POSHAN
Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
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EDITOR'S NOTE

This issue of Abstract Digest has a collection of articles that examine trends, inequities, and coverage measurement topics pertaining to maternal, newborn, and child health and nutrition. The recently released Countdown to 2030 Report includes profiles of 81 Countdown priority countries on their current situation and trends in reproductive, maternal, newborn and child health and nutrition. The special supplement of The *Journal of Global Health* on 'Measuring coverage of essential maternal and newborn care interventions: An unfinished agenda' highlights the gaps in the current measurement of newborn care practices, comparability issues with implications for future measurement and research.

- Going beyond the current child growth monitoring practices, Haisma and colleagues (2017) propose a theoretical "capability" approach to further the discourse on child growth measurement that views context as integral to the growth assessment.
- Khara and colleagues (2017) estimate the burden of co-occurrence of stunting and wasting among 6–59 months children using the demographic and health survey and Multi indicator Cluster Surveys datasets from 84 countries.
- Findings from the MAL-ED birth cohort study (2017) show that diarrhea is not a major driver of poor growth *but* higher enteropathogens burden as well as low energy and protein density of complementary foods was associated with poor growth in the first 2 years of life.
- Krishna and colleagues (2017) used time series analysis to examine the trends in inequalities in child stunting and find substantial differences among countries in reducing prevalence of undernutrition and that prevalence of stunting is greater in households experiencing multiple types of disadvantages including poor diet diversity, low maternal education, and poverty.
- Analysing evidence from household surveys for measuring the essential elements of maternal and newborn health:
    - Sitrin and colleagues (2017) conclude that breastfeeding initiation indicator is not a good marker to determine coverage of other essential newborn practices and therefore recommend including standardized questions about specific practices, in addition to breastfeeding initiation in national household surveys.
    - Amouzou and colleagues (2017) have found that difference in questionnaires and the methodology adopted to measure postnatal care have created comparability issues in the coverage levels, suggesting harmonization of survey instruments on postnatal contacts for examining coverage and trends accurately.
- Maternal and Neonatal Directed Assessment of Technologies (MANDATE) is a mathematical model designed to estimate the relative impact of multiple interventions on reducing maternal, fetal, and neonatal mortality in low-resource settings (Jones-Hepler et al. 2017).
- Countdown to 2030 Report (2018) is the first report in the context of the 2030 agenda for sustainable development, which includes coverage profiles and concludes that although more data for RMNCH interventions are available now, major data gaps still preclude the use of evidence to drive decision making and accountability.

- Himaz (2018) used four rounds of longitudinal data to analyse the growth patterns in middle childhood and adolescence and their outcomes as a young adult.
- Wilunda and colleagues (2017) find no association between caesarean delivery and risk of anaemia among children in low- and middle-income countries.
- Looking at the different aspects of multiple micronutrient deficiencies:
  - Harding and colleagues (2017) discuss the trends and challenges of 'hidden hunger' in South Asia.
  - Berti and colleagues (2017) examine evidence from large-scale prenatal programmes on coverage, compliance and impact of multiple-micronutrient (MMN) supplementation to identify mechanisms for successful implementation of supplementation interventions.
  - Highlighting the importance of monitoring and surveillance for effective implementation of multiple micronutrient supplement programs in pregnancy, Mei and colleagues (2017) propose a set of indicators across the programme lifecycle for consideration when designing a monitoring and surveillance system for multiple micronutrient supplement programs in pregnancy.
  - Monterrosa and colleagues (2017) focus on the procurement and production-related issues of multiple micronutrient supplements in 12 lower and upper middle-income countries.
  - Young and colleagues (2017) examine the acceptability of MMN powders and iron syrup among mothers in Bihar and find no significant difference in preference for one product over the other product.
- Raghunathan et al. (2017) examine the association between a conditional cash transfer scheme (*Mamata* in *Odisha)* and receipt of services and outcomes and find that the scheme positively affected receipt of services, especially those during pregnancy as well as household food security.
- Nandi and colleagues (2018) estimated the long-term association between early-childhood exposure to ICDS nutrition and adult outcomes including schooling and labor market outcomes and marriage rates.
- Roy and colleagues (2017) underscore the importance of pulses for nutrition in India.

Enjoy reading!

PEER-REVIEWED

Towards a capability approach to child growth: A theoretical framework

Haisma, H., S. Yousefzadeh, and P. Boele Van Hensbroek. 2017. *Maternal & Child Nutrition.* 2017;e12534.

http://onlinelibrary.wiley.com/doi/10.1111/mcn.12534/full

Abstract: Child malnutrition is an important cause of under-5 mortality and morbidity around the globe. Despite the partial success of (inter)national efforts to reduce child mortality, under-5 mortality rates continue to be high. The multidimensional approaches of the Sustainable Development Goals may suggest new directions for rethinking strategies for reducing child mortality and malnutrition. We propose a theoretical framework for developing a "capability" approach to child growth. The current child growth monitoring practices are based on 2 assumptions: (a) that anthropometric and motor development measures are the appropriate indicators; and (b) that child growth can be assessed using a single universal standard that is applicable around the world. These practices may be further advanced by applying a capability approach to child growth, whereby growth is redefined as the achievement of certain capabilities (of society, parents, and children). This framework is similar to the multidimensional approach to societal development presented in the seminal work of Amartya Sen. To identify the dimensions of healthy child growth, we draw upon theories from the social sciences and evolutionary biology. Conceptually, we consider growth as a plural space and propose assessing growth by means of a child growth matrix in which the context is embedded in the assessment. This approach will better address the diversities and the inequalities in child growth. Such a multidimensional measure will have implications for interventions and policy, including prevention and counselling, and could have an impact on child malnutrition and mortality.

Children concurrently wasted and stunted: A meta-analysis of prevalence data of children 6–59 months from 84 countries

Khara, T., M. Mwangome, M. Ngari, *and C.* Dolan. 2017. *Maternal & Child Nutrition.* 2017*; e12516.*

https://doi.org/10.1111/mcn.12516

Abstract: Children can be stunted and wasted at the same time. Having both deficits greatly elevates risk of mortality. The analysis aimed to estimate the prevalence and burden of children aged 6–59 months concurrently wasted and stunted. Data from demographic and health survey and Multi indicator Cluster Surveys datasets from 84 countries were analysed. Overall prevalence for being wasted, stunted, and concurrently wasted and stunted among children 6 to 59 months was calculated. A pooled prevalence of concurrence was estimated and reported by gender, age, United Nations regions, and contextual categories. Burden was calculated using population figures from the global joint estimates database. The pooled prevalence of concurrence in the 84 countries was 3.0%, 95% CI [2.97, 3.06], ranging from 0% to 8.0%. Nine countries reported a concurrence prevalence greater than 5%. The estimated burden was 5,963,940 children. Prevalence of concurrence was highest in the 12- to 24-month age group 4.2%, 95% CI [4.1, 4.3], and was significantly higher among boys 3.54%, 95% CI [3.47, 3.61], compared to girls; 2.46%, 95% CI [2.41, 2.52]. Fragile and conflict-affected states reported significantly higher concurrence 3.6%, 95% CI [3.5, 3.6], than those defined as stable 2.24%, 95% CI [2.18, 2.30]. This analysis represents the first multiple country estimation of the prevalence and burden of children concurrently wasted and stunted. Given the high risk of mortality associated with concurrence, the findings indicate a need to report on this condition as well as investigate whether these children are being reached through existing programmes.

Relationship between growth and illness, enteropathogens and dietary intakes in the first 2 years of life: findings from the MAL-ED birth cohort study

MAL-ED Network Investigators. 2017. *BMJ Global Health* 2(4), DOI: 10.1136/bmjgh-2017-000370.

http://gh.bmj.com/content/2/4/e000370

Background Dietary and illness factors affect risk of growth faltering; the role of enteropathogens is less clear. As part of the Etiology, Risk Factors and Interactions of Enteric Infections and Malnutrition and the Consequences for Child Health and Development (MAL-ED) study, we quantify the effects of enteropathogen infection, diarrhoea and diet on child growth. **Methods** Newborns were enrolled and followed until 24 months. Length and weight were assessed monthly. Illnesses and breastfeeding practices were documented biweekly; from 9 to 24 months, non-breast milk intakes were quantified monthly. Routinely collected non-diarrhoeal stools were analysed for a broad array of enteropathogens. A linear piecewise spline model was used to quantify associations of each factor with growth velocity in seven of eight MAL-ED sites; cumulative effects on attained size at 24 months were estimated for mean, low (10th percentile) and high (90th percentile) exposure levels. Additionally, the six most prevalent enteropathogens were evaluated for their effects on growth. **Results** Diarrhoea did not have a statistically significant effect on growth. Children with high enteropathogen exposure were estimated to be 1.21±0.33 cm (p<0.001; 0.39 length for age (LAZ)) shorter and 0.08±0.15 kg (p=0.60; 0.08 weight-for-age (WAZ)) lighter at 24 months, on average, than children with low exposure. Campylobacter and enteroaggregative Escherichia coli detections were associated with deficits of 0.83±0.33 and 0.85±0.31 cm in length (p=0.011 and 0.001) and 0.22±0.15 and 0.09±0.14 kg in weight (p=0.14 and 0.52), respectively. Children with low energy intakes and protein density were estimated to be 1.39±0.33 cm (p<0.001; 0.42 LAZ) shorter and 0.81±0.15 kg (p<0.001; 0.65 WAZ) lighter at 24 months than those with high intakes. **Conclusions** Reducing enteropathogen burden and improving energy and protein density of complementary foods could reduce stunting.

Trends in inequalities in child stunting in South Asia

Krishna, A., *I.* Mejía-Guevara, *M.* McGovern, *V.* Aguayo, *and S.V.* Subramanian. *2017. Maternal & Child Nutrition.* 2017;*e12517.*

https://doi.org/10.1111/mcn.12517

Abstract*:* We analysed socio-economic inequalities in stunting in South Asia and investigated disparities associated with factors at the individual, caregiver, and household levels (poor dietary diversity, low maternal education, and household poverty). We used time-series analysis of data from 55,459 children ages 6–23 months from Demographic and Health Surveys in Bangladesh, India, Nepal, and Pakistan (1991–2014). Logistic regression models, adjusted for age, sex, birth order, and place of residency, examined associations between stunting and multiple types of socio-economic disadvantage. All countries had high stunting rates. Bangladesh and Nepal recorded the largest reductions—2.9 and 4.1 percentage points per year, respectively—compared to 1.3 and 0.6 percentage points in India and Pakistan, respectively. Socio-economic adversity was associated with increased risk of stunting, regardless of disadvantage type. Poor children with inadequate diets and with poorly educated mothers experienced greater risk of stunting. Although stunting rates declined in the most deprived groups, socio-economic differences were largely preserved over time and in some cases worsened, namely, between wealth quintiles. The disproportionate burden of stunting experienced by the most disadvantaged children and the worsening inequalities between socio-

economic groups are of concern in countries with substantial stunting burdens. Closing the gap between best and worst performing countries, and between most and least disadvantaged groups within countries, would yield substantial improvements in stunting rates in South Asia. To do so, greater attention needs to be paid to addressing the social, economic, and political drivers of stunting with targeted efforts towards the populations experiencing the greatest disadvantage and child growth faltering.

Evidence from household surveys for measuring coverage of newborn care practices

Sitrin, D., J. Perin, L.M.E. Vaz, L. Carvajal–Aguirre, S.M. Khan, J. Fishel, and A. Amouzou. 2017. *Journal of Global Health* 7(2).

http://jogh.org/documents/issue201702/jogh-07-020503.pdf

Background Aside from breastfeeding, there are little data on use of essential newborn care practices, such as thermal protection and hygienic cord care, in high mortality countries. These practices have not typically been measured in national household surveys, often the main source for coverage data in these settings. The Every Newborn Action Plan proposed early breastfeeding as a tracer for essential newborn care due to data availability and evidence for the benefits of breastfeeding. In the past decade, a few national surveys have added questions on other practices, presenting an opportunity to assess the performance of early breastfeeding initiation as a tracer indicator. **Methods** We identified twelve national surveys between 2005–2014 that included at least one indicator for immediate newborn care in addition to breastfeeding. Because question wording and reference populations varied, we standardized data to the extent possible to estimate coverage of newborn care practices, accounting for strata and multistage survey design. We assessed early breastfeeding as a tracer by: 1) examining associations with other indicators using Pearson correlations; and 2) stratifying by early breastfeeding to determine differences in coverage of other practices for initiators vs non–initiators in each survey, then pooling across surveys for a meta–analysis, using the inverse standard error as the weight for each observation. **Findings** Associations between pairs of coverage indicators are generally weak, including those with breastfeeding. The exception is drying and wrapping, which have the strongest association of any two interventions in all five surveys where measured; estimated correlations for this range from 0.47 in Bangladesh's 2007 DHS to 0.83 in Nepal's 2006 DHS. The contrast in coverage for other practices by early breastfeeding is generally small; the greatest absolute difference was 6.7%, between coverage of immediate drying for newborns breastfed early compared to those who were not. **Conclusions** Early initiation of breastfeeding is not a high performing tracer indicator for essential newborn care practices measured in previous national surveys. To have informative data on whether newborns are getting life–saving services, standardized questions about specific practices, in addition to breastfeeding initiation, need to be added to surveys.

Measuring postnatal care contacts for mothers and newborns: An analysis of data from the MICS and DHS surveys

Amouzou, A., V. Mehra, L. Carvajal–Aguirre, S.M. Khan, D. Sitrin, and L. Vaz. 2017. *Journal of Global Health* 7(2).

http://jogh.org/documents/issue201702/jogh-07-020502.pdf

Background The postnatal period represents a vulnerable phase for mothers and newborns where both face increased risk of morbidity and death. WHO recommends postnatal care (PNC) for

mothers and newborns to include a first contact within 24 hours following the birth of the child. However, measuring coverage of PNC in household surveys has been variable over time. The two largest household survey programs in low and middle–income countries, the UNICEF–supported Multiple Indicator Cluster Surveys (MICS) and USAID–funded Demographic and Health Surveys (DHS), now include modules that capture these measures. However, the measurement approach is slightly different between the two programs. We attempt to assess the possible measurement differences that might affect comparability of coverage measures. **Methods** We first review the standard questionnaires of the two survey programs to compare approaches to collecting data on postnatal contacts for mothers and newborns. We then illustrate how the approaches used can affect PNC coverage estimates by analysing data from four countries; Bangladesh, Ghana, Kygyz Republic, and Nepal, with both MICS and DHS between 2010–2015. **Results** We found that tools implemented to date by MICS and DHS (up to MICS round 5 and up to DHS phase 6) have collected PNC information in different ways. While MICS dedicated a full module to PNC and distinguishes immediate vs later PNC, DHS implemented a more blended module of pregnancy and postnatal and did not systematically distinguish those phases. The two survey programs differed in the way questions on postnatal care for mothers and new-borns were framed. Subsequently, MICS and DHS surveys followed different methodological approach to compute the global indicator of postnatal contacts for mothers and newborns within two days following delivery. Regardless of the place of delivery, MICS estimates for postnatal contacts for mothers and newbors appeared consistently higher than those reported in DHS. The difference was however, far more pronounced in case of newborns. **Conclusions:** Difference in questionnaires and the methodology adopted to measure PNC have created comparability issues in the coverage levels. Harmonization of survey instruments on postnatal contacts will allow comparable and better assessment of coverage levels and trends.

Maternal and Neonatal Directed Assessment of Technologies (MANDATE): Methods and Assumptions for a Predictive Model for Maternal, Fetal, and Neonatal Mortality Interventions

Jones-Hepler, B., K. Moran, J. Griffin, E.M. McClure, D. Rouse, C. Barbosa, E. MacGuire, E. Robbins and R.L. Goldenberg. 2017. *Global Health: Science and Practice* 5(4):571-580.

http://www.ghspjournal.org/content/5/4/571

Abstract: Maternal, fetal, and neonatal mortality disproportionately impact low- and middle-income countries, and many current interventions that can save lives are often not available nor appropriate for these settings. Maternal and Neonatal Directed Assessment of Technologies (MANDATE) is a mathematical model designed to evaluate which interventions have the greatest potential to save maternal, fetal, and neonatal lives saved in sub-Saharan Africa and India. The MANDATE decision-support model includes interventions such as preventive interventions, diagnostics, treatments, and transfers to different care settings to compare the relative impact of different interventions on mortality outcomes. The model is calibrated and validated based on historical and current rates of disease in sub-Saharan Africa and India. In addition, each maternal, fetal, or newborn condition included in MANDATE considers disease rates specific to sub-Saharan Africa and India projected to intervention rates similar to those seen in high-income countries. Limitations include variance in quality of data to inform the estimates and generalizability of findings of the effectiveness of the interventions. The model serves as a valuable resource to compare the potential impact of multiple interventions, which could help reduce maternal, fetal, and neonatal mortality in low-resource settings. The user should be aware of assumptions in evaluating the model and interpret results accordingly.

Countdown to 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health

Countdown to 2030 collaborators. 2018. *The Lancet*. DOI: https://doi.org/10.1016/S0140-6736(18)30104-1.

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30104-1/fulltext

Abstract: Building upon the successes of Countdown to 2015, Countdown to 2030 aims to support the monitoring and measurement of women's, children's, and adolescents' health in the 81 countries that account for 95% of maternal and 90% of all child deaths worldwide. To achieve the Sustainable Development Goals by 2030, the rate of decline in prevalence of maternal and child mortality, stillbirths, and stunting among children younger than 5 years of age needs to accelerate considerably compared with progress since 2000. Such accelerations are only possible with a rapid scale-up of effective interventions to all population groups within countries (particularly in countries with the highest mortality and in those affected by conflict), supported by improvements in underlying socioeconomic conditions, including women's empowerment. Three main conclusions emerge from our analysis of intervention coverage, equity, and drivers of reproductive, maternal, newborn, and child health (RMNCH) in the 81 Countdown countries. First, even though strong progress was made in the coverage of many essential RMNCH interventions during the past decade, many countries are still a long way from universal coverage for most essential interventions. Furthermore, a growing body of evidence suggests that available services in many countries are of poor quality, limiting the potential effect on RMNCH outcomes. Second, within-country inequalities in intervention coverage are reducing in most countries (and are now almost non-existent in a few countries), but the pace is too slow. Third, health-sector (eg, weak country health systems) and non-health-sector drivers (eg, conflict settings) are major impediments to delivering high-quality services to all populations. Although more data for RMNCH interventions are available now, major data gaps still preclude the use of evidence to drive decision making and accountability. Countdown to 2030 is investing in improvements in measurement in several areas, such as quality of care and effective coverage, nutrition programmes, adolescent health, early childhood development, and evidence for conflict settings, and is prioritising its regional networks to enhance local analytic capacity and evidence for RMNCH.

Stunting later in childhood and outcomes as a young adult: Evidence from India

Himaz, R. 2018. *World Development* (104):344-357.

https://www.sciencedirect.com/science/article/pii/S0305750X17304126

Abstract: This paper looks at patterns of growth faltering and catch up of around 1000 children as they moved from 8 to 19 years of age, from middle childhood through adolescence to young adulthood, using Height for Age Difference (HAD) and the more conventional Height for age z-scores (HAZ). It also looks at what individual and household characteristics may have moved these children into or out of situations of nutritional deprivation and how their stunting profile in later childhood correlates with psychosocial outcomes at age 19 and how it may have intergenerational consequences. The paper uses 4 rounds of longitudinal data collected in 2002, 2006, 2009 and 2013 from Andhra Pradesh and Telengana, India when the children were aged 8, 12, 15 and 19. The paper finds that there are significant gender based biases in growth faltering later in childhood disfavouring girls and that becoming newly stunted as an adolescent is strongly correlated with a

child reporting to have poorer relationships with peers compared to the group that were never stunted. We also find that a girl experiencing stunting in middle childhood or adolescence (even if they were not stunted at age 8 or eventually moved out of being stunted by age 19) correlates significantly with offspring being shorter and thinner than the offspring of girls never stunted. This is one of few, if any, studies that look at growth patterns in middle childhood and adolescence and outcomes as a young adult and the results are important for their implications for further research and policy.

Caesarean delivery and anaemia risk in children in 45 low- and middle-income countries

Wilunda, C., S. Yoshida, M. Blangiardo, A.P. Betran, S. Tanaka, *and* K. Kawakami. 2017. *Maternal & Child Nutrition.* 2017*; e12538.*

https://doi.org/10.1111/mcn.12538

Abstract: Caesarean delivery (CD) may reduce placental transfusion and cause poor iron-related haematological indices in the neonate. We aimed to explore the association between CD and anaemia in children aged <5 years utilising data from Demographic and Health Surveys conducted between 2005 and 2015 in 45 low- and middle-income countries (N = 132,877). We defined anaemia categories based on haemoglobin levels, analysed each country's data separately using propensity-score weighting, pooled the country-specific odds ratios (ORs) using random effects meta-analysis, and performed meta-regression to determine whether the association between CD and anaemia varies by national CD rate, anaemia prevalence, and gross national income. Individual-level CD was not associated with any anaemia (OR 0.95, 95% confidence interval (CI) [0.86, 1.06]; I2 = 40.2%), mild anaemia (OR 0.91, 95% CI [0.81, 1.02]; I2 = 24.8%), and moderate/severe anaemia (OR 0.97, 95% CI [0.85, 1.11]; I2 = 47.7%). CD tended to be positively associated with moderate/severe anaemia in upper middle-income countries and negatively associated with mild anaemia in lower middle-income countries; however, meta-regression did not detect any variation in the association between anaemia and CD by the level of income, CD rate, and anaemia prevalence. In conclusion, there was no evidence for an association between CD and anaemia in children younger than 5 years in low- and middle-income countries. Our conclusions were consistent when we looked at only countries with CD rate >15% with data stratified by individual-level wealth status and type of health facility of birth.

Hidden hunger in South Asia: a review of recent trends and persistent challenges

Harding, K.L., V.M. Aguayo, and P. Webb. 2017. *Public Health Nutrition*. DOI:10.1017/S1368980017003202.

https://www.cambridge.org/core/services/aop-cambridge-core/content/view/2725C310F5DA6BEDE83500CF5E7342FF/S1368980017003202a.pdf/hidden_hunger_in_south_asia_a_review_of_recent_trends_and_persistent_challenges.pdf

Abstract: 'Hidden hunger' is a term used to describe human deficiencies of key vitamins and minerals, also known as micronutrients. While global in scale, the prevalence of micronutrient deficiencies is particularly high in South Asia despite recent successes in economic growth, agricultural output and health care. The present paper reviews the most recent evidence on patterns and trends of hidden hunger across the region, with a focus on the most significant deficiencies – iodine, Fe, vitamin A and Zn – and interprets these in terms of health and economic consequences. The challenge for South Asian policy makers is to invest in actions that can cost-effectively resolve chronic nutrient gaps facing millions of households. Appropriate solutions are available today, so

governments should build on evidence-based successes that combine targeted health system delivery of quality services with carefully designed multisector actions that help promote healthier diets, reduce poverty and ensure social protection simultaneously.

Multiple-micronutrient supplementation: Evidence from large-scale prenatal programmes on coverage, compliance and impact

Berti, C., M.F. Gaffey, Z.A. Bhutta, and I. Cetin. *2017. Maternal & Child Nutrition.* 2018*; e12531.*

https://doi.org/10.1111/mcn.12531

Abstract: Micronutrient deficiencies during pregnancy pose important challenges for public-health, given the potential adverse outcomes not only during pregnancy but across the life-course. Provision of iron-folic acid (IFA) supplements is the strategy most commonly practiced and recommended globally. How to successfully implement IFA and multiple micronutrient supplementation interventions among pregnant women and to achieve sustainable/permanent solutions to prenatal micronutrient deficiencies remain unresolved issues in many countries. This paper aims to analyse available experiences of prenatal IFA and multiple micronutrient interventions to distil learning for their effective planning and large-scale implementation. Relevant articles and programme-documentation were comprehensively identified from electronic databases, websites of major-agencies and through hand-searching of relevant documents. Retrieved documents were screened and potentially relevant reports were critically examined by the authors with the aim of identifying a set of case studies reflecting regional variation, a mix of implementation successes and failures, and a mix of programmes and large-scale experimental studies. Information on implementation, coverage, compliance, and impact was extracted from reports of large-scale interventions in Central America, Southeast Asia, South Asia, and Sub-Saharan Africa. The WHO/CDC Logic-Model for Micronutrient Interventions in Public Health was used as an organizing framework for analysing and presenting the evidence. Our findings suggest that to successfully implement supplementation interventions and achieve sustainable-permanent solutions efforts must focus on factors and processes related to quality, cost-effectiveness, coverage, utilization, demand, outcomes, impacts, and sustainability of programmes including strategic analysis, management, collaborations to pilot a project, and careful monitoring, midcourse corrections, supervision and logistical-support to gradually scaling it up.

Monitoring and surveillance for multiple micronutrient supplements in pregnancy

Mei, Z., M.E. Jefferds, S. Namaste, P.S. Suchdev, *and* R.C. Flores-Ayala. *2017. Maternal & Child Nutrition.* 2018*:e12501.*

https://doi.org/10.1111/mcn.12501

Abstract: The World Health Organization (WHO) recommends iron–folic acid (IFA) supplementation during pregnancy to improve maternal and infant health outcomes. Multiple micronutrient (MMN) supplementation in pregnancy has been implemented in select countries and emerging evidence suggests that MMN supplementation in pregnancy may provide additional benefits compared to IFA alone. In 2015, WHO, the United Nations Children's Fund (UNICEF), and the Micronutrient Initiative held a “Technical Consultation on MMN supplements in pregnancy: implementation considerations for successful incorporation into existing programmes,” which included a call for indicators needed for monitoring, evaluation, and surveillance of MMN supplementation programmes. Currently, global surveillance and monitoring data show that overall IFA supplementation programmes suffer from low coverage and intake adherence, despite inclusion in national policies. Common barriers

that limit the effectiveness of IFA—which also apply to MMN programmes—include weak supply chains, low access to antenatal care services, low-quality behaviour change interventions to support and motivate women, and weak or non-existent monitoring systems used for programme improvement. The causes of these barriers in a given country need careful review to resolve them. As countries heighten their focus on supplementation during pregnancy, or if they decide to initiate or transition into MMN supplementation, a priority is to identify key monitoring indicators to address these issues and support effective programmes. National and global monitoring and surveillance data on IFA supplementation during pregnancy are primarily derived from cross-sectional surveys and, on a more routine basis, through health and logistics management information systems. Indicators for IFA supplementation exist; however, the new indicators for MMN supplementation need to be incorporated. We reviewed practice-based evidence, guided by the WHO/Centers for Disease Control and Prevention logic model for vitamin and mineral interventions in public health programmes, and used existing manuals, published literature, country reports, and the opinion of experts, to identify monitoring, evaluation, and surveillance indicators for MMN supplementation programmes. We also considered cross-cutting indicators that could be used across programme settings, as well as those specific to common delivery models, such as antenatal care services. We then described mechanisms for collecting these data, including integration within existing government monitoring systems, as well as other existing or proposed systems. Monitoring data needs at all stages of the programme lifecycle were considered, as well as the feasibility and cost of data collection. We also propose revisions to global-, national-, and subnational-surveillance indicators based on these reviews.

Situation analysis of procurement and production of multiple micronutrient supplements in 12 lower and upper middle-income countries

Monterrosa, E.C., K. Beesabathuni, K.G. van Zutphen, *G. Steiger, R. Kupka, A. Fleet, and K. Kraemer.*
2017. *Maternal & Child Nutrition.* 2018;*e12500.*

https://doi.org/10.1111/mcn.12500

Abstract: Globally, there are few vitamin and mineral ingredient manufacturers. To support local, in-country or regional procurement and production of multiple micronutrient supplements (MMS), the following production scenarios are possible: (a) straight ingredients of vitamins and minerals forms imported or locally produced that are mixed, tableted, or encapsulated and packaged by a local manufacturer; (b) import or local production of a vitamin and minerals premix that is tableted or encapsulated and packaged locally; (c) import of a bulk, finished product (tablets or capsules) that is packaged and branded; and (d) or import of a branded packaged product. This paper is a situation analysis of the market, manufacturing, and policy factors that are driving the production of MMS in 12 lower and upper middle-income countries. Key informants completed a self-administered structured questionnaire, which examined the local context of products available in the market and their cost, regulations and policies, in Brazil, Colombia, Guatemala, Mexico, Peru, Bangladesh, India, Vietnam, Ghana, Kenya, Nigeria, and South Africa. Our study found that although most countries have the capacity to produce locally MMS, the major barriers observed for sustainable and affordable production include (a) poor technical capacity and policies for ensuring quality along the value chain and (b) lack of policy coherence to incentivize local production and lower the manufacture and retail price of MMS. Also, better guidelines and government oversight will be required because not one country had an MMS formulation that matched the globally recommended formulation of the United Nations Multiple Micronutrient Preparation (UNIMMAP).

Acceptability of multiple micronutrient powders and iron syrup in Bihar, India

Young, M.F., A.W. Girard, R. Mehta, S. Srikantiah, L. Gosdin, P. Menon, U. Ramakrishnan, R. Martorell, and R. Avula. 2017. Maternal & Child Nutrition. 2017;e12572.

http://onlinelibrary.wiley.com/doi/10.1111/mcn.12572/full

Abstract: Nearly two thirds of young children are anaemic in Bihar, India. Paediatric iron and folic acid syrup (IFAS) and multiple micronutrient powders (MNPs) are two evidence-based interventions to prevent anaemia. Using a randomized crossover design, we examined the acceptability of IFAS versus MNPs for children 6–23 months. In a catchment area of 2 health centres in Bihar, health front-line workers (FLWs) delivered either (a) IFAS twice weekly or (b) MNPs for 1 month followed by the other supplementation strategy for 1 month to the same families (NCT02610881). Household surveys were conducted at baseline (N = 100), 1 month after receiving the first intervention (1 month; N = 95), and 1 month after the second intervention (2 months; N = 93). Focus group discussions (10 FLWs) and in-depth interviews (20 mothers) were held at 1 and 2 months. We used chi-square and Fisher exact tests to test mothers' product preferences. Qualitative data were analysed using MaxQDA and Excel employing a thematic analysis approach. There was high adherence and acceptability for both products (>80%). There was no significant difference in preference ($p < .05$) on perceived benefits (39% MNPs, 40% IFAS), side effects (30% MNPs, 30% IFAS), ease of use (42% IFAS, 31% MNPs), child preference (45% IFAS, 37% MNPs), and maternal preference (44% IFAS, 34% MNPs). Mothers and FLWs indicated that the direct administration of IFAS ensured that children consumed the full dose, and MNPs intake depended on the quantity of food consumed, especially among younger children, which emphasizes the need to integrate supplementation with the promotion of optimal child feeding practices.

Can conditional cash transfers improve the uptake of nutrition interventions and household food security? Evidence from Odisha's Mamata scheme

Raghunathan, K., S. Chakrabarti, R. Avula, and S.S. Kim. 2017. *PLoS ONE* 12(12): e0188952.

https://doi.org/10.1371/journal.pone.0188952

Abstract: There is considerable global evidence on the effectiveness of cash transfers in improving health and nutrition outcomes; however, the evidence from South Asia, particularly India, is limited. In the context of India where more than a third of children are undernourished, and where there is considerable under-utilization of health and nutrition interventions, it is opportune to investigate the impact of cash transfer programs on the use of interventions. We study one conditional cash transfer program, Mamata scheme, implemented in the state of Odisha, in India that targeted pregnant and lactating women. Using survey data on 1161 households from three districts in the state of Odisha, we examine the effect of the scheme on eight outcomes: 1) pregnancy registration; 2) receipt of antenatal services; 3) receipt of iron and folic acid (IFA) tablets; 4) exposure to counseling during pregnancy; 5) exposure to postnatal counseling; 6) exclusive breastfeeding; 7) full immunization; and 8) household food security. We conduct regression analyses and correct for endogeneity using nearest neighbour matching and inverse-probability weighting models. We find that the receipt of payments from the Mamata scheme is associated with a 5 percentage point (pp) increase in the likelihood of receiving antenatal services, a 10 pp increase in the likelihood of receiving IFA tablets, and a decline of 0.84 on the Household Food Insecurity Access Scale. These results provide the first quantitative estimates of effects associated with the Mamata scheme, which can inform the design of government policies related to conditional cash transfers.

Early-Life Nutrition Is Associated Positively with Schooling and Labor Market Outcomes and Negatively with Marriage Rates at Age 20–25 Years: Evidence from the Andhra Pradesh Children and Parents Study (APCAPS) in India

Nandi, A., J.R. Behrman, S. Kinra, and R. Laxminarayan. 2018. *The Journal of Nutrition* 148(1):140–146.

https://doi.org/10.1093/jn/nxx012

Background: India's Integrated Child Development Services (ICDS) is among the world's largest public nutritional programs, providing daily nutritional supplements and other public health and educational services to pregnant and nursing women, children aged <6 y, and adolescent girls. **Objective:** We estimated the long-term association between early-childhood ICDS nutrition and adult outcomes. **Methods:** We used follow-up data from a controlled nutritional trial conducted during 1987–1990 in 29 villages near the city of Hyderabad. In 15 intervention villages, a balanced protein-calorie supplement—made from locally available corn-soya ingredients and called upma—was offered to pregnant women and to children <6 y old. No supplement was offered in the 14 control villages. During 2010–2012, adults born during the trial were re-surveyed (n = 715 in the intervention arm and n = 645 in the control arm). We used probit regression and propensity score-matching methods to estimate the association between birth in an intervention village and rates of secondary and graduate education completion, marriage, and employment or enrolment in higher education of these adults. **Results:** Adults born in the intervention group during the trial, compared with the control group, were 9% (95% CI: 0.04, 0.14; P < 0.01) more likely to complete secondary school and 11% (95% CI: 0.06, 0.15; P < 0.01) more likely to complete graduate education, were 6% (95% CI: −0.11, −0.01; P < 0.05) less likely to be ever-married at age 20–25 y, and were 5% (95% CI: 0, 0.11; P < 0.05) more likely to be employed or enrolled in higher education. The estimated associations for graduate education completion and employment-study rates were greater for men, whereas the associations for secondary education and ever-married rates were greater for women. **Conclusion:** Exposure to nutritional supplement in utero or during the first 3 years of life was associated with improved adult educational and employment outcomes and lower marriage rates in India.

Pulses for nutrition in India: Changing patterns from farm to fork

Roy, D., P.K. Joshi, and R. Chandra. 2017. *Pulses for nutrition in India: Changing patterns from farm to fork*. Washington, D.C.: International Food Policy Research Institute (IFPRI).

https://doi.org/10.2499/9780896292567

Abstract: India, a country with high concentrations of poor and malnourished people, long promoted a cereal-centric diet composed of subsidized staple commodities such as rice and wheat to feed its population of more than a billion. Today, however, dietary patterns are changing. Policy makers, researchers, and health activists are looking for ways to fight hunger and malnutrition in the country. As they shift their focus from calorie intake to nutrition, neglected foods such as pulses (the dried, edible seeds of legumes) are gaining attention.

NON-PEER REVIEWED

Health Equity Research: A Political Project

Ravindran, T.K.S., R. Gaitonde, P.N. Srinivas, S. Subramaniam, P. Chidambaram, and G.A. Chitra. 2018. "Health Equity Research: A Political Project." In *Health Inequities in India,* edited by Ravindran T., and R. Gaitonde, 221-239. Springer, Singapore.

https://link.springer.com/chapter/10.1007/978-981-10-5089-3_9

Abstract: Health equity research in India is clearly at an early and formative stage. There is a large body of literature around the patterns of health inequities along several axes, but for this literature to mature into actionable knowledge, and result in the implementation of meaningful policies, programmes and interventions, there is still a long way to go. Section 9.2 seeks to make meaning of the evidence through an attempt to weave the various strands of explanations presented in the literature together into a coherent approach for researching health inequities. It identifies the Coleman's boat that helps organise various social mechanisms; the institutional focus and the intersectional lens as critical components to any approach that attempts to engage with the complex phenomena of health inequities in a meaningful fashion. The concept of embodiment, which makes the link between institutions and individual bodies, is an integral part of such an approach. Section 9.3 draws on this to suggest our thoughts on what needs to be done differently in health equity research, to make a tangible impact, especially on those affected the most.

The Sociocultural Drivers of Food Choices Formative research among pregnant and lactating women in Rajasthan

Monterrosa, E.C. 2017. *Sight and Life* 31(2): 27-35.

https://sightandlife.org/wp-content/uploads/2017/12/SAL_TechnolyandEntrepreneurship_The-Social-Drivers-of-Food-Choices.pdf

Abstract: Addressing maternal undernutrition is not just about the nutrient profile of the foods women eat; it also requires an understanding of the social norms and beliefs that guide eating practices during pregnancy and lactation. Pregnant and lactating women (PLW) in Rajasthan consume on average 30% less than the Indian Medical Research Council's recommended intakes for calories and for protein in the third trimester of pregnancy or during exclusive breastfeeding. Formative research was conducted to identify how key social influencers shape the decisions of PLW in Rajasthan on what and when to eat and to understand important barriers to healthy eating during pregnancy. Food taboos tend to be propagated by mothers-in-law (MIL), whereas husbands may be more accessible to dietary advice in respect of their wives, not least because of the cost of medical care in the event that they fall sick. Key insights of the research are that improving food intake is feasible through non- main-meal occasions, that women need permission to eat more during pregnancy and lactation, and that actionable dietary advice needs to be relevant, specific, and desirable.

UPCOMING EVENTS

3rd World Congress on Public Health & Nutrition

Based on the theme 'Impediment to Exploration of Public Health Challenges in Globalizing World,' the event promises to be an opportunity for healthcare professionals, advocates, policymakers and academics to come together to share and explore ideas in the field of public health, in pursuit of tangible improvements in healthcare and nutrition around the world.

When: February 26-28, 2018

Where: London, UK

For more information: https://publichealth.global-summit.com/

19th International Congress on Nutrition & Health

Theme of the Congress is 'Amalgamation of competent researchers across the globe to foster the novel research in the field of Nutrition & Health.' Nutrition & Health 2018 is intended to provide a notable opening to the experts in the field of nutrition& health to discuss modern exploration and encounters in the field. Nutrition & Health 2018 is planned to provide a special podium for nutritionists, registered dieticians, and other health-care professionals, researchers and students working in the arena to consciously, exchange visions and their understandings in front of a large intercontinental listeners.

When: April 12-14, 2018

Where: Amsterdam, Netherlands

For more information: https://health.nutritionalconference.com/

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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