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Maternal and Child Nutrition in Nepal: Examining drivers of progress from the mid-1990s to 2010s

Kenda Cunningham[a,*], Derek Headey[b], Akriti Singh[c], Chandni Karmacharya[d], Pooja Pandey Rana[a]

[a] Helen Keller International, Kathmandu, Nepal
[b] International Food Policy Research Institute, Washington D.C., United States
[c] Tufts University, Boston, United States
[d] Johns Hopkins University, Feed the Future Innovation Lab for Nutrition, Kathmandu, Nepal

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ABSTRACT

This paper explores the drivers of Nepal's maternal and child nutrition success using document review, interviews with mothers, and quantitative analysis of DHS datasets. Our qualitative and quantitative analyses both highlight similar policy and community level changes but limited improvements in child feeding and care practices. Improvements in four key drivers of nutritional change emerged: health services, sanitation, education, and wealth. However, the relative contributions of each factor varied by indicator, with health services more important for linear growth among children, and sanitation more important for weight gain among both children and mothers. We conclude with a discussion bringing the qualitative and quantitative findings together into key lessons from Nepal's success.

1. Introduction

Undernutrition continues to affect millions globally, particularly in low- and middle-income countries (LMIC). Its consequences include mortality and morbidity, as well as both immediate and long-term cognitive, productive, and reproductive losses (Bhutta, 2013; Hoddinott et al., 2013). Encouragingly, however, the past decade or so has seen increasing political commitment to this crippling public health problem. The 2008 and 2013 Lancet series provided insights on both the nutrition-specific and nutrition-sensitive drivers of undernutrition, including potential policy and programmatic solutions (Bhutta, 2013; Bhutta et al., 2008; Black et al., 2008; Ruel and Hoddinott, 2008; Ruel and Alderman, 2013). This series, and many other reviews, demonstrate a growing consensus that solving the problem of undernutrition requires addressing the diverse underlying determinants of nutritional well-being, including the various deficiencies of health systems, food systems, childcare and feeding practices, family planning, and water, sanitation and hygiene (WASH) (International Food Policy Research Institute, 2014; International Food Policy Research Institute, 2015; Standing Committee on Nutrition, 2011).

Despite this consensus, the evidence on how countries actually achieve progress in reducing undernutrition is limited (Crum et al., 2013). Nepal is undoubtedly one of the more striking examples from recent history. In the 1990s, Nepal had some of the highest levels of undernutrition globally, with almost two-thirds of young children being stunted. However, from 2001 to 2011 Nepal experienced the fastest recorded reduction in stunting in the world (by one measure at least) (Headey and Hoddinott, 2015). Identifying how Nepal achieved these improvements can shed light on what Nepal, and other countries facing similar issues and/or in similar contexts, can do to achieve rapid and sustained progress against undernutrition.

In this paper we aim to identify the drivers of Nepal's nutritional success through a combination of qualitative and quantitative techniques. Our qualitative analysis is used to identify plausible hypotheses for the kinds of policies, programs and socioeconomic trends that might be driving nutritional change. This analysis involves both a review of nutrition-related policies and programs in Nepal, as well as interviews with Nepalese mothers regarding major changes in their communities, as well as ongoing constraints to nutritional improvement. Our quantitative analysis takes a more macro perspective by employing the regression and decomposition techniques used by Headey and Hoddinott (2015) to analyze nutritional change in Nepal. However, we extend their approach by focusing on additional indicators of child and maternal nutrition and a longer time frame.

* Corresponding author.

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2. Methods

This mixed-method study can primarily be divided into 3 methods: document review of policies and programs, interviews with mothers residing in rural Nepal, and quantitative analysis of national-level change in nutritional status and nutrition-related indicators.

2.1. Document review

First, we conducted a document review to collate and synthesize information on key nutrition-related programs and policies in Nepal from 1990 to present. This review covered both academic and grey literature on a wide range of sectors, including nutrition and health, WASH, and education as well as demographic changes and economic development (e.g. macroeconomic growth, agriculture, migration and remittances). A key objective of this review was to understand the policy factors that may have contributed to nutritional change, given that secondary data sources – such as the DHS – do not directly measure policy factors.

2.2. Interviews with mothers

Next, we collected qualitative data from 20 mothers living in rural, remote communities to give a bottom-up perspective on nutrition-relevant changes over time. We interviewed mothers from two *terai* districts – Rupandehi and Chitwan –, which were purposively selected to include one covered by *Suaahara* (a large-scale integrated nutrition program) and one without any large-scale health or nutrition program. Within each district, we purposefully selected the most disadvantaged village development committee (VDC) and within the VDC, two wards closest to each other. In each of the 4 wards, we interviewed one mother per "cohort", with cohort referring to the five-year period during which the mother had given birth (1990–1995, 1995–2000, 2000–2005, 2005–2010, and 2010–2015). We modified the "life history method" (Davis, 2011) to understand wellbeing over the course of each woman's life. Using an open-ended interview guide, women were asked questions around nutrition specific programs as well as nutrition-relevant items including agriculture, income generation, literacy and education, WASH, demographic changes, and other local developments. Women were also asked about childcare and feeding practices and cultural beliefs about feeding and diets. This component of the study received ethical approval from the institutional review board of The International Food Policy Research Institute (IFPRI).

2.3. Quantitative analysis of DHS data

Lastly, we conducted an analysis of four rounds of data from Nepal's DHS: 1996, 2001, 2006, and 2011 (Ministry of Health and Population, 2006, 2001; Ministry of Health and Population et al., 2011, 1996). These surveys are nationally representative.. Following Headey and Hoddinott (2015), we used multivariate regression analysis and decomposition techniques to identify which factors significantly explain changes in nutrition outcomes over time. This involved three steps. First, mean scores for nutrition outcomes and nutritional determinants were estimated across survey rounds using survey weights. Second, multivariate regression models (e.g. least squares, linear probability) were used to estimate coefficients of association between nutrition outcomes and these determinants. Third, a decomposition approach was used to estimate the potential contribution of changes in each determinant to changes in each nutrition outcomes. In a simple decomposition at means, wherein regression coefficients are assumed to be stable over time, the estimated contribution of a particular indicator is the product of its coefficient and the change in its mean over time (e.g. 1996–2011). Hence, a determinant will make a large contribution if its regression coefficient is large and if its mean score changes substantively over time.

While we closely follow the statistical methods of Headey and Hoddinott (2015), our analysis extends their study in several ways.

First, we go beyond height/length-for-age z scores (HAZ/LAZ) to additionally analyze child weight-for-height (WHZ) and the maternal body mass index (BMI). Whilst HAZ/stunting is certainly an important cumulative measure of exposure to nutritional insults, WHZ and BMI are also important indicators of undernutrition that reflect more recent nutritional insults.

Second, for stunting changes, we focus on children 0–2 years of age, rather than 0–5 years of age as done by Headey and Hoddinott (2015), as they identified some sensitivity of regression coefficients for the younger sample restriction and argued that including older children in the sample may lead to attenuation biases related to the phrasing of questions and recall problems.

Lastly, we included data from the 1996 DHS for child LAZ and WHZ, whereas Headey and Hoddinott (2015) excluded this round of data because this round only surveyed children 0–3 years of age and because there was minimal reduction in stunting over 1996–2001. We find that there was some improvement in the stunting rate for children 0–2 years of age and for other nutrition indicators. Maternal BMI regressions exclude 1996 because information on women's decision-making was not available for this round.

We used continuous outcome measures (LAZ, WHZ, and BMI) rather than dichotomous measures for our decomposition regression analysis because dichotomous variables reduce precision. Our selection of explanatory variables is guided by the UNICEF 1990 and Lancet 2013 frameworks, and includes household assets, parental education (years), access to antenatal, neonatal and postnatal healthcare, WASH factors, household demography and mother's decision-making power (Table 1). All regressions also included dummy variables for child age, location, caste, maternal age and survey round, though these are omitted for the sake of brevity, and because they are not time-varying indicators that could account for nutritional change across rounds.

3. Policies and programs: the enabling environment

Nepal's nutrition progress over the last several decades happened within an unstable political and economic context including an armed conflict known as the "people's war" from 1996 to 2006 and a difficult and drawn-out transition to a new constitution and more decentralized democratic system. Despite this, the government of Nepal (GoN) and its development partners were able to implement an array of effective social programs, and the country maintained solid and sustained growth in household incomes. Here we briefly describe some of the key policies and socioeconomic trends in the country from the late 1980s onwards.

In Nepal, as in many other countries, government efforts on nutrition have traditionally been embedded within the health sector, with a primary focus on addressing high levels of maternal and infant mortality. The GoN's first explicit focus on nutrition was the Vitamin A campaign, although there have also been significant efforts to reduce the incidence and severity of diarrhea and to promote iron and folic acid (IFA) supplementation for pregnant and lactating women as part of antenatal care (ANC) and postnatal care (PNC) (Ministry of Health and Population (MOHP), 2013). Isolation and poor physical access to services present major barrier for these and many other programs in Nepal (Government of Nepal National Planning Commission, 2012). To address this, a network of female community health volunteers (FCHVs) was created in 1988 to provide frontline basic health and family planning services (Pokharel et al., 2009). The Local Self Governance Act (LSGA) of 1999 also served to decentralize government functions and empower local bodies with resources and power for local level planning and programming, including health services and social inclusion programs (Ministry of Local Development and UNICEF, n.d).

Since the mid 1990s, most health and nutrition initiatives aiming to deliver messages and provide health information and advice to house-