season 56% of households reported that less than 25% of household food was produced at home compared to 35% in the month preceding the survey. In general, most foods produced in the home were also consumed; the major exception was in Warrap, where 10% of households did not consume animal [products] they produced. More than half of households reported selling livestock to purchase less costly staple foods.

Foraging and gathering were prevalent throughout the year and accounted for more than half of food consumed in 25% to 30% of households both prior to the survey and in the lean season. Consumption of gathered foods was significantly more common in Warrap (83% of households), compared to Northern Bahr el Ghazal (55% of households; $p = .002$). Common wild foods that households relied on included a green leafy plant called thou and small fruits and berries known as akour. Markets and trading were also common food sources, and 91% and 51% of households, respectively, reported using them at least once per month. Among items purchased from the market, sorghum and maize flour were the main staples, and to a lesser extent dried okra, beans, dry meat (typically fish) and occasionally oil. In order to purchase food from the market, most

households had to engage in some kind of work, typically cutting grass or gathering firewood, or, if there was no grass to cut or no one able to physically work, households would sell a cow or goat to purchase sorghum.

Figure 2. Food sources during December and the 2011 Lean Season (April to August)



All households surveyed in Warrap and Northern Bahr el Ghazal received food aid from SSHiNE in 2011. SSHiNE food distributions began in June 2011 and continued through December 2011, with monthly coverage rates between 75% and 98% in the two states in all months except July, when distributions were not planned because of independence. Households received an average of 5.3 distributions in 2011, with 83% reporting receipt of a ration at the most recent distribution (Table 2). No households reported receiving rations from the World Food Programme (WFP) or other sources during the time period rations were received from SSHiNE. In PM2A programs, ration receipt is conditional on participation in behaviour change interventions, in this case Care Groups[3], which are essential for behaviour change and information dissemination (Davis et al. 2013; FANTA-2 2010). The majority of households in each state (78% in each state) had participated in Care Groups. Of Warrap participants, 39% had participated in two or fewer Care Group meetings, 55% in three to five meetings and 6% in six to eight meetings. In Northern Bahr el Ghazal, 29% had participated in two or fewer Care Group meetings, 61% in three to five meetings and 10% in six to eight meetings. Of those who had participated, 48% in Warrap and 35% in Northern Bahr el Ghazal attended their first Care Group meeting less than two months before the study and after a majority of food distributions.

For the most recent ration distribution in December 2011, the planned ration included 3 kg of fortified corn–soya blend (CSB) and 0.3 kg of oil for each pregnant woman, mother of a child zero to five months and a child six to twenty-three months of age; as well as 14.0 kg of bulgur, 1.5 kg of lentils and 1.0 kg of oil for each targeted beneficiary's household. Households reported receiving an average of 14.9 kg of bulgur, 2.1 kg of lentils, 1.86 kg of CSB and 1.27 kg of oil. Sales of food from the most recent distribution were not reported by any household, and the ration accounted for less than 25% of food consumed by the household in nearly two-thirds of

households. There were no significant differences between Warrap and Northern Bahr el Ghazal with respect to receipt of rations. At the time of the study, households in Warrap had less food remaining than those in Northern Bahr el Ghazal, which is likely a result of larger household sizes. At the time of data collection, very few households had any rations remaining. The main foods in homes were grains (primarily sorghum and maize flour), and some households had okra, pumpkin leaves and wild foods. When rations ended, focus group participants indicated they would rely on foraging, agricultural production and sales of livestock and other assets in order to buy food – the same coping mechanisms that are employed whenever food is scarce. In focus group discussions, expansion of gardens was a possibility for only a minority of households because of a lack of resources, in particular tools and technical knowledge, and because many families were new to the area and did not feel settled. Focus group participants felt challenged by the combination of living in communities that were not well established and where drought conditions effectively made the entire year a lean season. There was enthusiasm about home garden projects and growing food if adequate rains came; however, there was also fear that famine would return because of an inability to raise crops in the face of poor rains and because many households had few livestock or assets to sell.

Table 1. Household food sources in Warrap and Northern Bahr El Ghazal

	N	Warrap	*N*	NBG	*p*-value
Household food production (past year)					
Sorghum, millet or other grains (%)	26	65%	34	85%	.07
Cowpeas, bambara or other beans (%)	2	5%	0	0%	.49
Vegetables (e.g., okra, pumpkin, greens) (%)	30	75%	33	83%	.59
Animals (e.g., cows, goats, chickens) (%)	23	58%	19	48%	.50
Foraging or gathering, including fishing (%)	22	55%	33	83%	.02
Any home production (%)	37	93%	39	98%	.62
Consumption of food produced at home					
Sorghum, millet or other grains (%)	26	65%	34	85%	.07
Cowpeas, bambara or other beans (%)	2	5%	0	0%	.49
Vegetables (e.g., okra, pumpkin, greens) (%)	30	75%	33	83%	.59
Animals (e.g., cows, goats, chickens) (%)	19	48%	19	48%	1.00
Foraging or gathering, including fishing (%)	22	55%	33	83%	.02
Consumption of any food produced at home (%)	37	93%	39	98%	.62
Frequency of market as a food source (past month)					.25
Never	6	15%	1	3%	–
Once per month	11	28%	12	30%	–
1–3 times per month	19	48%	22	55%	–
Once a week	3	8%	5	13%	–
More than once a week	1	3%	0	0%	–
Frequency of trade as a food source (past month)					.38
Never	21	53%	17	43%	–
Once per month	10	25%	7	18%	–
1–3 times per month	6	15%	12	30%	–
Once a week	0	0%	1	3%	–
More than once a week	2	5%	3	8%	–
Don't know	1	3%	0	0%	–

NBG = Northern Bahr el Ghazal.

Table 2. Household ration receipt in Warrap and Northern Bahr el Ghazal

		Warrap	NBG	*p*-value
2011 ration distributions	Mean	5.4 (1.1)	5.2 (1.5)	.51
	Median	6	6	–
	% with > 1	100%	95%	
	% with ≥ 6	73%	75%	
December 2011 ration distribution	% receiving	85%	80%	.77
Foods received at the last distribution		**Warrap**	**NBG**	***p*-value**
Bulgur (% received)		100%	100%	1.00
Amount received (mean, kg)		15.05 (3.74)	14.74 (2.49)	.66
Amount remaining (mean, kg)		1.43 (3.45)	0.15 (0.96)	.03
Households with any amount remaining (%)		38%	5%	.00
Lentils (% received)		100%	100%	1.00
Amount received (mean, kg)		1.81 (0.74)	2.45(4.03)	.32
Amount remaining (mean, kg)		0.06 (0.26)	0	.19
Households with any amount remaining (%)		15%	3%	.11
CSB (% received)		65%	70%	.81
Amount received (mean, kg)		1.86 (1.34)	1.85 (1.33)	.97
Amount remaining (mean, kg)		0	0	1.00
Households with any amount remaining (%)		0%	0%	1.00
Oil (% received)		100%	100%	1.00
Amount received (mean, L)		1.24 (0.31)	1.29 (0.35)	.46
Amount remaining (mean, L)		0	0	1.00
Households with any amount remaining (%)		0%	0%	1.00

Foods received at the last distribution	Planned rations			Reported total amount received by households
	Children†	Women†	Household	
CSB	3.0 kg	–	–	1.9 kg
Bulgur	–	4.5 kg	14.0 kg	14.9 kg
Lentils	–	1.2 kg	1.5 kg	2.1 kg
Oil	0.3 kg	0.6 kg	1.0 kg	1.4 kg

CSB = corn–soya blend; NBG = Northern Bahr el Ghazal.
† Targeted beneficiaries include pregnant women, mothers of children < 6 months, and children 6–23 months.

Discussion

During the SSHiNE implementation period, food insecurity in South Sudan was driven by below-average harvests; conflict; increased demand for food and services due to the growing internally displayed person, returnee and refugee populations; reduced imports from Sudan; and high cereal prices. Both Warrap and Northern Bahr El Ghazal states were considered key areas of concern where food insecurity was likely to continue to deteriorate (Famine Early Warning System Network 2012). Poor agricultural production, widespread use of coping mechanisms such as assets and livestock sales, and dietary adaptations including reductions in consumption and dependency on wild foods reported among SSHiNE beneficiary households indicate that despite food assistance, the prevalence of food insecurity remains high. Beneficiaries generally regarded rations as helpful but insufficient to provide the majority of the household diet, and a poor 2012 growing season and potential for the return of famine conditions were major concerns.

In this context, several issues related to the appropriateness of the PM2A approach come to light, including targeting and coverage, fidelity to the intervention and the ability to meet caloric needs of targeted beneficiaries.

One important consideration is targeting, where guidance indicates that PM2A programs should target the most food insecure districts and that linkages should be formed with existing health services. Community selection was a challenge, given the widespread needs and the absence of community-level information that could be used for comparison purposes. Prevalence of global acute malnutrition[4] was estimated at 31% in Warrap and 26% in Northern Bahr el Ghazal around the time of community selection, which is reflective of widespread food insecurity and poverty (Liverpool Associates in Tropical Health 2010). Poverty rates in Warrap and Northern Bahr el Ghazal states are estimated 64% and 76%, respectively (South Sudan National Bureau of Statistics [SSNBS] 2009). In the case of the SSHiNE program, three payams were selected in each state as SSHiNE program areas, but only a sub-set of communities within these payams received PM2A rations because of budget constraints. Community selection was driven largely by access and logistical considerations and community size. Because PM2A guidance recommends 100% coverage and beneficiaries were disbursed across different administrative units, the population of the different payams selected had to align with the program budget. Other factors included availability of functional health services and presence of other food, agricultural and health programs. An evidenced-based approach to community selection where the most vulnerable communities are identified and targeted is not required in MYAPs, presumably because of the cost and time required to conduct assessments; instead, it is assumed that because target communities are within food insecure states, that by proxy, food insecure communities will be selected. However, it is reasonable to assume that levels of food insecurity may vary within states and that a more nuanced understanding of local conditions might lead to selection of the communities that are most in need of food assistance. Given annual US government funding for MYAPs awarded in 2011 and 2012, estimated at $161 million and $50 million, respectively, mandating a more rigorous selection process based on rapid community-level assessments might improve targeting of programs to those in greatest need and most likely to benefit from program activities (USAID 2010, 2011).

Targeting households for the PM2A intervention package is another important issue. The current PM2A criteria provide rations to all members of households with pregnant or lactating women and children under two in the target community, including adequately nourished children and adults, while vulnerable households not meeting these criteria receive no rations. Thus, households consisting of returnees, disabled individuals, female-headed households, and those with acutely malnourished children between 24 and 59 months of age are not eligible for PM2A rations. PM2A guidance does indicate that adequate access to treatment for severe acute malnutrition must be available, and that acutely malnourished children from non-PM2A households be referred to community-managed programs for outpatient treatment of malnutrition. However, in many settings these services are not readily accessible for a significant portion of households. At the time of SSHiNE program implementation, acute malnutrition rates had persisted at emergency levels for an extended period. Resource shortages, including low availability of ready to use foods (RUFs) and human capacity for nutrition screening and recuperative program implementation, restricted coverage of services in Warrap and Northern Bahr el Ghazal both in terms of capacity and geographic scope. While the PM2A approach can be seen as both preventive and recuperative because it includes beneficiaries with and without acute malnutrition, it can also be argued that the prioritization of chronic malnutrition prevention over the treatment of acute malnutrition in settings such as South Sudan is ethically questionable, in particular because rations designed for prevention of chronic malnutrition may be calorically inadequate for treatment of acute malnutrition and because without timely access to recuperative services, children with acute malnutrition face an increased risk of death. Experiences from the SSHiNE

program suggest that PM2A may not be appropriate for food insecure settings with high levels of acute malnutrition, and that programs supporting community management of acute malnutrition should be prioritized so that the needs of the most vulnerable children are addressed.

Another issue identified in the SSHiNE program was difficulty scaling-up and achieving adequate food production from home garden activities, particularly in conditions of drought and food insecurity. While PM2A is intended to be coupled with broader food assistance and livelihoods strategies, its success is also bound by their performance. In theory the household ration is intended to augment existing household food sources and the ability to meet the caloric needs of target beneficiaries; thus, preventing malnutrition is dependent on stable access to food resources. In highly food insecure contexts such as South Sudan and many other areas where MYAPs are implemented, this underlying assumption is problematic. Chronic food insecurity as well as large seasonal differences in food accessibility means that rations may serve to replace other food sources rather than augment them. While serving a critical role of meeting basic energy requirements, they may fail to achieve the stated goal of preventing malnutrition. Cultural considerations are also important to take into account – for example, in Dinka communities such as those where the SSHiNE program was implemented, the cultural system is based on egalitarianism and kinship. Food is shared in equal parts among those present (including non-household members), which greatly impacts the quantity of food available for children and makes targeting food aid difficult (Groves 2011). Current studies of the impact and cost-effectiveness of PM2A on child nutrition status are ongoing and seek to understand the implications of varying ration size, schedule and composition, and the ability of the approach to supplement diet and prevent sharing (Swindale 2010). It will be important to address both cultural and situational factors in future guidance for PM2A programs. In contexts such as South Sudan, where global acute malnutrition rates surpass emergency thresholds and food insecurity is prevalent, cultural factors may impede targeting different interventions, and modified PM2A approaches should be considered.

Limitations

Both the SSHiNE program and this research were influenced by the challenging operational context of South Sudan. Limited access to communities due to poor road conditions and the security situation, human resources, high costs and delays in commodity receipt were major problems faced by the SSHiNE program. Another limitation was the short length of the program implementation period, which precluded assessment of anthropometric outcomes, most notably stunting. It also must be recognized that food insecurity and diet are highly seasonal and that information presented represents only a snapshot in time. With respect to this research, the primary limitations of the study were the lack of a representative sample of all SSHiNE beneficiaries and the small sample size for the household interviews, which drastically limited the ability to draw generalizable comparisons and identify differences that were statistically significant.

Conclusions

PM2A is a new approach being used for Title II non-emergency food aid programs. Since 2010, PM2A has been adopted on a widespread basis in multi-year assistance programs with the aim of addressing underlying causes of chronic food insecurity in non-emergency settings such as South Sudan. Evidence from the SSHiNE program in South Sudan, which included a PM2A component in addition to health, empowerment and household agricultural interventions, indicates that household food security remained poor despite ration receipt. While the food security situation among many households would undoubtedly be worse in the absence of rations, it is unlikely that PM2A objectives of preventing malnutrition were achieved given persistently high levels of food insecurity and cultural factors that were important determinants of intra-household food allocation. An important outcome of the SSHiNE program experience in South Sudan are questions relating to the appropriateness of the PM2A approach, including targeting and coverage, ability to meet caloric needs and equity considerations. While PM2A is a relatively new strategy and efforts are under way to evaluate outcomes, cost-effectiveness and implementation strategies,

more evidence is needed to establish the range of contexts in which PM2A is a choice approach for food assistance programs.

Acknowledgements

We would like to thank Mesfin Hailemariam and Grace Laki for logistical support during data collection, as well as the team of data collectors: Amuk Ater Achuil, Magai Noi Yak, Joseph Deng, Jong Anthony Deng, Gabriel Mading Apach and James Nmoi Yaach. Additionally, we acknowledge the SSHiNE implementing partners and staff at the Adventist Development and Relief Agency, Concern Worldwide and Food for the Hungry for their assistance in facilitating this research and introducing us to the participating communities, and Bess Lewis for her valuable support in questionnaire development. Finally we would like to thank the US Office of Food for Peace and the FANTA-3 project for their critical review and recommendations.

Notes

1. Under the Food for Peace Act of 1954, the USAID Office of Food for Peace is tasked with managing programs under Title II of the Trade portion of the Farm Bill, which provides for donation of US agricultural commodities and humanitarian assistance to meet emergency and non-emergency food needs in other countries.

2. Chronic food insecurity is commonly described as the result of overwhelming poverty indicated by a lack of assets, while acute food insecurity is usually considered more of a short-term phenomenon related to either manmade or unusual natural shocks, such as drought.

3. A Care Group is a group of 10 to 15 volunteer, community-based health educators who regularly meet together with NGO project staff for training and supervision. All of these volunteers then go out at least monthly to promote positive health practices with a small cohort of mothers and young children. They are different from typical mothers' groups in that each volunteer is chosen by the 10 to 15 of her neighbourhood mothers she serves and is then responsible for regularly visiting these mothers, sharing what she has learned and facilitating behaviour change at the household level.

4. Global acute malnutrition includes moderately and severely malnourished children, defined as ≤ 2 z-scores for weight-for-height or the presence of bipedal edema.

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