



# THE Jivita JOURNAL

## The JiVitA Maternal & Child Health & Nutrition Research Project: 2000 to 2012

*Critical to public health research is an ability to infer & translate findings to a larger society in need.*

**G**angetic South Asia, stretching from Punjab in north India through the terai of Nepal to Bangladesh, remains the most undernourished region on earth: home to nearly 400 million, where 40% of newborns are born low in weight, 80% at home, facing a 5% chance of dying before age 1; where 40% of preschool aged children are stunted; where half of women are undernourished; and, where 40% of all maternal deaths occur each year. It is also a region with rising hope and expectation of fostering generations that are more healthy, food secure and live longer without transitioning to burdens of obesity and chronic diseases.

Chronic undernourishment, in terms of quality and quantity of diet, can influence health and, if occurring in pregnancy, may have lasting consequences among offspring. Some nutrition programs exist to curb the extent and consequences of undernutrition but results are often disappointing. Surveys provide cross-sectional estimates of nutritional problems but fail to adequately assess, intervene, evaluate and discern causal effects, or discover what else needs and can be done, with what impact and at what cost. Longitudinal population research can fill this need. An example of a population research setting is the JiVitA Project site in northern Bangladesh, established under grant GH 614 of the Bill and Melinda Gates Foundation and with USAID support by the Center for Human Nutrition at Johns Hopkins University. The site was established in 2000 under the auspices of the Ministry of Health and Family Welfare of the Government of Bangladesh for the purpose of conducting research on interventions to prevent

micronutrient deficiencies and their health consequences in mothers, infants and children.

### Gaibandha District

To serve its goal of research findings being generalizable, it was essential that the setting be typical of rural life in Bangladesh. Following a year's review of government local area statistics and site visits, the District of Gaibandha was selected as the location for the JiVitA research site, which broadly reflects the rural character of Bangladesh in terms of the country's demography, socioeconomic and nutritional profiles and rural infrastructure as represented in the *Table*<sup>1</sup>. For example, the women in the district mimic the age distribution of rural women nationally. Homes, though, are slightly less likely to be made of bamboo or thatch. One fourth of homes have a television, both nationally and in the district, whereas 18% and 15%, respectively, had a mobile phone in 2006 (a figure that rises each year). Child health services and sources of drinking water are virtually identical, but latrine usage is different from the national pattern. Half of mothers nationally and in Gaibandha receive no antenatal care, and nearly 90% deliver at home; but relatives or friends are more likely to deliver mothers in Gaibandha than nationally. Age at marriage is slightly younger in Gaibandha as well. Thus, with few exceptions, the JiVitA site provides what may be considered a lower-middle class rural setting for asking intervention and health questions and a basis

Population characteristics of the study area (Gaibandha) compared to national statistics for Bangladesh overall and only rural Bangladesh. Public-access data analyzed from the 2006 Multiple Indicator Cluster Survey, conducted by the Bangladesh Bureau of Statistics between June and October 2006, sponsored by UNICEF.

	Bangladesh Overall (%)	Bangladesh Rural (%)	Gaibandha (%)	Bangladesh, Rural vs. Gaibandha (%)
<b>Women of Reproductive Age (yos)</b>				
15-24	40.0	39.9	40.2	-0.3
25-34	29.4	29.5	29.2	0.3
35-49	30.7	30.8	30.5	0.3
<b>Education</b>				
None	34.1	37.6	41.1	-3.5
Secondary education or higher	12.8	7.3	11.7	-4.4
Female, literate 15-24yos	69.9	67.6	62.8	4.8
<b>Household characteristics</b>				
<b>♦ Roof construction</b>				
Thatch /leaf/palm/bamboo	7.3	8.3	5.2	3.1
Metal/tin	83.4	87.5	91.9	-4.4
Cement	7.5	2.2	2.9	-0.7
<b>♦ Wall construction</b>				
Cane /leaf/palm/jute sticks	8.5	11.0	12.7	-1.7
Dirt /mud	15.5	17.9	15.7	2.2
Bamboo/bamboo with mud	16.8	16.9	10.6	6.3
Tin sheet	34.9	39.2	43.0	-3.8
Bricks	21.2	12.0	16.7	-4.7
<b>Household assets</b>				
Electricity	50.5	39.3	37.5	1.8
Radio	30.2	29.3	27.7	1.6
Television	34.6	24.8	25.5	-0.7
Mobile phone	25.2	18.4	15.1	3.3
<b>Government Health Services</b>				
<b>♦ Nutrition Program Coverage</b>				
Vitamin A supplementation – Children <sup>1</sup>	89.2	88.3	90.8	-2.5
Postpartum Vitamin A supplementation <sup>2</sup>	17.2	15.8	18.0	-2.2
<b>♦ Child &amp; Maternal Vaccination <sup>3</sup></b>				
BCG	97.0	96.7	98.4	-1.7
DPT (1 <sup>st</sup> Dose)	96.6	96.2	98.4	-2.2
Polio (1 <sup>st</sup> Dose)	99.1	99.0	100.0	1.0
Measles	87.5	87.2	93.7	-6.5
Maternal tetanus toxoid (TT) <sup>4</sup>	89.6	88.9	85.7	3.2
<b>Environmental characteristics</b>				
<b>♦ Source of drinking water</b>				
Piped into dwelling or common area	6.6	0.3	2.0	-1.7
Tubewell /borehole	88.7	95.9	94.8	1.1
<b>♦ Sanitation</b>				
Piped sewer system or septic tank	16.1	7.4	16.0	-8.6
Closed-slab pit latrine (sealed)	23.1	24.5	23.9	0.6
Open pit /hanging toilet	52.1	58.3	35.5	22.8
No facilities or bush or field	7.5	9.2	23.3	-14.1
Use of improved sanitation <sup>5</sup>	39.2	31.9	39.9	-8.0
<b>Reproductive Health</b>				
Antenatal Care Provider				
Medical doctor	37.1	31.1	26.3	4.8
Community health worker	4.6	5.1	5.3	-0.2
No ANC received	43.8	49.2	48.9	0.3
<b>Delivery assistance</b>				
Medical doctor	15.5	10.6	7.5	3.1
TBA	66.0	71.1	48.1	23.0
Relative/friend	11.2	12.3	33.1	-20.8
Home-based delivery	82.7	88.2	89.2	1.0
<b>Early marriage</b>				
Married, <15yos <sup>6</sup>	33.1	36.2	40.0	-3.8
Married, 15-19yos	41.9	46.1	51.3	-5.2

Some category totals do not add to 100% as rows may have been omitted for brevity, or lack of information.

<sup>1</sup> Children 9-59 mos who received vitamin A supplementation in the last six months prior to the survey interview.

<sup>2</sup> Mothers 15-49yos with a birth in the two years preceding the survey who received high-dose vitamin A supplementation before the infant was 8 weeks old.

<sup>3</sup> Children 12-23 mos with proof of current vaccination against childhood disease.

<sup>4</sup> Mothers with live births in one year preceding the survey who were given at least two doses of tetanus toxoid vaccine within the appropriate interval prior to giving birth.

<sup>5</sup> Improved sanitation facilities are: flush to piped sewer system, flush to septic tank, flush to pit latrine and pit latrine with slab.

<sup>6</sup> Numerator: number of women that were first married by the exact age of 15 and denominator: total number of women 15-49yos.

**Source:** Labrique A, Christian P, Klemm R et al. A cluster-randomized, placebo-controlled maternal vitamin A or beta-carotene supplementation trial in Bangladesh: Design and Methods BMC Trials 2011;12:102.

for translating research findings into rural society.

### The JiVitA Project Site

Once the district was selected, a contiguous rural site was identified covering a 450 sq km area that is four times the size of Washington DC, consisting of 18 unions in Gaibandha and one in the adjacent Rangpur District, with a total population of about 650,000 people (Figure). In 2000-1, nearly 300 small cadastral maps, hand drawn from aerial photographs taken during the British Geological Survey in the early 1930s were purchased, computer scanned and converted from a digital to a line format, edited and updated in the field for houses, water sources, community landmarks, roads and intersections via a global positioning system (GPS)<sup>2</sup>. Nearly 150,000 homes 86,000 other community waypoints or structures, and over 2000 km of roadways, paths and rail lines were documented and digitally mapped and addressed for the purpose of assigning verifiable household addresses, subject identifiers and randomization/worker units. This system has provided a basis for locating, addressing and assigning individual identifiers for all subjects participating in JiVitA studies. Today, the Project's GIS system holds over 400,000 structures in the mapping database.

With JiVitA trials planned to reach tens of thousands of subjects, the entire study area was placed under a routine pregnancy surveillance system that, with envisioned data collection needs, required over 750 local, trained field and another ~100 administrative, logistical and data management staff, 85% of whom are local women.

Teams are based in 70 field offices, one data management center and one overall study headquarters and laboratory facility, with the latter two operating in the provincial towns of Rangpur and Gaibandha, respectively (Figure). The Project collaborates with national institutions in Bangladesh and other regional research centers in Nepal, India, and Thailand. Its activities are coordinated through Johns Hopkins University in Bangladesh, an INGO formally registered with the NGO Affairs Bureau of the Government of Bangladesh. Research activities are reviewed and approved by institutional review boards in-country and at Johns Hopkins University.

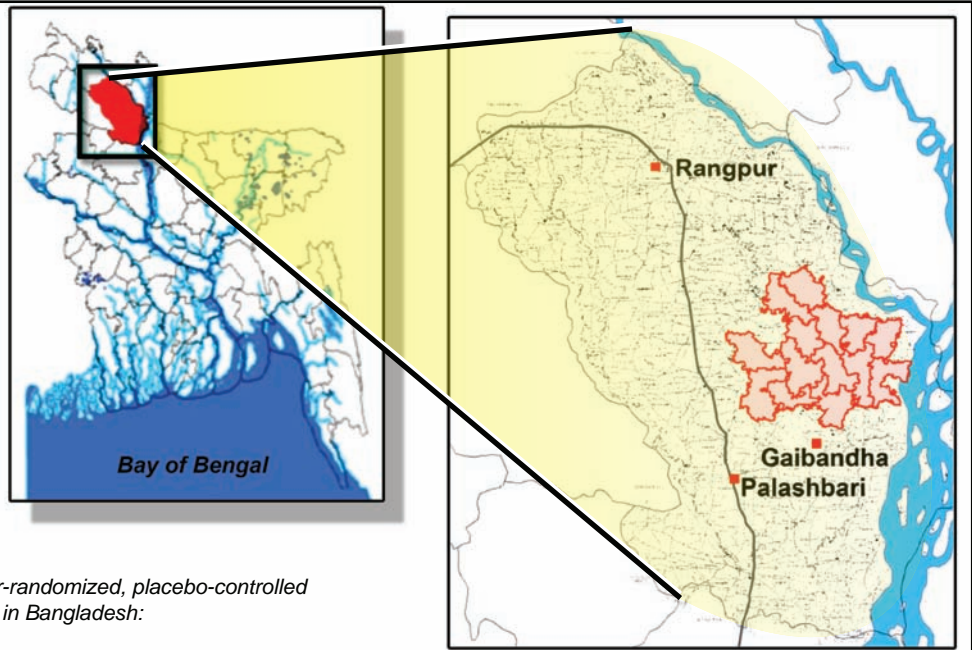
As of 2012, JiVitA has carried out three major, collaborative field trials with associated substudies, as described in separate briefs. The Project has maintained under home-based pregnancy surveillance a total of ~165,000 women of reproductive age and has enrolled and followed in its studies over 110,000 pregnant women, with over 70,000 live born infants. Assessments have included vital status and multiple maternal and infant measures of health and nutritional status, dietary intakes, a composite and sensitive socioeconomic index derived from over 40 other variables<sup>3</sup>, indicators of anthropometric, functional and biochemical status, measures of growth and body composition, cognition and other functions of importance to health and development. Additionally, in its trials, JiVitA has explored the use of new technologies to advance prevention, detection and treatment of diseases through improved nutrition and other public health interventions among South Asia's rural poor.

## Gaibandha & Rangpur Districts, Bangladesh

### Location of the JiVitA Maternal & Child Health & Nutrition Research Project

#### The 650km<sup>2</sup> JiVitA Project Area

- >19 Unions across 2 Districts
- >596 Sectors of randomization
- >Population of 650,000



**Source:** Labrique A, Christian P, Klemm R et al. A cluster-randomized, placebo-controlled maternal vitamin A or beta-carotene supplementation trial in Bangladesh: Design and Methods *BMC Trials* 2011;12:102.

**JiVitA** is a project of the Center for Human Nutrition of Johns Hopkins University, spanning 19 unions of Gaibandha and Rangpur Districts in rural Northwestern Bangladesh. JiVitA has been conducting community trials, supported by epidemiologic, ethnographic, and laboratory research since 2000, to reveal the impact of public health interventions in order to guide nutrition and health programs and policies in Bangladesh and elsewhere in South Asia.

#### References

- 1) Labrique A, Christian P, Klemm R et al. A cluster-randomized, placebo-controlled maternal vitamin A or beta-carotene supplementation trial in Bangladesh: Design and Methods *BMC Trials* 2011;12:102
- 2) Sugimoto JD, Labrique AB, Ahmad S, Rashid M, Klemm RDW, Christian P, West KP Jr. *J Health Popul Nutr* 2007;25:436-447.
- 3) Gunnsteinsson S, Labrique AB, West KP, Jr, Christian P, Mehra S, Shamim AA, Rashid MR, Katz J, Klemm RDW. Constructing indices of rural living standards in northwestern Bangladesh. *J Health Popul Nutr* 2010;28:509-19



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