



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



Innovation Lab for Nutrition- Asia
Harvard TH Chan School of Public Health Annual Report
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Lessons learned from programs
in Nepal that integrate
agriculture and nutrition actions

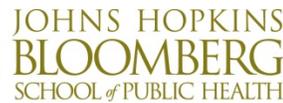
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Feed the Future Innovation Lab
for Nutrition-Asia

U.S. Government Partners



Partners in Nepal



Annual Report
Harvard TH Chan School of Public Health
Feed the Future Innovation Lab for Nutrition-Asia
Year 5 (2014-2015)

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I) Executive Summary

One of the main reasons for the current focus on stunting in the nutrition world is that it is a proxy for the brain development of infants and children. In recent years, there has been interest in trying to use more direct measures of brain development to try to understand more directly the benefits of nutritional interventions in the first 1,000 days. However, tools often used in high-income countries are hard to administer in rural populations in low and middle-income countries, particularly in rural areas where the problem of malnutrition is most prevalent. This year, the main activity we had planned was to assess the feasibility of including a home-administered version of the Ages and Stages-3 Questionnaire (ASQ-3) in the context of a study being undertaken in western Nepal by Heifer International and Tufts University.

During Year 5 of our work for the Feed the Future Innovation Lab for Nutrition-Asia, we tested a home-administered ASQ tool in the Banke District, Nepal administered to children. In preliminary analyses we have evaluated the internal consistency of the tools for five domains and for the total score. We are currently undertaking a comprehensive analysis of the data and preparing a manuscript for submission based on this study.

II) Program Activities and Highlights

This was a productive and eventful year for the collaboration between researchers at the Harvard TH Chan School of Public Health, Tribhuvan University and the University of Bergen. Our joint research expanded beyond Bhaktapur to the far Western District of Banke in which we undertook a joint study to pilot the feasibility of administering a locally-adapted version of the ASQ tool in collaboration with researchers from Tufts University and Heifer International. This tool is noted for its ease of administration and the short amount of time it takes to administer in the field. The study, nested within a larger controlled trial, used trained enumerators to collect data from children directly in the homes of study participants. This approach to the assessment of child development represents a shift from traditional approaches, which normally are administered under controlled conditions in a clinic. It is hoped that efforts such as these will enable us to measure brain development directly rather than relying on proxies such as child stunting and, therefore, enable research in remote areas of Nepal to understand which interventions have the greatest promise to allow children to reach their cognitive and developmental potential. We are currently undertaking advanced analysis of the data from the study (see update below) and expect to submit the publication to a journal. We also continued to advance a number of papers towards publication in peer review journals, drawing on the data collected from Banke and from the rich dataset from Bhaktapur.

III) Training and Capacity Development

As part of the survey described above, 10 field staff (seven females, three males) from Green Valley Research participated in a training session on methods to administer the ASQ tool. The training was administered over four days in November, 2014, by a team of experienced staff from IOM including Dr. Merina Shrestha and Dr. Prakash Sunder Shrestha, and Dr. Laurie Miller from Tufts University, and involved classroom review of the questionnaires and the theory behind assessment as well as field site supervised practice. Field site testing and supervision of the tool was also undertaken for eight days by Ms. Bimala Karmacharya, an experienced supervisor in the field of child development and ASQ assessment from Bhaktapur. Given how little research has been conducted on this important topic in the context of rural Nepal, this represents an important development of capacity that we hope will also be utilized in the future.

IV) Lessons Learned

A number of lessons were learned as part of the process of modifying the ASQ tool to the local setting, training enumerators, and implementing the study. As few such studies have been conducted previously in rural Nepal, it is important to reflect on these lessons. The tool takes approximately 20 minutes to administer by trained enumerators, which makes it feasible to integrate into larger surveys. Enumerators were able to use either questions or observation (ideally both) to collect information with the tool, which proved useful in situations where barriers made communication challenging. Administering the tool in a home environment was sometimes challenging, particularly when other children were present, who would take the toys used in the study; having other distractions ready for children not participating in the ASQ observations was helpful.

Extensive work went into training the enumerators, and the trainers felt that the practice sessions in the field were helpful as was supervision by an experienced psychologist of data collection in the field for the first part of the study,

as she was able to reinforce the lessons learned during the training exercise. Strong community ties of the Heifer staff to the surveyed families also helped with the success of the survey, as households were cooperative and patient during the administration of the survey tool.

Last year, we realized that despite having considerable good will among our partners, we had limited person power on the existing team to move papers forward expeditiously. To help fill the capacity gap, we had originally intended to hire a post-doctoral fellow. However, with the short time period of less than a year remaining, it was difficult to recruit a candidate for this post, and so we instead decided to hire four graduate students from Harvard School of Public Health to assist with analyses and data processing tasks. Having the extra capacity on hand to undertake analyses with the guidance of our senior team members was extremely helpful in advancing many of our analyses.

We consciously invested a great deal of time over the past several years in providing feedback and guidance on papers being led by our Nepali colleagues as one of the main goals of the collaboration has been to build the capacity of Nepali scientists to undertake nutrition research. We are pleased to report that two of the papers submitted for peer review this year were led by Nepali researchers as the primary author. One of these papers has already been accepted (see below).

Due to disruptions associated with the April 2015 earthquake, the validation analysis using data from Bhaktapur of the ASQ against the Bayley score being led by our colleague, Dr. Merina Shrestha, was delayed. We also had to adjust our plans for the analysis of the paper from Banke, bringing in additional support from an experienced data analyst already at Harvard, to help with some of the more rigorous analysis. While this delayed the preparation of the paper slightly, we are now moving forward rapidly and are aiming for a final submission to a journal of this publication by the end of October.

V) Presentations and Publications

Anemia and iron deficiency in infants and their mothers in Bhaktapur, Nepal

Led by Nepali author Ram Chandyo, this paper was accepted for publication in an upcoming issue of the *European Journal of Clinical Nutrition*. This is the first study from peri-urban Nepal to assess the prevalence of iron deficiency using multiple measures of iron status. Typically anemia (i.e., hemoglobin) is used as an indicator of iron status in low and middle income countries, including Nepal due to the difficulty associated with analyzing other markers of iron status. The paper underscores the importance of continuing supplementation and dietary diversification by women and infants, even in urban settings.

Low dietary diversity and micronutrient adequacy among lactating women in a peri-urban area of Nepal. Published in the March 2015 issue of *Public Health Nutrition*, and led by Dr. Sigrun Henjum, this paper explored the relationships between dietary diversity and nutrient adequacy in Bhaktapur, Nepal. The paper revealed that the mean probability of nutrient adequacy was positively associated with energy intake, dietary diversity, women's educational level and socioeconomic status, and exhibited seasonal trends, peaking in the winter.

Vitamin status of breastfed infants in Bhaktapur, Nepal

This paper highlights work by IOM researcher Manjeswori Ulak and colleagues documenting the prevalence of multiple micronutrient deficiencies in peri-urban Nepal. Although multiple micronutrient deficiencies are believed to coexist in Nepal, only one paper that we are aware of has explored the prevalence and coexistence of multiple vitamin deficiencies among Nepali infants. This is the first paper from peri-urban Nepal exploring the prevalence of multiple deficiencies including vitamins B6 and B12, folate and vitamins A, D, and E. In addition to generating

prevalence estimates for individual deficiencies the paper explores the overlap of deficiencies and sheds light on the importance of efforts to diversify diets and to use fortification and supplementation as measures to address multiple micronutrient deficiencies. The paper is about to be submitted to *Nutrients*.

Food security, socioeconomic vulnerability and nutrition in Bhaktapur prior to the earthquake The earthquake of 2015 heavily hit Bhaktapur, causing considerable damage to structures, which received a great deal of media attention. What received less attention were the potential implications of the earthquake on agriculture-related productivity, livelihoods, and food security/dietary diversity. This paper makes use of data from a survey conducted by researchers from Harvard, IOM, and University of Bergen, brings attention to the importance of seasonal patterns in dietary diversity and highlights the fact that even in peri-urban areas, self-produced food makes an important contribution to dietary intake. The paper is under review at *PLoS One*.

Pilot testing of the ASQ in rural area of Nepal

This paper explores the validity of the ASQ data collected in a sample of 488 children in the Banke District, Nepal. The main purpose of this study was to explore the feasibility of administering a locally-adapted tool assessing multiple aspects of child development (Communication, Gross Motor, Fine Motor, Problem Solving, Personal Social) in a rural context as part of a larger survey, administered by enumerators at the household level. While the ASQ has been tested extensively in various studies in Bhaktapur, we are not aware of any other studies making use of this tool in a rural setting, and its application is of relevance to researchers wanting to make use of a tool to directly measure these domains. We have analyzed the internal validity across different domains of the tool and are nearing completion of confirmatory factor analysis of the tool. We anticipate submission of the paper to a journal this fall.

Dietary diversity indicators and the nutritional status of women, infants and children in Nepal We are reworking a paper examining random within-measurement error to explore the comparative associations of the Women's Dietary Diversity Score (WDDS) vs. the new Minimum Dietary Diversity Score for women (MDDW) in predicting associations with anthropometry, anemia, and iron status of women and children. The paper will also examine issues related to misclassification and measurement error in dealing with the specific relationships with nutritional status outcomes.

Validation study of ASQ against the Bayley score in Bhaktapur

Dr. Merina Shrestha began analyzing the data with colleagues from the University of Bergen last fall but the analysis was put on hold following the earthquake and will be revisited following submission of the pilot test from Banke.

Creation of a food composition database for Nepal

One of the steps involved with processing data from the survey undertaken in Bhaktapur has involved translating data on dietary intake of foods and recipes into nutrients. We are in the final steps of assembling this database and are planning on making the food composition table, which we assembled from databases throughout the world, available for other researchers working in Nepal.