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EDITOR'S NOTE

The 41st issue of POSHAN Abstract Digest brings to you yet again a tailored set of articles on malnutrition in India. This issue features a studies examining trends in nutrition outcomes, inequities associated with anthropometric failure, and role of WASH in addressing undernutrition. In addition, this issue also features articles on the intergenerational benefits of India's national school feeding program, effect of women's labor force participation on nutrition, and the role of maternal empowerment and paternal gender-equitable attitudes on stunting.

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Stay safe and enjoy reading!

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Osendarp et al. 2021. *Nature Food* 2, 476–484.

PEER-REVIEWED

Trends in Underweight, Stunting, and Wasting Prevalence and Inequality Among Children Under Three in Indian States, 1993–2016

Karlsson, O., R. Kim, B. Bogin, and S.V. Subramanian. 2021. "Trends in Underweight, Stunting, and Wasting Prevalence and Inequality Among Children Under Three in Indian States, 1993–2016." *Scientific Reports* 11:14137. doi: https://doi.org/10.1038/s41598-021-93493-1

Child undernutrition remains high in India with far-reaching consequences for child health and development. Anthropometry reflects undernutrition. We examined the state-level trends in underweight, stunting, and wasting prevalence and inequality by living standards using four rounds of the National Family Health Surveys in 26 states in India, conducted in 1992–1993, 1998–1999, 2005–2006, and 2015–2016. The average annual reduction (AAR) for underweight ranged from 0.04 percentage points (pp) (95% CI − 0.12, 0.20) in Haryana to 1.05 pp (95% CI 0.88, 1.22) in West Bengal for underweight; 0.35 pp (95% CI 0.11, 0.59) in Manipur to 1.47 (95% CI 1.19, 1.75) in Himachal Pradesh for stunting; and − 0.65 pp (95% CI − 0.77, − 0.52) in Haryana to 0.36 pp (95% CI 0.22, 0.51) in Bihar & Jharkhand for wasting. We find that change in the pp difference between children with the poorest and richest household living standards varied by states: statistically significant decline (increase) was observed in 5 (3) states for underweight, 5 (4) states for stunting, and 2 (1) states for wasting. Prevalence of poor anthropometric outcomes as well as disparities by states and living standards remain a problem in India.

Household Water Insecurity Affects Child Nutrition Through Alternative Pathways to WASH: Evidence From India

Choudhary, N., R.C. Schuster, A. Brewis, and A. Wutich. 2021. "Household Water Insecurity Affects Child Nutrition Through Alternative Pathways to WASH: Evidence From India." *Food and Nutrition Bulletin* 42(2): 170–187. doi: https://doi.org/10.1177/0379572121998122

Background: Household water security matters greatly for child nutrition outcomes in the global South. Water's role in sanitation/hygiene, via diarrheal disease, is cited as a primary mechanism here. Yet, the relationship between Water along with Sanitation and Hygiene (WASH) and child stunting remains inconclusive. Water-related mechanisms outside of the traditional scope of WASH might assist with explaining this. **Objective:** We aim to test the mediating role of reduced dietary diversity as an additional potential mechanism in linking worse household water access to increased risk of early childhood stunting, separating its effects from sanitation and diarrhea among children (as a proxy for hygiene) and taking into account regional water availability. **Method:** We use nationally representative India Demographic and Health Survey (2015-16) data for 58 038 children aged 6 to 23 months, applying generalized structural equation modelling to estimate water's direct and indirect effects (as mediated through dietary diversity and access to sanitation) on a child's likelihood of being stunted. **Results:** Suboptimal water access is significantly associated with elevated likelihood of child stunting. More than 30% of the effect is indirect. In the context of low water access and availability, children's dietary diversity alone mediates more than 20% of its total effect on child stunting. **Conclusion:** Beyond the WASH mechanisms, household water access affects child stunting indirectly, mediated through its impacts on children's dietary diversity. These mediating effects are also moderated by regional water availability. Water interventions in low-water regions should help reduce children's risk of nutrition-related stunting in households with lowest water access.

Adolescent Undernutrition in South Asia: A Scoping Review

Querol, S.E., P. Gill, R. Iqbal, M. Kletter, N. Ozdemir, and L. Al-Khudairy. 2021. "Adolescent Undernutrition in South Asia: A Scoping Review." *Nutrition Research Reviews*: 1–11. doi: 10.1017/S0954422421000068

Undernutrition is a growing public health challenge affecting growth and development during adolescence in many low- and middle-income countries. This scoping review maps the evidence on adolescent undernutrition (stunting, thinness and micronutrient deficiencies) in South Asia and highlights gaps in knowledge. Using Arksey and O'Malley's framework and the Joanna Briggs Institute Reviewers' Manual, the search included electronic bibliographic databases (Medline (OVID), Embase, Cochrane Library, Web of Science, CINAHL, PsycInfo, and Scopus) as well as various grey literature sources published up to March 2019. In total, 131 publications met the inclusion criteria of this review. All the included evidence used quantitative data and 115 publications used a cross-sectional design. Nearly 70% (n = 86) of the included publications were conducted in India. Prevalence of undernutrition was reported based on different growth references and cut-offs. Evidence is divided into publications that included an intervention component (n = 12) and publications that did not include an intervention component (n = 116), and presented in a narrative synthesis. This scoping review provides a wide range of publications on adolescent undernutrition in South Asia and identifies future research priorities in the field.

Maternal Height-Standardized Prevalence of Stunting in 67 Low- and Middle-Income Countries

Karlsson, O., R. Kim, B. Bogin, and S.V. Subramanian. 2021. "Maternal Height-Standardized Prevalence of Stunting in 67 Low- and Middle-Income Countries." *Journal of Epidemiology*. doi: https://doi.org/10.2188/jea.je20200537

Background: Prevalence of stunting is frequently used as a marker of population-level child undernutrition. Parental height varies widely in low- and middle-income countries (LMIC) and is also a major determinant of stunting. While stunting is a useful measure of child health, with multiple causal components, removing the component attributable to parental height may in some cases be helpful to identify shortcoming in current environments. **Methods:** We estimated maternal height-standardized prevalence of stunting (SPS) in 67 LMICs and parental height-SPS in 20 LMICs and compared with crude prevalence of stunting (CPS) using data on 575,767 children under-five from 67 Demographic and Health Surveys (DHS). We supplemented the DHS with population-level measures of other child health outcomes from the World Health Organization's (WHO) Global Health Observatory and the United Nations' Inter-Agency Group for Child Mortality Estimation. Prevalence of stunting was defined as percentage of children with height-for-age falling below −2 z-scores from the median of the 2006 WHO growth standard. **Results:** The average CPS across countries was 27.8% (95% confidence interval [CI], 27.5–28.1%) and the average SPS was 23.3% (95% CI, 23.0–23.6%). The rank of countries according to SPS differed substantially from the rank according to CPS. Guatemala, Bangladesh, and Nepal had the biggest improvement in ranking according to SPS compared to CPS, while Gambia, Mali, and Senegal had the biggest decline in ranking. Guatemala had the largest difference between CPS and SPS with a CPS of 45.2 (95% CI, 43.7–46.9%) and SPS of 14.1 (95% CI, 12.6–15.8%). Senegal had the largest increase in the prevalence after standardizing maternal height, with a CPS of 28.0% (95% CI, 25.8–30.2%) and SPS of 31.6% (95% CI, 29.5–33.8%). SPS correlated better than CPS with other population-level measures of child health. **Conclusions:** Our study suggests that CPS is sensitive to adjustment for maternal height. Maternal height, while a strong predictor of child stunting, is not amenable to policy interventions. We showed the plausibility of SPS in capturing current exposures to undernutrition and infections in children.

Epidemiology of Overweight and Obesity in Indian Adults – A Secondary Data Analysis of the National Family Health Surveys

Verma, M., M. Das, P. Sharma, N. Kapoor, and S. Kalra. 2021. "Epidemiology of Overweight and Obesity in Indian Adults – A Secondary Data Analysis of the National Family Health Surveys." *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 15(4): 102166. doi: https://doi.org/10.1016/j.dsx.2021.06.003

Aims: National Family Health Survey (NFHS) conducted in India provide nationally comparable data on socio-demographic characteristics and anthropometric estimates. Present study was conducted to examine the prevalence of Indian adults who are living with overweight/obesity, their correlates, and trends observed between the last two rounds of the NFHS 2005-06 to 2015–16). **Methods:** Socio-demographic characteristics and anthropometric estimates of respondents from NFHS round III & IV were analysed. Asian cut-offs were used for obesity classification. Of the total 198,754 and 811,808 eligible respondents, adults ≥18 years of age were included in the analysis. Prevalence and correlates were presented after taking into account stratification, clustering and sampling weights. GIS mapping was done to depict regional variations. **Results:** Prevalence of men and women living with overweight/obesity were observed to be 38.4% and 36.2% respectively. Wide variations were observed in prevalence across the regions of India. Results of multivariate analysis showed that the strongest predictors for being overweight or obese were older age, currently in union, higher education, richest wealth quintile, and living in urban areas. **Conclusion:** The present study highlights the rising prevalence across the urban and rural locations and has implications for policy change based on the prevalence estimates.

Knowledge of Breastfeeding and Kangaroo Mother Care Practices Among General Practitioners in Rural Western India

Fahey, N., N. Sadhwani, S. Shethwala, J. Allison, A. Soni, and S. Nimbalkar. 2021. "Knowledge of Breastfeeding and Kangaroo Mother Care Practices Among General Practitioners in Rural Western India." *Food and Nutrition Bulletin*. doi: https://doi.org/10.1177%2F03795721211026520

Background: Breastfeeding and Kangaroo Mother Care (KMC) are interventions to reduce neonatal mortality and undernutrition. We investigated the knowledge of allopathic and Ayurvedic, Yoga-naturopathy, Siddha, and Homeopathic (AYUSH) general practitioners in rural western India and identified attributes associated with awareness and knowledge on these topics. **Methods:** This cross-sectional study of general practitioners in the Anand district of Gujarat, India, used an anonymous self-reported survey. Multivariable regression models were used to identify practitioner attributes associated with awareness and knowledge. **Results:** Among the 158 respondents, a quarter (26.0%) were trained in allopathic medicine and 63.0% had practiced for 5 years or more. The average score of breastfeeding knowledge was 8.0 of 13. Most (79.1%) did not have any awareness of KMC. After adjusting for potential confounders, knowledge of breastfeeding practices among AYUSH practitioners was 4-fold greater than that of allopathic practitioners (incidence rate ratio: 3.9; 95% CI: 3.2-4.6). By contrast, AYUSH practitioners had 80% decreased odds of awareness about KMC compared with allopathic practitioners (odds ratio: 0.2; 95% CI: 0.1-0.3). **Discussion:** This study demonstrates distinct knowledge gaps among allopathic and AYUSH general practitioners regarding breastfeeding and KMC. There is a need for tailored continuing medical education among general practitioners to enhance their clinical knowledge of newborn care practices to achieve improvements in neonatal health.

Infant and Young Child Feeding Practices among Adolescent Mothers and Associated Factors in India

Dhami, M.V., F.A. Ogbo, T.M.O. Diallo, B.O. Olusanya, P.C. Goson, and K.E. Agho. 2021. Infant and Young Child Feeding Practices among Adolescent Mothers and Associated Factors in India. *Nutrients* 13, 2376. doi: https://doi.org/10.3390/nu13072376

Adequate infant and young child feeding (IYCF) improve child survival and growth. Globally, about 18 million babies are born to mothers aged 18 years or less and have a higher likelihood of adverse birth outcomes in India due to insufficient knowledge of child growth. This paper examined factors associated with IYCF practices among adolescent Indian mothers. This cross sectional study extracted data on 5148 children aged 0–23 months from the 2015–2016 India National Family Health Survey. Survey logistic regression was used to assess factors associated with IYCF among adolescent mothers. Prevalence of exclusive breastfeeding, early initiation of breastfeeding, timely introduction of complementary feeding, minimum dietary diversity, minimum meal frequency, and minimum acceptable diet rates were: 58.7%, 43.8%, 43.3%, 16.6%, 27.4% and 6.8%, respectively. Maternal education, mode of delivery, frequency of antenatal care (ANC) clinic visits, geographical region, child's age, and household wealth were the main factors associated with breastfeeding practices while maternal education, maternal marital status, child's age, frequency of ANC clinic visits, geographical region, and household wealth were factors associated with complementary feeding practices. IYCF practices among adolescent mothers are suboptimal except for breastfeeding. Health and nutritional support interventions should address the factors for these indicators among adolescent mothers in India.

Socio-Economic Inequality in Anthropometric Failure Among Children Aged Under 5 Years in India: Evidence from the Comprehensive National Nutrition Survey 2016–18

Porwal, A., R. Acharya, S. Ashraf, P. Agarwal, S. Ramesh, N. Khan, A. Sarna, and R. Johnston. 2021. "Socio-Economic Inequality in Anthropometric Failure Among Children Aged Under 5 Years in India: Evidence from the Comprehensive National Nutrition Survey 2016–18." *International Journal of Equity in Health* 20: 176. doi: https://doi.org/10.1186/s12939-021-01512-4

Background: Conventional indicators used to access the nutritional status of children tend to underestimate the overall undernutrition in the presence of multiple anthropometric failures. Further, factors contributing to the rich poor gap in the composite index of anthropometric failure (CIAF) have not been explored. This study aims to estimate the prevalence of CIAF and quantify the contribution of factors that explain the rich-poor gap in CIAF. **Methods:** The present study used data of 38,060 children under the age of five years and their biological mothers, drawn from the nationally representative Comprehensive National Nutrition Survey of children and adolescents aged 0–19 years in India. The CIAF outcome variable in this study provide an overall prevalence of undernutrition, with six mutually exclusive anthropometric measurements of height-for-age, height for-weight, and weight-for-age, calculated using the World Health Organization (WHO) Multicenter Growth Reference Study. Multivariate regression and decomposition analysis were used to examine the association between covariates with CIAF and to estimate the contribution of different covariates in the existing rich-poor gap. **Results:** An overall CIAF prevalence of 48.2% among children aged under 5 years of age was found in this study. 6.0% children had all three forms of anthropometric failures. The odds of CIAF were more likely among children belonging to poorest households (AOR: 2.41, 95% CI: 2.12–2.75) and those residing in urban area (AOR: 1.06, 95% CI 1.00 1.11). Children of underweight mothers and those with high parity were at higher risk of CIAF (AOR: 1.51, 95% CI: 1.42–1.61) and (AOR: 1.15, 95% CI: 1.08–1.22), respectively. Children of mother exposed to mass media were at lower risk of CIAF (AOR: 0.87, 95% CI: 0.81–0.93).

Socio-Economic Inequality in Anaemia Among Men in India: A Study Based on Cross-Sectional Data

Kumar, P., H. Sharma, and D. Sinha. 2021. "Socio-Economic Inequality in Anaemia Among Men in India: A Study Based on Cross-Sectional Data." BMC Public Health 21: 1345. doi: https://doi.org/10.1186/s12889-021-11393-5

Background: Undernutrition is a serious matter of public health concern in India. Existing studies, policies and programs focus on women and children thereby ignoring men in policymaking. This study examines the socio-economic inequality in anaemia levels among men in India and tries to decompose the factors behind it. **Methods:** The fourth round of National Family Health Survey is used to fulfill the study objectives. The outcome variable of the study is men having anaemia or not. The study uses bivariate and multivariate techniques to identify the factors associated with the outcome variable. Further, concentration index and concentration curve are calculated to measure the socio-economic inequality in anaemia among men in India. **Results:** The results indicate that majority of the socio-economic related inequality is explained by wealth quintile followed by geographical regions of India, body mass index and educational attainment. The results also emphasize that older men belong to the high-risk groups. Moreover, the likelihood of anaemia is 40% more likely among men who belonged to East region and 25%, 13% and 7 % less likely among those who belonged to Northeast, West and South region compared to those who belonged in the North region of the country. **Conclusion:** Existing policies on anaemia should include men to achieve an anaemia free India. Individual education and awareness should be encouraged to improve nutritional status.

Integrated Approach in Addressing Undernutrition in Developing Countries: A Scoping Review of Integrated Water Access, Sanitation, and Hygiene (WASH) + Nutrition Interventions

Nounkeu, C.D., and J.M. Dharod. 2021. "Integrated Approach in Addressing Undernutrition in Developing Countries: A Scoping Review of Integrated Water Access, Sanitation, and Hygiene (WASH) + Nutrition Interventions." *Current Developments in Nutrition* 5(7): nzab087. doi: https://doi.org/10.1093/cdn/nzab087

A scoping review of integrated water access, sanitation, and hygiene (WASH) plus nutrition interventions was conducted mainly to describe different components of intervention and examine their effectiveness in improving nutritional outcomes among children. Of the 8 small- to large-scale interventions, 6 were conducted in sub-Saharan Africa and the remaining 2 in South Asia. All the interventions were done in rural settings; the majority involved sanitation and hygiene deliverables along with the nutrition strategies, such as distribution of nutrition supplements. In assessing effectiveness, no significant improvements were seen in growth indicators; reduction in diarrheal rate among children was also not universal across interventions. Further strengthening of WASH, especially an improvement in "W", or water access, is warranted to ensure uptake of sanitation and hygiene behaviors and prevent the fecal–oral route among children. Improved water access will also enhance the effectiveness of nutrition initiatives, such as promoting vegetable gardening and utilization of child nutrient supplements.

Intergenerational Nutrition Benefits of India's National School Feeding Program

Chakrabarti, S., S.P. Scott, H. Alderman, P. Menon, and D.O. Gilligan. 2021. "Intergenerational nutrition benefits of India's national school feeding program." *Nature Communications* 12: 4248. doi: https://doi.org/10.1038/s41467-021-24433-w

India has the world's highest number of undernourished children and the largest school feeding program, the Mid-Day Meal (MDM) scheme. As school feeding programs target children outside the highest-return "first 1000-days" window, they have not been included in the global agenda to address stunting. School meals benefit education and nutrition in participants, but no studies have examined whether benefits carry over to their children. Using nationally representative data on mothers and their children spanning 1993 to 2016, we assess whether MDM supports intergenerational improvements in child linear growth. Here we report that height-for-age z-score (HAZ) among children born to mothers with full MDM exposure was greater (+0.40 SD) than that in children born to non-exposed mothers. Associations were stronger in low socioeconomic strata and likely work through women's education, fertility, and health service utilization. MDM was associated with 13–32% of the HAZ improvement in India from 2006 to 2016.

Labor Force Participation of Rural Women and the Household's Nutrition: Panel Data Evidence From SAT India

Sangwan, S., and S. Kumar. 2021. "Labor Force Participation of Rural Women and the Household's Nutrition: Panel Data Evidence From SAT India." *Food Policy* 102: 102117. doi: https://doi.org/10.1016/j.foodpol.2021.102117

This paper investigates the role of women's labor force participation in the household's dietary diversity and the value of home-production. Using unique household panel data from Semi-Arid tropics of India, empirical estimations from a household fixed effects model reveal a positive significant effect of workdays of women on dietary diversity (overall and home-produced) and home-production. Our findings highlight a significant heterogeneity in the effect by type of work—paid and unpaid. The results for paid work are driven by a greater decision-making power emanating from labor force participation of women. Unpaid work, on the other hand, operates through the self-consumption of home-produced goods. We show that correcting for endogenous labor force participation of women leaves our conclusions unchanged. The results suggest that interventions boosting female labor force participation in paid activities are nutrition enhancing for the household and work towards improving women's bargaining power within the household. Moreover, we rule out deleterious effects on health indicators of women despite increased time burden.

Intersectional Role of Paternal Gender-Equitable Attitudes and Maternal Empowerment in Child Undernutrition: A Cross-Sectional National Study From India

Sharma A.J., M.A. Subramanyam. 2021. "Intersectional Role of Paternal Gender-Equitable Attitudes and Maternal Empowerment in Child Undernutrition: A Cross-Sectional National Study From India." *BMJ Open* 11: e047276. doi: http://dx.doi.org/10.1136/bmjopen-2020-047276

Objectives: To investigate the role of the intersection of maternal empowerment, paternal gender-equitable attitudes, and household wealth in stunting and severe stunting among underfives in India. **Design:** Cross-sectional study. **Setting:** Community-based setting, nationally representative household survey from India. **Participants:** We used a sample of 22 867 mother–father–child triads from the fourth round of India's National Family Health Survey (2015–2016). Our inclusion criterion was children below the age of 5 years. The exclusion criterion was a lack of information on paternal

gender-equitable attitudes and maternal empowerment. Observations with missing data on any of the covariates were also excluded. **Primary outcome:** Stunting and severe stunting among underfives in India. **Results:** Our survey-adjusted logistic regression models revealed that even among children from poorer households, those with either an empowered mother or a father with gender-equitable attitudes versus those with none such parents, had a lower odds of stunting (adjusted OR (AOR): 0.92, 95% CI: 0.84 to 1.02) and severe stunting (AOR: 0.87, 95% CI: 0.77 to 0.98), independent of all covariates. We also found substantially lower odds of severe stunting in groups with parental concordance in a woman-friendly outlook, whether non-affluent (AOR: 0.80, 95% CI: 0.67 to 0.94) or affluent (AOR: 0.50, 95% CI: 0.38 to 0.67). **Conclusion:** We argue that while women's autonomy could reduce the risk of child undernutrition, focusing on men's attitudes towards gender equity also holds promise for reducing undernutrition. Our findings not only underscore how patriarchy is embodied in undernourished children, but also suggest programmatic interventions to address this deep-rooted scourge in India.

Vulnerability of Agriculture to Climate Change Increases the Risk of Child Malnutrition: Evidence From a Large Scale Observational Study in India

Mahapatra B., M. Walia, C.A.R. Rao, B.M.K. Raju, and N. Saggurti. 2021. *PLOS ONE* 16(6): e0253637. doi: https://doi.org/10.1371/journal.pone.0253637

Introduction: The impact of climate change on agriculture and food security has been examined quite thoroughly by researchers globally as well as in India. While existing studies provide evidence on how climate variability affects the food security and nutrition, research examining the extent of effect vulnerability of agriculture to climate change can have on nutrition in India are scarce. This study examined a) the association between the degree of vulnerability in agriculture to climate change and child nutrition at the micro-level b) spatial effect of climate vulnerability on child nutrition, and c) the geographical hotspots of both vulnerability in agriculture to climate change and child malnutrition. **Methods:** The study used an index on vulnerability of agriculture to climate change and linked it to child malnutrition indicators (stunting, wasting, underweight and anaemia) from the National Family Health Survey 4 (2015–16). Mixed-effect and spatial autoregressive models were fitted to assess the direction and strength of the relationship between vulnerability and child malnutrition at macro and micro level. Spatial analyses examined the within-district and across-district spill-over effects of climate change vulnerability on child malnutrition. **Results:** Both mixed-effect and spatial autoregressive models found that the degree of vulnerability was positively associated with malnutrition among children. Children residing in districts with a very high degree of vulnerability were more like to have malnutrition than those residing in districts with very low vulnerability. The analyses found that the odds of a child suffering from stunting increased by 32%, wasting by 42%, underweight by 45%, and anaemia by 63% if the child belonged to a district categorised as very highly vulnerable when compared to those categorised as very low. The spatial analysis also suggested a high level of clustering in the spatial distribution of vulnerability and malnutrition. Hotspots of child malnutrition and degree of vulnerability were mostly found to be clustered around western-central part of India. **Conclusion:** Study highlights the consequences that vulnerability of agriculture to climate change can have on child nutrition. Strategies should be developed to mitigate the effect of climate change on areas where there is a clustering of vulnerability and child malnutrition.

Using Cognitive Interviewing to Bridge the Intent-Interpretation Gap for Nutrition Coverage Survey Questions in India

Ashok, S., S.S. Kim, R.A. Heidkamp, M.K. Munos, P. Menon, and R. Avula. 2021. Using Cognitive Interviewing to Bridge the Intent-Interpretation Gap for Nutrition Coverage Survey Questions in India. *Maternal & Child Nutrition*: e13248. doi: https://doi.org/10.1111/mcn.13248

Designing survey questions that clearly and precisely communicate the question's intent and elicit responses based on the intended interpretation is critical but often undervalued. We used cognitive interviewing to qualitatively assess respondents' interpretation of and responses to questions pertaining to maternal and child nutrition intervention coverage. We conducted interviews to cognitively test 25 survey questions with mothers (N = 21) with children less than 1 year in Madhya Pradesh, India. Each question was followed by probes to capture information on four cognitive stages—comprehension, retrieval, judgement, and response. Data were analysed for common and unique patterns across the survey questions. We identified four types of cognitive challenges: (1) retention of multiple concepts in long questions: difficulty in comprehending and retaining questions with three or more key concepts; (2) temporal confusion: difficulty in conceptualizing recall periods such as “in the last 6 months” as compared to life stages such as pregnancy; (3) interpretation of concepts: mismatch of information being asked, meaning of certain terms and intervention scope; and (4) understanding of technical terms: difficulty in understanding commonly used technical words such as “breastfeeding” and “antenatal care” and requiring use of simple alternative language. Findings from this study will be useful for stakeholders involved in survey design and implementation, especially those conducting large-scale household surveys to measure coverage of essential nutrition interventions.

COVID-19

Supporting Efforts to Address Malnutrition in the Context of the COVID-19 Pandemic in India: An Emergency Need

Menon, P., A. de Wagt, V. Reddy, K. Reddy, C.S. Pandav, R. Avula, P. Mathews, S. Kaur, S. Pawar, S. Ranjan, S. Sharma, and R. Sankar. 2021. “Supporting Efforts to Address Malnutrition in the Context of the COVID-19 Pandemic in India: An Emergency Need.” *Medical Journal of Dr. D.Y. Patil Vidyapeeth* 14(4): 369–73. doi: https://doi.org/10.4103/mjdrdypu.mjdrdypu_338_21

India has been on a steady march to address malnutrition in the last decade. The nutrition community has worked on building consensus on key actions, implementation platforms were put in place and financing for nutrition slowly increased. Under the strong leadership of the Prime Minister, a revolutionary program to address malnutrition was launched in 2018. As actions under the mission accelerated, the COVID-19 pandemic arrived in early 2020. Affecting health systems, food systems, nutrition programs, social safety nets, and the economy, the pandemic has the potential to exacerbate the challenge of malnutrition in multiple ways. India can mitigate some of the possible ways in which COVID-19 will affect malnutrition but will require strong leadership and continued commitment, adaptation of the national nutrition mission, strengthening of the social safety net and innovative evidence-based data to take informed decisions, implement them and ensure feedback to take necessary corrective action. In this article, we outline some challenges and key areas for action. We conclude that India's nutrition journey is too important to be derailed by a crisis like COVID-19. This is a clarion call for the nutrition community in India to rally strongly to support continued attention to malnutrition in all its forms, to generate relevant evidence, and to support and engage all of society to urgently and adequately address malnutrition in the context of the COVID-19 pandemic. We have come too far to turn back now.

The COVID-19 Crisis Will Exacerbate Maternal and Child Undernutrition and Child Mortality in Low- and Middle-Income Countries

Osendarp, S., J.K. Akuoku, R.E. Black, D. Headey, M. Ruel, N. Scott, M. Shekar, N. Walker, A. Flory, L. Haddad, D. Laborde, A. Stegmuller, M. Thomas, and R. Heidkamp. 2021. *Nature Food* 2, 476–484. doi: https://doi.org/10.1038/s43016-021-00319-4

The economic crisis and food and health system disruptions related to the COVID-19 pandemic threaten to exacerbate undernutrition in low- and middle-income countries (LMICs). We developed pessimistic, moderate and optimistic scenarios for 2020–2022 and used three modelling tools (MIRAGRODEP, the Lives Saved Tool and Optima Nutrition) to estimate the impacts of pandemic-induced disruptions on child stunting, wasting and mortality, maternal anaemia and children born to women with a low body mass index (BMI) in 118 LMICs. We estimated the cost of six nutrition interventions to mitigate excess stunting and child mortality due to the pandemic and to maximize alive and non-stunted children, and used the human capital approach to estimate future productivity losses. By 2022, COVID-19-related disruptions could result in an additional 9.3 million wasted children and 2.6 million stunted children, 168,000 additional child deaths, 2.1 million maternal anaemia cases, 2.1 million children born to women with a low BMI and US$29.7 billion in future productivity losses due to excess stunting and child mortality. An additional US$1.2 billion per year will be needed to mitigate these effects by scaling up nutrition interventions. Governments and donors must maintain nutrition as a priority, continue to support resilient systems and ensure the efficient use of new and existing resources.

NON-PEER REVIEWED

WHO Guideline on the Dairy Protein Content in Ready-to-Use Therapeutic Foods for Treatment of Uncomplicated Severe Acute Malnutrition

WHO (World Health Organization). 2021. *Guideline on the Dairy Protein Content in Ready-to-Use Therapeutic Foods for Treatment of Uncomplicated Severe Acute Malnutrition*. Geneva. https://www.who.int/publications/i/item/9789240022270

This is a new World Health Organization (WHO) guideline that updates the specific recommendation in the technical annex of the 2007 Joint Statement by WHO, the World Food Programme (WFP), the United Nations System Standing Committee on Nutrition (UNSSCN) and the United Nations Children's Fund (UNICEF) on community-based management of severe acute malnutrition, which states that at least 50% of protein in ready-to-use therapeutic foods (RUTF) should come from dairy products. The rigorous procedures described in the WHO handbook for guideline development, 2nd edition were followed in producing this guideline. This document presents the direct and indirect evidence that served to inform the recommendation herein.

Impacts of Double-Fortified Salt on Anemia and Cognition: Four-Year Follow-Up Evidence From a School-Based Nutrition Intervention in India

von Grafenstein, L., A. Kumar, S. Kumar, and S. Vollmer. 2021. *Impacts of Double-Fortified Salt on Anemia and Cognition: Four-Year Follow-Up Evidence From a School-Based Nutrition Intervention in India*. Discussion Paper No. 282. Georg-August-Universität Göttingen: Göttingen. http://hdl.handle.net/10419/236628

Long-term follow-up of early childhood health interventions is important for human capital accumulation. We provide experimental evidence on child health and human capital outcomes from the longer-term follow-up of a school-based nutrition intervention in India. Using panel data, we

examine the effectiveness of the use of iron and iodine fortified salt in school lunches to reduce anemia among school children. After four years of treatment, treated children, on average, have higher hemoglobin levels and a lower likelihood of anemia relative to the control group. Interestingly, the intervention did not have an impact on cognitive and educational outcomes.

UPCOMING EVENTS & DEADLINES

United Nations Food Systems Summit

The UN Food Systems Summit, held during the UN General Assembly in New York on September 23, is setting the stage for global food systems transformation to achieve the Sustainable Development Goals by 2030.

When: September 23, 2021
Where: Online
For more information: www.un.org/en/food-systems-summit

Delivering for Nutrition (D4N) in South Asia: Implementation Research in the Context of COVID-19

We are pleased to announce that the call for abstracts for the Delivering for Nutrition (D4N) in South Asia: Implementation Research in the Context of COVID-19 virtual conference to be held December 1-2, 2021, is now open. Submissions are due by Friday, October 15 at 5:30 p.m. Indian Standard Time (IST). D4N 2021 aims to bring together evidence that can inform and support policy and program initiatives in South Asia to prioritize and improve maternal and child nutrition during the COVID-19 pandemic and beyond.

When: December 1-2, 2021
Where: Online
For more information: poshan.ifpri.info/delivering-for-nutrition-in-south-asia-implementation-research-in-the-context-of-covid-19/
Call for abstracts: poshan.ifpri.info/delivering-for-nutrition-in-south-asia-call-for-abstract/

ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) is a multi-year initiative that aims to build evidence on effective actions for nutrition and support the use of evidence in decision-making. 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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