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A Review of the Integrated Child Development Services' Supplementary Nutrition Program for Infants and Young Children: Take Home Ration for Children

INTRODUCTION

The first 1000 days of a child's life are a critical window of opportunity for preventing undernutrition and its long-term consequences. Growth faltering occurs within this period (from 6—24 months of age), when a child starts to transition from breastfeeding to complementary feeding. Children in this age group have high nutrient requirements and therefore need high nutrient-dense complementary foods (Dewey et al. 2013).

In low-resource settings, a child's nutrient requirements are rarely satisfied where a majority of the complementary foods are prepared using cereals and legumes, which are low in micronutrients. Furthermore, basic complementary feeding practices are poor. In India, only 51.6 percent of 6—8 month old children are introduced to any complementary food and only 8.7 percent of 6—23 month old children receive an adequate diet (National Family Health Survey 2015–16). Nearly 60 percent of 6—59 month old children in India are anemic (National Family Health Survey 2015–16).

Behavior change communication (BCC), along with food supplementation, is a recommended intervention for improving complementary feeding practices in food insecure populations (Imdad et al. 2011). In 1975, the Government of India (GoI) launched the Integrated Child Development Services' (ICDS) Supplementary Nutrition Program (SNP), in an effort to bridge the calorie gap in pre-school children. One of the intents of the program was to provide them with micronutrient and energy-dense food in the form of Take Home Ration (THR) along with BCC. Data from recent surveys, especially the National Family Health Survey, highlight that the coverage of ICDS SNP has increased over time (from 26.3 percent to 48.1 percent on average between 2006 and 2016, nationally).

The Ministry of Women and Child Development (MoWCD) revised the SNP guidelines in 2009 and universalized (i.e. extended to all minority groups) the SNP entitlements (MoWCD 2009), which were reaffirmed in 2015 (MoWCD 2015). The SNP guidelines recommend that THR should be provided in the form of micronutrient-fortified food or energy dense food which meets 50 percent of Recommended Dietary Allowance (RDA) level per beneficiary per day; a total of 500 kcal and 12—15 grams of protein per day for children 6 months to 3 years of age is recommended. The GoI provides the states with RDA requirements and cost norms for THR. Thereafter, the states decide on the type of THR and its ingredients.

OBJECTIVES

We aimed to examine the current policy guidance for ICDS SNP and operationalization of these at the state-level. To do so, we compared India's SNP guidance for THR with global guidelines for infant and young child feeding (IYCF). Additionally, the current state of the take-home ration supplied for infants and young children across India was reviewed and summarized. Findings on state- and district-specific coverage of services is described elsewhere.

METHODOLOGY

We first reviewed the national guidelines for SNP (MoWCD 2015) alongside available recommendations for nutrient intakes of children in the different age groups covered by SNP. We compared the SNP nutritional norms for nutrients (energy, protein and iron) with the global guidelines (WHO/FAO/UNU 2007;WHO/FAO 2004), and the Indian Council of Medical Research's (ICMR) RDA for Indian infants (Indian Council of Medical Research 2010).

We also examined recommendations for the composition of SNP against Pan American Health Organization/World Health Organization (PAHO/WHO) guidelines for complementary feeding of the breastfed child (PAHO/WHO 2003). The overall approach to SNP was reviewed against currently available scientific knowledge about complementary feeding, as summarized by Dewey et al. (2013).

To examine the content, quantity and frequency of the food provided under SNP, we reviewed and summarized the information available in a recent report on food safety and operational guidelines published by the National Institute of Public Cooperation in Child Development (NIPCCD). The NIPCCD report (NIPCCD 2016) includes this information for 26 states and union territories (UTs) (**Box 1**).

FINDINGS

Comparing global and national guidelines

When comparing the SNP guidelines with global guidelines for energy, protein and iron for complementary food supplements (CFS) we find significant differences across all age groups for several key nutrients (**Table 1**). The World Health Organization (WHO) recommends that a breastfed infant in a developing country should receive about 200 kcal per day at 6—8 months of age, 300 kcal per day at 9—11 months and 550 kcal per day at 12—23 months of age, from all complementary foods and the remaining energy from breast milk (PAHO/WHO 2003). The Global Alliance for Improved Nutrition (GAIN) recommends 100 to 150 kcal per day from CFS (GAIN 2008). The recommended energy from supplementary foods, specified in India's SNP guidelines, therefore, seems to be excessive for a CFS, as 500 kcal would make up 81 percent of the total daily energy requirements for a 6–8 month old breastfed infant, and 73 percent for a 9–11 month old breastfed infant.

Similarly, India's SNP protein recommendations exceed global recommendations. The SNP guidelines recommend 12–15 grams per day of protein from supplementary food for 6–72 month olds, when the estimated total protein requirement for 6–23 month olds is 8.2–9.1 grams per day (WHO/FAO/UNU 2007). In the case of iron, India's SNP recommendations are only available for 1–3 year olds (6 mg/day).

TABLE 1: Comparing global and national guidelines for energy, protein and iron content of complementary foods

Energy				
Age group	**Pan American Health Organization/World Health Organization (2003)**		**Indian Council of Medical Research (2010)**	**India's Supplementary Nutrition Program (2009)**
	Total energy requirements for breastfed children	**Energy from all complementary food**	**RDA for Indian infants**	**Energy from supplementary food**
6–8 months	615 kcal/day	200 kcal/day	Boys: 650–700 kcal/day Girls: 600–650 kcal/day (6–9 months)	500 kcal/day (6–72 months)
9–11 months	686 kcal/day	300 kcal/day	Boys: 730–780 kcal/day Girls: 680–710 kcal/day (9–12 months)	
12–23 months	894 kcal/day	550 kcal/day	Boys: 910 kcal/day Girls: 830 kcal/day (1–2 years)	

Protein			
Age group	**World Health Organization, Food and Agriculture Organization, and the United Nations University (2007)**	**Indian Council of Medical Research (2010)**	**India's Supplementary Nutrition Program (2009)**
	Total protein requirements	**RDA for Indian infants**	**Protein from supplementary food**
6–8 months	Boys: 8.8 g/day Girls: 8.2 g/day (6 months)	13.4 g/day (6–9 months)	12–15 g/day (6–72 months)
9–11 months	----	14.9 g/day (9–12 months)	
12–23 months	Boys: 9.1 g/day Girls: 8.5 g/day (1 year)	Boys: 15.1 g/day Girls: 14.1 g/day (1–2 years)	

Iron				
Age group	**World Health Organization/Food and Agriculture Organization (2004)**		**Indian Council of Medical Research (2010)**	**India's Supplementary Nutrition Program (2009)**
	Recommended iron intake		**RDA for Indian infants**	**From supplementary food**
	Based on low bioavailability	**Based on medium bioavailability**		
6–12 months	19 mg/day	9 mg/day	5 mg/day	No information available
1–3 years	12 mg/day	6 mg/day	9 mg/day	6 mg/day

Note: Total protein requirements were estimated using recommended safe levels of protein intake for weaned infants and children (WHO/FAO/UNU 2007), and median body weights for 6 month old girls and boys and 12 month old girls and boys from the World Health Organization's child growth standards; RDA= Recommended Dietary Allowance.

Differences in Indian RDA and World Health Organization recommended daily nutrient intakes

A possible reason for the differences in the supplementary food guidelines is that the ICMR's RDA for nutrients differs from the global recommendations (**Table 1**) for some nutrients.

The ICMR and World Health Organization (WHO) recommendations for caloric requirements are nearly similar. The WHO recommends 615 kcal per day for 6–8 month olds, 686 kcal per day for 9–11 month olds, and 894 kcal per day for 12–23 month olds. The ICMR recommends month and sex-specific daily energy requirements. For 6-9 month old boys it recommends 650 to 700 kcal per day and for girls in the same age group 600 to 650 kcal per day; for 1–2 year old boys 910 kcal per day and for girls 830 kcal per day. The ICMR guidance on caloric requirements exceeds the WHO recommendations by less than 100 kcals. However, the ICMR guidance does not specify calorific requirements from CFS.

For protein, the ICMR's RDA exceeds global recommendations (**Table 1**). A joint report by WHO, the Food and Agriculture Organization (FAO) of the United Nations, and the United Nations University (UNU) recommends 1.12 g/kg body weight/day and 0.95 g/kg body weight/day for 6 month olds and 1 year olds respectively (WHO/FAO/UNU 2007). Applying these to the median weight for age, 7.9 kg and 9.6 kg for 6 month old and 1 year old boys and girls respectively, these recommendations range from 8.2–8.8 grams per day for 6 month olds, and 8.5–9.1 grams per day for 1 year olds. The ICMR recommends 13.4 grams per day for 6–9 month olds, 14.9 grams per day for 9–12 month olds and 14.1–15.1 grams per day for 1–2 year olds.

Finally, in the case of iron, the ICMR recommends 5 milligrams per day for 6–12 month olds, and 9 milligrams per day for 1–3 year olds. The WHO recommends 19 milligrams per day and 9 milligrams per day based on low and medium bioavailability respectively for 6-12 month olds, and 12 milligrams per day and 6 milligrams per day based on low and medium bioavailability respectively for 1-3 year olds (WHO/FAO 2004). The WHO recommendations for iron for the youngest age group are more than double that of the ICMR recommendations.

Thus, while ICMR recommendations for caloric intake are similar as the global recommendations, they are higher for protein intake, and lower for iron intake when compared with the global recommendations. This difference could be due to the different approaches used by the two organizations in estimating the requirements.

The WHO's daily energy requirements are derived from measurements of total energy expenditure and energy deposition (Butte et al. 2007; Dewey et al. 2003). The ICMR RDA (2010) uses the same values of energy requirements for infants which were developed during the 2001 Consultations of FAO/WHO/UNU. These energy requirements were derived using the doubly labeled water (DLW) method to which energy acquisition due to growth is added. The Consultation Group had used body weights of infants from both the developed and the developing countries. There are no separate studies on Indian children using the DLW method (ICMR 2010). In the case of protein, ICMR adopts the figures recommended by the FAO/WHO/UNU Committee (2007), correcting for the low quality of protein in the routine Indian diets, which are predominantly plant-based proteins with small contributions from animal-source foods (ICMR 2010).

The WHO recommended iron intakes have been designed to cover the requirements of 97.5 percent of infants in each age group for diets with different bioavailabilities, while the ICMR allowances have been estimated using the factorial approach and take into consideration the basal loss and growth requirements. Both the recommendations have, however, been tailored to suit a low bioavailability diet, which is a simple diet predominantly based on cereals, roots and tubers, with small quantities of meat, and foods that inhibit iron absorption, such as rice, beans and whole wheat flour (WHO/FAO 2004).

Box 1 Take-home ration provided by different states to children in the complementary feeding age group

*We have summarized the details of take-home ration (THR) provision to 6–36 month old children in 26 states and union territories (UTs), specifically the inclusion of sugar and eggs, where mentioned (**Table 2**) based on the 2016 Facilitators' Guidebook on Food, Food Safety and Hygiene Measures in ICDS, prepared by the National Institute of Public Cooperation and Child Development. There may have been changes in the THR provision in some states since then, which have not been reflected here.*

In providing THR to 6–36 month old children, states follow the central guidance on nutrient composition of THR. However, the modalities for provision, ingredients used, and the types of THR vary across the states. A recent compilation and our review of THR models show that among 23 states and 3 UTs self-help groups provide THR in 6 states. In Andhra Pradesh and Punjab, there are multiple sources of procurement for THR. In Madhya Pradesh and Uttar Pradesh, large corporations are the sole suppliers of THR. There is no information on delivery modalities for 12 states.

The ingredients of THR are predominantly a combination of cereal, legume, oil, and sugar. There is a variability in the quantity of THR provided to infants and young children among the states. Of the 22 states and UTs where information is available on THR provision to children, in 12 states 120 to 140 grams of THR is given per day, while in Haryana and Odisha it is 160 grams, and in Manipur it is 25 grams.

In 15 states and UTs, sugar is one of the ingredients of THR. Overall, the sugar content of THR is high in most states, but varies by state. In Chandigarh, 40 grams of sugar makes up a 120 gram serving of THR; in Gujarat, 35 grams of sugar is added to make 125 grams of Balbhog; and in Rajasthan, 36 grams of sugar is used to make 125 grams of weaning food. Only in Assam, Karnataka, Kerala, Puducherry, Tamil Nadu, and West Bengal sugar is not added to THR. In addition to THR, eggs are given to 6–36 month old children only in two states - Andhra Pradesh and Odisha. In Tamil Nadu, 2-3 year old children are given eggs as part of their afternoon meal.

In 17 states and UTs, the same formulation of THR which is given to all children, is provided to severely undernourished children, but in larger quantities compared to the usual quantity of THR. In the case of 7 states and UTs, details of THR for severely undernourished children are not mentioned. Only Madhya Pradesh and Jharkhand have a different formulation of THR for severely undernourished children.

TABLE 2: Inclusion of sugar and eggs in supplementary nutrition foods provided to children 6–36 months of age

State name	Sugar included	Eggs included
Andaman		
Andhra Pradesh		√
Arunachal Pradesh	√	
Assam		
Chandigarh	√	
Chhattisgarh	√	
Delhi	√	
Goa		
Gujarat	√	
Haryana	√	
Himachal Pradesh	√	
Jammu & Kashmir	√	
Jharkhand	√	
Karnataka		
Kerala		
Madhya Pradesh		
Maharashtra	√	
Manipur		
Odisha	√	√
Puducherry		
Punjab	√	
Rajasthan	√	
Sikkim	√	
Tamil Nadu		Only for 2-3 year old children as part of afternoon meal
Uttar Pradesh	√	
West Bengal		
Total	15	

Source: National Institute of Public Cooperation and Child Development. 2016. *Facilitators guide book on food, food safety and hygiene measures in ICDS.*

CONCLUSIONS

We have identified some areas of possible reform for the supplementary nutrition program in India's ICDS program, focusing on guidelines for nutrient requirements, and the composition of THR for young infants in the complementary feeding age group (**Box 2**).

First, we found some differences between the Indian and global recommendations for nutrient requirements. The ICMR's protein requirements exceed those of WHO, while its iron intake recommendations are lower than those of WHO. It would be useful to review the current guidelines for the supplementary nutrition component of ICDS and to consider aligning them more strongly with the recently available data on infant nutrient needs, accounting for breast milk intake.

Second, we found a mix of models for the provision of THR across the country. The THR provision follows ICMR guidelines. However, information on THR content, quantity, frequency of provision, and nutrient content is not uniformly available for all the states. In instances where it is available, it may be outdated. Given the dearth of information, it is unclear whether the states are currently meeting the THR norms specified in the national guidelines. Furthermore, in the current context of rising double burden of malnutrition in India, and more importantly, the low nutritive value of sugar, there is an urgent need to critically examine the sugar content of THR.

Finally, given the low caloric requirement, small gastric capacity, and the need for a diverse diet among children below three years, the guidelines for THR need to be re-examined. THR is intended to be a supplemental food, to be added into the daily diet of infants and young children who should also receive other family foods to ensure adequate transition to family foods along with breast milk. However, in the absence of information and behavioral support that emphasize the importance of dietary diversity for child growth, it is likely that THR might become the only food consumed by children. States should therefore consider integrating a more comprehensive behavior change program that links appropriate communications about infant and young child feeding along with the provision of a high quality THR to provide better products/foods that help to strengthen and support IYCF practices as a whole.

India's ICDS program, which already includes food supplements, offers an unparalleled opportunity to improve the nutrient intake of children and support optimal infant and young child feeding. It is imperative, however, that the nutrient content and food composition of the foods offered within ICDS, specifically foods offered to children 6–36 months of age, be reviewed and revised, if needed. Given the variability across India, it is also crucial to test different formulations of THR or associated commodities, such as eggs, for their ability to meet the critical nutrient gaps in the diets of infants in ways that also address safety, palatability, and acceptability.

Box 2 Desiging Complementary Food Supplements

The following should be considered when designing complementary food supplements (CFS):

- *Breast milk should continue to be a major source of energy in the first one year of life; complementary foods should not replace the energy received from breast milk.*
- *Complementary foods should have a high-nutrient density, limited sugar content, and contain adequate amounts of proteins, minerals, vitamins and essential fatty acids.*
- *Nutrient needs and infant gastric capacity vary for different age groups and complementary foods need to consider both nutrient needs and gastric capacity.*

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ABOUT POSHAN

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ABOUT RESEARCH NOTES

Research Notes summarize the latest findings from POSHAN-led studies.

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