

EDITOR'S NOTE

This issue of Abstract Digest comes to you at an unprecedented time of COVID-19 pandemic. We hope all of you are healthy and safe. In the current circumstances, [Naja and Hamadeh](#) present a framework for action at multiple levels to maintain optimal nutrition during COVID-19, at the individual, community, national and global levels. Along with it, this issue has a collection of articles on various outcomes, determinants and interventions related to maternal and child nutrition.

There are articles and related correspondence on the topic of micronutrient supplementation, from a [special issue](#) of *Annals of the New York Academy of Sciences*. There are articles from the [March issue](#) of *EClinicalMedicine*, published by *The Lancet*, that focus on the issue of women's empowerment in the context of addressing malnutrition. This issue also includes a WHO–UNICEF–Lancet Commission that presents the [case](#) for placing children, aged 0–18 years, at the centre of the Sustainable Development Goals, and the [key findings](#) of the 2020 edition of the Joint Child Malnutrition Estimates, by UNICEF-WHO-World Bank.

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Stay safe and enjoy reading!

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Menon and Kumar. 2020. *EClinicalMedicine* 18: 100234.

Original article

Effects of health behaviour change intervention through women's self-help groups on maternal and newborn health practices and related inequalities in rural india: A quasi-experimental study

Hazra et al. 2019. *EClinicalMedicine* 18: 100198.

PEER-REVIEWEDPerspective**Nutrition amid the COVID-19 pandemic: a multi-level framework for action**

Naja, F., and R. Hamadeh. 2020. "Nutrition amid the COVID-19 pandemic: a multi-level framework for action". *European Journal of Clinical Nutrition*. <https://doi.org/10.1038/s41430-020-0634-3>.

In order to enhance the physical and mental health of individuals vis a vis the COVID-19 pandemic, this commentary presents a framework for action to maintain optimal nutrition at the individual, community, national and global levels using an adapted version of the ecological model of health behaviour.

A future for the world's children? A WHO–UNICEF–Lancet Commission

Clark, H., A.M. Coll-Seck, A. Banerjee, S. Peterson, S.L. Dalglish, S. Ameratunga, D. Balabanova, M.K. Bhan, Z.A. Bhutta, J. Borrazzo, M. Claeson, T. Doherty, F. El-Jardali, A.S. George, A. Gichaga, L. Gram, D.B. Hipgrave, A. Kwamie, Q. Meng, R. Mercer, S. Narain, J. Nsungwa-Sabiiti, A.O. Olumide, D. Osrin, T. Powell-Jackson, K. Rasanathan, I. Rasul, P. Reid, J. Requejo, S.S. Rohde, N. Rollins, M. Romedenne, H.S. Sachdev, R. Saleh, Y.R. Shawar, J. Shiffman, J. Simon, P.D. Sly, K. Stenberg, M. Tomlinson, R.R. Ved, and A. Costello. 2020. "A future for the world's children? A WHO–UNICEF–Lancet Commission". *The Lancet* 395(10224): P605-658. [https://doi.org/10.1016/S0140-6736\(19\)32540-1](https://doi.org/10.1016/S0140-6736(19)32540-1)

Despite dramatic improvements in survival, nutrition, and education over recent decades, today's children face an uncertain future. Climate change, ecological degradation, migrating populations, conflict, pervasive inequalities, and predatory commercial practices threaten the health and future of children in every country. In 2015, the world's countries agreed on the Sustainable Development Goals (SDGs), yet nearly 5 years later, few countries have recorded much progress towards achieving them. This Commission presents the case for placing children, aged 0–18 years, at the centre of the SDGs: at the heart of the concept of sustainability and our shared human endeavour. Governments must harness coalitions across sectors to overcome ecological and commercial pressures to ensure children receive their rights and entitlements now and a liveable planet in the years to come.

Setting research priorities on multiple micronutrient supplementation in pregnancy

Gomes, F., M.W. Bourassa, S. Adu-Afarwuah, C. Ajello, Z.A. Bhutta, R. Black, E. Catarino, R. Chowdhury, N. Dalmiya, P. Dwarkanath, R. Engle-Stone, A.D. Gernand, S. Goudet, J. Hoddinott, P. Kæstel, M.S. Manger, C.M. McDonald, S. Mehta, S.E. Moore, L.M. Neufeld, S. Osendarp, P. Ramachandran, K.M. Rasmussen, C. Stewart, C. Sudfeld, K. West, and G. Bergeron. 2020. "Setting research priorities on multiple micronutrient supplementation in pregnancy". *Annals of the New York Academy of Sciences* 1465: 76-88. doi:10.1111/nyas.14267. <https://doi.org/10.1111/nyas.14267>

Prenatal micronutrient deficiencies are associated with negative maternal and birth outcomes. Multiple micronutrient supplementation (MMS) during pregnancy is a cost-effective intervention to reduce these adverse outcomes. However, important knowledge gaps remain in the implementation of MMS interventions. The Child Health and Nutrition Research Initiative (CHNRI) methodology was applied to inform the direction of research and investments needed to support the implementation of MMS interventions for pregnant women in low- and middle-income countries (LMIC). Following CHNRI methodology guidelines, a group of international experts in nutrition and maternal health provided and ranked the research questions that most urgently need to be resolved for prenatal MMS interventions to be successfully implemented. Seventy-three research questions were received, analyzed, and reorganized, resulting in 35 consolidated research questions. These were

scored against four criteria, yielding a priority ranking where the top 10 research options focused on strategies to increase antenatal care attendance and MMS adherence, methods needed to identify populations more likely to benefit from MMS interventions and some discovery issues (e.g., potential benefit of extending MMS through lactation). This exercise prioritized 35 discrete research questions that merit serious consideration for the potential of MMS during pregnancy to be optimized in LMIC.

Association of Maternal History of Neonatal Death with Subsequent Neonatal Death in India

Kapoor, M., R. Kim, T. Sahoo, A. Roy, S. Ravi, A.K. Kumar, R. Agarwal, and S.V. Subramanian. 2020. "Association of Maternal History of Neonatal Death With Subsequent Neonatal Death in India". *JAMA Network Open* 3(4): e202887. doi: 10.1001/jamanetworkopen.2020.2887. <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2764579>

Importance: Among the United Nations' Sustainable Development Goals is to reduce the neonatal mortality rate to 12 per 1000 live births by 2030. Identifying high-risk pregnancies can help achieve this target in low-resource countries, such as India, which accounts for one-fourth of global neonatal deaths. **Objective:** To analyze the association of maternal history of neonatal death with subsequent neonatal mortality. **Design, Setting, and Participants:** This cross-sectional study included a nationally representative sample of singleton live births from multiparous women. Data were obtained from the 2016 National Family Health Survey in India. Data were analyzed from November 2018 to January 2020. **Exposures:** Maternal history of neonatal death and a comprehensive set of covariates, including socioeconomic environment, maternal anthropometry, and pregnancy care. **Main Outcomes and Measures:** Subsequent neonatal mortality. Population-attributable risk associated with history of neonatal death was calculated, and sensitivity analyses were performed. **Results:** The overall study population consisted of 127 336 singleton live births from multiparous women aged 15 to 49 (mean [SD] age, 28.8 [5.2] years) years when the survey was undertaken. In our analytic sample, 11 101 (8.7%) mothers had a history of neonatal death, and 506 of 2224 total neonatal deaths (22.8%) were attributed to women with history of neonatal death. The prevalence of history of neonatal death differed by selected covariates and across states or union territories. Maternal history of neonatal death was associated with significantly higher odds of neonatal mortality (adjusted odds ratio, 2.23; 95% CI, 1.96-2.55), and this remained consistent across different subgroups. The population-attributable risk associated with maternal history of neonatal death was 11.8%. Stronger associations were found for maternal history of multiple neonatal deaths (adjusted odds ratio, 3.50; 95% CI, 2.78-4.41) and in respect to the risk of mortality in early neonatal period (ie, 0-2 completed days) (adjusted odds ratio, 2.45; 95% CI, 2.09-2.86). **Conclusions and Relevance:** These findings suggest that maternal history of neonatal death is a potentially useful risk factor to identify women and neonates who may need extended and enhanced pregnancy care.

Commentary

Reconsidering the "Thin-Fat" Indian Neonate

Wells, J.C. 2020. "Reconsidering the "Thin-Fat" Indian Neonate". *The Journal of Nutrition* 150(4): 658–660. <https://doi.org/10.1093/jn/nxaa026>

Over recent decades, India has emerged as one of the world's "capitals" of type 2 diabetes mellitus (T2DM). In 2016, the national T2DM prevalence in Indian adults aged ≥ 20 y was estimated at 7.7% (95% CI: 6.9, 8.4%), equivalent to 65 million individuals. Among the key risk factors for T2DM are adult overweight and obesity, most commonly indexed by BMI, along with sedentary behavior and energy-dense diets. However, it has long been recognized that Indians, in common with other South Asian populations, have an elevated susceptibility to T2DM for a given profile of risk factors. For

example, T2DM typically emerges at lower BMI thresholds and at younger ages in South Asian compared with other populations.

Corresponding article

The Thin But Fat Phenotype is Uncommon at Birth in Indian Babies

Kuriyan, R., S. Naqvi, K.G Bhat, S. Ghosh, S. Rao, T. Preston, H.S. Sachdev, and A.V. Kurpad. 2020. "The Thin But Fat Phenotype is Uncommon at Birth in Indian Babies". *The Journal of Nutrition* 150(4): 826–832. <https://doi-org.ifpri.idm.oclc.org/10.1093/jn/nxz305>

Background: Indian babies are hypothesized to be born thin but fat. This has not been confirmed with precise measurements at birth. If it is true, it could track into later life and confer risk of noncommunicable diseases (NCDs). **Objectives:** Primarily, to accurately measure percentage of body fat (%BF) and body cell mass (BCM) in Indian babies with normal birth weight, compare them across different gestational ages and sex, and test the hypothesis of the thin but fat phenotype in Indian babies. Secondly, to examine the relation between body weight and body fat in Indian babies. **Methods:** Term newborns ($n = 156$) weighing ≥ 2500 g, from middle socioeconomic status mothers were recruited in Bengaluru, India, and their anthropometry, %BF (air displacement plethysmography), and BCM (whole-body potassium counter) were measured. Maternal demography and anthropometry were recorded. The mean %BF and its dispersion were compared with earlier studies. The relation between newborn %BF and body weight was explored by regression analysis. **Results:** Mean birth weight was 3.0 ± 0.3 kg, with mean %BF $9.8 \pm 3.5\%$, which was comparable to pooled estimates of %BF from published studies (9.8%; 95% CI: 9.7, 10.0; $P > 0.05$). Appropriate-for-gestational age (AGA) babies had higher %BF (1.8%) compared to small-for-gestational age (SGA) babies ($P < 0.01$). Mean %BCM of all babies at birth was $35.4 \pm 10.5\%$; AGA babies had higher %BCM compared to SGA babies (7.0%, $P < 0.05$). Girls in comparison to boys had significantly higher %BF and lower %BCM. Body weight was positively associated with %BF. **Conclusion:** Indian babies with normal birth weight did not demonstrate the thin but fat phenotype. Body weight and fat had positive correlation, such that SGA babies did not show a preservation of their %BF. These findings will have relevance in planning optimal interventions during early childhood to prevent NCDs risk in adult life.

Affordability of the EAT–Lancet reference diet: a global analysis

Hirvonen, K., Y. Bai, D. Headey, and W.A. Masters. 2020. "Affordability of the EAT–Lancet reference diet: a global analysis". *The Lancet Global Health* 8(1): e59–e66. [https://doi.org/10.1016/S2214-109X\(19\)30447-4](https://doi.org/10.1016/S2214-109X(19)30447-4)

Background: The EAT–Lancet Commission drew on all available nutritional and environmental evidence to construct the first global benchmark diet capable of sustaining health and protecting the planet, but it did not assess dietary affordability. We used food price and household income data to estimate affordability of EAT–Lancet benchmark diets, as a first step to guiding interventions to improve diets around the world. **Methods:** We obtained retail prices from 2011 for 744 foods in 159 countries, collected under the International Comparison Program. We used these data to identify the most affordable foods to meet EAT–Lancet targets. We compared total diet cost per day to each country's mean per capita household income, calculated the proportion of people for whom the most affordable EAT–Lancet diet exceeds total income, and also measured affordability relative to a least-cost diet that meets essential nutrient requirements. **Findings:** The most affordable EAT–Lancet diets cost a global median of US\$2.84 per day (IQR 2.41–3.16) in 2011, of which the largest share was the cost of fruits and vegetables (31.2%), followed by legumes and nuts (18.7%), meat,

eggs, and fish (15.2%), and dairy (13.2%). This diet costs a small fraction of average incomes in high-income countries but is not affordable for the world's poor. We estimated that the cost of an EAT–Lancet diet exceeded household per capita income for at least 1.58 billion people. The EAT–Lancet diet is also more expensive than the minimum cost of nutrient adequacy, on average, by a mean factor of 1.60 (IQR 1.41–1.78). **Interpretation:** Current diets differ greatly from EAT–Lancet targets. Improving diets is affordable in many countries but for many people would require some combination of higher income, nutritional assistance, and lower prices. Data and analysis for the cost of healthier foods are needed to inform both local interventions and systemic changes.

First foods: Diet quality among infants aged 6–23 months in 42 countries

Choudhury, S., D.D. Headey, and W.A. Masters. 2019. “First foods: Diet quality among infants aged 6–23 months in 42 countries”. *Food Policy* 88: 101762.

<https://doi.org/10.1016/j.foodpol.2019.101762>

Diet quality is closely linked to child growth and development, especially among infants aged 6–23 months who need to complement breastmilk with the gradual introduction of nutrient-rich solid foods. This paper links Demographic and Health Survey data on infant feeding to household and environmental factors for 76,641 children in 42 low- and middle-income countries surveyed in 2006–2013, providing novel stylized facts about diets in early childhood. Multivariate regressions examine the associations of household socioeconomic characteristics and community level indicators of climate and infrastructure with dietary diversity scores (DDS). Results show strong support for an infant-feeding version of Bennett's Law, as wealthier households introduce more diverse foods at earlier ages, with additional positive effects of parental education, local infrastructure and more temperate agro-climatic conditions. Associations with consumption of specific nutrient-dense foods are less consistent. Our findings imply that while income growth is indeed an important driver of diversification, there are strong grounds to also invest heavily in women's education and food environments to improve diet quality, while addressing the impacts of climate change on livelihoods and food systems. These results reveal systematic patterns in how first foods vary across developing countries, pointing to new opportunities for research towards nutrition-smart policies to improve children's diets.

Review of the evidence regarding the use of antenatal multiple micronutrient supplementation in low- and middle-income countries

Bourassa, M.W., S.J. Osendarp, S. Adu-Afarwuah, S. Ahmed, C. Ajello, G. Bergeron, R. Black, P. Christian, S. Cousens, S. de Pee, K.G. Dewey, S.E. Arifeen, R. Engle-Stone, A. Fleet, A.D. Gernand, J. Hoddinott, R. Klemm, K. Kraemer, R. Kupka, E. McLean, S.E. Moore, L.M. Neufeld, L.-Å. Persson, K.M. Rasmussen, A.H. Shankar, E. Smith, C.R. Sudfeld, E. Udomkesmalee, and S.A. Vosti. 2019. “Review of the evidence regarding the use of antenatal multiple micronutrient supplementation in low- and middle-income countries”. *Annals of the New York Academy of Sciences* 1444: 6-21.

<https://doi.org/10.1111/nyas.14121>

Inadequate micronutrient intakes are relatively common in low- and middle-income countries (LMICs), especially among pregnant women, who have increased micronutrient requirements. This can lead to an increase in adverse pregnancy and birth outcomes. This review presents the conclusions of a task force that set out to assess the prevalence of inadequate micronutrient intakes and adverse birth outcomes in LMICs; the data from trials comparing multiple micronutrient supplements (MMS) that contain iron and folic acid (IFA) with IFA supplements alone; the risks of reaching the upper intake levels with MMS; and the cost-effectiveness of MMS compared with IFA. Recent meta-analyses demonstrate that MMS can reduce the risks of preterm birth, low birth

weight, and small for gestational age in comparison with IFA alone. An individual-participant data meta-analysis also revealed even greater benefits for anemic and underweight women and female infants. Importantly, there was no increased risk of harm for the pregnant women or their infants with MMS. These data suggest that countries with inadequate micronutrient intakes should consider supplementing pregnant women with MMS as a cost-effective method to reduce the risk of adverse birth outcomes.

Letter in response to this article

Antenatal multiple micronutrient supplementation: where are the long-term benefits?

Devakumar, D., D. Osrin, H.S. Sachdev, and A. Pros. 2020. "Antenatal multiple micronutrient supplementation: where are the long-term benefits?". *Annals of the New York Academy of Sciences* 1465: 8-9. <https://doi.org/10.1111/nyas.14272>

Bourassa et al. describe the work of a task force convened to consider whether antenatal multiple micronutrient supplementation (MMS) should be offered to pregnant women. They summarize a 2019 Cochrane review of antenatal MMS versus iron and folic acid supplementation and an individual participant data analysis. The Cochrane review found reductions in low birthweight and small-for-gestational age, but no effects on stillbirths, neonatal mortality, maternal anemia, maternal mortality, or any other pregnancy outcome examined. Low birth weight was the only outcome for which authors had high-quality evidence of a reduction. On the basis of these mixed results, Bourassa et al. conclude that countries where women have insufficient micronutrient intakes should offer antenatal MMS to reduce the risk of adverse birth outcomes. We have two concerns: the first is about the risks of relying on birthweight as the main measure of fetal health, and the second is about the current lack of evidence for long-term benefits of antenatal MMS.

Response to Devakumar et al.

Antenatal multiple micronutrient supplementation: call to action for change in recommendation

Bourassa, M.W., S.J. Osendarp, S. Adu-Afarwuah, S. Ahmed, C. Ajello, G. Bergeron, R. Black, P. Christian, S. Cousens, S. de Pee, K.G. Dewey, S.E. Arifeen, R. Engle-Stone, A. Fleet, A.D. Gernand, J. Hoddinott, R. Klemm, K. Kraemer, R. Kupka, E. McLean, S.E. Moore, L.M. Neufeld, L.-Å. Persson, K.M. Rasmussen, A.H. Shankar, E. Smith, C.R. Sudfeld, E. Udomkesmalee, and S.A. Vosti. 2020. "Antenatal multiple micronutrient supplementation: call to action for change in recommendation". *Annals of the New York Academy of Sciences* 1465: 5-7. <https://doi.org/10.1111/nyas.14271>

We appreciate the comments by Devakumar et al. and agree that there are still some unanswered questions regarding the long-term impact of multiple micronutrient supplementation (MMS) during pregnancy. However, in their assessment, Devakumar and colleagues ignore the significant benefits shown in the individual patient data (IPD) meta-analysis, which strongly influenced our task force's conclusions. Rather, their comments focus only on the birth size data from the Cochrane reviews. In the IPD meta-analysis, which included data from nearly 113,000 pregnancies, the authors found that, in addition to reducing the risk of low birthweight, MMS significantly reduces the risk of preterm birth (RR = 0.93 (0.87–0.98), random effects). The Cochrane review also states that MMS "probably led to a slight reduction in preterm births" on the basis of data from 91,425 participants with moderate quality evidence (RR = 0.95 (0.90–1.01)).

Preconception nutrition intervention improved birth length and reduced stunting and wasting in newborns in South Asia: The Women First Randomized Controlled Trial

Dhaded, S.M., K.M Hambidge, S.A. Ali, M. Somannavar, S. Saleem, O. Pasha, U. Khan, V. Herekar, S. Vernekar, Y. K. S., J.E. Westcott, V.R. Thorsten, A. Sridhar, A. Das, E. McClure, R.J. Derman, R.L. Goldenberg, M. Koso-Thomas, S.S. Goudar, and N.F. Krebs. 2020. "Preconception nutrition intervention improved birth length and reduced stunting and wasting in newborns in South Asia: The Women First Randomized Controlled Trial". *PLoS ONE* 15(1): e0218960. <https://doi.org/10.1371/journal.pone.0218960>

South Asia has >50% of the global burden of low birth weight (LBW). The objective was to determine the extent to which maternal nutrition interventions commenced before conception or in the 1st trimester improved fetal growth in this region. This was a secondary analysis of combined newborn anthropometric data for the South Asian sites (India and Pakistan) in the Women First Preconception Maternal Nutrition Trial. Participants were 972 newborn of mothers who were poor, rural, unselected on basis of nutritional status, and had been randomized to receive a daily lipid-based micronutrient supplement commencing ≥ 3 months prior to conception (Arm 1), in the 1st trimester (Arm 2), or not at all (Arm 3). An additional protein-energy supplement was provided if BMI < 20 kg/m² or gestational weight gain was less than guidelines. Gestational age was established in the 1st trimester and newborn anthropometry obtained < 48 -hours post-delivery. Mean differences at birth between Arm 1 vs. 3 were length +5.3mm and weight +89g. Effect sizes (ES) and relative risks (RR) with 95% CI for Arm 1 vs. 3 were: length-for-age Z-score (LAZ) +0.29 (0.11–0.46, $p = 0.0011$); weight-for-age Z-score (WAZ) +0.22 (0.07–0.37, $p = 0.0043$); weight-to-length-ratio-for-age Z-score (WLRAZ) +0.27 (0.06–0.48, $p = 0.0133$); LAZ < -2 , 0.56 (0.38–0.82, $p = 0.0032$); WAZ < -2 , 0.68 (0.53–0.88, $p = 0.0028$); WLRAZ < -2 , 0.76 (0.64–0.89, $p = 0.0011$); small-for-gestational-age (SGA), 0.74 (0.66–0.83, $p < 0.0001$); low birth weight 0.81 (0.66–1.00, $p = 0.0461$). For Arm 2 vs. 3, LAZ, 0.21 (0.04–0.38); WAZ < -2 , 0.70 (0.53–0.92); and SGA, 0.88 (0.79–0.97) were only marginally different. ES or RR did not differ for preterm birth for either Arm 1 vs. 3 or 2 vs. 3. In conclusion, point estimates for both continuous and binary anthropometric outcomes were consistently more favorable when maternal nutrition supplements were commenced ≥ 3 months prior to conception indicating benefits to fetal growth of improving women's nutrition in this population.

Long-term trend in socioeconomic inequalities and geographic variation in the utilization of antenatal care service in India between 1998 and 2015

Lee, H., J. Oh, R. Kim, and S.V. Subramanian. 2020. "Long-term trend in socioeconomic inequalities and geographic variation in the utilization of antenatal care service in India between 1998 and 2015". *Health Services Research*. <https://doi.org/10.1111/1475-6773.13277>

Objective: To investigate the temporal trend of socioeconomic and rural-urban disparities and geographical variation in the utilization of antenatal care (ANC) services in India before and throughout the Millennium Development Goals era. **Data Sources/Study Setting:** For this temporal analysis, secondary data from the Indian National Family Health Surveys between 1998 and 2015 (Waves 2, 3, and 4) were used. **Study Design:** We analyzed the trend in inequality for at least one and four ANC visits to a health care professional (ANC1+ and ANC4+, respectively) by education, wealth, and residence type. Multilevel logistic regression models were used to assess the temporal trend and the relative contribution of communities and states to the overall variation in ANC1+ and ANC4+. **Data Collection/Extraction Methods:** Data on utilization of ANC services for the last birth of women aged 15-49 years during the three or five years preceding the survey (depending on the survey year) were used. **Principal Findings:** Educational and wealth inequality in ANC1+ and ANC4+ worsened between 1998 and 2005 and improved between 2005 and 2015 (for ANC4+, OR [95% CI] = 0.22 [0.19-0.25] in Wave 2; OR [95% CI] = 0.19 [0.17-0.22] in Wave 3; and OR [95% CI] = 0.38 [0.36-

0.40] in Wave 4 for the poorest). Rural-urban inequality showed a consistent decline (for ANC4+, OR [95% CI] = 0.59 [0.54-0.64] in Wave 2; OR [95% CI] = 0.63 [0.59-0.68] in Wave 3; and OR [95% CI] = 0.82 [0.79-0.85] in Wave 4 for rural area). The relative contribution of the community to the total geographic variation in the utilization of ANC services increased more than four times during the study period. **Conclusions:** The use of ANC services remains disproportionately lower among women with low socioeconomic status. Efforts to directly target these women are necessary to tackle inequality in ANC utilization in India.

Commentary

Access to women physicians and uptake of reproductive, maternal and child health services in India

Bhan, N., L. McDougal, A. Singh, Y. Atmavilas, and A. Raj. 2020. "Access to women physicians and uptake of reproductive, maternal and child health services in India". *EClinicalMedicine* 20: 100309. <https://doi.org/10.1016/j.eclinm.2020.100309>

Background: Low availability of women physicians in rural areas can compromise women's health care seeking, where need can be greatest. We examined the associations between availability of women physicians and maternal and child health service utilization in India. **Methods:** We analyzed cross-sectional district-level data from all 256 districts in 18 states, from India's District-Level Household and Facility Survey (2012–13) and the National Family Health Survey (2015–16). Assessed measures included lady medical officers (LMOs) availability at Primary Health Centers (PHCs, which are largely rural serving), modern contraceptive use, antenatal care (ANC), skilled birth attendance (SBA), maternal postnatal care (PNC), infant PNC, and child immunization. Multilevel regression models nesting districts in states examined associations between LMO availability and health service utilization, adjusting for district-level socioeconomic status (SES) indicators (e.g., women's education, household water access), urbanicity, health insurance coverage and sampled PHCs (15 on average) within districts. **Findings:** Only 72 of 256 districts (28.1%) reported >50% of PHCs with LMOs. In multivariable models, LMO availability in PHCs was associated with higher district prevalence (%) of modern contraceptive use [$\beta=0.04$ (95% CI: 0.007, 0.08)], 4+ ANC [$\beta=0.07$ (95% CI: 0.008, 0.13)], skilled birth attendance [$\beta=0.09$ (0.03, 0.14)] and maternal PNC [$\beta=0.08$ (95% CI: 0.03, 0.12)], but not infant PNC or child immunization. **Interpretation:** Higher district availability of women physicians is associated with higher maternal health care utilization but not child health care utilization. Improving gender parity in the physician workforce and rural women physician access may improve maternal health care use in India.

Coaching Intensity, Adherence to Essential Birth Practices, and Health Outcomes in the BetterBirth Trial in Uttar Pradesh, India

Barnhart, D.A., D. Spiegelman, C.M. Zigler, N. Kara, M.M. Delaney, T. Kalita, P. Maji, L.R. Hirschhorn, and K.E.A. Semrau. 2020. "Coaching Intensity, Adherence to Essential Birth Practices, and Health Outcomes in the BetterBirth Trial in Uttar Pradesh, India". *Global Health: Science and Practice* 8(1). <https://doi.org/10.9745/GHSP-D-19-003174>

Background: Coaching can improve the quality of care in primary-level birth facilities and promote birth attendant adherence to essential birth practices (EBPs) that reduce maternal and perinatal mortality. The intensity of coaching needed to promote and sustain behavior change is unknown. We investigated the relationship between coaching intensity, EBP adherence, and maternal and perinatal health outcomes using data from the BetterBirth Trial, which assessed the impact of a complex, coaching-based implementation of the World Health Organization's Safe Childbirth Checklist in Uttar Pradesh, India. **Methods:** For each birth, we defined multiple coaching intensity metrics, including coaching frequency (coaching visits per month), cumulative coaching (total

coaching visits accrued during the intervention), and scheduling adherence (coaching delivered as scheduled). We considered coaching delivered at both facility and birth attendant levels. We assessed the association between coaching intensity and birth attendant adherence to 18 EBPs and with maternal and perinatal health outcomes using regression models. **Results:** Coaching frequency was associated with modestly increased EBP adherence. Delivering 6 coaching visits per month to facilities was associated with adherence to 1.3 additional EBPs (95% confidence interval [CI]=0.6, 1.9). High-frequency coaching delivered with high coverage among birth attendants was associated with greater improvements: providing 70% of birth attendants at a facility with at least 1 visit per month was associated with adherence to 2.0 additional EBPs (95% CI=1.0, 2.9). Neither cumulative coaching nor scheduling adherence was associated with EBP adherence. Coaching was generally not associated with health outcomes, possibly due to the small magnitude of association between coaching and EBP adherence. **Conclusions:** Frequent coaching may promote behavior change, especially if delivered with high coverage among birth attendants. However, the effects of coaching were modest and did not persist over time, suggesting that future coaching-based interventions should explore providing frequent coaching for longer periods.

Impact of an integrated nutrition, health, water sanitation and hygiene, psychosocial care and support intervention package delivered during the pre- and peri-conception period and/or during pregnancy and early childhood on linear growth of infants in the first two years of life, birth outcomes and nutritional status of mothers: study protocol of a factorial, individually randomized controlled trial in India

Taneja, S., R. Chowdhury, N. Dhabhai, S. Mazumder, R.P. Upadhyay, S. Sharma, R. Dewan, P. Mittal, H. Chellani, R. Bahl, M.K. Bhan, N. Bhandari and on behalf of the Women and Infants Integrated Growth Study (WINGS) Group. 2020. "Impact of an integrated nutrition, health, water sanitation and hygiene, psychosocial care and support intervention package delivered during the pre- and peri-conception period and/or during pregnancy and early childhood on linear growth of infants in the first two years of life, birth outcomes and nutritional status of mothers: study protocol of a factorial, individually randomized controlled trial in India". *Trials* 21(127). <https://doi.org/10.1186/s13063-020-4059-z>

Background: The period from conception to two years of life denotes a critical window of opportunity for promoting optimal growth and development of children. Poor nutrition and health in women of reproductive age and during pregnancy can negatively impact birth outcomes and subsequent infant survival, health and growth. Studies to improve birth outcomes and to achieve optimal growth and development in young children have usually tested the effect of standalone interventions in pregnancy and/or the postnatal period. It is not clearly known whether evidence-based interventions in the different domains such as health, nutrition, water sanitation and hygiene (WASH) and psychosocial care, when delivered together have a synergistic effect. Further, the effect of delivery of an intervention package in the pre and peri-conception period is not fully understood. This study was conceived with an aim to understand the impact of an integrated intervention package, delivered across the pre and peri-conception period, through pregnancy and till 24 months of child age on birth outcomes, growth and development in children. **Methods:** An individually randomized controlled trial with factorial design is being conducted in urban and peri-urban low- to mid-socioeconomic neighbourhoods in South Delhi, India. 13,500 married women aged 18 to 30 years will be enrolled and randomized to receive either the pre and peri-conception intervention package or routine care (first randomization). Interventions will be delivered until women are confirmed to be pregnant or complete 18 months of follow up. Once pregnancy is confirmed, women are randomized again (second randomization) to receive either the intervention package for pregnancy and postnatal period or to routine care. Newborns will be followed up till 24 months of age. The interventions are delivered through different study teams. Outcome data are collected by

an independent outcome ascertainment team. **Discussion:** This study will demonstrate the improvement that can be achieved when key factors known to limit child growth and development are addressed together, throughout the continuum from pre and peri-conception until early childhood. The findings will increase our scientific understanding and provide guidance to nutrition programs in low- and middle-income settings.

How can we realise the full potential of health systems for nutrition?

Heidkamp, R.A., E. Wilson, P. Menon, H. Kuo, S. Walton, G. Gatica-Domínguez, I.C. da Silva, T. Aung, N. Hajeerhoy, and E. Piwoz. 2020. "How can we realise the full potential of health systems for nutrition?" *The British Medical Journal* 368: l6911. <https://doi.org/10.1136/bmj.l6911>

Key messages

- Most essential nutrition interventions are delivered through health systems
 - Global movements to scale up effective nutrition interventions and achieve universal health coverage have not been connected to help each realise their full potential
 - Scaling up nutrition interventions among those who are already reached by health services is an important first step for accelerating progress
 - Other countries can learn from the experience of those that seem to be on track to achieving universal health coverage for specific health services and nutrition interventions
 - We need to deal with the widespread gaps in data on the coverage of nutrition interventions if we want to monitor progress and achieve universal coverage.
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Group-based programs to improve health outcomes in India: An accumulating body of evidence but questions remain

Menon, P., and N. Kumar. 2020. "Group-based programs to improve health outcomes in India: An accumulating body of evidence but questions remain". *EClinicalMedicine* 18: 100234. <https://doi.org/10.1016/j.eclinm.2019.12.004>

There is a strong global movement to scale-up various types of programs based on women's groups, both to empower women economically and to use the potential of women's groups to deliver other interventions. In India the movement has taken a strong hold, with the launch and scale-up of the National Rural Livelihoods Mission and several other associated programs. Many of these programs operate in poor states, or are focused on the poor even in richer states.

Original article (*Abstract Digest, Dec 2019 issue*)

Effects of health behaviour change intervention through women's self-help groups on maternal and newborn health practices and related inequalities in rural india: A quasi-experimental study

Hazra, A., Y. Atmavilas, K. Hay, N. Saggurti, R.K. Verma, J. Ahmad, S. Kumar, P.S. Mohanand, D. Mavalankar, and L. Irani. 2019. "Effects of health behaviour change intervention through women's self-help groups on maternal and newborn health practices and related inequalities in rural india: A quasi-experimental study". *EClinicalMedicine* 18: 100198. <https://doi.org/10.1016/j.eclinm.2019.10.011>

NON-PEER REVIEWED

Affordability of Nutritious Diets in Rural India

Raghunathan, K., D. Headey, and A. Herforth. 2020. *Affordability of Nutritious Diets in Rural India*. IFPRI Discussion Paper 01912. <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/133638>

Malnutrition is endemic in India. In 2015-16 some 38% of preschool children were stunted and 21% were wasted, while more than half of Indian mothers and children were anemic. There are many posited explanations for the high rates of malnutrition in India, but surprisingly few discuss the role of Indian diets, particularly the affordability of nutritious diets given low wages and the significant structural problems facing India's agricultural sector. This study was undertaken to address knowledge gaps around the affordability of nutritious diets in rural India. To do so we used nationally representative rural price and wage data to estimate the least cost means of satisfying India-specific dietary recommendations, referred to as the Cost of a Recommended Diet (CoRD), and assess the affordability of this diet relative to male and female wages for unskilled laborers. Although we find that dietary costs increased substantially over 2001-2011 for both men and women, rural wage rates increased more rapidly, implying that nutritious diets became substantially more affordable over time. However, in absolute terms nutritious diets in 2011 were still expensive relative to unskilled wages, constituting approximately 50-60% of male and about 70-80% of female daily wages, and were often even higher relative to minimum wages earned from the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). Since many poor households have significant numbers of dependents and substantial non-food expenditure requirements, it follows that nutritious diets are often highly unaffordable for the rural poor; we estimate that 45-64% of the rural poor cannot afford a nutritious diet that meets India's national food-based dietary guidelines. Our results point to the need to more closely monitor food prices through a nutritional lens, and to shift India's existing food policies away from their heavy bias towards cereals. Achieving nutritional security in India requires a much more holistic focus on improving the affordability of the full range of nutritious food groups and ensuring that economic growth results in sustained income growth for the poor.

Levels and trends in child malnutrition: Key Findings of the 2020 Edition of the Joint Child Malnutrition Estimates

United Nations Children's Fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development/The World Bank. *Levels and trends in child malnutrition: Key Findings of the 2020 Edition of the Joint Child Malnutrition Estimates*. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO. <https://data.unicef.org/resources/jme-report-2020/>

The UNICEF, WHO and the World Bank inter-agency team update the joint global and regional estimates of malnutrition among children under 5 years of age each year. These estimates of prevalence and numbers affected for child stunting, overweight, wasting and severe wasting are derived for the global population as well as by regional groupings of United Nations (UN) regions and sub-regions, Sustainable Development Goals (SDG), UNICEF, WHO and World Bank regions, as well as World Bank country-income group classifications. The key findings report of the 2020 edition presents estimates from 2000-2019.

UPCOMING EVENTS & DEADLINES

Measuring Food Insecurity in the era of COVID-19: Practical insights from data collection activities in four global contexts

When: 6 May 2020

Where: Webinar

For more information: <https://datafornutrition.org/>

3rd World Congress on Food and Nutrition

Theme: Discovering the recent advances on food and nutrition for new generation

When: 15-16 June 2020

Where: Webinar

For more information: <https://food-technology.nutritionalconference.com/scientific-program>

29th World Congress on Nutrition & Dietetics

Theme: Exploring Nutritional Innovations in Malnourished Obese World

When: 22-23 June 2020

Where: Webinar

For more information: <https://worldnutrition.conferenceseries.com/scientific-program>

7th WHO advanced course on health financing for universal coverage for low- and middle-income countries

About the course: The course is structured in line with WHO's approach to thinking and analyzing health financing policy and its role in improving health system performance, in particular making progress towards universal health coverage. During the course, participants will be able to apply WHO approach to analyze and reflect on their own health systems performance, assess the problems it faces, and discuss ideas with professionals from a wide range of countries.

When: 21–25 September 2020

Where: Geneva, Switzerland/Possibility of a facilitated online version

For more information: <https://www.who.int/news-room/events/detail/2020/09/21/default-calendar/seventh-advanced-course-on-health-financing-for-universal-coverage-for-low--and-middle-income-countries>

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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This publication has been prepared by POSHAN with research assistance from Pratima Mathews, IFPRI, 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](mailto:Dr.Rasmi.Avula) for any questions.