

Research Brief

Innovative strategies to promote early child development among low-income rural infants and preschoolers in India through multiple micronutrient fortification and early learning opportunities



राष्ट्रीय पोषण संस्थान
National Institute of Nutrition
(भारतीय आयुर्विज्ञान अनुसंधान परिषद)
(Indian Council of Medical Research)



Micronutrient
Initiative



Mathile Institute
for the Advancement of Human Nutrition



UNIVERSITY OF MARYLAND
SCHOOL OF MEDICINE



NATIONAL INSTITUTE OF NUTRITION
(Indian Council of Medical Research)
Ministry of Health & Family Welfare, Gol
Hyderabad 500007, Telangana State

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PROJECT GROW SMART

BACKGROUND

Micronutrient deficiencies & limited learning opportunities contribute to the loss of developmental potential among millions of children. Early developmental loss contributes to low academic performance, limited economic capabilities, and lifelong disparities. Integrated nutrition & early child development interventions may be an efficient & optimal strategy to promote early child health & development.

STUDY OBJECTIVE

To evaluate the effects of an integrated micronutrient powder (MNP) and Early Learning intervention on micronutrient status and development of infants & preschoolers.

STUDY DESIGN

Setting: Rural areas, Nalgonda District, Telangana (formerly Andhra Pradesh), India.

Infant Phase (age 6–12 months): Dewormed and randomized into 1) MNP + Early Learning, 2) MNP alone, 3) Placebo + Early Learning, 4) Placebo alone, home visits conducted biweekly for one year by Village Level Workers: delivered MNP/placebo sachets (added to the infants' food) & Early Learning intervention (education for caregivers based on Care for Child Development from UNICEF/WHO) for 12 months.

Preschool Phase (age 36–48 months): Cluster-randomized trial in Anganwadi centers (AWCs), stratified by AWC quality (High/low), dewormed and randomized into 1) MNP and 2) placebo. MNP/placebo packets delivered biweekly for 8 months and mixed into the children's mid-day meal.

MNP formulations were based on Indian RDAs & prior efficacy trials, and were produced specifically for the study by M/s Primal Healthcare, Mumbai, India.



Infants



Preschoolers



Nutrient composition of MNP products (per child/day)

	6-12 mo	13-24 mo	36 + mo	Placebo (all ages)
Iron, mg	8	10	13	0
Vitamin A, µg	200	200	150	0
Vitamin C, mg	20	20	20	0
Folic Acid, µg	20	20	20	0
Zinc, mg	5	5	5	0
Vitamin B12, µg	0.5	0.5	0.5	0
Vitamin B2, mg	0.5	0.5	0.5	0.5
Maltodextrin	Filler			

EVALUATION

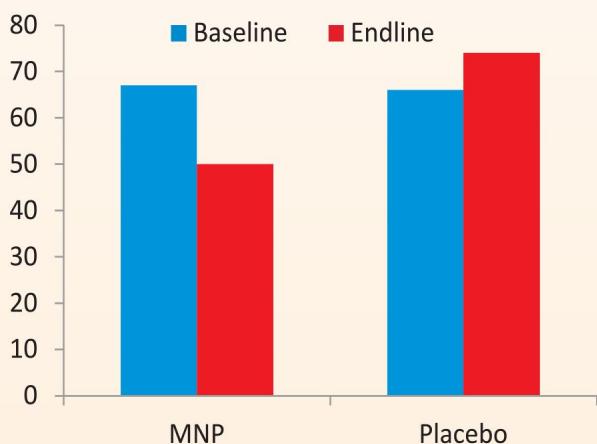
Evaluations for infants were conducted at enrollment, 6-months, and 12-months. Evaluations for preschoolers were conducted at enrollment and 8-months. Primary outcome measures were 1) Anemia and micronutrient status (hemoglobin, iron, zinc, folate and vitamin B12); 2) Child development (cognitive, motor, social emotional development, executive functioning and parent-child interactions).

FINDINGS

PROJECT GROW SMART REDUCED ANEMIA & IRON DEFICIENCY

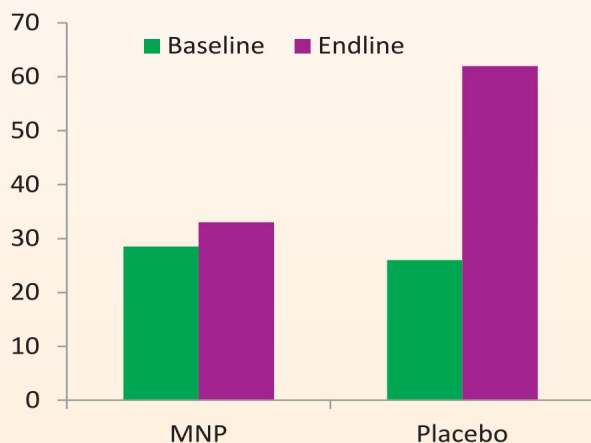
INFANTS

ANEMIA



Reduced from 67% to 50% with MNP
Increased from 66% to 72% with placebo

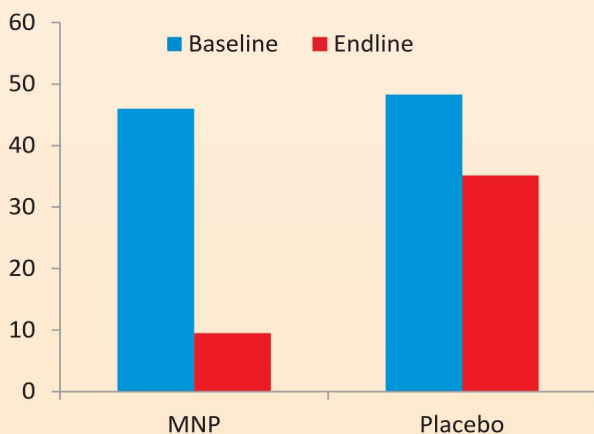
IRON DEFICIENCY



Increased from 31% to 34% with MNP
Increased from 30% to 64% with Placebo

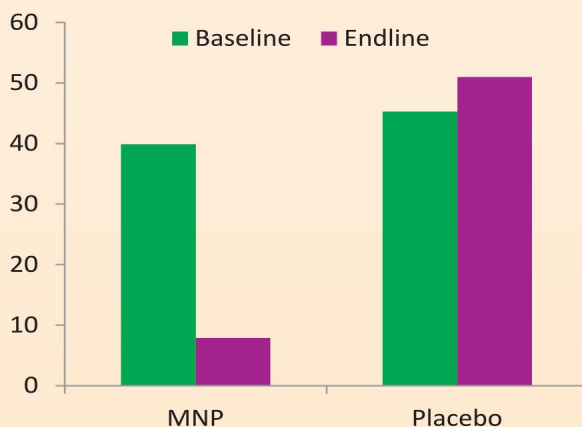
PRESCHOOLERS

ANEMIA



Reduced from 46% to 10% with MNP
Reduced from 48% to 35% with placebo

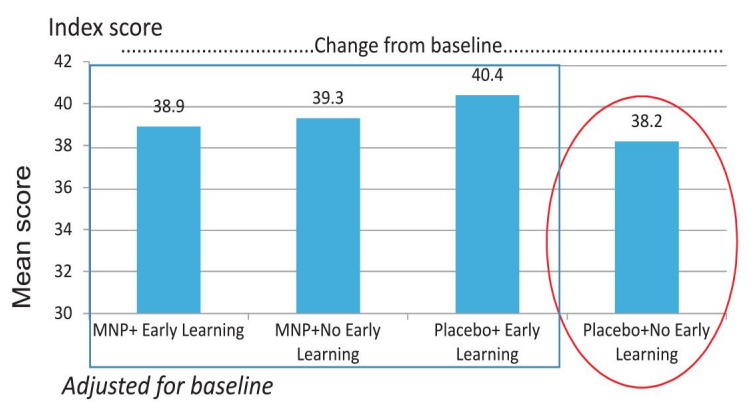
IRON DEFICIENCY



Reduced from 40% to 8% with MNP
Increased from 45% to 51% with placebo

PROJECT GROW SMART PROMOTED COGNITIVE DEVELOPMENT AND REDUCED DISPARITIES

INFANTS: CHANGE IN COGNITION

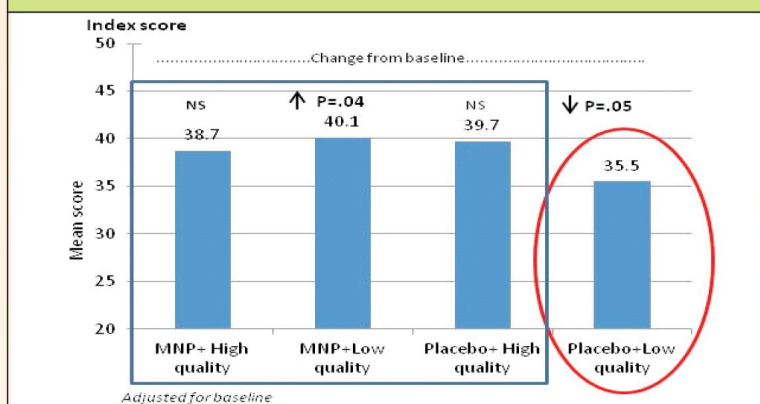


Infants who received Early Learning Intervention or MNP had better cognition post intervention.

No additional benefit from giving MNP & Early Learning together.

Infants who received no intervention had the lowest score.

PRESCHOOLERS: CHANGE IN COGNITION



MNP significantly improved children's cognitive skills in Low Quality AWCs.

No difference in High Quality AWCs.

MNP reduced disparities between children in High and Low Quality AWCs.

IMPLICATIONS

Findings from this home (infant) and preschool (Anganwadi Centre) based integrated trial can be used to guide larger-scale policy and programs designed to promote the developmental, education, and economic potential of young children in rural India.

National Institute of Nutrition, (ICMR)
Jamai Osmania P.O., Hyderabad, Telangana

K. Madhavan Nair (nairthayil@gmail.com)
Sylvia Fernandez-Rao (fernandezsylvia1@gmail.com)
Nagalla Balakrishna (dr_nbk@yahoo.com)
Kankipati V. Radhakrishna (vijrkk@yahoo.com)
Punjal Ravinder (rpunjal@rediffmail.com)

University of Maryland School of Medicine,
Baltimore, MD, USA

Maureen M. Black (mblack@peds.umaryland.edu)
Nicholas Tilton (ntilton@peds.umaryland.edu)

Johns Hopkins Bloomberg School of Public Health,
Baltimore, MD, USA

Kristen M. Hurley (khurley2@jhu.edu)

Micronutrient Initiative, Ottawa, Canada

Kimberly B. Harding (kharding@micronutrient.org)

Mathile Institute for the Advancement of Human Nutrition,
Dayton, OH, USA

Greg A. Reinhart (greinhart@mathileinstitute.org)