
The effectiveness of delivery platforms for improving coverage and impact of maternal, child and adolescent nutrition interventions: a systematic review

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Background

Approximately 50% of deaths among children under 5 years of age are linked to poor nutrition (WHO, 2016). In addition, inadequate nutrition contributes a large burden of disease, disability, and cognitive impairment affecting educational attainment and productivity of individuals and communities (Martins, 2011). Improving nutritional status requires effective delivery platforms to enable access to and uptake of interventions for large segments of populations in low-resource settings.

Traditionally, nutrition-specific interventions have leveraged the health system platform and have generally piggy-backed on delivery of prenatal and postnatal services. Though the health sector provides a good platform for providing education, micronutrient supplementation, as well as other interventions and can achieve high compliance, coverage is limited to individuals actively seeking care and, therefore, the most vulnerable segments of populations may be missed. To address this, community-based platforms, such as Child Health Days (CHD), are now regularly implemented in many countries to reach communities with an integrated package of essential health and nutrition interventions including vitamin A supplementation, immunization, deworming, and bednets (UNICEF, 2017). The provision of vitamin A supplementation to children under 5 years is a good example of how CHDs have dramatically increased coverage of this life-saving intervention (Oliphant, 2010).

Opportunities to deliver nutrition interventions through nutrition-sensitive platforms, such as social protection programs, exist but have not been fully utilized. Such platforms have the potential to not only address nutritional deficiencies, but also underlying determinants of undernutrition such as poverty, food insecurity, gender inequity, and lack of access to basic health care. The 2013 Lancet series on maternal and child nutrition (Bhutta, 2013) reviewed studies reporting the effectiveness of community-based platforms (community health workers, integrated management of childhood illness within facility or community settings, community campaigns such as Child Health Days), school feeding programs, and financial incentive platforms (cash transfers, voucher schemes) for nutrition-specific interventions targeting children under 5 years.

Community-based platforms enable the delivery of health and nutrition services by outreach health workers or trained community volunteers. These services generally include basic

antenatal and postnatal care, newborn care, counselling on breastfeeding and infant/child feeding, and community health mobilization. Though the Lancet review identified few robust assessments, the evidence suggested higher coverage of child health and nutrition interventions using CHDs compared to traditional health campaigns (Doherty, 2010). However, the need for further research on integration of CHDs into routine health services was noted. Despite the lack of high-quality evidence from studies involving the use of community health workers (CHW), available data suggested the potential of CHWs to improve child health and nutrition in hard-to-reach populations (GHWA, 2010). Integrated Management of Childhood Illness (IMCI) uses facility and home-based preventive and curative interventions to promote child health, growth, and development through a “whole child” approach (WHO, 2016). Evidence from the 2013 Lancet review indicated IMCI implementation has resulted in improvements in health service delivery and exclusive breastfeeding and reductions in child stunting and mortality (Ahmed, 2010; Arifeen, 2009; Schellenberg, 2004). Though not included in the 2013 review, community women’s groups/mother-to-mother support groups/peer-to-peer networks have shown positive impact on maternal and newborn health (Prost, 2013). However, linkages between such groups and maternal and child nutrition outcomes warrant further exploration and will, therefore, be included under the community-based platform in our current review.

The financial incentive platform includes direct cash or indirect vouchers which are increasingly being used as part of poverty reduction efforts in low- and middle-income countries (Ruel, 2013). These are intended to provide safety nets for vulnerable populations to enable improvements in health through attainment of better diets, food security, access to health services, and improved living environments (FAO, 2015). The use of cash transfers is a large component of social protection programs globally. These are either conditional or unconditional, with conditional transfers typically linked to beneficiary compliance with key health-related behaviors (Bastagli, 2016; Ibararán, 2017). Payments are generally provided to mothers of young children on the assumption that increasing women’s access to financial resources will lead to improved child health. Though evidence suggests cash transfers can reduce poverty, food insecurity, and gender inequalities, there is limited evidence of nutritional impact (Olney, 2012). The 2013 Lancet review examined the effects of financial incentive programs on breastfeeding practices, child immunization coverage, diarrhea management, and healthcare use. Though the evidence suggested cash incentives are promising strategies for increasing coverage of key child health interventions, the low quality available evidence for nutritional impact in target communities was noted. As such, the full potential of cash transfers and voucher schemes to improve nutrition needs to be further investigated.

The Lancet review also examined the evidence on school feeding which is used in many countries as an incentive for school attendance and improved child nutrition. The evidence suggested moderate increases in school attendance and weight gain, though inconclusive results for height gain (Kristjansson, 2007). Notwithstanding the limited evidence on nutritional outcomes, schools provide an important platform for promotion of health and nutrition for children and adolescents. As an update of the evidence on school feeding is underway, this will not be included in our review.

In this review, we will update the evidence on the community-based and financial incentive platforms reviewed previously, as well as review the evidence on technology platforms for nutrition interventions given their increased use in global maternal and child health programming. Our review will provide a comprehensive assessment of the effectiveness of each of these platforms for delivering nutrition interventions to at-risk populations and is intended to inform policy and programmatic decision-making on effective ways to deliver essential maternal, newborn, and child nutrition interventions in low- and middle-income countries.

Objectives

1. What is the effectiveness of community-based platforms on coverage/impact of maternal, child and adolescent health and nutrition interventions?
2. What is the effectiveness of financial incentive platforms on coverage/impact of maternal, child and adolescent health and nutrition interventions?
3. What is the effectiveness of technology-based platforms on coverage/impact of maternal, child and adolescent health and nutrition interventions?

Existing reviews

Objective 1: Community-based platforms

Bhutta ZA, Lassi ZS, Pariyo G, Huicho L. Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems. WHO, Global Health Workforce Alliance, 2010.

Gera T, Shah D, Garner P, Richardson M, Sachdev HS. Integrated management of childhood illness (IMCI) strategy for children under five. Cochrane Database of Systematic Reviews 2016, Issue 6. Art. No: CD010123. doi:10.1002/14651858.CD010123.pub2.

Glenton C, Colvin CJ, Carlsen B, Swartz A, Lewin S, Noyes J, Rashidian A. Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. Cochrane Database of Systematic Reviews 2013, Issue 10. Art. No: CD010414. doi:10.1002/14651858.CD010414.pub2.

Lassi ZS, Bhutta ZA. Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes. *Cochrane Database of Systematic Reviews* 2015, Issue 3. Art. No: CD007754. doi:10.1002/14651858.CD007754.pub3.

Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, Odgaard-Jensen J, Johansen M, Aja GN, Zwarenstein M, Scheel IB. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database of Systematic Reviews* 2010, Issue 3. Art. No: CD004015. doi:10.1002/14651858.CD004015.pub3.

McFadden A, Gavine A, Renfrew MJ, Wade A, Buchanan P, Taylor JL, Veitch E, Rennie AM, Crowther SA, Neiman S, MacGillivray S. Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database of Systematic Reviews* 2017, Issue 2. Art. No: CD001141. doi:10.1002/14651858.CD001141.pub5.

Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Annu Rev Public Health* 2014;35:399-421. doi: 10.1146/annurev-publhealth-032013-182354.

Shakya P, Kunieda MK, Koyama M, Rai SS, Miyaguchi M, Dhakal S, et al. Effectiveness of community-based peer support for mothers to improve their breastfeeding practices: A systematic review and meta-analysis. *PLoS One*, 2017;12(5), e0177434.

Objective 2: Financial incentive platforms

Bassani DG, Arora P, Wazny K, Gaffey MF, Lenters L, Bhutta ZA. Financial incentives and coverage of child health interventions: a systematic review and meta-analysis. *BMC Public Health* 2013;13 (3):S30. doi:10.1186/1471-2458-13-S3-S30.

Bastagli F, Hagen-Zanker J, Harman L, Barca V, Sturge G, Schmidt T, Pellerano L. Cash transfers: what does the evidence say? A rigorous review of programme impact and of the role of design and implementation features. ODI July 2016.

de Groot R, Palermo T, Handa S, Ragno LP, Peterman A. Cash Transfers and Child Nutrition: What we know and what we need to know, Innocenti Working Paper No.2015-07, UNICEF Office of Research, Florence, 2015.

Owusu-Addo E, Cross R. The impact of conditional cash transfers on child health in low- and middle-income countries: a systematic review. *Int J Public Health* 2014;59(4):609-18.

Pega F, Liu SY, Walter S, Lhachimi SK. Unconditional cash transfers for assistance in humanitarian disasters: effect on use of health services and health outcomes in low- and middle-income countries. *Cochrane Database Syst Rev* 2015, Issue 9, Art. No: CD011247. doi:10.1002/14651858.CD011247.pub2.

Objective 3: Technology-based platforms

Barnett I, Yosellina, Sulistyono S, Befani B, KariSari K, Sharmin S, Dewi D. Mixed-Method Impact Evaluation of a Mobile Phone Application for Nutrition Monitoring in Indonesia. Institute of Development Studies Evidence Report, 2016.

Sondaal SF, Browne JL, Amoakoh-Coleman M, Borgstein A, Miltenburg AS, Verwijs M, et al. Assessing the Effect of mHealth Interventions in Improving Maternal and Neonatal Care in Low- and Middle-Income Countries: A Systematic Review. *PLoS One*. 2016;11(5):e0154664.

Intervention

We will examine the evidence for each of the following nutrition intervention delivery platforms targeting pregnant women, mothers of children < 5 years, children < 5 years, and adolescent girls in low- and middle-income countries:

1. Community-based platforms
2. Financial incentive platforms
3. Technology-based platforms

In your protocol, please give a few details of primary studies that exemplify each of these platforms.

Population

The target populations are pregnant women, mothers of children < 5 years, children < 5 years, and adolescent girls, regardless of health status, living in low- and middle-income countries as defined by the World Bank. Studies undertaken in high-income countries and emergency settings will be excluded.

Outcomes

Primary Outcomes

- Uptake/coverage of nutrition-specific or nutrition-sensitive intervention being delivered.
- Effectiveness of delivered nutrition interventions on nutritional outcomes in pregnant women, mothers of children < 5, and adolescent girls including anemia prevalence and micronutrient status.
- Effectiveness of delivered nutrition interventions on birth outcomes including low birth weight and small-for-gestational age.
- Effectiveness of delivered nutrition interventions on nutritional outcomes in children < 5 years including anthropometric and micronutrient status and child growth.

These are very broad outcomes. In the protocol, please give a few more details and examples as well as acceptable methods for measuring them.

Secondary Outcomes

- IYCF practices (Again, very broad). Examples in the protocol will help.
- Child vitamin A supplementation
- Maternal/child dietary intake/diversity

Study designs

We will include primary studies that assess the efficacy and/or effectiveness of each platform to deliver nutrition interventions using experimental and quasi-experimental study designs that allow for causal inference:

1. Studies where participants were randomly assigned, individually or in clusters, to intervention and comparison groups. Stepped wedge?
2. Studies where non-random assignment to intervention and comparison groups is based on other known allocation rules, including a threshold on a continuous variable (regression discontinuity designs) or exogenous geographical variation in the treatment allocation (natural experiments).
3. Controlled before-after studies in which allocation to intervention and control groups was not made by study investigators, and outcomes were measured in both intervention and control groups at baseline, and appropriate methods were used to control for selection bias and confounding, such as statistical matching (e.g., propensity score matching, or covariate matching) or regression adjustment (e.g., difference-in-differences, instrumental variables).
4. Interrupted time series studies in which outcomes were measured in the intervention group at least three time points before the intervention was implemented and at least three time points after.

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Roles and responsibilities

- **Content:** Content expertise will be provided by Dr. Zulfiqar A. Bhutta, Dr. Aynah Janmohamed, and Dr. Zohra Lassi
- **Systematic review methods:** Systematic review methods expertise will be provided by Dr. Aynah Janmohamed and Dr. Zohra Lassi
- **Statistical analysis:** Statistical analysis expertise will be provided by Dr. Aynah Janmohamed and Dr. Zohra Lassi
- **Information retrieval:** Dr. Aynah Janmohamed and Dr. Zohra Lassi have experience in information retrieval.

All additional team members (to be determined) will receive training in systematic review methods.

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Potential conflicts of interest

The authors are not aware of any conflicts of interest arising from financial or researcher interests.

Preliminary timeframe

Note, if the protocol or review is not submitted within six months and 18 months of title registration, respectively, the review area is opened up for other authors.

- Date you plan to submit a draft protocol: February 28, 2018
- Date you plan to submit a draft review: June 30, 2018