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Partnerships and Opportunities to Strengthen and Harmonize Actions for Nurition in India
Abstract Digest
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EDITOR'S NOTE

This issue of Abstract Digest features articles on factors influencing child outcomes, delivery of health and nutrition interventions, a *Lancet Commission* on the importance of women's health, and multi-country studies tackling multisectoral issues such as poverty, and examining enabling environments. Here are some highlights:

Child outcomes

Fall and colleagues (2015) find that young maternal age (<19 years) is associated with poor birth outcomes and stunting at 2-years. Vart et al. (2015) discover that belonging to the most disadvantageous caste category increases risk of anemia among children under-six years. Humphries and colleagues' (2015) findings reiterate the importance of household food security on child growth in Ethiopia, India, Peru, and Vietnam.

Delivery of health and nutrition interventions

Walker et al. (2015) find that training improved public-sector providers' knowledge of zinc treatment and dosage to treat children with diarrhea. Kosec et al. (2015) find that monetary incentives, designated day events (i.e., immunization day), and good frontline worker recordkeeping improved delivery of essential health and nutrition services in Bhojpur district of Bihar. Batura and colleagues (2015) caution how lack of published literature and evidence from low- and middle-income countries affects cost-effectiveness of early childhood nutrition and development interventions and has implications for at-scale delivery.

Multisectoral programs

In an evaluation of a multifaceted program to improve livelihoods among the very poor in six countries (Ethiopia, Ghana, Honduras, India, Pakistan, and Peru), Banerjee and colleagues (2015) find that household consumption was significantly higher in the interventions groups compared with the comparison groups in most countries, an effect that was maintained after one year of the conclusion of the program.

Shaping enabling environments

Gillespie et al. (2015) use a set of case studies from South Asia and East Africa to characterize enabling environments for agriculture to benefit nutrition and to inform how such environments could be shaped and sustained. Nisbett et al. (2015) identify characteristics of and challenges faced by nutrition leaders that may influence the nutrition leaders' success or lack of it in policy environments, in a study conducted in Bangladesh, Ethiopia, India, and Kenya.

Enjoy Reading!

Warm Regards,
Dr. Rasmi Avula

PEER-REVIEWED STUDIES

Nutrition and Maternal, Neonatal, and Child Health

Christian, P., L.C. Mullany, K. M. Hurley, J. Katz, and R.E. Black 2015. *Seminars in Perinatology*. doi: http://dx.doi.org/10.1053/j.semperi.²015.06.009

http://www.sciencedirect.com/science/article/pii/S0146000515000567

This article reviews the central role of nutrition in advancing the maternal, newborn, and child health agenda with a focus on evidence for effective interventions generated using randomized controlled trials in low- and middle-income countries (LMIC). The 1000 days spanning from conception to 2 years of life are a critical period of time when nutritional needs must be ensured can lead to adverse impacts on short-term survival as well as long-term health and development. The burden of maternal mortality continues to be high in many under-resourced settings; prenatal calcium supplementation in populations with low intakes can reduce the risk of pre-eclampsia and eclampsia morbidity and mortality and is recommended, and antenatal iron–folic acid use in many countries may reduce anemia, a condition that may be an underlying factor in postpartum hemorrhage. Sufficient evidence exists to promote multiple micronutrient supplementation during pregnancy to reduce fetal growth restriction and low birth weight. Early initiation of breastfeeding (within an hour), exclusive breastfeeding in the first 6 months of life, and vitamin A supplementation in the first few days of life in Asia (but not in Africa) reduce infant mortality. Biannual large-dose vitamin A supplements to children 6–59 months of age and zinc for treatment of diarrhea continue to be important strategies for improving child health and survival. Early nutrition and micronutrient status can influence child development but should be integrated with early responsive learning interventions. Future research is needed that goes beyond the 1000 days to ensure adequate preconceptional nutrition and health, with special emphasis on adolescents who contribute to a large proportion of first births in many LMIC. Thus, we make the case for integrating proven nutrition interventions with those for health in pregnant women, and with those for health and child development in neonates, infants, and young children to help advance the global MNCH agenda.

Association between Maternal Age at Childbirth and Child and Adult Outcomes in the Offspring: A Prospective Study in Five Low-Income and Middle-Income Countries (COHORTS Collaboration)

Fall, C.H.D., H.S. Sachdev, C. Osmond, M.C. Restrepo-Mendez, C. Victora, R. Martorell, A.D. Stein, S. Sinha, N. Tandon, L. Adair, I. Bas, S. Norris, and L.M. Richter. 2015. *The Lancet Global Health* 3 (7): e366–e377. doi: http://dx.doi.org/10.1016/S2214-109X(15)00038-8

http://www.thelancet.com/journals/langlo/article/PIIS2214-109X%2815%2900038-8/fulltext

Background: Both young and advanced maternal age is associated with adverse birth and child outcomes. Few studies have examined these associations in low-income and middle-income countries (LMICs) and none have studied adult outcomes in the offspring. We aimed to examine both child and adult outcomes in five LMICs. **Methods:** In this prospective study, we pooled data from COHORTS (Consortium for Health

Orientated Research in Transitioning Societies)—a collaboration of five birth cohorts from LMICs (Brazil, Guatemala, India, the Philippines, and South Africa), in which mothers were recruited before or during pregnancy, and the children followed up to adulthood. We examined associations between maternal age and offspring birthweight, gestational age at birth, height-for-age and weight-for-height Z scores in childhood, attained schooling, and adult height, body composition (body-mass index, waist circumference, fat, and lean mass), and cardiometabolic risk factors (blood pressure and fasting plasma glucose concentration), along with binary variables derived from these. Analyses were unadjusted and adjusted for maternal socioeconomic status, height and parity, and breastfeeding duration. **Findings:** We obtained data for 22 188 mothers from the five cohorts, enrolment into which took place at various times between 1969 and 1989. Data for maternal age and at least one outcome were available for 19,403 offspring (87%). In unadjusted analyses, younger (≤19 years) and older (≥35 years) maternal age were associated with lower birthweight, gestational age, child nutritional status, and schooling. After adjustment, associations with younger maternal age remained for low birthweight (odds ratio [OR] 1.18 (95% CI 1.02–1.36)], preterm birth (1.26 [1.03–1.3]), 2-year stunting (1.46 [1.25–1.70]), and failure to complete secondary schooling (1.38 [1.18–1.62]) compared with mothers aged 20–24 years. After adjustment, older maternal age remained associated with increased risk of preterm birth (OR 1.33 [95% CI 1.05–1.67]), but children of older mothers had less 2-year stunting (0.64 [0.54–0.77]) and failure to complete secondary schooling (0.59 [0.48–0.71]) than did those with mothers aged 20–24 years. Offspring of both younger and older mothers had higher adult fasting glucose concentrations (roughly 0.05 mmol/L). **Interpretation:** Children of young mothers in LMICs are disadvantaged at birth and in childhood nutrition and schooling. Efforts to prevent early childbearing should be strengthened. After adjustment for confounders, children of older mothers have advantages in nutritional status and schooling. Extremes of maternal age could be associated with disturbed offspring glucose metabolism.

COMMENT

Maternal age matters: for a lifetime, or longer

Saloojee, H., and H. Coovadia. 2015. *The Lancet* 3 (7): e342–e343. doi: http://dx.doi.org/10.1016/

S2214-109X(15)00034-0

http://www.thelancet.com/journals/langlo/article/PIIS2214-109X%2815%2900034-0/abstract

Pregnancies in adolescents (10–19-year-olds) and in older women (≥35 years) are hazardous for the mother and the child. Despite an almost universal decline in the adolescent birth rate since 1990,1 adolescent fertility still accounts for 11% of all births worldwide,[2] with 95% of these births occurring in low-income and middle-income countries (LMICs).2 In 2014, the average global birth rate among 15–19-year-olds was 49 per 1000 girls (1 in 20), with startling differences in rates between countries (from 1 to 299 per 1000), the highest rates occurring in sub-Saharan Africa.

Caste-Based Social Inequalities and Childhood Anemia in India: Results from the National Family Health Survey (NFHS) 2005–2006

Vart, P., A. Jaglan, and K. Shafique. 2015. *BMC Public Health* 15: 537. doi: 10.1186/s12889-015-1881-4

http://link.springer.com/article/10.1186/s12889-015-1881-4

Background: Caste is one of the traditional measures of social segregation in India and differs from other indicators as it is both, endogamous and hereditary. Evidence suggests that belonging to lower castes exposes one to social inequalities and affects health adversely. We examined the association of caste with childhood anemia in India and explored the effect modifying role of adult education and household wealth. Methods: A cross-sectional analysis of National Family Health Survey (NFHS) data of 43,484 children aged 6–59 months was performed. Poisson regression analysis was conducted to study the association between caste and childhood anemia accounting for various maternal, child, and household related variables. Caste was categorized as "other caste" (least disadvantageous), "other backward caste", "scheduled tribe" and "scheduled caste" (most disadvantageous). Anemia was defined as mild (hemoglobin level 7-11 g/dL), moderate (hemoglobin level 5-7 g/dL) and severe (hemoglobin level <5 g/dL). Results: We found that children in scheduled caste had higher risk of having anemia [mild anemia: RR = 1.10, 95 % CI = 1.05-1.15; moderate anemia: RR = 1.19, 95 % CI = 1.14–1.24; severe anemia: RR = 1.87, 95 % CI = 1.51 – 2.31] after accounting for child, maternal and household covariates including adult education and household wealth. The interaction of caste with adult education and household wealth was not statistically significant for any level of anemia. Sensitivity analyses for children born to mothers of age ≥ 18 years at first child birth and body mass index (BMI) ≥ 18.5 kg/m2, resulted in similar findings. Conclusion: Caste is an independent determinant of childhood anemia in India. The level of adult education and household wealth did not modify the association between caste and childhood anemia. The findings may be used for countering childhood anemia and it may be beneficial to target future public health actions towards disadvantageous castes in India.

A Randomized Trial of Iron-Biofortified Pearl Millet in School Children in India

Finkelstein, J.L., S. Mehta, S.A. Udipi, P.S. Ghugre, S.V. Luna, M.J. Wenger, L.E. Murray-Kolb, E.M. Przybyszewski, and J.D. Haas. 2015. *The Journal of Nutrition*. doi:10.3945/jn.¹14.208009

http://jn.nutrition.org/content/early/2015/05/06/jn.¹14.208009.abstract

Background: Iron deficiency is the most widespread nutritional deficiency in the world. Objective: The objective of this randomized efficacy trial was to determine the effects of iron-biofortified pearl millet (Fe-PM) on iron status compared with control pearl millet (Control-PM). Methods: A randomized trial of biofortified pearl millet (Pennisetum glaucum), bred to enhance iron content, was conducted in 246 children (12–16 y) for 6 mo in Maharashtra, India. Iron status [hemoglobin, serum ferritin (SF), soluble transferrin receptor (sTfR), and total body iron (TBI)], inflammation (C-reactive protein and α-1 acid glycoprotein), and anthropometric indices were evaluated at enrollment and after 4 and 6 mo. Hodges-Lehmann-Sen 95% CIs were used to examine the effect of the Fe-PM on iron status compared with commercially available Control-PM. Linear and binomial regression models were used to evaluate the effects of Fe-PM on iron status and incidence of anemia and iron deficiency, compared with Control-PM. Results: At baseline, 41% of children were iron

deficient (SF <15 µg/L) and 28% were anemic (hemoglobin <12.0 g/dL). Fe-PM significantly increased SF concentrations and TBI after 4 mo compared with Control-PM. Among children who were iron deficient at baseline, those who received Fe-PM were 1.64 times more likely to become iron replete by 6 mo than were those receiving Control-PM (RR: 1.64, 95% CI: 1.07, 2.49, P = 0.02). The effects of Fe-PM on iron status were greater among children who were iron deficient at baseline than among children who were not iron deficient at baseline. **Conclusions:** Fe-PM significantly improved iron status in children by 4 mo compared with Control-PM. This study demonstrated that feeding Fe-PM is an efficacious approach to improve iron status in school-age children and it should be further evaluated for effectiveness in a broader population context. This trial was registered at clinicaltrials.gov as NCT02152150.

Cross-Sectional and Longitudinal Associations between Household Food Security and Child Anthropometry at Ages 5 and 8 Years in Ethiopia, India, Peru, and Vietnam

Humphries, D.L., K.A. Dearden, B.T. Crookston, L.C. Fernald, A.D. Stein, T. Woldehanna, M.E. Penny and J.R. Behrman. 2015. *The Journal of Nutrition*. doi: 10.3945/jn.115.210229

http://jn.nutrition.org/content/early/2015/06/17/jn.115.210229.abstract

Background: Poor childhood nutritional status has lifetime effects and food insecurity is associated with dietary practices that can impair nutritional status. **Objectives:** We assessed concurrent and subsequent associations between food insecurity and height-for-age z scores (HAZs) and body mass index–for-age z scores (BMI-Zs); evaluated associations with transitory and chronic food insecurity; and tested whether dietary diversity mediates associations between food insecurity and nutritional status. **Methods:** We used data from the Young Lives younger cohort composed of children in Ethiopia (n = 1757), India (n = 1825), Peru (n = 1844), and Vietnam (n = 1828) recruited in 2002 (round 1) at α1 y old, with subsequent data collection at 5 y in 2006 (round 2) and 8 y in 2009 (round 3). **Results:** Children from food-insecure households had significantly lower HAZs in all countries at 5 y (Ethiopia, −0.33; India, −0.53; Peru, −0.31; and Vietnam, −0.68 HAZ; all P < 0.001), although results were attenuated after controlling for potential confounders (Ethiopia, −0.21; India, −0.32; Peru, −0.14; and Vietnam, −0.27 HAZ; P < 0.01). Age 5 y food insecurity predicted the age 8 y HAZ, but did not add predictive power beyond HAZ at age 5 y in Ethiopia, India, or Peru. Age 5 y food insecurity predicted the age 8 y BMI-Z even after controlling for the 5 y BMI-Z, although associations were not significant after the inclusion of additional confounding variables (Ethiopia, P = 0.12; India, P = 0.29; Peru, P = 0.16; and Vietnam, P = 0.51). Chronically food-insecure households had significantly lower HAZs than households that were consistently food-secure, although BMI-Zs did not differ by chronic food-insecurity status. Dietary diversity mediated 18.8–30.5% of the association between food security and anthropometry in Vietnam, but mediated to a lesser degree (8.4–19.3%) in other countries. **Conclusions:** In 4 countries, food insecurity at 5 y of age was associated with both HAZ and BMI-Z at age 8 y, although the association was attenuated after adjusting for other household factors and anthropometry at age 5 y, and remained significant only for the HAZ in Vietnam.

Midupper Arm Circumference Outperforms Weight-Based Measures of Nutritional Status in Children with Diarrhea

Modi, P., S. Nasrin, M. Hawes, J. Glavis-Bloom, N.H. Alam, M.I. Hossain and A.C. Levine. 2015. *The Journal of Nutrition*. doi:10.3945/jn.114.209718

http://jn.nutrition.org/content/early/2015/05/13/jn.114.209718.abstract

Background: Undernutrition contributes to 45% of all deaths in children <5 y of age worldwide, with a large proportion of those deaths caused by diarrhea. However, no validated tools exist for assessing undernutrition in children with diarrhea and possible dehydration. Objective: This study aimed to assess the validity of different measures of undernutrition in children with diarrhea. Methods: A prospective cohort study was conducted at an urban hospital in Bangladesh. Children <60 mo of age presenting to the hospital rehydration unit with acute diarrhea were eligible for enrollment. Study staff randomly selected 1196 children for screening, of which 1025 were eligible, 850 were enrolled, and 721 had complete data for analysis. Anthropometric measurements, including weight-for-age z score (WAZ), weight-for-length z score (WLZ), midupper arm circumference (MUAC), and midupper arm circumference z score (MUACZ), were calculated pre- and posthydration in all patients. Measurements were evaluated for their ability to correctly identify undernutrition in children with varying degrees of dehydration. Results: Of the 721 patients with full data for analysis, the median percent dehydration was 4%. Of the 4 measures evaluated, MUAC and MUACZ demonstrated 92–94% agreement pre- and posthydration compared with 69–76% for WAZ and WLZ. Although each 1% change in hydration status was found to change weight-for-age by 0.0895 z scores and weight-for-length by 0.1304 z scores, MUAC and MUACZ were not significantly affected by dehydration status. Weight-based measures misclassified 12% of children with severe underweight and 14% with severe acute malnutrition (SAM) compared with only 1–2% for MUAC and MUACZ. Conclusions: MUAC and MUACZ were the most accurate predictors of undernutrition in children with diarrhea. WAZ and WLZ were significantly affected by dehydration status, leading to the misdiagnosis of many patients on arrival with severe underweight and SAM. This trial was registered at clinicaltrials.gov as NCT02007733.

Appropriate Management of Acute Diarrhea in Children Among Public and Private Providers in Gujarat, India: A Cross-Sectional Survey

Walker, C.L.F., S. Taneja, A. LeFevre, R.E. Black, and S. Mazumder. 2015. *Global Health: Science and Practice* 3 (2): 230–241. doi: 10.9745/GHSP-D-14-00209

http://www.ghspjournal.org/content/3/2/230.full.pdf+html

Diarrhea remains a leading cause of morbidity and mortality among children under 5 years of age in low- and middle income countries. In 2006, the Indian government formally endorsed the World Health Organization guidelines that introduced zinc supplementation and low-osmolarity oral rehydration salts (ORS) for the treatment of diarrhea. Despite this, zinc is rarely prescribed and has not been available in the public sector in India until very recently. The Diarrhea Alleviation Through Zinc and ORS Treatment (DAZT) project was implemented in Gujarat between 2011 and 2013 to accelerate the uptake of zinc and ORS among public and private providers in 6 rural districts. As part of an external evaluation of DAZT, we interviewed 619

randomly selected facility- and community-based public and private providers 2–3 months after a 1-day training event had been completed (or, in the case of private providers, after at least 1 drug-detailing visit by a pharmaceutical representative had occurred) and supplies were in place. The purpose of the interviews was to assess providers' knowledge of appropriate treatment for diarrhea in children, reported treatment practices, and availability of drugs in stock. More than 80% of all providers interviewed reported they had received training or a drug-detailing visit on diarrheal treatment in the past 6 months. Most providers in all cadres (range, 68% to 100%) correctly described how to prepare ORS and nearly all (range, 90% to 100%) reported routinely prescribing it to treat diarrhea in children. Reported routine prescription of zinc was lower, ranging from 62% among private providers to 96% among auxiliary nurse midwives. Among providers who reported ever not recommending zinc (n = 242), the 2 most frequently reported reasons for not doing so were not completely understanding zinc for diarrhea treatment and not having zinc in stock at the time of contact with the patient. In a multiple logistic regression analysis, recent training or drug-detailing visits and having zinc in stock were associated with reported zinc prescribing (P<.05). Recent training among public providers was significantly associated with having correct knowledge of zinc treatment duration and dosage, but the same was not true of drug detailing visits among private providers. Treating diarrhea with zinc and low-osmolarity ORS is new for public and private providers in India and other low- and middle-income countries. Sufficient training and logistics support to ensure consistent supplies are critical if providers are to begin routinely treating all diarrhea episodes with zinc and ORS.

Predictors of Essential Health and Nutrition Service Delivery in Bihar, India: Results From Household and Frontline Worker Surveys.

Kosec, K., R. Avula, B. Holtemeyer, P. Tyagi, S. Hausladen, and P. Menon. 2015. *Global Health: Science and Practice* 3 (2): 255–73. doi: 10.9745/GHSP-D-14-00144

http://www.ncbi.nlm.nih.gov/pubmed/26085022

Background: In Bihar, India, coverage of essential health and nutrition interventions is low. These interventions are provided by 2 national programs-the Integrated Child Development Services (ICDS) and Health/National Rural Health Mission (NRHM)-through Anganwadi workers (AWWs) and Accredited Social Health Activists (ASHAs), respectively. Little is known, however, about factors that predict effective service delivery by these frontline workers (FLWs) or receipt of services by households. This study examined the predictors of use of 4 services: (1) immunization information and services, (2) food supplements, (3) pregnancy care information, and (4) general nutrition information. **Methods:** Data are from a 2012 cross-sectional survey of 6,002 households in 400 randomly selected villages in 1 district of Bihar state, as well as an integrated survey of 377 AWWs and 382 ASHAs from the same villages. For each of the 4 service delivery outcomes, logistic regression models were specified using a combination of variables hypothesized to be supply- and demand-side drivers of service utilization. **Results:** About 35% of households reported receiving any of the 4 services. Monetary immunization incentives for AWWs (OR=1.55, CI=1.02-2.36) and above-median household head education (OR=1.39, CI=1.05-1.82) were statistically significant predictors of household receipt of immunization services. Higher household socioeconomic status was associated with significantly lower odds of receiving food supplements (OR=0.87, CI=0.79-0.96). ASHAs receiving incentives for institutional delivery (OR=1.52, CI=0.99-2.33) was marginally associated with higher odds of receiving pregnancy care information, and ASHAs who maintained records of pregnant women was significantly associated with households receiving such information (OR=2.25, CI=1.07-4.74). AWWs receiving immunization incentives

was associated with significantly higher odds of households receiving general nutrition information (OR=1.92, CI=1.08-3.41), suggesting a large spillover effect of incentives from product- to information-oriented services. **Conclusion:** Product-oriented incentives affect delivery of both product- and information-oriented services, although household factors are also important. In India, existing government programs can mitigate supply- and demand-side constraints to receiving essential interventions by optimizing existing incentives for FLWs in national programs, helping FLWs better organize their work, and raising awareness among groups who are less likely to access services.

Highlighting the Evidence Gap: How Cost-Effective are Interventions to Improve Early Childhood Nutrition and Development?

Batura, N., Z. Hill, H. Haghparast-Bidgoli, R. Lingam, T. Colbourn, S. Kim, S. Sikander, A.M. Pulkki-Brannstrom, A. Rahman, B. Kirkwood, and J. Skordis-Worrall. 2015. *Health Policy and Planning* 30: 813–821. doi:10.1093/heapol/czu055

http://heapol.oxfordjournals.org/content/30/6/813.full.pdf?etoc

There is growing evidence of the effectiveness of early childhood interventions to improve the growth and development of children. Although, historically, nutrition and stimulation interventions may have been delivered separately, they are increasingly being tested as a package of early childhood interventions that synergistically improve outcomes over the life course. However, implementation at scale is seldom possible without first considering the relative cost and cost-effectiveness of these interventions. An evidence gap in this area may deter large-scale implementation, particularly in low- and middle-income countries. We conduct a literature review to establish what is known about the cost effectiveness of early childhood nutrition and development interventions. A set of predefined search terms and exclusion criteria standardized the search across five databases. The search identified 15 relevant articles. Of these, nine were from studies set in high-income countries and six in low- and middle-income countries. The articles either calculated the cost-effectiveness of nutrition specific interventions (n = 8) aimed at improving child growth, or parenting interventions (stimulation) to improve early childhood development (n = 7). No articles estimated the cost-effectiveness of combined interventions. Comparing results within nutrition or stimulation interventions, or between nutrition and stimulation interventions was largely prevented by the variety of outcome measures used in these analyses. This article highlights the need for further evidence relevant to low- and middle-income countries. To facilitate comparison of cost-effectiveness between studies, and between contexts where appropriate, a move towards a common outcome measure such as the cost per disability adjusted life years averted is advocated. Finally, given the increasing number of combined nutrition and stimulation interventions being tested, there is a significant need for evidence of cost-effectiveness for combined programmes. This too would be facilitated by the use of a common outcome measure able to pool the impact of both nutrition and stimulation activities.

A Multifaceted Program Causes Lasting Progress for the Very Poor: Evidence from Six Countries

Banerjee, A., E. Duflo, N. Goldberg, D. Karlan, R. Osei, W. Parienté, J. Shapiro, B. Thuysbaert, and C. Udry. 2015. *Science* 348 (6236): 1260799-1–1260799-16. doi: 10.1126/science.[1]260799

http://www.sciencemag.org/content/348/6236/1260799.full.pdf

Introduction: Working in six countries with an international consortium, we investigate whether a multifaceted Graduation program can help the extreme poor establish sustainable self-employment activities and generate lasting improvements in their well-being. The program targets the poorest members in a village and provides a productive asset grant, training and support, life skills coaching, temporary cash consumption support, and typically access to savings accounts and health information or services. In each country, the program was adjusted to suit different contexts and cultures, while staying true to the same overall principles. This multipronged approach is relatively expensive, but the theory of change is that the combination of these activities is necessary and sufficient to obtain a persistent impact. We do not test whether each of the program dimensions is individually necessary. Instead, we examine the "sufficiency" claim: A year after the conclusion of the program, and 3 years after the asset transfer, are program participants earning more income and achieving stable improvements in their well-being? Rationale: We conducted six randomized trials in Ethiopia, Ghana, Honduras, India, Pakistan, and Peru with a total of 10,495 participants. In each site, our implementing partners selected eligible villages based on being in geographies associated with extreme poverty, and then identified the poorest of the poor in these villages through a participatory wealth-ranking process. About half the eligible participants were assigned to treatment, and half to control. In three of the sites, to measure within village spillovers, we also randomized half of villages to treatment and half to control. We conducted a baseline survey on all eligible participants, as well as an endline at the end of the intervention (typically 24 months after the start of the intervention) and a second endline 1 year after the first endline. We measure impacts on consumption, food security, productive and household assets, financial inclusion, time use, income and revenues, physical health, mental health, political involvement, and women's empowerment. Results: At the end of the intervention, we found statistically significant impacts on all 10 key outcomes or indices. One year after the end of the intervention, 36 months after the productive asset transfer, 8 out of 10 indices still showed statistically significant gains, and there was very little or no decline in the impact of the program on the key variables (consumption, household assets, and food security). Income and revenues were significantly higher in the treatment group in every country. Household consumption was significantly higher in every country except one (Honduras). In most countries, the (discounted) extra earnings exceeded the program cost. Conclusion: The Graduation program's primary goal, to substantially increase consumption of the very poor, is achieved by the conclusion of the program and maintained 1 year later. The estimated benefits are higher than the costs in five out of six sites. Although more can be learned about how to optimize the design and implementation of the program, we establish that a multifaceted approach to increasing income and well-being for the ultrapoor is sustainable and cost-effective.

Leveraging Agriculture for Nutrition in South Asia and East Africa: Examining the Enabling Environment through Stakeholder Perceptions

Gillespie, S., M. van den Bold, J. Hodge, and A. Herforth. 2015. *Food Security: The Science, Sociology and Economics of Food Production and Access to Food* 7 (449). doi: 10.1007/s12571-015-0449-6

http://link.springer.com/article/10.1007/s12571-015-0449-6/fulltext.html

South Asia and sub-Saharan Africa are the two regions of the world with the highest concentration of undernutrition. The majority of the nutritionally vulnerable populations in both regions is dependent in some way upon agriculture as a primary source of livelihood. The agriculture sector and wider agri-food system is considered to be central to sustained progress in reducing undernutrition – and yet not enough is known about how to unleash this potential. Recent scoping assessments have also revealed a paucity of information on wider political, institutional and policy-related challenges relating to the agriculture-nutrition nexus globally. Contextualized research into policy processes and the political economy of agriculture and nutrition is needed to better characterize "enabling environments" for agriculture to benefit nutrition, and how these environments can be shaped and sustained. This study aims to contribute to filling this gap, by drawing upon evidence from a set of case studies in South Asia (India, Bangladesh and Pakistan) and eastern Africa (Ethiopia, Uganda and Kenya). In synthesizing results across countries, while recognizing important nuance and detail, we conclude by highlighting four key issues to be addressed. First, improving knowledge and perception of undernutrition and its links to agriculture, on the part of agricultural policymakers and programme managers. Second, generating system-wide incentives for decisions and actions to become more pro-nutrition. Third, developing transparent systems of accountability for nutrition-relevant action throughout the agriculture sector, through linking timely and actionable data and evidence with incentives. And fourth, cultivating and strengthening leadership and capacities at different levels, underpinned by adequate financing.

What Drives and Constrains Effective Leadership in Tackling Child Undernutrition? Findings from Bangladesh, Ethiopia, India and Kenya

Nisbett, N., E. Wach, L. Haddad, and S. El Arifeen. 2015. *Food Policy* 53: 33–45. doi:10.1016/j.foodpol.²015.04.001

http://www.sciencedirect.com/science/article/pii/S030691921500038X

Strong leadership has been highlighted as a common element of success within countries that have made rapid progress in tackling child and maternal undernutrition. Yet little is known of what contributes to nutrition leaders' success or lack of it in particular policy environments. This study of 89 individuals identified as influential within child and maternal undernutrition policy and programming in Bangladesh, Ethiopia, Kenya and India sheds light on why particular individuals have been effective in contributing towards positive changes in nutrition policy, and how they operate in the wider policy/political sphere. We employ a framework working outwards from individual capabilities, knowledge and motivations, through to wider political economy considerations and the narratives and knowledge structuring individual capacity. We argue that only by locating individuals within this wider political economy can we begin to appreciate the range of strategies and avenues for influence (or constraints to that influence) that individual leaders employ and encounter.

The Other Asian Enigma: Explaining the Rapid Reduction of Undernutrition in Bangladesh

Headey, Derek D., J.F. Hoddinott, D. Ali, R. Tesfaye, and M. Dereje. 2015. *World Development* 66: 749–761. http://dx.doi.org/10.1016/j.worlddev.²014.09.022

http://ebrary.ifpri.org/cdm/ref/collection/p15738coll5/id/4763

Although South Asia has long been synonymous with persistent and unusually high rates of child undernutrition – the socalled Asian Enigma – Bangladesh has managed to sustain a surprisingly rapid reduction in the rate of child undernutrition for at least two decades. We investigate this unheralded success through a regression and decomposition analysis of changes in child growth outcomes across five rounds of DHS surveys from 1997 to 2011. We find that rapid wealth accumulation and large gains in parental education are the two largest drivers of change, though health, sanitation, and demographic factors have played significant secondary roles

Women and Health: The Key for Sustainable Development

Langer. A., A. Meleis, F.M. Knaul, R. Atun, M. Aran, H. Arreola-Ornelas, Z.A. Bhutta, A. Binagwaho, R. Bonita, J.M. Caglia, M. Claeson, J. Davies, F.A. Donnay, J.M. Gausman, C. Glickman, A.D. Kearns, T. Kendall, R. Lozano, N. Seboni, G. Sen, S. Sindhu, M. Temin, and J. Frenk. 2015. *The Lancet*. http://dx.doi.org/10.1016/S0140-6736(15)60497-4

http://www.thelancet.com/commissions/women-health-2015

Girls' and women's health is in transition and, although some aspects of it have improved substantially in the past few decades, there are still important unmet needs. Population ageing and transformations in the social determinants of health have increased the coexistence of disease burdens related to reproductive health, nutrition, and infections, and the emerging epidemic of chronic and non-communicable diseases (NCDs). Simultaneously, worldwide priorities in women's health have themselves been changing from a narrow focus on maternal and child health to the broader framework of sexual and reproductive health and to the encompassing concept of women's health, which is founded on a life-course approach. This expanded vision incorporates health challenges that affect women beyond their reproductive years and those that they share with men, but with manifestations and results that affect women disproportionally owing to biological, gender, and other social determinants.

COMMENTS

Making Women Count

Horton, R., and A. Ceschia. 2015. *The Lancet*

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60964-3/abstract

Promoting Women's Health for Sustainable Development

Kim, J.Y., and T. Evans. 2015. *The Lancet*

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60942-4/abstract

Valuing the Health and Contribution of Women is Central to Global Development

Gates, M. 2015. *The Lancet*

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60940-0/abstract

For Every Woman, Every Child, Everywhere: A Universal Agenda for the Health of Women, children, and Adolescent

Zeid, S., F. Bustreo, M.T. Barakat, P. Maurer, and K. Gilmore. 2015. *The Lancet* 385 (9981): 1919–1920. doi: http://dx.doi.org/10.1016/S0140-6736(15)60766-8

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60766-8/fulltext?rss=yes

NON PEER-REVIEWED STUDIES

Delivering for Nutrition in Odisha: Insights from a study on the state of essential nutrition interventions

Avula, R., S. S. Kim, S. Chakrabarti, P. Tyagi, N. Kohli, S. Kadiyala, and P. Menon. 2015. *Delivering for Nutrition in Odisha: Insights from a Study on the State of Essential Nutrition Interventions*. POSHAN Report No 7. New Delhi: International Food Policy Research Institute.

http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129277

Odisha, a state of 42 million people in eastern India, has taken steps in recent years to enhance service coverage and foster coordination between ICDS and health programs. These include the initiation of supply-side mechanisms, such as the Village Health and Nutrition Days (VHNDs, locally known as Mamata Diwas) and Village Health and Sanitation Committees, as well as the creation of demand-side mechanisms, such as the maternal conditional cash transfer scheme (Mamata Scheme). This report presents findings of a study conducted in three districts of Odisha to examine the state of delivery and use of ten select essential nutrition interventions (ENIs) and the role of intersectoral coordination in their delivery.

WASH & Nutrition: Water and Development Strategy Implementation Brief

USAID (United States American International Development). 2015. *WASH & Nutrition: Water and Development Strategy Implementation Brief*.

https://www.securenutritionplatform.org/Pages/DisplayResources.aspx?RID=370

This Brief takes a conceptual and programmatic look at the relationship between WASH interventions and nutritional outcomes. It highlights evidence linking WASH, nutrition, and gut dysfunction, and lays out best practices to reduce diarrheal rates that may in turn improve nutritional outcomes. Pages 6-8 look specifically at how WASH can be integrated into health or agricultural programming, including key questions for program assessment.

National Guidelines for Calcium Supplementation During Pregnancy and Lactation

MoHFW (Ministry of Health & Family Welfare). 2014. *National Guidelines for Calcium Supplementation During Pregnancy and Lactation*. New Delhi.

http://nrhm.gov.in/nrhm-components/rmnch-a/maternal-health/guidelines.html

Adolescent Nutrition: Policy and Programming in SUN+ Countries

Save the Children. 2015. *Adolescent Nutrition: Policy and Programming in SUN+ Countries.* London.

https://www.securenutritionplatform.org/Pages/DisplayResources.aspx?RID=353

Data show a high percentage of adolescent girls giving birth in SUN+ countries - a significant factor in the 'intergenerational cycle' of malnutrition. Growing recognition of this fact is beginning to turn nutrition interventions toward adolescent girls, but there is still much ground to be covered. The report finds that of the 22 countries for whose SUN plans were available, only 10 included details on adolescents. Readers will find examples of direct and indirect nutrition interventions that target this age group, and guidance for policymakers on how to support adolescent nutrition going forward.

Global Reference List of 100 Core Health Indicators

WHO (World Health Organization). 2015. *Global Reference List of 100 Core Health Indicators.* Geneva.

http://apps.who.int/iris/bitstream/10665/173589/1/WHO_HIS_HSI_2015.3_eng.pdf?ua=1

The Global Reference List of 100 Core Health Indicators for results monitoring, referred to hereafter as "The Global Reference List," is a standard set of 100 core indicators prioritized by the global community to provide concise information on the health situation and trends, including responses at national and global levels. The Global Reference List contains indicators of relevance to country, regional and global reporting across the spectrum of global health priorities relating to the post-2015 health goals of the Sustainable Development Goals.[2] These include the Millennium Development Goals (MDGs) agenda, new and emerging priorities such as noncommunicable diseases, universal health coverage and other issues in the post-2015 development agenda. The Global Reference List is not an exclusive list of indicators and it is not intended to limit information collection only to that which meets management and programmatic needs. Rather, the list is intended as a general reference and guide for standard indicators and definitions that countries can use for monitoring in accordance with their own health priorities and capacity.

UPCOMING EVENTS

Workshop Series 2015-2016

Where: The Indian Institute of Public Health, Gurgaon

Nutritional Management of Children with Severe Acute Malnutrition (SAM)

Date: August 17 - 21, 2015

Registration deadline: August 3, 2015

Economic Evaluation of Health Care Programmes

Date: August 25 - 28, 2015

Registration deadline: August 11, 2015

For more information: http://emaila.phfi.co.in/phfiorg/lt.php?id=e0lUU1YJUVVXCUoEUwMIXRg=CwEHAlEGRUUaVRdFXlQkUFINAhQXDhAD&client=8665

The Indian Institute of Public Health, established by the Public Health Foundation of India (www.phfi.org), has successfully been functioning since past six years as one of the nodal institutions for public health education, advocacy, research and practice by providing quality public health training to graduates of diverse disciplines.

Led by IFPRI

Partnership members:

Institute of Development Studies (IDS)

Public Health Foundation of India (PHFI)

One World South Asia

Vikas Samvad

Coalition for Sustainable Nutrition Security in India

Save the Children, India

Public Health Resource Network (PHRN)

Vatsalya

Centre for Equity Studies

ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) is a 4-year initiative that aims to build evidence on effective actions for nutrition and support the use of evidence in decisionmaking. It is supported by the Bill & Melinda Gates Foundation and led by IFPRI in India.

ABOUT ABSTRACT DIGEST

In each issue, the POSHAN Abstract Digest brings you some of the new and noteworthy studies on maternal and child nutrition. It focuses on India-specific studies and also brings to you other relevant global or regional literature with broader implications for maternal and child nutrition. The Abstract Digest is based on literature searches to identify selected studies that we think are most relevant to nutrition issues in India and to Indian programs and policies. We share with you a collection of abstracts from articles published in peer-reviewed journals, as well as selected non peer-reviewed articles by researchers in reputed academic and/or research institutions and which demonstrated rigor in their research objectives, methodology, and analysis. The abstracts in this document are reproduced in their original form from their source, and without editorial commentary about specific articles.

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This publication has been prepared by POSHAN with research assistance from Abhilasha Vaid, Research Communications Specialist, and has not been peer reviewed. Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies of the International Food Policy Research Institute. Please contact Dr. Rasmi Avula at IFPRI with any questions: r.avula@cgiar.org.